1 PJM External Interface Specification

Market Participant XML

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Revision 36

Transmittal No.:

ALSTOM Grid Inc.
Redmond, Washington USA

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Revision History

Revision	Transmittal	Date	Comments
1	xxxxxxxx	June 13, 2003	[peh] Original Draft.
2	461E0415	July 30, 2003	[peh] Updated. Changes highlighted below result from internal bug fixing changes and review comments by PJM. 1. All items mentioned on PJM's review comments of Revision 1 have been fixed and incorporated into this revision. 2. Daylight savings time handling and description added to section 4.9.3. 3. Modified a number of query response messages to include a top level container xxxSet element. 4. Added UnitSchedules submittal and query for UnitSchedules. 5. Added query for Messages. 6. Modified price sensitive bids and virtual inc/dec bids to require a bid segment id on submittal of bid segments. 7. For those queries that support query parameters <LocationName> or <PortfolioName>, added an <All/> parameter for requesting all suitable resources. 8. Moved condensing unit data from schedule details to spinning reserve offer.

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3	461E0418	August 25, 2003	[peh] Updated. Changes highlighted below result from internal bug fixing and market rules interpretation problems, changes required for suggestions and comments from PJM. 1. General typo correction on documented schema tag names (e.g. AggregateNode and others), data types, and minor other items. Also, added character string maximum length to each *returned* character string item. 2. Modified section 4.9.3 to update the description of daylight savings time handling when absolute XML dateTime format is used. 3. Modified section 5.4.2 and 5.4.4 and the XML Schema to change the format of the VirtualBid message. The <Increment> and <Decrement> elements were moved up to become children of <VirtualBid>. This new structure matches existing behavior and is easier from a standpoint of XML usage (we also found some anomalies with the old structure). 4. Modified section 6.6.2 and 6.6.4 and the XML Schema to added condensing data parameters to the SpinningReserveOffer message in accordance to e-mail from Ray Fernandez on August 5th and August 18th, 2003. 5. Modified section 6.8.2 and the XML schema to remove "Limits" suffix from names of individual element tags in the <DefaultLimits> element. Also added the elements <EconomicRange> and <EmergencyRange> to the <Temperature> limits. This was inadvertently left out of the schema. Also added the condensing parameter data per the Ray Fernandez' e-mail quoted above on item (4). 6. Modified section 6.11.3 to describe the temperature data as being optional (per the current database schema implementation). 7. Modified section 7.1.3 and XML Schema to added the container element of <ASMarketPrice> so that area or reserve zone dependent prices can be distinguished. 8. Modified section 7.14.3 and XML Schema to added <ReserveZone> element to schema definition and documentation.

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4	461E0432	September 24, 2003	[peh] Updated. Changes highlighted below result from internal bug fixing. Those items below that describe changes to the XML Schema may mean that participant software may require changes. 1. Modified section 2.4.3 and other similar sections to correct the XML Schema dateTime data type pattern to correctly identify date and time components as: YYYY-MM-DDThh:mm:ss. 2. Modified section 4.2 to add the special URL for receiving <QueryByTransaction> requests. More information on this is described in chapter 8. 3. Modified section 4.9.3 to correct the hour that is skipped during the spring transition date. Changed from 02 to the correct 03 hour-ending. 4. Modified section 5.1.2 to change </DemandHourly> closing element to </DemandBidHourly>. 5. Modified section 6.2.2 and the XML Schema to remove the <EconomicMin> element from the <RegulationUpdate> message. It was not required. Also added the description of <RegulationLimits> minMW and maxMW values. 6. Modified section 6.10.2 and the XML Schema to add the <DefaultEconomicLimits> and <DefaultEmergencyLimits> to the query response. These values are not used on data submittal. 7. Modified sections 7.6.1 and 7.6.2 and the XML Schema to add the "Public" query type to the message request. 8. Modified section 7.11.3 to correct the size of the Buyer and Seller elements. 9. Modified sections 8.1 and 8.1.1 and the XML Schema to change the message structure for the Query By Transaction capability.

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5	461E0440	October 16, 2003	[peh] Updated. The following changes reflect fixes to problems, clarification of description in the document, and enhancements and features added since Revision 4: 1. Fixed daylight savings time error regarding the skipped hour correction of 2 to 3. Modified section 2.4.4. 2. Changed the schedule id from a 2-digit character string to a one or two digit numeric value of 1 through 99 to match the XML schema and the implementation. Modified sections: 2.4.4, 6.3.1, 6.3.5, 6.4.1, 6.4.5, 6.5.5, 6.9.2, 12.2.1, 12.3. 3. Fixed minor typo of missing quotes in name space string. Modified section 4.4. 4. Documented the optional .000 fractional second suffix that may appear on an XML dateTime value. Modified section 4.9.3. 5. Enhanced description of optional arguments and how default values are determined or assumed. Modified sections: 5.1.2, 5.3.2, 6.10.2. 6. Documented new limit of 20 BidSegment entries for PriceSensitive elements or Virtual Increment or Decrement elements. Modified sections: 5.1.2, 5.4.2, and the XML Schema. 7. Changed delete behavior logic for PriceSensitive bid segment deletes and for the Virtual Increment and Decrement deletes. Previous implementation was not supported by XML. Sections modified: 5.1.4, 5.4.4. 8. Changed documentation of delete behavior for DistributionFactors. Previous description was not correct. Modified section 5.2.4. 9. Provided Query ALL Schedules capability for Schedule Offers, Details, and Selection. Also modified existing query for schedule related data to use a return set element. Modified sections 6.3.5, 6.4.5, 6.5.5 and modified the XML Schema. 10. Removed Maximum Daily Energy limit. Modified section 6.4.1. 11. Added Fixed Gen indicator to the Unit Detail and the Unit Update messages. Modified sections 6.8.2, 6.10.2, and the XML Schema. 12. Created new message to query for bid history nodes. Inserted new section 7.7 and updated XML Schema. 13. Corrected and enhanced the description of how the query parameters are used for querying market prices. Modified section 7.7 (formerly section 7.6). 14. Added Virtual type for query of Market Results so that virtual energy results

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6		September 1, 2004	[dbs] Updated. The following changes relect fixes to problems, clarification of description in the document, and enhancements and features added since Revision 5. 1. Added FullLoadHeatRate, ReducedHeatRate, and VOMRate elements to SpinningReserveOffer. Modified section 6.6.2 and XML schema. 2. Added MinimumMW element to RegulationOffer. Modified section 6.1.2 and XML schema. 3. Added day attribute to QueryNodeList. Modified sections 7.11.2 and 7.11.3 and XML schema. 4. Added NonRampLambdaMW element to DispatchLambda. Modified section 7.5.3 and XML schema. 5. Changed <SPMCP> tag to <Tier> in the XML example in section 7.16.3.
7		November 16, 2004	[dbs] Updated. The following changes relect fixes to problems, clarification of description in the document, and enhancements and features added since Revision 6. 1. Enhanced description of VOMRate element of SpinningReserveOffer. Modified section 6.6.2. 2. Modified length of BranchName element from 60 to 90 characters in section 7.3.3.
8		April 1,2005	[dbs] Updated. The following changes reflect enhancements and features added since Revision 7. 1. Added CombinedCycleParameters to UnitDetail. Modified section 6.8.2 and XML schema.

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9		November 9, 2005	[dbs] Updated. The following changes reflect enhancements and features added since Revision 8. 1. Added NotificationTime to UnitUpdate. Modified section 6.10.2 and XML schema. 2. Added PumpStorageLimits to UnitDetail. Modified section 6.8.2 and XML schema. 3. Added PumpStorageParameters to UnitDetail. Modified section 6.8.2 and XML schema. 4. Added PumpStorageLimits to UnitUpdate. Modified section 6.10.2 and XML schema. 5. Added MarginalValue to BindingLimits. Modified section 7.3.3 and XML schema.
10		February 5th, 2006	[dbs] Updated. The following changes reflect enhancements and features added since Revision 9. In general added added support for Demand Side Resource participation in Synchronized Reserve and Regulation Markets. 1. Added DSRRegulationOffer. 2. Added QueryDSRRegulationOffer. 3. Added DSRRegulationUpdate. 4. Added QueryDSRRegulationUpdate. 5. Added DSRSynchReserveOffer. 6. Added QueryDSRSynchReserveOffer. 7. Added DSRSynchReserveUpdate. 8. Added QueryDSRSynchReserveUpdate. 9. Added QueryDSRSRREGAward
11		March 15th, 2007	[jvv] Updated. The following changes reflect enhancements and features added since Revision 10. In general added to support Real Time Demand Side Response (RT-DSR) and Marginal losses work. 1. Added RealTimeLoadResponseDaily 2. Added RealTimeLoadResponseHourly 3. Added QueryRealTimeLoadResponseDaily 4. Added QueryRealTimeLoadResponseHourly 5. Updated MarketPricesHourly to include Marginal Losses components.

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12		July 1st, 2007	[dbs] Updated. The following changes reflect enhancements and features added since Revision 10. 1. Added QueryRASchedMW and RASchedMW 2. Added ConstraintName and ContingencyName to MarketResults
13		March 18th, 2008	[jvv] Updated. The following changes reflect enhancements and features added since Revision 12. In general added support for Day-Ahead Scheduling Reserve (DASR). Reviewed and updated the new DASR messages. [pxs] 1. Added DSRSchedReserveOffer and QueryDSRSchedReserveOffer 2. Added DSRSchedReserveUpdate and QueryDSRSchedReserveUpdate 3. Added SchedReserveOffer and QuerySchedReserveOffer 4. Added QuerySchedReserveAward and QueryDSRSchedReserveAward 5. Updated QueryASMarketPrices to include DASRMCP 6. Added SchedReserveBilaterals and QuerySchedReserveBilaterals 7. Added SchedReserveResults and QuerySchedReserveResults
14		October 15th, 2008	[dbs] Updated. The following changes reflect enhancements and features added since Revision 13. 1. Added QueryUnitParameterLimit and UnitParameterLimitSet 2. Added QueryScheduleDefinitions and ScheduleDefinitions. 3. Updated ScheduleSelection to include UseMaxGen.
15		November 1st, 2008	[dbs] Updated. The following changes reflect enhancements and features added since Revision 14. 1. Added OfferCost, EcoMaxHeatRate, RegMinHeatRate, VOMRate, and FuelCost elements to RegulationOffer. 2. Added OfferCost element to DSRRegulationOffer.
16		December 24th, 2008	[dbs] Updated. The following changes reflect enhancements and features added since Revision 15. 1. Added Sections 16.13 through 16.16. 2. Sections 16.9, 16.11 and 16.12 will be removed at a to be determined date.

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17		May 1st, 2009	[dbs] Updated. The following changes reflect enhancements and features added since Revision 16. 1. Updated existing SPREGAward to include the results of the TPS test. 2. Added QueryExceptionParameterLImits and ExceptionParameterLimits. 3. Corrected typos related to DSR.
18		February 3rd, 2010	[jvv] Updated. Removed Load Response-related Queries/Submittals. Remove Real Time Load Response Daily and Hourly-related Queries/Submittals.
19		February 24th, 2011	[jvv] Updated. Added TPSResult and RegOfferPriceUsed elements to DSRSRRegAward. Adde SelfSupply element to UnitDetail.
20		July 21st, 2011	[jvv] Updated. Added Up To Transactions.
21		February 15th, 2012	[jvv] Added AvailableTransferMW to Query for Spin Reserve Results.
22		April 5th, 2012	[jvv] Added PRD Hourly Data and PRD response Curve.
23		April 30th, 2012	Added New UpTo Transaction ID
24		May 7, 2012	Added QueryWindForecast
25		June 22, 2012	[maw] Updated. The following changes reflect enhancements and features added since Revision 24. 1. Updated existing Regulation Results to include RTO Average Performance Score 2. Updated existing Generator SPREGAward to include the actual hourly performance score. 3. Updated existing DSR SPREGAward to include the actual hourly performance score.
26		August 17, 2012	[pmf] Updated for Shortage Pricing/PBR
27		Sept 10, 2012	[pmf] RegType is a required field not for submit of regulation offers
28		Sept 14, 2012	[pmf] updated query regulation results add in mileage elements

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29		Sept 19, 2012	[pmf] NSR bilaterals ASProducttype
30		Feb 04, 2013	[pmf] • Market Results A/S, Regulation Results removed the column RMCP • MarketResults A/S, Synchronized Reserve Results removed the column SRMCP • Removed Query Ancillary Service Market Prices • Removed Nonsynchronized Reserve Bilaterals • Submit Regulation Offer added the elment energyStorageLoss • Submit Regulation Update added the element ReduceRampRatePct • Submit Unit Detail added the element ReducedRampRatePct
31		April 25, 2013	[pmf] Removed Ancillary Service Market Prices report.
32		May 2, 2013	[pmf] Added Flexible flag to the Submit DSR Synch Reserve Offer. Also added the new query Query DA Sched MW
33		May 7, 2013	[pmf] fixed typo in DSRSynchReserveOffer message.
34		July 15, 2013	[pmf] Added On-Reason name to the Generation Market Results
35		July 31, 2013	[pmf] added use Extended Cold flag to Generation Unit Unit details and the elements Extened Cold Notification, Extended Cold Start Up, Extended Cold Reason, and Extened Cold End Day to Generation Schedules Schedule Detail.
36		October 7th, 2013	[pmf] Added CIR element to Schedule Detail, Unit Detail, and Unit Hourly Updates.

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2 Introduction

2.1 Purpose

The purpose of this document is to describe the participant's XML-based external interface to the PJM energy market system.

The participant uses this document to guide in the formulation of messages to be sent to the energy market system and the interpretation of messages received from the system. This document describes the addressing, exchange protocol, data, and XML formulation for all defined messages.

The reader of this document is assumed to be a software engineer whose intent is to understand the requirements of the participant's interface to the system and to implement the software necessary to exchange data. Data exchange functions include:

- Interacting with the energy market by submitting offers of generation supply, ancillary service supply, and submitting bids for demand and virtual (inc/dec) supply and demand.
- Query the market for public and private data.
- Manage portfolios of generating units or demand bid pricing node locations.

The business market rules that govern the data exchange for the energy market system are not described in this document. Market rules are published by PJM separately.

2.2 Technology Prerequisite Knowledge

In order to design and implement the XML data exchange software interface to the system using this external interface, the reader should be familiar with:

- Using XML for data description, XML Schemas, XML Namespaces, and XML parsing and validation.
- Protocols HTTP, HTTPS, and TCP/IP.
- Security and authentication technologies: encryption, authorization, and SSL (secure sockets layer).
- General network communication software methodology.

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2.3 Document References

The following references are suggested helps for the technology used by the programmatic API.

[T1] Professional XML, 2000 by a myriad of authors, published by Wrox Press.

There is also a Beginning XML by the same publisher but this edition here is more complete.

[T2] Professional XML Schemas, 2001 by a countable set of authors, published by Wrox Press.

This book also has sufficient discussion of XML namespaces to provide background for the Programmatic API.

[T3] Professional Java Web Services, 2001 by a number of people, published by Wrox Press.

This reference has a good discussion of the SOAP standard giving a number of examples. The inclusion reference is not necessarily an endorsement of the Java language nor does it suggest that the programmatic API is a web services implementation.

[T4] SSL and TLS Essentials, 2002 by Stephen Thomas, published by Wrox Press.

A good overview of the SSL protocol. However, it is recommended that SSL capability by acquired from a 3rd party vendor or the OpenSSL software be considered.

[T5] RFC 2616: Hypertext Transfer Protocol, HTTP 1.1, 1999 by R. Fielding et' el, published by the Networks Working Group, IETF.

The best description of HTTP is the RFC documenting the standard.

2.4 Terminology

The following terms and acronyms are used by this document.

ACK – acronym meaning acknowledgement and indicates a normal and successful acknowledgement message. Contrast with NAK.

Asynchronous Messaging – see push messaging.

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base64 – a coding scheme used to encode the username and password on the HTTP authorization header. The base64 encoding algorithm is published in several locations and defined by RFCs 1521 and 2045. Public available software (Java API, Visual Basic, and C) is available to code and decode base64 strings.

CRLF – acronym meaning *Carriage Return Line Feed* and is the definition of a line terminator. A line is contiguous set of octets (8-bit characters) that is terminated by a CRLF character. The CRLF character is often platform dependent and may be defined as the hex codes 0x0D, 0x0A or simply as the hex code 0x0A. The usage of 0x0D, 0x0A two-character couplet is standard for Windows platforms (e.g. Windows NT). The usage of 0x0A, single-character, is standard for many Unix platforms. The CRLF can be created using language features for generating a *new-line* character such as the C escape character \n.

Character Data – is the XML term that defines the non-markup data that exists between an XML start and end tag. For example, given a start and end tag of UNITMW, the character data in the following example is the number 400.0: <UNITMW>400.0</UNITMW>.

DTD – acronym meaning *Document Type Definition* and it is defined by the XML specification as the statements that describe the elements, attributes, and entities that comprise an XML document. This specification uses the XML Schema only (see entry for XML Schema). DTDs are not used.

First-Normal-Form – is the specification that character data defined by XML start and end tags (see definition of character data in this terminology section) represents a single data item. Data that does not fit the *First-Normal-Form* definition is data that includes sets of information, repeating groups, or structured elements. For the purposes of this specification, Date and Time data is considered to be First-Normal-Form data even though it defines sets of information (e.g. month, day, year, hour, minute).

General Public – is the description given to the web browser interface user who is not a registered participant and who does not access the system through authentication credentials. The general public may access only data deemed by PJM to be published for the general public. This may or may not include all types of *public data* (see glossary entry for public data). The general public user may access files coded in XML per the formats set forth in this document if such files are made available on the public web server.

HTTP – acronym meaning Hyper-text Transfer Protocol. HTTP is an application-level protocol for distributed, collaborative, hypermedia, information systems. Or, more simply, HTTP is a network communications protocol used to send and receive data over the Internet. The version of HTTP used by this specification is 1.1 and this is often referred to as HTTP/1.1. The HTTP/1.1 protocol is defined by RFC 2616.

HTTPS – acronym meaning Hyper-text Transfer Protocol Secure. HTTPS is a secure protocol where the security is established by SSL (see terminology entry). HTTPS does not define nor does it add new communications features to HTTP, it is merely a secure version of HTTP. The HTTPS name is used to specify the protocol in the URL declaration to identify it as being secured by SSL.

IETF – acronym meaning Internet Engineering Task Force and it is the body whose members work together to define, specify, and regulate the various standards used for Internet network communications. The RFCs referenced by this specification are defined and maintained by the IETF. The IETF web site can be consulted for more information: www.ietf.org.

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ISO – acronym meaning International Standards Organization and it is the standards body responsible for a number of international standards used implicitly and explicitly by this document. Explicit standards cited by this specification include ISO 8601 used to define Date and Time standards and conventions; and, ISO-8859-1 used to define the XML operative character set. In the deregulated electricity industry, ISO also means Independent System Operator. That definition is not used in this document.

Location – the location of a resource is the unique identifier of a resource. Each resource specified in this document is uniquely identified by a location. For generator resources, the location is the generator's CPTU number. For demand and virtual (inc/dec) bids, the location is the bidding pnodeid (numeric sequence number id). For load response, the location is the unique load response id (numeric sequence id) that is assigned when PJM defines the load response as part of registration.

Market Participant (or, MP) –a market participant is a registered user who accesses public and private data or submits data (if authorized). A market participant is registered and known to the PJM's access ESuite security system. All access, via the web browser interface or the XML programmatic interface must be authenticated via appropriate credentials and authorized for access. Access authorization is granted by the user registration system. The term *participant* is considered the same as market participant.

NAK – is the acronym meaning negative acknowledgement and is the opposite in meaning to the ACK acronym. NAK is commonly given when a network communications message is rejected or not processed completely. Contrast with ACK.

Node – See entry for PNode.

PNode – PNode is a pricing node. All demand and virtual (inc/dec) resources and demand load locations are specified at specific pricing nodes defined by PJM. Pricing nodes are transmission network locations where a locational marginal price (LMP) has been computed. All nodes described in this document are pricing nodes. Pricing nodes are commonly associated with the *location* of the resource and therefore the attribute or field name of location is commonly used.

Portfolio – a portfolio is a folder created by the user to hold resource locations grouped together for some particular purpose. Portfolios are used primarily by the web display user as they are helpful in reducing the information overload that can be possible on some queries. A portfolio is created and named by the participant. Portfolios are global to all users registered on behalf of the participant company. Portfolios contain location elements (see Location entry). A portfolio can contain any mixture of locations of varying type but portfolios usually contain generator locations or demand bid pnode locations.

Private Data – refers to access control of data. Private data is data that is private to a given participant. Private data includes generation offers, resource attributes and parameters, demand bids, virtual (inc/dec) offers and bids, market clearing results. Access permission must be granted to read and write private data. Such access permission is implicit to the participant who owns the data.

Public Data – refers to access control of data. Public data is data that is common to all registered participants and the possibly the general public (see entry for general public). Constrast public data with private data.

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Push Messaging – push messaging is an asynchronous sending of messages to participant message listeners by PJM. This is referred to as asynchronous because it is not a response to a requested message (e.g. Request/Reply). Thus, it is activity asynchronous to the activity of the participant. Therefore, the participant must always be listening to asynchronous messages. This type of messaging has become more popularly known as *push* style messaging because the message is pushed by PJM to the participant as opposed to the more normal request message issued by the participant. At this time, there are no defined push style messages.

RFC – acronym meaning Request For Comments. The RFC is the documentation method used by the IETF for developing and documenting network communications standards for the Internet community. Several network communications standards cited by this specification are defined by RFCs. Each RFC is identified by a number. For a complete list of RFCs and to obtain copies of RFCs, see the information located at the IETF web site: www.ietf.org.

Request/Reply – is a messaging style where a client sends a request message to a server and the server responds with a reply message. Request/Reply is also sometimes called Client-Server messaging. In the case of the external interface, the participant is always the client who initiates the request and PJM is always the server who responds with a reply.

SOAP – means Simple Object Access Protocol and it is the protocol used to *wrap* the various market data content messages described by this document. SOAP is used in a number of different messaging patterns. Various profiles of usage have been established and documented. The profile assumed by this specification is to use SOAP as a message wrapper to provide common root context to make routing and handling of messages a little easier.

SSL – acronym meaning Secure Sockets Layer. SSL is a protocol standard used to establish a secure, encrypted, connection between a given client and server. SSL Version 3.0 is the protocol used for establishing the secure communications between participants and PJM. SSL is an industry de-facto standard developed originally by the Netscape Corporation.

TCP/IP – acronym meaning Transport Control Protocol over Internet Protocol. TCP/IP is actually two separate protocol standards however, as used in this specification (and, in most other applications), TCP/IP are considered a single network communications protocol. TCP/IP is the protocol specified by various RFC documents published by IETF (RFCs in this case are not as useful as other more popular publications of the TCP/IP standard). TCP/IP is used as the carrier protocol for all messages defined by this specification.

URI – acronym meaning Uniform Resource Identifier and is a similar construct to URL (defined next). URL in fact is a kind of URI. The URI is used to name Internet resources that are not necessarily Internet locations. More information on URI can be found in RFC 1630.

URL – acronym meaning Uniform Resource Locator. URL (which is also a URI) is the standard method for specifying network addresses and network resources used by Internet protocols. The URL defines the protocol, network host address, optional port number, resource path and fragments. URLs are used to specify PJM's server addresses that receive messages sent by the participants. URL is defined by RFC 1738.

Valid – as used in this context, *valid* is the measurement of an XML document that is correctly formatted according to its schema. PJM accepts only valid XML documents in messages received from participants. All valid XML documents are implicitly also *well-formed*.

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W3C – is the acronym meaning World Wide Web consortium which is a Internet community standards body whose purpose is to develop, publish, and maintain standards for the Internet community. Since W3C is not a government body, its publications are called *recommendations* as the term *standard* is defined as government authorized. The XML and HTML recommendations (aka *standard*) is published by the W3C. More information on the W3C publications and organization can be found at their web site: www.w3c.org.

Well-formed – is used to measure an XML document that is formatted according to the syntax rules set forth by the XML recommendation. A *well-formed* document can be correctly parsed by an XML parser. A document that is not well-formed may fail to parse completely.

XML – is the acronym meaning Extensible Markup Language. XML is a W3C published recommendation. XML is used as the basic format method for all messages defined by this specification. More information on XML can be found at the web site: www.w3c.org/xml.

XML Namespaces – provide a mechanism for qualifying the name of an XML coded entity per a unique identifier defined by a URI. The use of namespaces allows element and other tag names to be derived from more than one vocabulary without conflict or collision. Namespaces, though optional with many XML usage patterns is required for this specification. For more information, consult the web site www.w3c.org.

XML Schema – provided an improved means of declaring structure and content of an XML document. XML Schema is a replacement for the older document type definition specified by the DTD. Use of XML Schemas are required by this specification. For more information, consult the section on XML Schema at the web site www.w3c.org or references [5] and [6] cited in section 1.3 of this document.

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3 External Interface Data Exchange Overview

This chapter provides an overview of the data exchange sets and data descriptions involved in the PJM energy market system.

The participants of the Day-Ahead and Real-time balancing market that exchange data with the PJM include:

- Companies that provide energy supply, regulation, or reserve services in the form of generation.
- Companies that provide energy supply using a load response resource.
- Companies that require energy demand to service loads.
- Other interested registered participants.

3.1 Data Exchange Synopsis

Data exchange is described in terms of data submitted by the participant and data received as a result of a query in different functional categories as shown in the table below.

Category	Description
Day Ahead Market Generation Participant Submittals	The generator participant is one who provides an energy offer into the day ahead or the real-time balancing market. Self-scheduled generators submit hourly MW schedules and they may submit a price at which they would reduce output. Generators that are capacity resources and self-scheduled must submit offer data if they are called upon during an emergency procedure. Capacity generator resources must submit a schedule of availability for the next seven days and submit non-binding offer prices for the days beyond the next operating day. Generation offers consist of startup, noload, and incremental energy offers in the form of a price curve. Energy may not exceed $1000/MWHr.

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Category	Description
Day Ahead Market Demand Participant Submittals	Energy buyers submit hourly demand quantities for which they commit to purchase energy at day-ahead prices for consumption the next day. These must be submitted by noon the day before the actual operating day. Quantity bids must specify MW and location. Price-sensitive demand must specify capacity, location, and price at which the demand is curtailed.
Day Ahead Market Public Data	Public data is available to both the demand participant and the generator participant. Public data is used to support the day-ahead market bids and offers or it shows the results (e.g. market result prices) of the market clearing.
Portfolio Management	Portfolios are participant named and specified collections of energy supply generator resources, and demand bid pnode locations , or load response resources that can be used by the interactive web browser user and the XML query processor. Portfolios are used to group resources identified by their location together for the benefit of the participant in viewing and managing data.

3.2 Input (Submit) Data Set Description

The input data provided to the PJM market, usually on a daily or sometimes hourly basis, is grouped into two categories: input provided by demand participant and input provided by the generation participant. This division is loose as their may be some cross over depending on the type of participant and the nature of the data submittal (e.g. VirtualBid does not fit cleanly into this division).

The Demand Participant input data is described in the following table.

Data Set Description	XML Submit Message
Day-ahead market fixed and price-sensitive hourly demand bids.	<DemandBid>
Node Distribution Factors for aggregate nodes.	<DistributionFactors>

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Data Set Description	XML Submit Message
Offer to sell regulation service for a demand-side resource.	<DSRRegulationOffer>
Hourly update of regulation limits and schedule for a demand-side resource.	<DSRRegulationUpdate>
Offer to sell synchronized reserve service for a demand-side resource.	<DSRSynchReserveOffer>
Hourly update of synchronized reserve limits and schedule for a demand-side resource.	<DSRSynchReserveUpdate>
Offer to sell Day-Ahead Scheduling Reserve service for a demand-side resource	<DSRSchedReserveOffer>
Hourly update of Day-Ahead Scheduling Reserve for a demand-side resource.	<DSRSchedReserveUpdate>
Day-ahead market load response daily and hourly response schedule.	<LoadResponse>
Day-ahead market Inc and Dec *virtual* bids.	<VirtualBid>

Each of the defined data submittal messages is also supported by a query message allowing the participant to query for any data submitted. The query response is the exact same format as the submittal data. This allows data sets to be queried, modified, and resubmitted easily.

The generation participant input data is described in the following table.

Data Set Description	XML Submit Message
Day-ahead market offer to sell regulation service.	<RegulationOffer>
Hourly update of regulation limits and schedule.	<RegulationUpdate>
Offer to sell Day-Ahead Scheduling Reserve service.	<SchedReserveOffer>
Day-ahead market generation energy schedule offer price curve.	<ScheduleOffer>

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Data Set Description	XML Submit Message
Schedule supporting data and parameter details.	<ScheduleDetail>
Schedule selection for inclusion in day-ahead market clearing or canceling schedule selection.	<ScheduleSelection>
Offer to sell spinning reserve service.	<SpinningReserveOffer>
Hourly update of spinning reserve limits and schedule.	<SpinningReserveUpdate>
Generator supporting parameters and default values.	<UnitDetail>
Generator ramp-rate.	<UnitDetail>
Spinning Reserve ramp-rate.	<UnitDetail>
Hourly update of generator unit limits.	<UnitUpdate>
Weather forecast information required by some generators.	<WeatherForecast>

Each of the defined data submittal messages is also supported by a query message allowing the participant to query for any data submitted. The query response is the exact same format as the submittal data. This allows data sets to be queried, modified, and resubmitted easily.

3.3 Reports (Query) Data Set Description

The following reports are available to the participant. Some reports are public and therefore available to all participants whereas other reports contain private data and available only to the participant company that owns the data.

Data Set Description	XML Submit Message
Constraints that apply for a particular hour due to contingency.	<QueryBindingLimits>
Demand participant's hourly day-ahead market results.	<QueryMarketResults>
Currrent (real-time) lambda generation.	<QueryDispatchLambda>

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Data Set Description	XML Submit Message
Day-Ahead Scheduling Reserve award for demand-side resources	<QueryDSRSchedReserveAward>
Generator participants hourly day-ahead market results (for energy supply).	<QueryMarketResults>
Hourly operating between PJM and other control areas.	<QueryInterfaceLimits>
Load response day-ahead hourly market results.	<QueryMarketResults>
Scheduled power flowing between PJM and neighbors.	<QueryNetTieSchedules>
List of pricing nodes defined for the market.	<QueryNodeList>
Day-ahead market clearing prices.	<QueryMarketPrices>
Day-ahead summary of forecast demand and cleared bid demand.	<QueryDemandSummary>
Regulation bilateral scheduled between buyer and seller participants.	<QueryRegulationBilaterals>
Regulation market results showing cleared MW and clearing prices for generation and demand side resources.	<QueryRegulationResults>
Day-Ahead Scheduling Reserve award for generation resources	<QuerySchedReserveAward>
Day-Ahead Scheduling Reserve bilateral schedules between buyer and seller participants	<QuerySchedReserveBilaterals>
Day-Ahead Scheduling Reserve market results showing cleared MW and clearing prices for generation and demand side resources.	<QuerySchedReserveResults>
List of defined schedules (associating schedule type with description).	<QueryScheduleDefinitions>

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Data Set Description	XML Submit Message
Spinning Reserve Bilateral schedules between buyer and seller participants.	<QuerySpinReserveBilaterals>
Spinning Reserve market results showing cleared MW and clearing prices for generation and demand side resources.	<QuerySpinReserveResults>
Spinning reserve and regulation award for generation resources.	<QuerySPREGAward>

3.4 Common Names, Data Types, and Fields

The messages defined by this specification rely upon common data types and associations and names. These common types are described in this section.

3.4.1 Resource Names (Location)

All data input data is associated with a resource. This resource may be a generator unit, a pricing node, or a load response resource identifier. All resource names are abstracted using the concept of *location*. That is, a generator name is a location, a pricing node id is a location, a load response identifier is a location.

This location name is specified on messages as either an attribute called *location* or it is an element (used with query requests) called *<LocationName>.* A portfolio is a collection of locations.

Generator Names

The generator is uniquely defined by its CPTU name (previously known as the Unit ID). The CPTU name uniquely identifies all generator unit referencing data. When a submittal or a query message refers to a generator unit, the associated location is the CPTU name.

Generator location *is a* CPTU number.

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Pnode (Pricing Node) Identifiers

The pricing nodes used for demand and virtual (inc/dec) bids are uniquely identified according to their pnode id. A pnode id is a sequence number that uniquely locates a given pricing node. Whenever a query or submit message refers to a pricing node, the location is specified using the pnode name.

Demand Bid or Inc/Dec Bid location *is a* pnode id.

Load Response Identifiers

A Load Response resource is uniquely identified by the load response identifier which is a sequence number. These load response identifiers are defined at the time that a load response resource is registered with PJM. Whenever a query or a submit message refers to a load response resource, the location specifies the unique load response identifier.

Load Response resource location *is a* load response identifier number.

Generator Schedule Names

Generation schedules are uniquely identified using a numeric code in the range of 1 through 99 that is attached to the generator CPTU name creating a new unique name commonly referred to as the CPTUS name. All schedules are uniquely identified by this CPTUS name.

However, the CPTUS name does not actually appear in any of the XML message data. Instead, the generator unique CPTU name specified by the location and the schedule numeric code are kept separate. Therefore, all references to generator schedules use the *location* field specifying the CPTU name and the numeric schedule code is specified by the *schedule* field.

3.4.2 Market Days and Hourly Intervals

Each day-ahead market day is specified by a calendar date using the XML Schema data type format for dates. This market day is considered the market operating day. Bids and offers submitted into the day-ahead market must be submitted by 12 Noon on the day before the operating day. However, the day specified on the bid or the offer is the operating day. That is, it is the effective day of the market data.

Hourly data is specified by a numeric code representing the ending hour value. The hour beginning at midnight and ending at 1 AM is called hour 01. The hour that begins with 11 PM and ends at midnight is hour 24. [See section 4.9.3 for a description of how daylight savings time is handled].

3.4.3 Common Data Types

The following table lists common data types used by the messages of this specification.

Data Type Name	Description

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Data Type Name	Description
date YYYY-MM-DD	This data type, specified normally via its default format is the XML Schema data type called *date* (note, lower case). This data type is used for all calendar dates and it is governed and defined by the XML Schema Datatypes standard.
dateTime YYYY-MM-DDThh:mm:ss	This data type, specified normally via its default format is the XML Schema data type called dateTime (note case). This data type is used for all field values that represent a calendar time and date or whenever a clock time is required. Note that the hour-ending codes are not considered clock times and therefore not represented by this type.
Boolean	This data type represents a Boolean value of "true" or "false". The values 1 and 0 can be used for true and false respectfully. This is an XML Schema data type spelled as boolean (note lower case). Although the name is called Boolean in this document.
HH	This data type is an invented type (see HourEndingType in XML Schema document) to represent the hour ending values. Each hour is a two-digit code from 01 through 24. Daylight savings time is handled in the spring by skipping the hour ending 02 interval. The Fall, the duplicated hour is indicated by including *isDuplicateHour* attribute (see section 5.9.3 for examples).
MWType	This data type is an invented type (see MWType in XML Schema document) to represent the MW or MWH values. This is a numeric data type of the format Number(8,1).
MWRateType	This data type is an invented type (see MWRateType in XML Schema document) to represent the MW rate values. This is a numeric data type of the format Number(8,2).
PriceType MWPriceType	This data type is an invented type (see MWPriceType) that represents MW prices in $ per MW. This is a numeric data type of the format Number(10,2).
Character String	This data type represents an arbitrary character string of varying length depending on the actual data field. The following rules apply: leading and trailing blanks (whitespace) are not recognized, embedded white space is compressed to a single blank character in all fields except for the pnode names (locations of pnodes). Special characters that are XML tokens such as <> must be properly escaped if they are part of the data.

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Data Type Name	Description
Complex Type	This describes an XML type declaration that consists of nested XML elements or other complex types. There is no character data defined for a complex type. Note: by character data, we mean the data between the opening and closeing element tags.
Singleton Type	This describes an XML type declaration that consists of attributes only and no character data. It is considered by XML to be an empty tag. It has no nested content.

3.4.4 Common Fields and Elements

The following table defines the common data types that are used throughout the data set descriptions that follow in subsequent sections. Those data field names that do not have the <> brackets are used as XML attributes. If the <> brackets appear, the data field is used as an XML element. Some data types appear as both attributes and elements in various messages.

If the data type includes a name in parenthesis then this is the name of a common type often referenced by other elements or attributes defined in the messages.

Data Field Name	Data Type	Data Description
day	YYYY-MM-DD Date	Specifies the date of data, typically used to specify the day-ahead market date on various messages. For day-ahead messages, the day specified is the operating day date, not the day before the operating date.

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Data Field Name	Data Type	Data Description
hour <Hour>	HH (HourEnding)	Specifies the two-digit hour-ending value ranging from 01 through 24 designating each hour of the day. Two digits are always required (i.e. 01, 02, 03, 04,…). Hours are always specified as hour-ending counting the first hour of the day as 01 and the last hour of the day as 24. All time values are defined with respect to the market day and market time-line. The market day is defined by Eastern Standard Time. In the spring, the hour ending 03 is skipped and the hours run from 02 to 04. In the Fall, the hour ending 02 is repeated so that the second hour is also designated by the syntax of 02 where the an attribute that declares the hour to be a duplicate hour (see section 5.9.3).
location <LocationName>	Character String	Specifies the location of the bid or offer data. If a demand bid is submitted, location specifies a particular pricing node name. If a generator offer is submitted, location refers to the generator name (i.e. the CPTU name). If a load response is submitted, the location refers to a load response identifier.
schedule	DD (ScheduleName)	A one or two digit number that represents the schedule name for a particular energy supply resource. Schedules are named as 1 through 99. Each schedule is separate.
<PortfolioName>	Character String	A 40-character string that specifies the name of a portfolio. Each portfolio contains one or more locations.

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4 Introduction to the Programmatic API

The programmatic API is an XML based messaging protocol used for the exchange of messages between market participants and PJM. The XML message is formulated as a SOAP wrapped payload carried by the HTTP protocol.

The participant software must implement the messaging protocol according to the specification described in this document. This software implementation relies heavily on standard technologies that can be obtained freely on the Internet (i.e. open software) or that can be obtained from 3rd party vendors.

4.1 Messaging Overview

The programmatic API is a messaging API used by PJM to exchange data with the market participants. In function, the programmatic API mimics the interactive web user interface: almost all functions supported by the web pages are supported by the programmatic API.

4.1.1 The Role of the Participant

This role description presumes a generic market participant.

The participant uses the programmatic API to implement an automated interface to the market services provided by PJM. Using the programmatic API, the participant can implement software that integrates efficiently with other applications and processes on the participant side of the network. This allows the necessary message exchange to fit more easily into the participant's business processes and methods.

The participant uses the programmatic API to:

- Query for market results and other public and private data.
- Submit market bids and offers into the day-ahead.
- Query for market results data.

4.1.2 The Role of PJM

PJM provides services that support the programmatic API. These services are identified by URLs (Universal Resource Locator) and made available to the participant. When the PJM server receives a request at a given URL, the following processing is performed:

- The request is validated both syntactically and semantically. Any error results in an error response.

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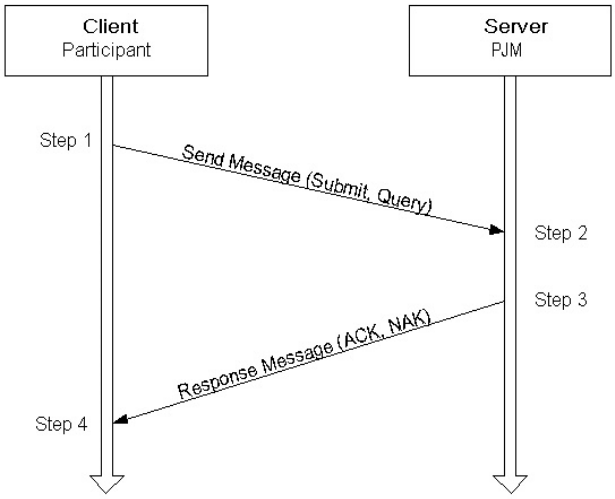
- If the request is a data submission then the data is validated per the market database constraints and per the market business rules. Any violations result in an error response *and the total rejection of data in the message*. If there are no errors, then the data is entered into the market database.

- If the request is a data query then the message is dispatched to the known service handler for the requested packet. If the request is correctly formatted then the data requested is packaged as a SOAP wrapped XML payload and returned to the participant.

4.2 Request/Reply Messaging

This messaging protocol is called request/reply (or, request/response). The client issues a request to the PJM server and a reply (response) is returned by the server to the client. The client initiates all request/reply messages.

The following diagram illustrates the request/reply protocol.



The client is the market participant that is sending a request to PJM's server handling the message. The processing steps are outlined below:

Step 1 – the client software formulates the request message and sends it to the server. Request messages may be to submit data (e.g. bids and offers) or query the market database. After sending the request, the client software waits for the response (step 4). Because the client software initiates the request and waits for the response, this is considered a *synchronous* messaging protocol.

Step 2 – the server software is actively listening for new messages and receives the message sent by the client. The server software processes the message which includes validating the message request, processing message action, and formulating the message response (step 3).

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Step 3 – the server formulates the response as either an ACK (successful request) or a NAK (unsuccessful request resulting in error response). The successful request may be a simple indicator of the success of the requested action or it may also include a data packet returned to the client as the response to the requested action (e.g. a data query). The unsuccessful response will always include an error packet that identifies each of the errors encountered in the request.

Step 4 – the client software receives the response message and acts accordingly depending on whether the response indicates success (ACK) or failure (NAK).

PJM's server implements a message listener using a standard HTTP web server that supports SSL for encryption and authentication[1]. Therefore, submitting a message request is tantamount to submitting an Internet web page request; although, instead of using the HTTP GET command, the HTTP POST command is used.

Therefore, the participant client must implement software that makes an HTTP connection using SSL along with the authentication scheme (username/password or digital certificate). Once the HTTP connection is established the message is sent as a POST command to the server.

4.3 XML File Upload and Download

The browser based web interface supports a XML file upload/download service via a web page. This service is available to any registered participant and it can be used to substitute for the need of developing a software programmatic interface.

Using the file upload and download service, the participant may:

- Format any valid QueryRequest message as a file for submittal to PJM.
- Format any valid SubmitRequest message as a file for submittal to PJM.

When a file is submitted, uploaded to PJM, the response file is made available as a download to the participant's computer. The participant may choose to open this file immediately using the application assigned by the MIME type or the participant may save the file on their local computer.

All query request and submit request messages formatted in file form must obey the rules of the specification set forth by this document. All data must be formatted as SOAP-wrapped, XML messages according to the schema. No other data format is supported.

[1] All message exchange between the participant and the PJM server uses HTTPS protocol which is HTTP over an SSL (encrypted) session. The name HTTP names the protocol commands, the suffix of S refers to the secure connection. When discussing the protocol, the name HTTP will be used.

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4.4 Web Technologies

As evident by the previous discussion, the programmatic API is implemented using standard *web* technologies. In particular, the following technologies are used by this scheme:

- XML, Extensible Markup Language
- SOAP, a web services API
- HTTP/HTTPS
- SSL and Authentication

4.4.1 XML – Extensible Markup Language

XML means eXtensible Markup Language. It is a structured, hierarchical, tag based coding language that is suitable for describing data that is sent over the public Internet. There are many good references for learning about XML and a few are listed in section 1.3 ([T1], [T2]) of this document. The specification and details of XML will not be repeated here. However, a few comments on "why" and "how" XML is used is discussed briefly below.

XML Versus CSV

XML is a replacement for data file exchange using CSV format. CSV means *comma separated values* and refers to a commonly used ASCII coded file format where each line is a set of data values separated by a comma (or, some other field separator character such as a TAB). Each line typically refers to a set of associated data and given a particular interpretation by the producers and consumers of the data. The interpretation is usually ruled and defined by an external element that is often cryptic and obscure.

XML has the following advantages over CSV:

- XML is usually easily readable where each data value is described by a name. CSV often does not describe data by name.
- XML supports structure allowing nested or hierarchical relationships that can be validated for correctness. CSV is necessarily flat in structure often leading to the need for repeating groups of data to model data hierarchy.
- XML supports strong data typing (using XMLSchema language) that can be validated as part of the XML parsing process. Since parsers are standard, given the XMLSchema, an XML message can be parsed and validated easily by anyone. Custom validation software is not required (for example, standard tools such as XMLSpy[2] can be used to validate a message against the schema).

[2] XMLSpy is a third-party utility product used to create and validate XML schema and XML instance documents. XMLSpy is recommended as a tool for anyone using XML and is available from ALTOVA (see www.xmlspy.com or www.altova.com).

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- XML supports data transparency where character data can be composed of any character code (assuming a few proper escapes where needed by the language). CSV on the other hand has trouble with embedded commas in character data if the comma is a field separator.

XML Schema

XML Schema is a relatively recent addition to the XML family of standards. XML Schema is a structured language used to describe other XML documents. XML Schema is itself an XML document described by an XML Schema.

XML Schemas are a replacement for the XML DTD (document type definition) which is still commonly used to describe XML. A DTD though lacks many of the features of XML Schema, such as strong data typing, name space management (DTDs do not support name spaces). XML Schema also supports a more powerful relationship and structure specification.

XML Schema is used to describe all market data exchange messages. DTDs are not used and they are not supported. There are many references describing XML Schema and how it is used. Those references already listed for XML ([T1], [T2]).

XML Namespaces

XML Namespaces are used to support the association of specific XML markup to a particular vocabulary and schema. Namespaces allow the mixture of XML markup from different vocabularies. In fact, using SOAP and XML Schemas require the use of namespaces and at least two vocabularies.

An XML Namespace is a unique identifier specified using a URI (uniform resource identifier). Thus, a namespace identifier looks like a URL or a web page address. However, an XML Namespace identifier is not a web page address and there is no expectation of finding any resource at the URI that is used. The combination of the unique domain name and the URI path establish the uniqueness that is required of namespace identifiers.

The use of XML Namespaces as shown later in this document are required. Failure to use the proper namespace will result in an XML validation failure and an error response. More information on XML Namespaces can be found in the XML references already cited.

4.4.2 SOAP – A Web Services API

SOAP means Simple Object Access Protocol. It is based on XML and is designed for the exchange of information in a distributed computing environment. The SOAP protocol was originally designed for RPC (remote procedure call) style of computing but it also supports other message exchange profiles. SOAP is not used as an RPC by PJM's energy market system; rather, it is used to wrap message payload in a common, standard, way to facilitate handling, routing, and common processing.

The SOAP protocol is an outside wrapper called the Envelope. This Envelope encloses all other XML data. The Envelope itself contains two distinct structures: Header and Body. The Header element is not used by this specification (it is considered optional by SOAP). They Body element contains the entire payload.

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The SOAP standard used by this specification is SOAP 1.1. SOAP is under rapid development and is suffering from volatile change. In fact, the SOAP 1.2 recommendation is already out in draft form and may be a full recommendation by early to mid 2003[3].

There are a growing number of good references for SOAP, the one provided here (reference [T2]) is just one recommendation.

4.4.3 HTTP/HTTPS

HTTP means Hyper-text Transport Protocol and HTTPS means Hyper-text Transport Protocol Secure. HTTP is the transport protocol used by the programmatic API (this specification) to carry the XML messages over the Internet. HTTPS is the same protocol as HTTP except that it is a secure, encrypted session established by SSL. All the commands, headers, error responses, and body format for HTTPS is the same as HTTP. Therefore, in this and many documents, HTTP is generally used to refer to both HTTP and HTTPS with regard to the actual protocol rules. The HTTP standard is specified by RFC 2616 (reference [T5]). HTTP 1.1 is used by this specification.

Although HTTP is the protocol for message exchange using the programmatic API, it is not the only method supported. File transfer is also supported for upload and download. The File transfer format and naming rules is described later in this document.

4.4.4 SSL and Authentication

SSL means Secure Socket Layer and it is a protocol used to establish a secure, encrypted, TCP/IP session between the client and server computers. SSL is used for all data exchange using this programmatic API. SSL is not the authentication method though -- it merely provides the security encryption for the authentication means.

SSL is an industry defacto standard developed by Netscape Corporation and it is the most commonly used and supported encryption protocol. Other protocols exist. The standard TLS is an IETF endorsed standard to replace SSL and thus is compatible with SSL. TLS means Transport Layer Security. SSL is referenced instead of TLS because it is still the industry dominant protocol used for establishing an encryption channel between client and server.

Authentication is the establishment and verification of the user submitting the requests to the PJM server. Authentication is based on X.509 digital certificates or user name and password credentials[4]. All messages submitted to PJM server must include the appropriate authentication credentials.

[3] The term *recommendation* is the World Wide Web consortium's word for a *standard*. The word *standard* is not used because apparently only government entities can define standards and the W3C is not a government (not yet at least). We will mix the terms standard and recommendation freely in this document without fear or excuse.
[4] The method of participant authentication to be determined by PJM.

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5 Common Principles

This chapter describes common requirements and messaging concepts used by all message types.

5.1 Participant Registration

All market participants using the XML programmatic interface must be registered with PJM. Each registered user must have appropriate authentication credentials that establish:

- A user name.
- A participant identifier or company name defined at the time of registration.
- Access permission based on the roles defined by the registration system.

5.2 PJM Server Addressing

All functions and data provided by the PJM Server are addressed using a Uniform Resource Locator (URL). Several URLs are defined as shown in the following table. Each message sent to the PJM server must use the appropriate URL. The appropriate URL is defined for each message type defined later in this specification.

Note: the host computer name, shown below and shown in each subsequent section defining messages,as emkt.pjm.com may be changed or there may be more than a single host computer available (such as sand box testing, market trials, training, etc.). The actual host name that must be used will be published by PJM.

The URL addresses are composed of two parts which are called the left-side protocol and host part and the right-side URL path part. Thus, the URL shown below:

`https://emkt.pjm.com/emkt/xml/query`

has a left-side that consists of the string **`https://emkt.pjm.com`** and a right-side that consists of the URL path **`/emkt/xml/query`**.

The left-side is fixed for all query and submit messages defined in this document. The actual host computer name depends on which system you are using but once a system is chosen (e.g. sand box, training, market), it is fixed for all message types.

The right-side is independent of the host computer choice and dependent on the application system and the message. The following table shows the syntax of the different URL paths supported by this specification.

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Function	URL
Query Public and Private Market Data	**/emkt/xml/query**
Submit Data into Day Ahead and Real-time Markets	**/emkt/xml/submit**
Query By Transaction (for previously submitted data)	**/emkt/xml/querybytransaction**

5.3 HTTP Command and Headers

All messages submitted to the PJM Server and all messages returned to the participant as responses are coded as HTTP POST command messages.

5.3.1 HTTP Request Message Format

The following example highlights the required format and content of the request message for both data submit and data query (although this example shows a query on market data as shown by the URI).

```
POST /emkt/xml/query HTTP/1.1
Host: emkt.pjm.com
Content-Type: text/xml
Content-Length: ddd
SOAPAction: "/emkt/xml/query"

<body content>
```

Each line of the HTTP headers is described below:

POST /emkt/xml/query HTTP/1.1

Specifies the HTTP command as a POST command. All HTTP messages submitted to the PJM server are POST commands, no other HTTP command is supported. The above line follows the syntax rules of the HTTP Version 1.1 RFC. Usage of HTTP version 1.1 is required.

Host: emkt.pjm.com

The above header naming the host computer is required by HTTP Version 1.1. This names the host computer which is the *same as the host computer specified on the URL*. Most likely this is the same computer that your HTTP software connects to though in

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general this is not a requirement for HTTP (that is, web listeners may establish virtual hosts that can handle HTTP connections of different names on one physical computer).

`Content-Type: text/xml`

The above header specifies the MIME type of the <body content>. The only MIME type accepted by the PJM server is text/xml.

`Content-Length: ddd`

The above header specifies the length, in bytes, of the <body content>.

`SOAPAction: "/emkt/xml/query"`

The above header is required for SOAP Version 1.1 messages by the SOAP standard. The header is required but the interpretation of the value and the purpose of the header is dependent on the application itself and not on the SOAP 1.1 standard. In SOAP Version 1.2 that will be released later this year (Spring 2003), this header is no longer required but considered optional. *Therefore, even though this specification assumes SOAP Version 1.1,* ***this header is considered optional****.*

If you specify this header than the value specified in quotes is typically the same path as specified on the POST header. However, the **PJM server software *ignores* this header**.

<body content>

This is not a header but rather the body content of the message. The body content is separated from the last header by a zero-length line. This is merely a line with a <CR><LF> terminator. The HTTP 1.1 Specification declares this terminator to be specified by both the <CR> and the <LF> character. However, the actual body content, the XML payload message, may include line terminators using either the single, Unix style, terminator of <LF> or the Microsoft Windows platform style of two characters CRLF.

The body content count, as specified on the Content-lenth header, counts the first byte following the <CR><LF> characters of the zero-length line terminator up to the last byte of the message. This count includes all white-space including all line-terminators that may be included as part of the message.

The <body content> of all messages defined by this specification must begin with the following line:

```
<?xml version="1.0"?>
```

5.3.2 HTTP Response (reply) Message Format

The following example highlights the content of a typical response message.

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```
HTTP/1.1 200 OK
Content-Type: text/xml
Content-Length: ddd

<body content>
```

The interpretation of the above lines is standard HTTP as described by the HTTP Version 1.1 RFC. The 200 status code indicates success. All responses returned by the PJM system are considered successful HTTP responses using a 200 status code even if they are reporting an error in the content of the message. If an error should be raised by the PJM web server or if there is an authorization failure or bad URL then other HTTP error codes can be returned. Codes that may be returned include:

400 – bad request is returned if there is a formatting error in the headers or the HTTP command line.

401 – Unauthorized is returned if the request does not include an authorization header or if the authentication fails to authorize the user.

404 – URI not found is returned if the URL specified on the request is unknown.

405 – Method not allowed is returned if any request to the specified URLs given any other command beside POST. Only the POST method is allowed.

500 – Internal Server Error is returned is some part of the server fails to respond or has crashed. See comment below on SOAP and the 500 error code.

It is possible that other error codes would be received but these are the most common likely to be seen during actual operation.

The SOAP standard requires that error code 500 be used in conjunction with any error message returned using the SOAP Fault response message. The main purpose of the SOAP Fault response message is to report failures due to exceptions, argument data type errors, and other RPC oriented problems. This implementation using SOAP is a message based request/reply exchange that does not suffer from the typical RPC type error handling and exception mechanism. Therefore, the SOAP Fault response message is not used and error code 500 is not reported from the PJM server software.

The interpretation of the 200 success code means that the <body content> can be assumed to be a well-formed and valid XML response that begins with the <?xml version="1.0"?> line and contains SOAP wrapped XML statements per the specification in this document. Any other response code means that the <body content> cannot be assumed to be XML! Therefore, participant software should only attempt to parse and validate XML derived from the body content if and only if the 200 success response code is returned.

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5.4 SOAP Envelope

In the above HTTP request and response examples, the <body content> refers to the XML SOAP envelope. The SOAP envelope wraps all message content including query requests, query response, submittal request, submittal response, and error response.

The following example shows the canonical SOAP envelope used for all request and response messages.

```
<?xml version="1.0"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
<env:Header/>
<env:Body>

   --- actual message body goes here ---

</env:Body>
</env:Envelope>
```

There are other parts to the SOAP standard that are not shown by this example. For example, encoding style can be specified, other name spaces can be referenced. The SOAP Header which is optional and may appear before the SOAP Body is not used. The Header element may be specified as an empty element (as shown above) or it may not be present at all. These other parts to SOAP are not used at this time by this specification.

The actual message content is specified within the <env:Body> element. This message must be specified and associated with the correct namespace that is used to validate the message. The following example shows a QueryRequest message enclosed within the SOAP Body:

```
<?xml version="1.0"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
<env:Header/>
<env:Body>
<QueryRequest xmlns="http://emkt.pjm.com/emkt/xml">

   --- actual query request goes here ---

</QueryRequest>
</env:Body>
</env:Envelope>
```

The namespace is specified as a default namespace on the QueryRequest element. This means that this namespace applies to all other elements from this layer on unless they have other local namespaces associated with them by using a specified prefix.

The SubmitRequest and the QueryResponse and SubmitResponse elements are used with the namespace in a similar fashion.

How one uses namespaces with SOAP and XML in general is not always obvious. The SOAP standard uses namespaces with linked schema in a subtle and sometimes tricky fashion. It is recommended that references such as [T2], [T3] be considered for additional information. How namespaces are used by this specification is described in the next section.

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5.5 XML Namespaces

Two namespaces are assumed and used by this specification. One namespace is used by SOAP and one name space is used by the energy market XML Schema and the financial schedules XML Schema. These namespaces are:

SOAP	**http://schemas.xmlsoap.org/soap/envelope/**
Energy Market	**http://emkt.pjm.com/emkt/xml**

Note that the host computer names on the above *namespace URIs are not interpreted in the same way as a host computer name on the URLs discussed earlier in this document*. The host computer name specified as part of a namespace URI is fixed. It does not change even if you send your messages to other computers. It is fixed by the software system and changing it requires a change to the PJM server software.

Another namespace that might be specified in some circumstances is the XML Schema Instance namespace. This namespace is typically associated with the xsi prefix and can be used to specify a null value for some numeric values defined in this specification. This namespace has the following URI:

XML Schema Instance (prefix, xsi:)	**http://www.w3.org/2001/XMLSchema-instance**

Namespaces and how they are used in an XML instance document can be confusing. There are rules that apply to how default namespaces can be overridden by local namespaces.

The examples of namespace usage in this specification are not to be considered fixed and required. There are a variety of methods that namespaces can be used. Given that at least two namespaces are required by all messages in this specification, the following examples show how these namespaces can be specified.

The first example shows the use of default namespaces.

```
<?xml version="1.0"?>
<Envelope xmlns="http://schemas.xmlsoap.org/soap/envelope/">
<Header/>
<Body>
<QueryRequest xmlns="http://emkt.pjm.com/emkt/xml">
  <QueryMarketPrices day="2003-03-02"/>
</QueryRequest>
</Body>
</Envelope>
```

The namespace usage above defines two default namespaces. The first default namespace is for the SOAP namespace and this is defined on the Envelope element. This default namespace applies to all elements that are not associated with any other local or default namespace.

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In the above example, the second default namespace is associated with the QueryRequest element. This second default namespace applies to all elements at this level and deeper (within the query request).

In the next example, a local namespace associated with a prefix "env:" is defined for the SOAP namespace.

```
<?xml version="1.0"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
<env:Header/>
<env:Body>
<QueryRequest xmlns="http://emkt.pjm.com/emkt/xml">
  <QueryMarketPrices day="2003-03-02"/>
</QueryRequest>
</env:Body>
</env:Envelope>
```

In the next example, the local namespace prefix of mkt: is specified for the QueryRequest elements:

```
<?xml version="1.0"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/"
              xmlns:mkt="http://emkt.pjm.com/emkt/xml">
<env:Header/>
<env:Body>
<mkt:QueryRequest >
  <mkt:QueryMarketPrices day="2003-03-02"/>
</mkt:QueryRequest>
</env:Body>
</env:Envelope>
```

There are other variations on this same theme. Namespaces may be defined at any point in the XML instance document. They may be defined as a local namespace with a prefix, they may be defined as a default namespace without a prefix. All of these variations, as long as the rules of XML and SOAP are followed, are acceptable.

For simplicity and clarity, only one variation is used in the examples in this specification. This example uses a local namespace with the env: prefix for the SOAP namespace and a default namespace without a prefix for the PJM energy market namespace. However, these examples do not necessarily endorse a particular style nor do they suggest that messages received (responses or notifications) necessarily follow this same style[5].

5.6 XML Schema

Two XML Schema references are required to successfully parse and validate the XML messages described by this document. One schema is for the SOAP 1.1 standard and the other schema is for PJM's XML messages. They are:

[5] The main reason that we do not stick to a particular style and adhere to it for the system implementation is that this is not always possible. Different software modules that may be used in the system follow their own style of namespace association. The only factor of importance is that all these variations are legal and acceptable.

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SOAP:	**`http://schemas.xmlsoap.org/soap/envelope/`**
Day Ahead	**`http://emkt.pjm.com/emkt/xml/schema`**

The schema *should not* be located using the schemaLocation element inside of an XML message. All schemas used by the PJM server are provided externally. The message content schema, if specified, is never used. You may use the schemaLocation attribute for your own testing or validation but it should not be a part of the submitted messages.

The URLs specified above are indeed Internet URLs where the schema can be found. The SOAP schema is fixed by standard and maintained by the SOAP community. The PJM energy market schema is located at the URL specified or some other URL that may be declared by PJM and published on the PJM website.

5.7 Error Response

There are three kinds of response messages returned to the client: success response, success with data response, and error response. The individual message success and success with data responses are described in later sections. The error response is described in this section and is common to all request type messages.

The error response is given for the following types of problems:

- Malformed XML format, that is, unable to parse the XML correctly.
- Invalid XML message, that is, XML content does not validate against the schema. This includes many of the data type, range, relationship errors that can be found.
- Violation of business rules include errors such as market is not open, invalid names or data values, and so on.

When an submit error response is returned, the transaction is cancelled and all changes are rolled back – the market database is not modified. For example, if a data submit message has an error in just one part of the overall message, the entire message and all of its data is rejected. No partial data submits are allowed or supported. If a query request has an error in any part of the request then no data is returned to the client even though other parts may be error free.

Note that if any of the HTTP errors are returned (as described previously) then there is no body returned with the message that is meaningful to this programmatic API (it might be some other body provided by an intermediary component that operates outside of this specification and therefore may be useful). All error responses described in this section are returned in a successful (`HTTP/1.1 200 OK`) message.

The error response message has the following SOAP wrapped XML format.

```
<?xml version="1.0"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
<env:Header/>
<env:Body>
```


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```
   <SubmitResponse xmlns="http://emkt.pjm.com/emkt/xml">
      <Error>
          <Code>ORA-20034</Code>
          <Text>Market is not open</Text>
      </Error>
      …
   </SubmitResponse>
</env:Body>
</env:Envelope>
```

<Error> is used to specify a single error occurrence, there may be multiple Error elements returned in a single error response message.

<Code> is optional and used to specify the error code (if one exists). Error codes may refer to specific software modules used by PJM software. Error codes are only used to communicate a particular vendor's software error event. Error codes may be defined for a range of software (e.g. Oracle, BEA Weblogic, Apache, Linux, Castor, etc.) using numeric codes particular to the vendor. These error codes are not meant to represent a cross-reference index for the <Text> messages. There is not a one-for-one mapping between the codes and an individual text message.

<Text> is used to contain the error message text describing the problem. This is a required element and always returned. This text description of the error is the complete description. It does not rely upon additional information that might be part of an error code or other subsystem.

<Line> is an optional line number that can be returned specifying the line where the problem occurred. Not all submittal methods use the notion of a line so this value is not always available and it may not be useful. It depends on the nature of the submitted data.

5.8 Transaction Semantics

Each submittal is executed using a transaction and the server logs the submittal request message and identifying aspects of the message. The rules associated with these transactions are supported by XML data submittals only. Although the transaction log also shows activity from the Web browser interface, that is supported only to show the historical order of events. The query of submitted data is only available for data submitted via XML.

5.8.1 Transaction Semantics and Transaction Identifier

Whenever a submittal request message is processed and is successful, resulting in the modification of the database, a transaction event is created and uniquely identified by a transaction identifier. This transaction identifier is returned as part of the Success response message.

The data submitted is saved and can be recalled by a subsequent query. After a period of time, the saved data can be archived and no longer available using the query request. It may still be available but only by special request to PJM's help desk.

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5.8.2 Transaction Log

The resulting transaction event *log* maintains a complete history of all changes initiated by the participant interface, whether initiated by the web user or an XML message submit request. This log is available for review via the web interface. The fields supported include the following:

- Transaction ID
- Participant ID of the owner of the data set
- User name of the submitter (or, web user)
- Time and Date of Transaction Event
- Type of Event: Web Submit or XML Submit
- Number of rows of database associated with the Transaction (may be zero).
- File that contains the message data of the original submit.
- Archive Flag (if set to true, submitted data has been archived offline).

5.9 XML Data Type and Specification Semantics

In general, data specified using the XML Schema rules is bound by very tight data type and constraining facets. However, some fields require special care in how they are specified since the user has complete freedom to specify any characters he wishes and some of these cause problems for XML or have dubious interpretations.

5.9.1 Character Case

Character case, upper, lower, and camel case must be honored by all XML specified in this document. Within the body of the XML, there are no *case insensitive* strings. Case must be honored at all times. For example:

- The values of the various enumerated strings, such as unit commit status (**Unavailable, Economic, MustRun, Emergency**), Portfolio action command (**Create, Replace, Remove,** etc.), or Market Availability (**DayAhead, Balancing, Both**) are all case sensitive strings and upper and lower case must be honored at all times.. For example, spellings such as *COST, cost, PRICE, or price,* for the schedule type will be rejected.
- The values of portfolio names, generator unit names, pricing node names, and schedule names are all case sensitive.
- All XML attribute names and element names are case sensitive.

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5.9.2 XML Boolean Data

Boolean data is a recognized type defined by the XML Schema. Boolean is binary data represented as true or false. The Boolean values acceptable for true and false are shown in the table below:

State	XML Representations
True	`true` `1`
False	`false` `0`

For example, if a Boolean element called <Veracity> were specified as input, each of the examples below would represent a true value being submitted:

```
<Veracity>true</Veracity>

<Veracity>1</Veracity>
```

5.9.3 XML Date and Time

All date and time values must follow the XML Schema data type rules for date and time. The following date and time formats are used in this specification.

Data Type	XML Syntax
Date	`YYYY-MM-DD`
Time	`hh:mm:ss[.ddd][offset]`
Date and Time	`YYYY-MM-DD`**`T`**`hh:mm:ss[.ddd][offset]`

The tokens that appear in the above table are described in the following table. For a more complete description, please consult other documentation regarding XML Schema data types [reference T2].

YYYY-MM-DD	Describes the calendar date as a 4-digit year (e.g. 1996, 2002, 2003), a two-digit month indicator ranging from 01 through 12 for January through December, and a two-digit day ranging from 01 through 31. Leading zeros for numeric values (e.g. 1 through 9) are required for all values.

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hh:mm:ss	Describes the hours, minutes, and seconds representing the current clock time. The hours ranges from 00 through 24, minutes range from 00 through 59, and seconds range from 00 through 59. All leading zeros are required.
[.ddd]	Describes a finer resolution in tenths, hundredths, or milliseconds. This value may not appear as it is optional. If it does appear, it may appear as .d, .dd, or .ddd. The digits "d" may range from 0 through 9. The square brackets [] are meta-data to show that this field is optional and may not appear in output.
[offset]	Describes the time zone offset. This field is described in more detail in the following sub-section below.

Timezone

The [offset] shown in the syntax examples above refer to the time zone offet that may be specified. This is optional but when employed must be specified per the rules specified in the XML Schema specification. When not specified, the default time zone is the **Eastern Prevailing Time** zone. PJM operates the entire market in the Eastern Standard time zone.

The [offset] code can be specified in the following ways:

Z The letter Z indicates that the time is Zulu time or GMT time.

-hh The minus hh specifies time zones west of the prime meridian. For example, Eastern Time zone is –05.

+hh The plus hh specifies time zones east of the prime meridian.

All submitted data that is time zone dependent is converted to GMT prior to storage or usage. All displayed data is Eastern Prevailing Time Zone. There is no method for receiving time data for a different time zone. It is recommended that all participants use the Eastern Prevailing Time zone to help eliminate confusion.

The time zone field is also used to show the duplicate hour during the daylight savings time fall transition day. This is a universally accepted convention to represent the distinction between the

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first occurrence and the second occurrence of the duplicate hour. More information on this is found in the next section on daylight savings time.

Daylight Savings Time Transition

Daylight savings time is honored by the market time line. In the Spring, an hour is skipped so that the day only has 23 identified hours. In the Fall, an hour is duplicated so that the day has 25 hours.

During the Spring transition, at 2 AM, clocks are adjusted to read 3 AM. Technically, this takes place just before the clock strikes 2 AM. As a result, the hour-ending at 3 AM, called 03, never occurs and this hour-ending interval is skipped. The hour-ending intervals of the day during the spring transition day read like: 01, 02, 04, 05, etc.

During the Fall transition, at 2 AM, clocks are adjusted back to read 1 AM. Thus, the hour ending at 02 occurs twice and is duplicated. The fall transition day hours read like: 01, 02, 02, 03, 04, etc.

In the fall, since there are two hourly intervals both designated as hour ending 02, there needs to be a method to distinguish between the two. On the XML, there are two different data fields used to specify the hour-ending (depending on the kind of message). One method uses an attribute on an element called ***hour***. The other method uses an element named ***<Hour>.*** The methods for distinguishing between the first occurrence of 02 and the second occurrence of 02 during the Fall transition is shown in the examples below.

Using the hour attribute field

For example, the Unit limit hourly update element for describing the limits for a given hourly interval is shown below for the normal (non-duplicate) hour:

```
<UnitUpdateHourly hour="02">
```

If the hour is the duplicate hour in the Fall, the isDuplicateHour attribute is included as shown below:

```
<UnitUpdateHourly hour="02" isDuplicateHour="true">
```

This field, isDuplicateHour, is defined as optional by the XML Schema with a default value of *false.* Therefore, if it is not included, it is the same as if you specified a false value. Including this attribute is only necessary on the duplicate hour in the Fall, however there is no harm on specifying it with the false value at other times.

Using the <Hour> element

For example, the query for spinning reserve and regulation award accepts the <Hour> element to indicate a particular hour to be included in the query. For the normal (non-duplicate) hour, the example is as shown below:

```
<Hour>02</Hour>
```


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For the duplicate hour in the fall, the isDuplicateHour attribute is include is a manner similar to the hour attribute example above:

```
<Hour isDuplicateHour="true">02</Hour>
```

The handling of the isDuplicateHour is exactly the same whether it is specified in concert with the hour attribute field or on the <Hour> element.

Although the most widely used method of representing time is the hour ending value as described above, there are a few situations where an XML absolute date and time value is used. This date and time value uses the zone offset to represent the distinction between the first occurrence of 2 AM and the second occurrence of 2 AM. The technique works because, during the daylight savings time transitions, it is the time zone offset value that actually changes (since GMT never changes as a result of daylight savings time).

Therefore, the first occurrence of fall 2 AM duplicate hour will be represented by an XML time and date value that shows the daylight savings time zone offset which is usually 1 hour less than the standard time offset. For example, these two values might look like:

```
2003-10-26T02:00:00-04

2003-10-26T02:00:00-05
```

So that the distinguishing factor is that the time zone offset values are different.

This technique for representing the duplicate fall hour will only be used in a few rare situations calling for such a time. For example, if the termination time on a message is during that hour (not likely).

Note: In order to keep the individual message descriptions more clear and and focused on the subject, this definition of isDuplicateHour and where it is used is not included in the detailed message descriptions that follow. This does not mean it is not supported. Only that the documentation for this feature is limited to this section of the specification.

5.9.4 XML Character Data, Markup, and Escaped Characters

XML text consists of intermingled character data and markup. Markup takes the form of start-tags, end-tags, empty-element tags, entity references, character references, comments, and CDATA section delimiters. Anything that is not markup is called *character data* of the XML document.

The ampersand character (&) and the left angle bracket (<) may appear in their literal form only when used as markup. These characters cannot appear in their literal form within *character data*.

If these characters are needed within character data, they must be escaped using either numeric character references or the strings “&” and “<” respectively for & and <. The right angle

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bracket may appear in character data in some circumstances but it is best to escape this character using “>” or the numeric escape equivalent.

For example, if an element calls for the specification of character data for a name for instance, that name cannot include any of the characters mentioned above. Consider the following:

`<name>MW&MVAR</name>`	This is illegal because the & sign must be escaped. The result is that the parser will see the & as a escape which means that the next few characters are sucked in and interpreted as special characters. The result is that the < and the / may be eaten by the parser and the resulting XML document is not well-formed.
`<name>MW&MVAR</name>`	This is the correct specification when the & sign is needed.
`<name>MW and MVAR</name>`	This is better yet, avoid the & character altogether.

The XML specification should be consulted for a more detailed explanation of the differences in handling character data, markup, entities, entity references and so on. Our motivation though is to create an XML Schema that will not result in any of these situations however that assumes that the user always does the right thing. This explanation is for those users who get caught doing the wrong thing.

5.9.5 XML Null Data

Sometimes it is useful or required to submit null data or null element sets. The *business rule* interpretation of null is based on the message type and the element involved. In some situations, specifying a null means that a delete operation is to be performed on the data (for example, see the submit request for `ScheduleOffer` message). In other usages, a null inserts a null value into the database itself, overwriting any previous value that may be held by the database.

To submit a null element set, the parent element is submitted without the sub-elements as shown in the following example for the `Runtimes` of the `ScheduleOffer` message:

```
<SubmitRequest>
   <ScheduleDetail location="Big Unit" day="2002-10-20" schedule="1">
      <Runtimes/>
   </ScheduleDetail>
</SubmitRequest>
```

In this example, the Runtimes null element set is interpreted to delete the Runtimes data for the resource, schedule, and date specified. If there is no data then this action is a noop and there is no warning or error message returned.

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When it is desired to submit a data value as null then the XML Schema Instance `nil` flag it specified on the element with a Boolean true value. For example, to overwrite the database value with a null for the ColdStartupCost, the following submission is specified. This is only supported for those elements that can be overridden by nulls. In the schema, these elements are defined with the nillable="true" attribute. Note: at this time, there is no need for this nil type submittal in any of the defined messages.

```
<SubmitRequest>
   <ScheduleDetail location="Big Unit" day="2002-10-20" schedule="01">
      <someExampleTag>
          <someExampleField xsi:nil="true"/>
      </someExampleTag>
   </ScheduleOffer>
</SubmitRequest>
```

Note, in order to use the XML Schema Instance name space as shown above, the name space prefix of xsi must be associated with the XML Schema Instance namespace as shown in the following example:

```
<SubmitRequest xmlns="http://emkt.pjm.com/emkt/xml"
               xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" >
<ScheduleOffer location="HorseTrack" schedule="01" day="2003-04-01">
      <someExampleTag>
          <someExampleField xsi:nil="true"/>
      </someExampleTag>
</ScheduleOffer>
</SubmitRequest>
```

5.9.6 XML Absent Elements

Some elements are optional. They may appear in the XML instance document or they may not. If they do not appear, the default handling is usually governed either by the XML Schema definition or the application.

If the XML Schema specifies a default value than that value is substituted just as if the element were specified with that value. If the XML Schema does not specify a default value then the handling of a missing element or attribute is dependent on the message type. The actual handling is described later for each message type when an optional element can be specified but a default value is not given.

5.10 File Upload/Download Format

The file upload/download XML format is identical to the message body of the HTTP requests or response. The only missing lines are those specifying HTTP headers. The file content is the same as described earlier as the <Body Content> of the HTTP message. The following example shows a query response as an HTTP message and the same query response formatted as a file.

First, the HTTP message query response[6]:

[6] XML example is shown for illustrative purposes only, it does not necessarily refer to an actual message defined by this specification.

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```
HTTP/1.1 200 OK
Content-Type: text/xml
Content-Length: ddd

<?xml version="1.0"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
<env:Header/>
<env:Body>
   <QueryResponse xmlns="http://emkt.pjm.com/emkt/xml">
      <NodeList>
          …
      </NodeList>
   </QueryResponse>
</env:Body>
</env:Envelope>
```

The equivalent file download format appears as shown below:

```
<?xml version="1.0"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
<env:Header/>
<env:Body>
   <QueryResponse xmlns="http://emkt.pjm.com/emkt/xml">
      <NodeList>
          …
      </NodeList>
   </QueryResponse>
</env:Body>
</env:Envelope>
```

Whether the message content is a QueryResponse (as shown in the example above), a QueryRequest, a SubmitRequest, or a SubmitResponse, the same rules apply in formatting the file.

Line breaks may be used to format the response message for readability and processing but are not part of the message content. There is no meaning to a line break in the XML message. Also, all line breaks are issued as single byte LF codes (the typical Unix style of line break, the Microsoft Windows style of CRLF are not used).

The file is named according to the type of data but this name can easily be changed by the user as part of the download process therefore not much substance is given to the file names.

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6 Demand Participant Data Submittal

The Demand Side Data Submittals and Queries supports all data submits associated with load demand, virtual offers, and virtual bids. The queries support the query of submitted data. Other queries are defined in section 7 of this document.

The following table summarizes the data submittal and queries described in this chapter.

`DemandBid` `QueryDemandBid`	The DemandBid message is used to submit a fixed demand and price-sensitive demand bid into the day-ahead market. Demand bids must be submitted by 12 Noon on the day before the operating day. Demand bids may be queried at any time to retrieve the data submitted by the participant. Only those bids submitted by the participant may be queried.
`DistributionFactors` `QueryDistributionFactors`	The DistributionFactors message is used by participants to submit node distribution factors of bus type pricing nodes that make up an aggregate type pricing node. Distribution factors must be submitted by 12 Noon on the day before the operating day in order to be effective on the operating day. Distribution factors may be queried at any time to obtain the data that was submitted. Only those distribution factors submitted by the participant may be queried.
`DSRRegulationOffer` `QueryDSRRegulationOffer`	This message is used by a demand side resource to submit regulation service offers. All regulation offers are locked in by 6 pm on the day before they take effect. You may query the regulation offer you submitted at anytime using the QueryDSRRegulationOffer message.
`DSRRegulationUpdate` `QueryDSRRegulationUpdate`	This message is used to add or update details of a demand side resource's regulation offer by overriding values on an hourly basis. Messages can be submitted at any time but for the data to be effective during the operating day, it must be submitted prior to the operating hour. You may query the details you submitted at anytime using the QueryDSRRegulationUpdate message.

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DSRSynchReserveOffer QueryDSRSynchReserveOffer	This message is used by a demand side resource to submit synchronized reserve service offers. All synchronized reserve offers are locked in by 6 pm on the day before they take effect. You may query the synchronized reserve offer you submitted at anytime using the QueryDSRSynchReserveOffer message.
DSRSynchReserveUpdate QueryDSRSynchReserveUpdate	This message is used to add or update a demand side resource synchronize reserve override values on an hourly basis. For changes to take effect you must submit the update prior to the operating hour. You may query the synchronized reserve update you submitted at any time using the QueryDSRSynchReserveUpdate message.
LoadResponse QueryLoadResponse	LoadResponse is used to submit a daily offer price and the hourly MW load profile at a given location. The LoadResponse message must be submitted by 12 Noon on the day before the operating day. A LoadResponse message cannot be submitted more than seven days prior to the operating day for the date the data is to take effect. LoadResponse data may be queried at any time to obtain the data that was submitted. Only the load response data submitted by the participant may be queried.
DSRSchedReserveOffer QueryDSRSchedReserveOffer	This message is used by a demand-side resource to submit day-ahead scheduling reserve service offers. All day-ahead scheduling reserve offers are locked in by 12 noon on the day before they take effect. You may query the day-ahead scheduling reserve offer you submitted at anytime using the QueryDSRSchedReserveOffer message.
DSRSchedReserveUpdate QueryDSRSchedReserveUpdate	This message is used by a demand-side resource to provide hourly updates or overrides to the day-ahead scheduling reserve values. You may submit this data at any time but to be effective in the day-ahead market it must be submitted before the specified operating hour. You may query any day-ahead scheduling reserve update data you submitted at any time using the QueryDSRSchedReserveUpdate message.

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`VirtualBid`	This message is used to submit virtual inc/dec offers at specified locations. The VirtualBid message must be submitted by 12 Noon on the day before the operating day. VirtualBid data may be queried by the participant at any time to obtain the data submitted.
`DSRScheduleOffer` `QueryDSRScheduleOffer`	This message is used to submit demand side resource offers to the market. For changes to take effect, you must submit the offer by 12 noon on the day before the operating day. You may query offers you submitted at any time using the QueryDSRScheduleOffer message.
`DSRScheduleDetail` `QueryDSRScheduleDetail`	This message is used to submit supporting data parameters for a demand side resource. For changes to take effect, they must be submitted by 12 noon on the day before the operating day. You may query the supporting data parameters you submitted at any time using the QueryDSRScheduleDetail message.
`DSRScheduleSelection` `QueryDSRScheduleSelection`	This message is used to indicate whether or not the schedule for a demand side resource is available on a particular operating day. To be effective any changes you submit, they need to be received by 12 noon on the day of the operating day. You may query the availability of the schedule you submitted at anytime using the QueryDSRScheduleSelection message.
`DSRSchedules` `QueryDSRSchedules`	This message is used to associate a schedule with a demand side resource. You may query any schedules you submitted at any time using the QueryDSRSchedules message.
`DSRUpdate` `QueryDSRUpdate`	This message is used to add or update the parameters of a demand side resource on an hourly basis. For changes to take effect, they must be submitted prior to the operating hour. You may query for parameters you submitted any time using the QueryDSRUpdate message.

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UpToTransaction QueryUpToTransactions	This message is used to add or update Up To Transactions on an hourly basis. For changes to take effect, they must be submitted prior to market close at 12 noon on the day before the operating day. You may query for submitted Up To Transactions at any time using the QueryUpToTransaction message.
NewUpToTransactionID QueryNewUpToTransactionID	This message is used to get the next upto transactionid for a participant.
PRDHourlyDaily QueryPRDHourly	This message is used to add or update parameters on an hourly basis for a price-responsive-demand resource. For changes to take effect, they must be submitted 3 hours prior to the operating hour. You may query for submitted parameters at any time using the QueryPRDHourly message.
PRDResponseCurve QueryPRDResponseCurve	This message is used to add or update the response curve for a price-responsive-demand resource. For changes to take effect, they must be submitted prior to market close at 12 noon on the day before the operating day and also between 4pm and 6pm before the operating day during the re-bid period. You may query for submitted response curves at any time using the QueryPRDResponseCurve message.

All data submit actions are executed under transaction control and a transaction identifier is associated with each submittal request. This transaction identifier has limited lifetime (~months) and is provided so that data submitted by an earlier message can be easily retrieved or used as a reference for any dispute resolution with PJM.

The data submit is initiated using a data submit request element as shown below. This submit request is the payload that is enclosed by the SOAP Body element. Only one such submit request element can be specified. The SubmitRequest may contain one or more instances of individual data elements containing the submitted data.

Example of submit of data day-ahead or real-time market:

```
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
<env:Header/>
<env:Body>
   <SubmitRequest xmlns="http://emkt.pjm.com/emkt/xml">
      <DemandBid location="xxx" day="yyyy-mm-dd">
          -- elements of demand bid --
```


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```
      </DemandBid>
      <VirtualBid location="xxx" day="yyyy-mm-dd">
          -- elements of virtual bid --
      </VirtualBid>
      …
   </SubmitRequest>
</env:Body>
</env:Envelope>
```

The data submit messages defined later in this chapter do not include the XML namespace prefix as shown in the example above. You may choose your prefix according to the XML specification.

The response message is always returned as a SOAP wrapped payload indicating either success or error. The success indicator is the same for all types of data submit. The successful submit always has the same format as shown below:

```
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
<env:Header/>
<env:Body>
   <SubmitResponse xmlns="http://emkt.pjm.com/emkt/xml">
      <Success>
         <TransactionID>Abee3433</TransactionID>
      </Success>
   </SubmitResponse>
</env:Body>
</env:Envelope>
```

The format for each of the submit requests follows the same naming conventions.

The following example shows an error response as a result of some problems in the submit:

```
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/"
<env:Body>
   <SubmitResponse xmlns="http://emkt.pjm.com/emkt/xml">
      <Error>
         <Code>BlueGreen</Code>
         <Text>Market does not exist</Text>
      </Error>
   </SubmitResponse>
</env:Body>
</env:Envelope>
```

All private submit requests must be issued to the appropriate URL using the correct namespaces as documented in sections later in this chapter.

6.1 Submit Demand Bid

6.1.1 Purpose

This message format is used to submit fixed and price-sensitive demand bids into the day-ahead market for the specified market operating day. Demand bids must be submitted prior to market close. The day-ahead market closes at 1200 on the day ahead of the operating day.

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A demand bid consists of an hourly fixed bid for each desired pricing location and an optional hourly price-sensitive demand bid.

6.1.2 Message Format

The submit request message format is described below.

```
<SubmitRequest>
  <DemandBid location="xxx" day="yyyy-mm-dd">
    <DemandBidHourly hour="hh">
       <FixedDemand>999.9</FixedDemand>
       <PriceSensitiveDemand>
          <BidSegment id="dd">
             <MW>9999.9</MW>
             <Price>999.99</Price>
          </BidSegment>
       </PriceSensitiveDemand>
    </DemandBidHourly>
  </DemandBid>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<DemandBid>	Complex Type	Specifies the fixed demand bid submitted for the specified market operating date and a given location.
Location	Character String	Required field specifying the pnode id of the demand bid.
day	YYYY-MM-DD	Required field specifying the market operating day date.
<DemandBidHourly>	Complex Type	Specifies the hourly schedule of demand bids. Repeated for each hour of the day. May be specified 0 to 25 times. If not specified then delete logic for the hour is executed (see next section on delete).
Hour	HH	Required field specifying the hour ending of the specified hour. Specified as a number from 01 through 24.

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Element or Attribute	Data Type	Description
<FixedDemand>	MWType	Optional element that specifies the fixed demand portion of the demand bid for the hourly interval. May be specified at most once. If not specified and if <PriceSensitiveDemand> is not specified then delete logic is executed (see next section on delete).
<PriceSensitiveDemand>	Complex Type	Optional element that specifies the price-sensitive component of the demand bid. Maybe specified at most once for a given hourly interval. If not specified, there is no price-sensitive bid. Also, if not specified and if <FixedDemand> is not specified then delete logic is executed (see next section on delete).
BidSegment	Complex Type	Optional element that specifies an incremental energy in MW at the given price. May be repeated from zero to 20 times.
id	Number(999)	Required field specifying the bid segment identifier as a number from 1 to 999. Bid segment numbers must be unique but not necessarily contiguous.
<MW>	MWType	Optional element that specifies the incremental energy demand for this pricing segment. If not specified then <Price> cannot be specified either to trigger delete logic (see next section on delete).
<Price>	MWPrice	Optional element that specifies the price in dollars per MW. If not specified then <MW> cannot be specified either to trigger delete logic (see next section on delete).

6.1.3 Response Message

The Success (ACK) response message is described below.

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```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or malformed XML
- Market is not open or market day does not exist.
- Bid location is not valid.
- Other market rule violations.

6.1.4 Deleting and Replacing Submitted Data

To delete all the bids submitted at a given pricing node location, the <DemandBid> element is submitted as an empty set as shown below.

```
<DemandBid location="zzz" day="yyyy-mm-dd"/>
```

A delete may only be specified prior to market close at 12 Noon on the day before the operating day. Bid data may not be deleted once it is used in the day-ahead market clearing.

To delete a bid at a given hourly interval, you specify the hourly interval as an empty set as shown in the example below.

```
<DemandBid location="zzz" day="yyyy-mm-dd">
   <DemandBidHourly hour="hh"/>
</DemandBid>
```


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The above example will delete the hourly interval specified.

To delete the price-sensitive portion of a demand bid, the PriceSensitiveDemand element is specified including each of the bid segments submitted as an empty elements as shown in the example below. This will delete all specified bid segments for the given hour and location. Also, the fixed demand is not affected by this operation.

```
<DemandBid location="zzz" day="yyyy-mm-dd">
   <DemandBidHourly hour="hh">
      <PriceSensitiveDemand>
        <BidSegment id="1"/>
        <BidSegment id="2"/>
        <BidSegment id="3"/>
          --- repeat for all defined bid segments ---
      </PriceSensitiveDemand>
   </DemandBidHourly>
</DemandBid>
```

Individual bid segments can be deleted by submitting empty BidSegment elements as shown below for only those segments to be deleted. Other bid segments not included are left in place.

```
<DemandBid location="zzz" day="yyyy-mm-dd">
   <DemandBidHourly hour="hh">
      <PriceSensitiveDemand>
         <BidSegment id="3"/>
      </PriceSensitiveDemand>
   </DemandBidHourly>
</DemandBid>
```

Data may be replaced merely by resubmitting any portion of data to be modified. To replace all segments of the price sensitive demand with new segments (possibly with new segment id) the previous segments should be deleted. Segments that are not deleted are replaced by new data if the same segment id is used. If a segment is not deleted and it is not replaced by a message then it is left intact.

6.1.5 Querying for Submitted Data

You may query for a particular effective day and did locations using the message described below. You may query by specifying a given location name or a portfolio of locations.

To query the system for a submitted fixed demand bids of a one or more bid location nodes for a given day, the following QueryRequest is issued:

```
<QueryRequest>
  <QueryDemandBid day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QueryDemandBid>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

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Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryDemandBid>	Complex Type	Specifies the query for demand bids for the specified market operating day.
day	YYYY-MM-DD	Specifies the market operating day.
<All/>	N/A	Optional element specifying that ALL submitted demand bids for the market operating day specified are to be returned. If you specify <All/>, you cannot also specify either <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional element to specify the desired bid location pricing node id. If not specified, then the portfolio name must be specified for a valid query request. You cannot specify both the location node name and the portfolio name.
<PortfolioName>	CharacterString	Optional element specifying a portfolio to designate the location nodes of the desired query. If not specified then the <LocationName> element must be specified for a valid query. You cannot specify both the portfolio name and the location node name.

The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
  <DemandBidSet>
   <DemandBid location="xxx" day="yyyy-mm-dd">
      ---data---
   </DemandBid>
  </DemandBidSet>
</QueryResponse>
```


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The fields and their interpretation for the <DemandBid> are the same as described for the <SubmitRequest> above. A <DemandBid> element is returned for each effective day and location that satisfies the query request. All <DemandBid> elements are contained in a single instance of <DemandBidSet>.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

6.2 Submit Distribution Factors

6.2.1 Purpose

This message format is used by participants to submit distribution factors used to allocate the percentage of load distribution of bus nodes to an aggregate node. Distribution factors must be submitted prior to market closing on the day-ahead to be used in the market clearing operations. Distribution factors are submitted for an effective day and may be submitted several days prior to the effective day but not before 7 days prior to the operating day.

Distribution factors are specified as a percentage share of an aggregate bus.

6.2.2 Message Format

The submit request message format is described below.

```
<SubmitRequest>
  <DistributionFactors day="yyyy-mm-dd">
    <AggregateNode location="zzz">
       <BusNode location="zzz" factor="9.999999"/>
    </AggregateNode>
  </DistributionFactors>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<DistributionFactors>	Complex Type	Specifies the distribution factors submittal for the specified effective day.

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Element or Attribute	Data Type	Description
day	YYYY-MM-DD	Required field specifying the effective day of the data.
<AggregateNode>	Complex Type	Specifies the aggregate node. May be repeated as needed.
location	Character String	Required field specifying the location name of the aggregate pnode.
<BusNode>	Singleton Type	Specifies the bus node percentage factor of the aggregate node. The bus is named and the percentage factor supplied. May be repeated as needed.
location	Character String	Required field specifies the location name of the bus node.
factor	Numeric(8.6)	Required field specifies the percentage factor as a number between –1.0 and +1.0.

6.2.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

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The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or malformed XML
- Effective day is not valid for the data being submitted.
- Aggregate node is not valid. Bus node is not valid.

6.2.4 Deleting and Replacing Submitted Data

To replace or update the distribution factors, the message can be resubmitted to overwrite the current values. You may not delete distribution factor <BusNode> elements from a <AggregateNode>.

6.2.5 Querying for Submitted Data

You may query for a particular effective day and Aggregate nodes using the message described below.

To query the system for a submitted distribution factors of a one or more aggregate nodes for a given day, the following QueryRequest is issued:

```
<QueryRequest>
  <QueryDistributionFactors day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QueryDistributionFactors>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryDistributionFactors>	Complex Type	Specifies the query for distribution factors whose effective day is specified.

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Element or Attribute	Data Type	Description
day	YYYY-MM-DD	Specifies the effective date of the data.
<All/>	N/A	Optional element specifying that ALL submitted distribution factor aggregate nodes for the market operating day specified are to be returned. If you specify <All/>, you cannot also specify either <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field to specify the desired aggregate pricing node location name. If not specified, then the portfolio name must be specified for a valid query request. You cannot specify both the aggregate node location name and the portfolio name.
<PortfolioName>	Character String	Optional field specifying a portfolio to designate the aggregate pnode locations. If not specified then the <LocationName> element must be specified for a valid query. You cannot specify both the portfolio name and the aggregate location name.

The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
   <DistributionFactors day="yyyy-mm-dd">
      ---data---
   </DistributionFactors>
</QueryResponse>
```

The fields and their interpretation for the <DistributionFactors> are the same as described for the <SubmitRequest> above. A <DistributionFactors> element is returned for each effective day that satisfies the query request.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

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6.3 Submit DSR Regulation Offer

6.3.1 Purpose

This message format is used to submit a regulation offer for the specified location which is a demand side resource. The location is specified using the resource identifier.

All regulation offers are locked in by 6 pm on the day before they take effect. Regulation offers may be submitted or updated at anytime prior to 6 pm of the day before the operating day.

6.3.2 Message Format

The submit message format is described below.

```
<SubmitRequest>
  <DSRRegulationOffer location="zz" day="yyyy-mm-dd">
    <OfferMW>9999.9</OfferMW>
    <OfferPrice>999.99</OfferPrice>
    <OfferCost>999.99</OfferCost>
    <RegulationLimits minMW="9999.9" maxMW="9999.9"/>
    <Unavailable>xxx</Unavailable>
    <SelfScheduled>xxx</SelfScheduled>
    <MinimumMW>9999999.9</MinimumMW>
    <RegType>x</RegType>
    <PerformanceOfferPrice>999.99</PerformanceOfferPrice>
    <PerformanceOfferCost>999.99</PerformanceOfferCost>
  </DSRRegulationOffer>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<DSRRegulationOffer>	Complex Type	The element specifies the regulation offer for the given resource and the operating day.
location	Character String	Required field specifying the resource location name.
day	YYYY-MM-DD	Required field specifying the operating day.

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Element or Attribute	Data Type	Description
<OfferMW>	MWType	Optional element specifying the regulation offer MW capability. If not specified then a zero MW value is used. Negative MW values are not allowed.
<OfferPrice>	PriceType	Optional element specifying the regulation offer price in $ per MWH. If not specified then a zero price is assumed. Negative price values are not allowed.
<OfferCost>	PriceType	Optional element specifying the regulation offer cost in $ per MWH.
<RegulationLimits>	Singleton Type	Optional element specifying the regulation high and low limits in MW for the hourly interval. If not specified, the resource's default regulation high and low limit are used.
minMW	MWType	Specifies the minimum MW limit for regulation service.
maxMW	MWType	Specifies the maximum MW limit for regulation service.
<Unavailable>	Boolean	Optional element specifying whether the resource is available for providing regulation. If specified as "true" then the resource is not available. The default value is "false".
<SelfScheduled>	Boolean	Optional element specifying whether the regulation is being self-scheduled. If not specified, the default value is "false".
<MinimumMW>	MWOfferType	Optional element specifying the mimimum regulation amount that must be assigned. If not specified then an amount of zero is assumed.
<RegType>	RegType	Required field, Valid values are A for tradional resources and D for dynamic reources.

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Element or Attribute	Data Type	Description
<PerformanceOfferPrice>	PriceType	Optional element specifying the performance offer price in $ per MWH. If not specified then a zero price is assumed. Negative price values are not allowed.
<PerformanceOfferCost>	PriceType	Optional element specifying the performance offer cost in $ per MWH.

6.3.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- Invalid location or day.
- Violations of business rules.

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6.3.4 Deleting and Replacing Submitted Data

You can delete a regulation offer if the delete occurs prior to the lock-in time of 6 pm on the day before the operating day. To delete a regulation offer, you supply the following message format within the <SubmitRequest> element:

```
<DSRRegulationOffer location="xxx" day="yyyy-mm-dd"/>
```

To replace or update a regulation offer, the data must be resubmitted as desired.

6.3.5 Querying for Submitted Data

You may query for a particular resource location using the message described below.

To query the for submitted DSRRegulation Offer data the following QueryRequest is issued:

```
<QueryRequest>
  <QueryDSRRegulationOffer day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QueryDSRRegulationOffer>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryDSRRegulationOffer>	Complex Type	Specifies the query for the regulation offer for the specified operating day.
day	YYYY-MM-DD	Required field specifying the operating day of the regulation offer data.
<All/>	N/A	Optional field that specifies all submitted regulation offers for the given day shall be returned. If <All/> I specified you cannot also specify <LocationName> or <PortfolioName>.

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Element or Attribute	Data Type	Description
<LocationName>	Character String	Optional field for specifying the resource identifier. If specified, you cannot also specify the <PortfolioName>. You must specify either the <LocationName> or the <PortfolioName>.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing resourc location names. If specified, you cannot also specify the <LocationName>. You must specify either the <PortfolioName> or the <LocationName>.

The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
  <DSRRegulationOfferSet>
   <DSRRegulationOffer location="zzz" day="yyyy-mm-dd">
      ---data---
       <PerformanceScore>9.999999</PerformanceScore>
      ---data---
   </DSRRegulationOffer>
  </DSRRegulationOfferSet>
</QueryResponse>
```

Note: The Performance Score posted in this section is based on a 100-hour rolling avagerage of verified DSR-specific performance scores. This element is being shown in the query response above and not in the message format section because this is a read only element and is not part of the submit request message.

The fields and their interpretation for the <DSRRegulationOffer> are the same as described for the <SubmitRequest> above. A <DSRRegulationOffer> element is returned for each location and each day that satisfies the query request. All <DSRRegulationOffer> elements are returned in a single <DSRRegulationOfferSet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

6.4 Submit DSR Regulation Update

6.4.1 Purpose

This message is used to add or update details of a demand side resource's regulation offer by overriding values on an hourly basis.

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You may submit a DSR Regulation Update message at any time but for the data to be effective during the operating day it must be submitted prior to the operating hour.

6.4.2 Message Format

The submit request message format is described below.

```
<SubmitRequest>
  <DSRRegulationUpdate location="zzz" day="yyyy-mm-dd">
     <DSRRegulationUpdateHourly hour="hh">
        <OfferMW>9999.9</OfferMW>
        <RegulationLimits minMW="9999.9" maxMW="9999.9"/>
        <Unavailable>xxx</Unavailable>
        <SelfScheduled>xxx</SelfScheduled>
        <RegDMW>9999.9</RegDMW>
        <RegDUnavailable>xxx</RegDUnavailable>
        <RegDSelfScheduled>xxx</RegDSelfScheduled>
     </DSRRegulationUpdateHourly>
  </DSRRegulationUpdate>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<DSRRegulationUpdate>	Complex Type	This element specifies the regulation update data at a given location and operating day.
location	Character String	Required field specifying the resource's location name.
day	YYYY-MM-DD	Required field specifying the operating day of the data.
<DSRRegulationUpdateHourly>	Complex Type	Specifies the data for the given hourly interval. May be repeated up to 25 times.
hour	HH	Required field specifying the hour ending value of the hourly interval of the data. Values specified range from 01 through 24.

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Element or Attribute	Data Type	Description
<OfferMW>	MWType	Optional element specifying the MW capability of the regulation for the specified hourly interval. If not specified, regulation capability is zero MW. Negative MW values are not allowed.
<RegulationLimits>	Singleton Type	Optional element specifying the regulation high and low limits in MW for the hourly interval. If not specified, the resource's default regulation high and low limit are used.
minMW	MWType	Specifies the minimum MW limit for regulation service.
maxMW	MWType	Specifies the maximum MW limit for regulation service.
<Unavailable>	Boolean	Optional element specifying whether the resource is available for regulation service during the given hourly interval. Default value is false, meaning that the resource is available.
<SelfScheduled>	Boolean	Optional element specifying whether the resource's regulation is self-scheduled during the specified hourly interval. Default value is false, meaning that it is not self-scheduled.
<RegDMW>	MWType	Optional element specifying the MW capability of the dynamic regulation for the specified hourly interval. If not specified, dynamic regulation capability is zero MW. Negative MW values are not allowed.
<RegDUnavailable>	Boolean	Optional element specifying whether the dynamic resource is available for regulation service during the given hourly interval. Default value is false, meaning that the resource is available.

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Element or Attribute	Data Type	Description
<RegDSelfScheduled>	Boolean	Optional element specifying whether the dynamic resource's regulation is self-scheduled during the specified hourly interval. Default value is false, meaning that it is not self-scheduled.

6.4.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- Invalid location name or operating day does not exist.

6.4.4 Deleting and Replacing Submitted Data

You may delete or update (replace) data prior to the operating hour of the data. To delete all hours of the effective day and resource location, the following empty <DSRRegulationUpdate> message is submitted:

```
<DSRRegulationUpdate location="xxx" day="yyyy-mm-dd"/>
```


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To delete a given hourly submittal resulting in default values applying for that particular hour, the hourly interval is specified as an empty element as shown below:

```
<DSRRegulationUpdate location="xxx" day="yyyy-mm-dd"
   <DSRRegulationUpdateHourly hour="hh"/>
</DSRRegulationUpdate>
```

Other data may be replaced by specifying the interval parameters according to the submittal definition described above. All parameters must be specified or their default actions apply. For example, to submit a new set of limits without modifying the other existing parameters, such as the <MW> value, you must submit all the other parameters using the same values as before. If they are not specified, the default values will be applied. In the example of the <MW> element, this means that the MW capability is set to zero.

6.4.5 Querying for Submitted Data

You may query for a particular effective day and resource location using the message described below.

To query the market for a submitted DSRRegulation Update data and receive all the hourly intervals submitted:

```
<QueryRequest>
  <QueryDSRRegulationUpdate day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QueryDSRRegulationUpdate>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryDSRRegulationUpdate>	Complex Type	Specifies query for the regulation update data for the given effective operating day.
day	YYYY-MM-DD	Required field specifying the operating day of the data requested.

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Element or Attribute	Data Type	Description
<All>	N/A	Optional field that specifies all submitted regulation offers for the given day shall be returned. If <All/> is specified you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field specifying the location identifier. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing resource location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
  <DSRRegulationUpdateSet>
   <DSRRegulationUpdate location="zzz" day="yyyy-mm-dd">
      ---data---
   </DSRRegulationUpdate>
  </DSRRegulationUpdateSet>
</QueryResponse>
```

The fields and their interpretation for the <DSRRegulationUpdate> are the same as described for the <SubmitRequest> above. A <DSRRegulationUpdate> element is returned for each resource location that satisfies the query request. All hours submitted are returned. All <DSRRegulationUpdate> elements are returned in a single <DSRRegulationUpdateSet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

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6.5 Submit DSR Synch Reserve Offer

6.5.1 Purpose

This message is submitted by an owner of a demand resource to sell synchronized reserve services.

All synchronized reserve offers are locked-in by 6 pm on the day before they take effect.

6.5.2 Message Format

The submit request message format is shown below:

```
<SubmitRequest>
   <DSRSynchReserveOffer location="xxx" day="yyyy-mm-dd">
      <OfferMW>999.9</OfferMW>
      <OfferPrice>999.99</OfferPrice>
      <Available>true</Available>
      <Flexible>true</Flexible>
   </DSRSynchReserveOffer>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<DSRSynchReserveOffer>	Complex Type	Specifies the synchronized reserve offer for the given location and the operating day.
location	Character String	Required field specifying the resource location name.
day	YYYY-MM-DD	Required field specifying the operating day of the schedule offer.
<OfferMW>	MWType	Optional field specifying the spinning reserve offer MW capability. If not specified, the default value is 0. Negative MW values are not allowed.

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Element or Attribute	Data Type	Description
<OfferPrice>	PriceType	Optional field specifying the offer price. If not specified, the default value is 0.00. Negative price values are not allowed.
<Available>	Boolean	Optional field specifying whether condensing is available for this resource. If not specified, the default value is "false".
Flexiable	Boolean	Field specifying whether the resource is flexible or not . if not specified, the default value is “false”

6.5.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- Demand-side resource does not exist

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6.5.4 Deleting and Replacing Submitted Data

You may delete a submitted spinning reserve offer by submitting an empty offer for the same location and day. This is shown in the example below:

```
<DSRSynchReserveOffer location="xxx" day="yyyy-mm-dd"/>
```

To replace or update a spinning reserve offer you merely resubmit the message with updated values.

6.5.5 Querying for Submitted Data

You may query for a particular market day and resource location using the message described below.

To query the for a submitted synchronized reserve offer data use the following query request:

```
<QueryRequest>
  <QueryDSRSynchReserveOffer day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QueryDSRSynchReserveOffer>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryDSRSynchReserveOffer>	Complex Type	Specifies query for the synchronized reserve offer data for the effective operating day.
day	YYYY-MM-DD	Required field specifying the operating day of the data requested.

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Element or Attribute	Data Type	Description
<All/>	N/A	Optional field specifying that all submitted synchronized reserve offers are to be returned. If <All/> is specified, you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field specifying the name of a demand side resource location. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing resourc location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
  <DSRSynchReserveOfferSet>
   <DSRSynchReserveOffer location="zzz" day="yyyy-mm-dd">
      ---data---
   </DSRSynchReserveOffer>
  </DSRSynchReserveOfferSet>
</QueryResponse>
```

The fields and their interpretation for the <DSRSynchReserveOffer> are the same as described for the <SubmitRequest> above. An instance of the <DSRSynchReserveOffer> message is returned for each individual location and date that satisfies the query request. All <DSRSynchReserveOffer> elements are returned in a single <DSRSynchReserveOfferSet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

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6.6 Submit DSR Synch Reserve Update

6.6.1 Purpose

This message is submitted to add or update a demand side resource synchronized reserve override values on an hourly basis.

For changes to take effect you must submit the update prior to the operating hour.

6.6.2 Message Format

The submit request message format is shown below:

```
<SubmitRequest>
   <DSRSynchReserveUpdate location="xxx" day="yyyy-mm-dd">
      <DSRSynchReserveUpdateHourly hour="hh">
         <OfferMW>999.9</OfferMW>
         <Unavailable>xxx</Unavailable>
         <SelfScheduledMW>999.9</SelfScheduledMW>
      </DSRSynchReserveUpdateHourly>
   </DSRSynchReserveUpdate>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<DSRSynchReserveUpdate>	Complex Type	Specifies the synchronized reserve update for the given location and the operating day.
location	Character String	Required field specifying the resource identifier.
day	YYYY-MM-DD	Required field specifying the operating day of the schedule offer.
<DSRSynchReserveUpdateHourly>	Complex Type	Optional element specifying the hourly update interval for the given hour ending.

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Element or Attribute	Data Type	Description
hour	HH	Required field specifying the hourly intervals hour ending value (01 through 24).
<OfferMW>	MWType	Optional element specifying the synchronized reserve MW capability. If not specified then the default value is 0.0. Negative MW values are not allowed.
<Unavailable>	Boolean	Optional element specifying whether the resource is available for synchronized reserve for this hourly interval. The default value is false indicating that the resource is available for synchronized reserve service.
<SelfScheduledMW>	MWType	Optional element specifying the amount of synchronized reserve that is self-scheduled. If not specified then the default value is 0.0.

6.6.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.

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Element or Attribute	Data Type	Description
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- Demand-side resource does not exist

6.6.4 Deleting and Replacing Submitted Data

You may delete a submitted synchronized reserve update for a specified hourly interval by submitting an empty offer for the same location and day and the same interval. This is shown in the example below:

```
<DSRSynchReserveUpdate location="xxx" day="yyyy-mm-dd">
   <DSRSynchReserveUpdateHourly hour="hh"/>
</DSRSynchReserveUpdate>
```

The effect of the message above is to submit the default values for the specified hourly interval which effectively deletes the synchronized reserve offer.

To delete all hours you must supply an empty <DSRSynchReserveUpdateHourly> element for each hour. You can only delete hourly data prior to the operating hour.

To replace or update a synchronized reserve update you merely resubmit the message with updated values.

6.6.5 Querying for Submitted Data

You may query for a particular market day and resource location using the message described below.

To query the for a submitted synchronized reserve update data use the following query request:

```
<QueryRequest>
  <QueryDSRSynchReserveUpdate day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QueryDSRSynchReserveUpdate>
</QueryRequest>
```


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The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryDSRSynchReserveUpdate>	Complex Type	Specifies query for the synchronized reserve update data for the effective operating day.
day	YYYY-MM-DD	Required field specifying the operating day of the data requested.
<All/>	N/A	Optional field specifying that all submitted synchronized reserve updates are to be returned. If <All/> is specified, you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field specifying the name of a resource identifier. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing resource location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

The response to the query request is the QueryResponse message shown below. All hours that have been submitted for synchronized reserve update will be returned.

```
<QueryResponse>
  <DSRSynchReserveUpdateSet>
   <DSRSynchReserveUpdate location="zzz" day="yyyy-mm-dd">
      ---data---
   </DSRSynchReserveUpdate>
  </DSRSynchReserveUpdateSet>
</QueryResponse>
```


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The fields and their interpretation for the <DSRSynchReserveUpdate> are the same as described for the <SubmitRequest> above. An instance of the <DSRSynchReserveUpdate> message is returned for each individual location and date that satisfies the query request. All <DSRSynchReserveUpdate> elements are returned in a single <DSRSynchReserveUpdateSet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

6.7 Submit DSR Day-Ahead Scheduling Reserve Offer

6.7.1 Purpose

This message is submitted by an owner of a demand resource to sell Day-Ahead scheduling reserve services.

If a day-ahead scheduling reserve offer is used in the day-ahead market it must be submitted by 12 Noon on the day before the operating day.

6.7.2 Message Format

The submit request message format is shown below:

```
<SubmitRequest>
   <DSRSchedReserveOffer location="xxx" day="yyyy-mm-dd">
      <OfferPrice>999.99</OfferPrice>
   </DSRSchedReserveOffer>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<DSRSchedReserveOffer>	Complex Type	Specifies the day-ahead scheduling reserve offer for the given location and the operating day.
location	Character String	Required field specifying the resource location name.

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Element or Attribute	Data Type	Description
day	YYYY-MM-DD	Required field specifying the operating day of the schedule offer.
<OfferPrice>	PriceType	Optional field specifying the offer price. If not specified, the default value is 0.00. Negative price values are not allowed.

6.7.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- Demand side resource does not exist

6.7.4 Deleting and Replacing Submitted Data

You may delete a submitted day-ahead scheduling reserve offer by submitting an empty offer for the same location and day. This is shown in the example below:

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```
<DSRSchedReserveOffer location="xxx" day="yyyy-mm-dd"/>
```

To replace or update a day-ahead scheduling reserve offer you merely resubmit the message with updated values.

6.7.5 Querying for Submitted Data

You may query for a particular market day and resource location using the message described below.

To query for a submitted day-ahead scheduling reserve offer data use the following query request:

```
<QueryRequest>
  <QueryDSRSchedReserveOffer day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QueryDSRSchedReserveOffer>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryDSRSchedReserveOffer>	Complex Type	Specifies query for the day-ahead scheduling reserve offer data for the effective operating day.
Day	YYYY-MM-DD	Required field specifying the operating day of the data requested.
<All/>	N/A	Optional field specifying that all submitted synchronized reserve offers are to be returned. If <All/> is specified, you cannot also specify <LocationName> or <PortfolioName>.

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Element or Attribute	Data Type	Description
<LocationName>	Character String	Optional field specifying the name of a demand side resource location. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing resourc location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
  <DSRSchedReserveOfferSet>
   <DSRSchedReserveOffer location="zzz" day="yyyy-mm-dd">
      ---data---
   </DSRSchedReserveOffer>
  </DSRSchedReserveOfferSet>
</QueryResponse>
```

The fields and their interpretation for the <DSRSchedReserveOffer> are the same as described for the <SubmitRequest> above. An instance of the <DSRSchedReserveOffer> message is returned for each individual location and date that satisfies the query request. All <DSRSchedReserveOffer> elements are returned in a single <DSRSchedReserveOfferSet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

6.8 Submit DSR Day-Ahead Scheduling Reserve Update

6.8.1 Purpose

This message is submitted to add or update a demand side resource day-ahead scheduling reserve override values on an hourly basis.

For changes to take effect you must submit the update prior to the operating hour.

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6.8.2 Message Format

The submit request message format is shown below:

```
<SubmitRequest>
   <DSRSchedReserveUpdate location="xxx" day="yyyy-mm-dd">
      <DSRSchedReserveUpdateHourly hour="hh">
         <Eligible>xxx</Eligible>
      </DSRSchedReserveUpdateHourly>
   </DSRSchedReserveUpdate>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<DSRSchedReserveUpdate>	Complex Type	Specifies the day-ahead scheduling reserve update for the given location and the operating day.
location	Character String	Required field specifying the resource identifier.
day	YYYY-MM-DD	Required field specifying the operating day of the schedule offer.
<DSRSchedReserveUpdateHourly>	Complex Type	Optional element specifying the hourly update interval for the given hour ending.
hour	HH	Required field specifying the hourly intervals hour ending value (01 through 24).
<Eligible>	Boolean	Optional element specifying whether the resource is eligible for day-ahead scheduling reserve for this hourly interval. The default value is false indicating that the resource is not eligible for day-ahead scheduling reserve service.

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6.8.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- Demand-Side Resource does not exist

6.8.4 Deleting and Replacing Submitted Data

You may delete a submitted day-ahead scheduling reserve update for a specified hourly interval by submitting an empty offer for the same location and day and the same interval. This is shown in the example below:

```
<DSRSchedReserveUpdate location="xxx" day="yyyy-mm-dd">
   <DSRSchedReserveUpdateHourly hour="hh"/>
</DSRSchedReserveUpdate>
```

The effect of the message above is to submit the default values for the specified hourly interval which effectively deletes the day-ahead scheduling reserve offer.

To delete all hours you must supply an empty <DSRSchedReserveUpdateHourly> element for each hour. You can only delete hourly data prior to the operating hour.

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To replace or update a day-ahead scheduling reserve update you merely resubmit the message with updated values.

6.8.5 Querying for Submitted Data

You may query for a particular market day and resource location using the message described below.

To query for a submitted day-ahead scheduling reserve update data use the following query request:

```
<QueryRequest>
  <QueryDSRSchedReserveUpdate day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QueryDSRSchedReserveUpdate>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryDSRSchedReserveUpdate>	Complex Type	Specifies query for the day-ahead scheduling reserve update data for the effective operating day.
day	YYYY-MM-DD	Required field specifying the operating day of the data requested.
<All/>	N/A	Optional field specifying that all submitted day-ahead scheduling reserve updates are to be returned. If <All/> is specified, you cannot also specify <LocationName> or <PortfolioName>.

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Element or Attribute	Data Type	Description
<LocationName>	Character String	Optional field specifying the name of a resource identifier. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing resource location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

The response to the query request is the QueryResponse message shown below. All hours that have been submitted for day-ahead scheduling reserve update will be returned.

```
<QueryResponse>
  <DSRSchedReserveUpdateSet>
   <DSRSchedReserveUpdate location="zzz" day="yyyy-mm-dd">
      ---data---
   </DSRSchedReserveUpdate>
  </DSRSchedReserveUpdateSet>
</QueryResponse>
```

The fields and their interpretation for the <DSRSchedReserveUpdate> are the same as described for the <SubmitRequest> above. An instance of the <DSRSchedReserveUpdate> message is returned for each individual location and date that satisfies the query request. All <DSRSchedReserveUpdate> elements are returned in a single <DSRSchedReserveUpdateSet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

6.9 Submit Virtual (Inc/Dec) Bid

6.9.1 Purpose

This message format to submit a virtual inc or dec bid at the given pnode and the specified market operating day. All virtual bids must be submitted prior to market close at 12 Noon on the day before the operating day.

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6.9.2 Message Format

The submit request message format is described below.

```
<SubmitRequest>
  <VirtualBid location="xxx" day="yyyy-mm-dd">
    <Increment>
       <VirtualBidHourly hour="hh">
          <BidSegment id="dd">
             <MW>999.9</MW>
             <Price>999.99</Price>
          </BidSegment>
       </VirtualBidHourly>
    </Increment>
    <Decrement>
       <VirtualBidHourly hour="hh">
          <BidSegment id="dd">
             <MW>999.9</MW>
             <Price>999.99</Price>
          </BidSegment>
       </VirtualBidHourly>
    </Decrement>
  </VirtualBid>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<VirtualBid>	Complex Type	Specifies the virtual (inc/dec) bid submitted for the specified market operating date.
location	Character String	Required field specifying the pnode id.
day	YYYY-MM-DD	Required field specifying the market operating day date.
<Increment>	Complex Type	Specifies the hourly bid for increment style virtual bids. Optional. If not specified then there is no increment bid for this location.
<VirtualBidHourly>	Complex Type	Specifies the hourly interval. May be repeated as necessary.

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Element or Attribute	Data Type	Description
hour	HH	Required field specifying the hour ending value for the hourly interval.
<BidSegment>	Complex Type	Specifies a block bid segment specifying a MW quantity and a price cap. This element can be repeated zero to 20 times.
id	Number(999)	Required field specifying the bid segment identifier as an integer number from 1 to N. Segment id numbers do not need to be contiguous nor are they considered ordered.
<MW>	MWType	Required field specifying the inc MW quantity of the bid.
<Price>	MWPrice	Required field specifies the price of the virtual bid segment.
<Decrement>	Complex Type	Optional element specifies the bid segments for a decrement style virtual bid. If not specified, there is no decrement bid for this location. The <VirtualBidHourly> elements are specified in the same manner as described above for the <Increment> element.

6.9.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description

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Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or malformed XML
- Market is not open or market day does not exist.
- Bid location is not valid.
- Other market rule violations.

6.9.4 Deleting and Replacing Submitted Data

You may delete or replace data prior to market close at 12 Noon on the day before the operating day. After market close, data cannot be changed.

To delete all submitted virtual bids, both increment and decrement, at the given location for the specified date, submit the empty element as shown below:

```
<VirtualBid location="zzz" day="yyyy-mm-dd"/>
```

To delete either the increment bids or decrement bids for the location you submit an Increment or Decrement element and then an empty <VirtualBidHourly> element for each hour that includes bids. A delete of the Increment bids for the location and day is shown in the example below.

```
<VirtualBid location="zzz" day="yyyy-mm-dd">
   <Increment>
     <VirtualBidHourly hour="01"/>
     <VirtualBidHourly hour="02"/>
     <VirtualBidHourly hour="03"/>
        …
     <VirtualBidHourly hour="23"/>
     <VirtualBidHourly hour="24"/>
   </Increment>
</VirtualBid>
```


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To delete a single hourly interval bid you submit the <VirtualBidHourly> element as empty for either the Increment or Decrement as shown below: This example deletes all segments for decrement bids at this location and hour.

```
<VirtualBid location="zzz" day="yyyy-mm-dd">
   <Decrement>
      <VirtualBidHourly hour="hh"/>
   </Decrement>
</VirtualBid>
```

To delete a given segment, you specify the BidSegment element as an empty element (not specifying the MW or Price elements). This is tantamount to submitting a null bid segment. The example below shows the deletion of two different decrement bid segments (id of 20 and 36) for the given hour and location.

```
<VirtualBid location="zzz" day="yyyy-mm-dd">
   <Decrement>
      <VirtualBidHourly hour="hh">
         <BidSegment id="20"/>
         <BidSegment id="36"/>
      </VirtualBidHourly>
   </Decrement>
</VirtualBid>
```

To replace a virtual bid, merely resubmit the data. If all bid segments are to be replaced, they must all be specified. If any bid segment id is no longer of need they it must be explicitly deleted prior to replacing data. Bid segments that exist but not replaced in a given submittal are left intact.

6.9.5 Querying for Submitted Data

You may query for a particular effective day and bid locations using the message described below.

To query the system for a submitted virtual bids of a one or more bid location nodes for a given day, the following QueryRequest is used:

```
<QueryRequest>
  <QueryVirtualBid day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PorfolioName>zzz</PortfolioName>
  </QueryVirtualBid>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

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Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryVirtualBid>	Complex Type	Specifies the query for virtual demand bids for the specified market operating day.
day	YYYY-MM-DD	Specifies the market operating day.
<All/>	N/A	Optional field specifying that all submitted virtual bids (incs and decs) are to be returned in the query. If <All/> is specified, you cannot also specify either <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field to specify the desired bid location pricing node id. If not specified, then the portfolio name must be specified for a valid query request. You cannot specify both the location node name and the portfolio name.
<PortfolioName>	CharacterString	Optional field specifying a portfolio to designate the location nodes of the desired query. If not specified then the <LocationName> element must be specified for a valid query. You cannot specify both the portfolio name and the location node name.

The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
  <VirtualBidSet>
   <VirtualBid location="xxx" day="yyyy-mm-dd">
      ---data---
   </VirtualBid>
  </VirtualBidSet>
</QueryResponse>
```


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The fields and their interpretation for the <VirtualBid> are the same as described for the <SubmitRequest> above. A <VirtualBid> element is returned for each effective day and location that satisfies the query request. All <VirtualBid> elements are returned in a single <VirtualBidSet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

6.10 Submit DSR Schedule Offer

6.10.1 Purpose

This message format is for submitting DSR offers to the market. If a schedule offer is used in the day-ahead market it must be submitted by 12 Noon on the day before the operating day.

A schedule offer is submitted as a price curve composed of at most 10 segments. The price curve segments may be interpreted in point-slope fashion or block offer mode. Price curve segments must be submitted in monotonic increasing order.

6.10.2 Message Format

The submit request message format is described below.

```
<SubmitRequest>
  <DSRScheduleOffer location="zzz" schedule="xx" day="yyyy-mm-dd"
slope="xx">
    <OfferSegment MW="999.9" price="99.99"/>
  </DSRScheduleOffer>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<DSRScheduleOffer>	Complex Type	This specifies the schedule offer for the schedule and generator unit location specified. Also, you specify whether the price curve is interpreted as point-slope or block mode.

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Element or Attribute	Data Type	Description
location	Character String	Specifies the load response identifier.
schedule	Numeric(2)	Required field specifying the one digit schedule type (1 through 2).
day	YYYY-MM-DD	Required field specifying the operating day of the schedule offer.
slope	Boolean	Optional field specifying whether the price curve is interpreted as a point slope or block. Point slope is specified by a true value. The default, if not specified, is false, which is a block mode curve.
<OfferSegment>	Singleton Type	Optional element specifying a single segment of the offer price curve. This element can be repeated 0 to 10 times.
MW	MWType	Required field specifies the segment's MW value.
price	PriceType	Required field specifies the segment's offer price in $ per MWH

6.10.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.

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Element or Attribute	Data Type	Description
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- MW values must be positive
- Offer prices may not exceed $1000
- Offer segments must be specified in monotonic increasing order.

6.10.4 Deleting and Replacing Submitted Data

You can delete a schedule offer completely or replace a schedule offer with another offer curve. To delete a schedule offer completely, submit the following empty element:

```
<DSRScheduleOffer location="xxx" schedule="xx" day="yyyy-mm-dd"/>
```

The slope attribute has no meaning on such a delete statement so it is not specified. If it is specified, it is merely ignored.

To replace a schedule offer you specify the schedule offer with all desired price curve segments completely. There is no notion of replacing only part of a schedule offer. You update or modify a schedule offer by replacing it entirely.

6.10.5 Querying for Submitted Data

To query the market for a specific submitted schedule offers, issue the following QueryRequest message:

```
<QueryRequest>
  <QueryDSRScheduleOffer location="xxx" schedule="xx" day="yyyy-mm-dd"/>
</QueryRequest>
```


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The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryDSRScheduleOffer>	Singleton Type	Specifies query for the schedule offer identified by the location, schedule, and day.
location	Character String	Required field specifying the load response name.
schedule	Numeric(2)	Required field specifying the schedule's numeric type code.
day	YYYY-MM-DD	Required field specifying the schedule offers effective operating day.

The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
  <DSRScheduleOfferSet>
    <DSRScheduleOffer location="zzz" schedule="xx" day="yyyy-mm-dd">
      ---data---
    </DSRScheduleOffer>
  </DSRScheduleOfferSet>
</QueryResponse>
```

The fields and their interpretation for the <DSRScheduleOffer> are the same as described for the <SubmitRequest> above. A single instance of <DSRScheduleOfferSet> will be returned containing at most a single instance of <DSRScheduleOffer> as identified by the request parameters. If a schedule offer does not match the query parameters than the <DSRScheduleOfferSet> is returned empty.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

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6.11 Submit DSR Schedule Detail

6.11.1 Purpose

This message format is used to submit supporting data parameters for the DSR schedule.

You can submit a <DSRScheduleDetail> message at any time but to be effective for a particular day it must be received by 12 Noon on the day before the operating day.

6.11.2 This Message Format

The submit request message format is described below.

```
<SubmitRequest>
  <DSRScheduleDetail location="zz" schedule="xx" day="yyyy-mm-dd">
    <Market>xxx</Market>
  </DSRScheduleDetail>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<DSRScheduleDetail>	Complex Type	This element specifies the schedule detail for the given location, schedule name, and operating day.
location	Character String	Required field specifying the load response identifier.
schedule	Numeric(2)	Required field specifying the schedule's numeric type code.
day	YYYY-MM-DD	Required field specifying the operating day.
<Market>	(DayAhead, Balancing, Both)	Optional field specifying the market as being DayAhead, Balancing, or Both (day-ahead and balancing).

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6.11.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- Invalid location name or schedule type code, invalid market date.

6.11.4 Deleting and Replacing Submitted Data

You may update or modify the schedule details at any time prior to being used in the market. To be effective on the operating day, updates must be submitted prior to 12 Noon on the day before the operating day.

Technically, you do not delete schedule detail data though you may submit schedule detail such that the defaults will apply or you replace or update parameter values directly.

6.11.5 Querying for Submitted Data

You may query for a particular market day and generator by location name and specific schedule identifier using the message described below.

```
<QueryRequest>
  <QueryDSRScheduleDetail location="xxx" schedule="xx" day="yyyy-mm-dd"/>
</QueryRequest>
```


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The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryDSRScheduleDetail>	Singleton Type	Specifies query for the schedule offer identified by the location, schedule, and day.
location	Character String	Required field specifying the load response identifier.
schedule	Numeric(2)	Required field specifying the schedule's numeric type code.
day	YYYY-MM-DD	Required field specifying the schedule offers effective operating day.

The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
  <DSRScheduleDetailSet>
    <DSRScheduleDetail location="zzz" schedule="xx" day="yyyy-mm-dd">
      ---data---
    </DSRScheduleDetail>
  </DSRScheduleDetailSet>
</QueryResponse>
```

The fields and their interpretation for the <DSRScheduleDetail> are the same as described for the <SubmitRequest> above. A single instance of the <DSRScheduleDetailSet> is returned containing at most a single instance of <DSRScheduleDetail>. If there are no schedule detail records that match the query parameters then the <DSRScheduleDetailSet> element is returned empty.

To request all schedules associated with a unit location or the locations of a portfolio, execute the following query request.

```
<QueryRequest>
  <QueryAllDSRScheduleDetail day="yyyy-mm-dd" available="xxx" >
    <All/>
    <LocationName>xxx</LocationName>
    <PortfolioName>xxx</PortfolioName>
  </QueryAllDSRScheduleDetail>
```


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```
</QueryRequest>
```

The following table describes each of the elements and attributes in the above <QueryRequest> message.

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryAllDSRScheduleDetail>	Complex Type	Specifies query for the all schedules associated with the given unit location(s).
day	YYYY-MM-DD	Required field specifying the operating day (market date) of the data requested.
available	Boolean	Optional field specifying whether the request is for all schedules or only those schedules available for a particular market date. If specified with true value then the request is for all schedules that are available for the specified market date. If false, then the request is for all schedules defined for the unit location whether they are available or not. If not specified, the default value is false.
<All>	N/A	Optional field that specifies all submitted schedule detail messages for the given day shall be returned. If <All/> is specified you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field specifying the load response identifier. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.

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Element or Attribute	Data Type	Description
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing generator unit location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

The response message of the query request appears as follows:

```
<QueryResponse>
  <AllDSRScheduleDetailSet>
   <DSRScheduleDetail location="zzz" schedule="xx" day="yyyy-mm-dd">
      ---data---
   </DSRScheduleDetail>
  </AllDSRScheduleDetailSet>
</QueryResponse>
```

The <DSRScheduleDetail> data is the same as described above for the first query request format shown. The outer element containing the returned <DSRScheduleDetail> elements is the <AllDSRScheduleDetailSet> element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

6.12 Submit DSR Schedule Selection

6.12.1 Purpose

This message format is used to indicate whether or not a particular DSR's schedule is available on a particular operating day.

You may submit the DSR Schedule Selection message at any time but to be effective is must be received by 12 Noon on the day before the operating day.

6.12.2 Message Format

The submit request message format is described below.

```
<SubmitRequest>
  <DSRScheduleSelection location="xxx" schedule="xx" day="yyyy-mm-dd">
    <Available>xxx</Available>
  </DSRScheduleSelection>
</SubmitRequest>
```


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The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<DSRScheduleSelection>	Complex Type	This specifies the schedule selection for the schedule and load response location specified.
location	Character String	Required field specifying the load response identifier.
schedule	Numeric(2)	Required field specifying the numeric schedule type (1 or 2).
day	YYYY-MM-DD	Required field specifying the operating day of the schedule selection.
<Available>	Boolean	Optional element that specifies the schedule's availability for the given operating day.

6.12.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.

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Element or Attribute	Data Type	Description
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- Location or schedule do not exist

6.12.4 Deleting and Replacing Submitted Data

You do not delete a schedule selection message. Instead, you may resubmit the message with a different value to cancel a previous submission.

6.12.5 Querying for Submitted Data

Two different schedule query requests are provided. You may query for a schedule selection by specifying a particular schedule and DSR name. The result if a single schedule details message that matches the request parameters. Or, you can request all schedules associated with a given DSR in a specified portfolio. The all qualifier can specify all schedules or all of the schedules that are available for a particular market date (day ahead or balancing).

You may query for a particular market day and DSR land schedule using the message described below.

To query the market for a single submitted schedule selection message for a given day, the following QueryRequest is issued:

```
<QueryRequest>
  <QueryDSRScheduleSelection location="xxx" schedule="xx" day="yyyy-mm-
dd"/>
</QueryRequest>
```


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The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryDSRScheduleSelection>	Singleton Type	Specifies query for the schedule selection identified by the location, schedule, and day.
Location	Character String	Required field specifying the DSR identifier.
Schedule	Numeric(2)	Required field specifying the schedule's numeric type code.
day	YYYY-MM-DD	Required field specifying the schedule offers effective operating day.

The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
  <DSRScheduleSelectionSet>
    <DSRScheduleSelection location="zzz" schedule="xx" day="yyyy-mm-dd">
      ---data---
    </DSRScheduleSelection>
  </DSRScheduleSelectionSet>
</QueryResponse>
```

The fields and their interpretation for the <DSRScheduleSelection> are the same as described for the <SubmitRequest> above. A single instance of <DSRScheduleSelectionSet> is returned containing at most a single instance of <DSRScheduleSelection>. If there are no schedules that match the query parameters then the <DSRScheduleSelectionSet> is returned empty.

To request all schedules associated with a unit location or the locations of a portfolio, execute the following query request.

```
<QueryRequest>
  <QueryAllDSRScheduleSelection day="yyyy-mm-dd" available="xxx" >
    <All/>
    <LocationName>xxx</LocationName>
    <PortfolioName>xxx</PortfolioName>
  </QueryAllDSRScheduleDetail>
</QueryRequest>
```


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The following table describes each of the elements and attributes in the above <QueryRequest> message.

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryAllDSRScheduleSelection>	Complex Type	Specifies query for the all schedules associated with the given DSR(s).
Day	YYYY-MM-DD	Required field specifying the operating day (market date) of the data requested.
available	Boolean	Optional field specifying whether the request is for all schedules or only those schedules available for a particular market date. If specified with true value then the request is for all schedules that are available for the specified market date. If false, then the request is for all schedules defined for the unit location whether they are available or not. If not specified, the default value is false.
<All>	N/A	Optional field that specifies all submitted schedule selection messages for the given day shall be returned. If <All/> is specified you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field specifying DSR identifier. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.

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Element or Attribute	Data Type	Description
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing generator unit location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

The response message of the query request appears as follows:

```
<QueryResponse>
  <AllDSRScheduleSelectionSet>
   <DSRScheduleDetail location="zzz" schedule="xx" day="yyyy-mm-dd">
      ---data---
   </DSRScheduleDetail>
  </AllDSRScheduleSelectionSet>
</QueryResponse>
```

The <DSRScheduleSelection> data is the same as described above for the first query request format shown. The outer element containing the returned <DSRScheduleSelection> elements is the <AlDSRlScheduleSelectionSet> element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

6.13 Submit DSR Schedules

6.13.1 Purpose

This message is submitted to associate a schedule with a DSR. Using this message a name and description is given to the schedule associated with a DSR.

Before a schedule can be created (that is, submitting schedule detail) or submitted into the day-ahead market, it must be associated with a DSR.

6.13.2 Message Format

The submit request message format is shown below:

```
<SubmitRequest>
   <DSRSchedules location="xxx">
      <DSRchedule schedule="dd">
         <ScheduleName>xxx</ScheduleName>
         <ScheduleDescription>xxx</ScheduleDescription>
      </DSRSchedule>
```


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```
   </DSRSchedules>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<DSRSchedules>	Complex Type	Specifies the schedules to be associated with the given DSR.
location	Character String	Required field specifying the DSR identifier.
<DSRSchedule>	Complex Type	Optional element specifying a given schedule identified by the schedule code. Repeated as necessary.
schedule	Number(2)	Required field specifying the numeric schedule code from 1 to 2. Only one schedule of each code value can be associated with a DSR.
<ScheduleName>	Character String (8)	Required element specifying the short name of the schedule. This name must be unique among schedules associated with this unit.
<ScheduleDescription>	Character String	Optional element specifying a descriptive string.

6.13.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

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Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- DSR does not exist
- Invalid schedule code.

6.13.4 Deleting and Replacing Submitted Data

You may delete a submitted unit schedule for a specified schedule code by submitting an empty <DSRSchedule>. This is shown in the example below:

```
<DSRSchedules location="xxx">
   <DSRSchedule schedule="2"/>
</DSRSchedules>
```

The effect of the message above is to delete the association between schedule 2 and the specified DSR.

6.13.5 Querying for Submitted Data

You may query for all schedules associated with a given generator unit.

To query the for a submitted unit schedules data use the following query request:

```
<QueryRequest>
  <QueryDSRSchedules>
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QueryDSRSchedules>
</QueryRequest>
```


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The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryDSRSchedules>	Complex Type	Specifies query for the DSR Schedules for the operating day.
day	YYYY-MM-DD	Required field specifying the operating day of the data requested.
<All/>	N/A	Optional field specifying that all DSR resources owned by the participant are to be included in the result set. If <All/> is specified then you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field specifying the name of a DSR. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing DSR names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

The response to the query request is the QueryResponse message shown below.

```
<QueryResponse>
  <DSRSchedulesSet>
   <DSRSchedules location="zzz">
      ---data---
   </DSRSchedules>
  </DSRSchedulesSet>
</QueryResponse>
```

The fields and their interpretation for the <DSRSchedules> are the same as described for the <SubmitRequest> above. An instance of the <DSRtSchedules> message is returned for each

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individual location that satisfies the query request. All <DSRSchedules> elements are returned in a single <DSRSchedulesSet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

6.14 Submit DSR Update

6.14.1 Purpose

This message is submitted to add or update DSR parameters on an hourly basis.

For changes to take effect you must submit the update prior to the operating hour.

6.14.2 Message Format

The submit request message format is shown below.

```
<SubmitRequest>
   <DSRUpdate location="xxx" day="yyyy-mm-dd">
      <DSRUpdateHourly hour="hh">
         <EconomicLimits minMW="999.9" maxMW="999.9"/>
         <CommitStatus>xxx</CommitStatus>
      </DSRUpdateHourly>
   </DSRUpdate>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<DSRUpdate>	Complex Type	Specifies the update for the given location and the operating day.
location	Character String	Required field specifying the DSR identifier.
day	YYYY-MM-DD	Required field specifying the operating day.

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Element or Attribute	Data Type	Description
<DSRUpdateHourly>	Complex Type	Optional element specifying the hourly update interval for the given hour ending.
hour	HH	Required field specifying the hourly intervals hour ending value (01 through 24).
<EconomicLimits>	Singleton Type	Optional element specifying the economic limits for the hourly interval. If not specified, the unit default limits apply.
minMW	MWType	Optional field specifying the minimum energy limit. If not specified, the unit default value shall be used.
maxMW	MWType	Optional field specifying the maximum energy limit. If not specified, the unit default value shall be used.
<EmergencyLimits>	Singleton Type	Optional element specifying the emergency limits for the hourly interval. If not specified, the unit default limits apply.
minMW	MWType	Optional field specifying the minimum energy limit. If not specified, the unit default value shall be used.
maxMW	MWType	Optional field specifying the maximum energy limit. If not specified, the unit default value shall be used.
<CommitStatus>	(Unavailable, Economic, Emergency, MustRun)	Optional element specifying commit status for the unit for this hourly interval. If not specified, the default is Economic.

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Element or Attribute	Data Type	Description
<FixedGen>	Boolean	Optional element specifying the fixed generation indicator for the unit for this hour. If not specified, the fixed generation value is set to the unit's default fixed generation status.
<DefaultEconomicLimits>	Singleton Type	Optional element specifying the economic default limits for the hourly interval. This is a query result element only, it is not specified on submittal. If specified on submittal, it is ignored.
minMW	MWType	Field specifying the minimum energy limit.
maxMW	MWType	Field specifying the maximum energy limit.
<DefaultEmergencyLimits>	Singleton Type	Optional element specifying the emergency default limits for the hourly interval. This is a query result element only, it is not specified on submittal. If specified on submittal, it is ignored.
minMW	MWType	Field specifying the minimum energy limit.
maxMW	MWType	Field specifying the maximum energy limit.
<NotificationTime>	DeltaHour	Optional element that overrides the daily schedule hot/cold/intermediate notification times.
<PumpStorageLimits>	Singleton Type	Optional element specifying limits associated with pump storage units.
<MinGenMW>	MWType	Optional element specifying the minimum MW dispatch when the unit is in generator mode.

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Element or Attribute	Data Type	Description
<MinPumpMW>	MWType	Optional element specifying the minimum MW dispatch when the unit is in pumping mode.

6.14.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- Location for DSR does not exist
- Limit order is violated as required and shown below:

  Emergency MinMW < Economic MinMW < Economic MaxMW < Emergency MaxMW

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6.14.4 Deleting and Replacing Submitted Data

You may delete a submitted DSR update for a specified hourly interval by submitting an empty update for the same location and day and the same hourly interval. This is shown in the example below:

```
<DSRUpdate location="xxx" day="yyyy-mm-dd">
   <DSRUpdateHourly hour="hh"/>
</DSRUpdate>
```

The effect of the message above is to submit the default values for the specified hourly interval which effectively deletes the unit update.

To delete all hours you must supply an empty <DSRUpdateHourly> element for each hour. You can only delete hourly data prior to the operating hour.

To replace or update a DSR update you merely resubmit the message with updated values.

6.14.5 Querying for Submitted Data

You may query for a particular market day and DSR location using the message described below.

To query the for a submitted DSR update data use the following query request:

```
<QueryRequest>
  <QueryDSRUpdate day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QueryDSRUpdate>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryDSRUpdate>	Complex Type	Specifies query for the unit update data for the effective operating day.
day	YYYY-MM-DD	Required field specifying the operating day of the data requested.

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Element or Attribute	Data Type	Description
<All/>	N/A	Optional field specifying that all units owned by the participant are to be included in the result set. If <All/> is specified then you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field specifying the name of a generator unit cptu identifier. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing generator unit location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

The response to the query request is the QueryResponse message shown below. All hours that have been submitted for unit update will be returned.

```
<QueryResponse>
  <DSRUpdateSet>
   <DSRUpdate location="zzz" day="yyyy-mm-dd">
      ---data---
   </DSRUpdate>
  </DSRUpdateSet>
</QueryResponse>
```

The fields and their interpretation for the <DSRUpdate> are the same as described for the <SubmitRequest> above. An instance of the <DSRUpdate> message is returned for each individual location and date that satisfies the query request. All <DSRUpdate> elements are returned in a single <DSRUpdateSet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

6.15 Submit Up To Transactions

6.15.1 Purpose

This message is submitted to add or update Up To Transactions on an hourly basis.

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All Up to Transactions must be submitted prior to market close at 12 Noon on the day before the operating day.

6.15.2 Message Format

The submit request message format is shown below.

```
<SubmitRequest>
   <UpToTransaction TransactionID="9999.1" day="yyyy-mm-dd"
sourceLocation="ssss" sinkLocation="ssss">
      <UpToTransactionHourly hour="hh">
         <MW>999.9</MW>
         <Price>999.99</Price>
      </UpToTransactionHourly>
   </UpToTransaction>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<UpToTransaction>	Complex Type	Specifies the Up To Transaction for the given source and sink locations and the operating day.
TransactionID	Numeric	The ID of the Up To Transaction to update. If not specified, it indicates a new up to transaction needs to be created. If the ID is specified but not found a new up to transaction will also be created. ***NOTE: To differentiate between existing Up To Transactions which came from external interfaces and the ones to be created by this interface, the ID must end with a single decimal (eg. 123456.7)***
day	YYYY-MM-DD	Required field specifying the operating day.

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Element or Attribute	Data Type	Description
sourceLocation	Character String	Field specifying the Source identifier. Optional if updating, required if creating new up to transaction.
sinkLocation	Character String	Field specifying the Sink identifier. Optional if updating, required if creating new up to transaction.
<UpToTransactionHourly>	Complex Type	Optional element specifying the hourly values for the up to transaction for the given hour ending.
hour	HH	Required field specifying the hourly intervals hour ending value (01 through 24).
MW	MWType	Optional field specifying the MW amount for the hour.
Price	MWPriceType	Optional field specifying the Price amount for the hour.

6.15.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.

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Element or Attribute	Data Type	Description
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. ***NOTE: Not to confuse with the Up To Transaction identifier. Always returned.***

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML.
- Market is not open or market day does not exist.
- Source and Sink are the same.
- Up To Transaction to be updated is not a Willing to Pay Up To Transaction.
- Participant does not match the Participant for the Up To Transaction to update.
- Source and Sink are required when creating a new Up To Transaction.
- Updating source/sink location(s) not allowed.
- Source/Sink location(s) not transaction eligible.
- Unknown Source/Sink location(s).

6.15.4 Deleting and Replacing Submitted Data

You may delete or replace data prior to market close at 12 Noon on the day before the operating day. After market close, data cannot be changed.

Up To Transactions can not be deleted as a whole once they exist. You may delete hourly values by submitting an empty update for the same transaction id and day and the same hourly interval. This is shown in the example below:

```
<SubmitRequest>
   <UpToTransaction TransactionID="9999.1" day="yyyy-mm-dd"
sourceLocation="ssss" sinkLocation="ssss">
      <UpToTransactionHourly hour="hh"/>
   </UpToTransaction>
</SubmitRequest>
```

The message above deletes (nullifies) the hourly value passed.

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To delete all hours you must supply an empty <UpToTransaction> element for the desired operating day. This is shown in the example below:

```
<SubmitRequest>
   <UpToTransaction TransactionID= "9999.1" day="yyyy-mm-dd"
sourceLocation= "ssss" sinkLocation= "ssss"/>
</SubmitRequest>
```

To replace or update an Up To Transaction you merely resubmit the message with updated values.

6.15.5 Querying for Submitted Data

You may query for a particular Up To Transaction using either a transaction id and market day or for a source/sink location(s) and day using the message described below.

To query for a submitted Up To Transaction data using a Transaction ID use the following query request:

```
<QueryRequest>
  <QueryUpToTransactions day="yyyy-mm-dd">
     <TransactionID>999999.9</TransactionID>
  </QueryUpToTransactions>
</QueryRequest>
```

To query for a submitted Up To Transaction data using Source/Sink locations use the following query request:

```
<QueryRequest>
  <QueryUpToTransactions day="yyyy-mm-dd">
     <SourceLocation>ssss</SourceLocation>
     <SinkLocation>sss</SinkLocation>
  </QueryUpToTransactions>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryUpToTransactions>	Complex Type	Specifies query for the Up To Transaction data for the effective operating day.

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Element or Attribute	Data Type	Description
day	YYYY-MM-DD	Required field specifying the operating day of the data requested.
<TransactionID>	Numeric	Optional field specifying the ID of the Up To Transaction to query. If specified, overrides the source/sink values, this is, the results are based on the ID and not on the other values provided.
<SourceLocation>	Character String	Optional field specifying the source identifier. If not specified (and a transaction id has not been specified either) then all hourly values for Up To Transactions with data for that day will be returned. If a transaction id has been specified, this value is disregarded.
<SinkLocation>	Character String	Optional field specifying the sink identifier. If not specified (and a transaction id has not been specified either) then all hourly values for Up To Transactions with data for that day will be returned. If a transaction id has been specified, this value is disregarded.

The response to the query request is the QueryResponse message shown below. All hours that have been submitted for unit update will be returned.

```
<QueryResponse>
   <UpToTransactionSet>
      <UpToTransaction TransactionID="9999.1" day="yyyy-mm-dd"
sourceLocation= "ssss" sinkLocation= "ssss">
         --- data ---
      </UpToTransaction>
   </UpToTransactionSet>
</QueryResponse>
```

The fields and their interpretation for the <UpToTransaction> are the same as described for the <SubmitRequest> above. An instance of the <UpToTransaction> message is returned for each individual Up To Transaction that satisfies the query request. All <UpToTransaction> elements are returned in a single <UpToTransactionSet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

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6.16 Submit Price-Responsive-Demand (PRD) Hourly Data

6.16.1 Purpose

This message is submitted to add or update parameters for a price-responsive-demand (PRD) resource on an hourly basis.

All parameter values must be submitted at most 3 hours before the operating hour.

6.16.2 Message Format

The submit request message format is shown below.

```
<SubmitRequest>
   <PRDHourlyDaily location="ssss" day="yyyy-mm-dd">
      <PRDHourly hour="hh">
         <MaxMW>999.9</MaxMW>
         <MinMW>999.9</MinMW>
         <UpResponseRate>999.99</UpResponseRate>
         <DownResponseRate>999.99</DownResponseRate>
      </PRDHourly>
   </PRDHourlyDaily>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<PRDHourlyDaily>	Complex Type	Specifies the hourly values for the given location and the operating day.
location	Character String	Required field specifying the PRD identifier.
day	YYYY-MM-DD	Required field specifying the operating day.
<PRDHourly>	Complex Type	Optional element specifying the hourly values for the PRD for the given hour ending.

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Element or Attribute	Data Type	Description
hour	HH	Required field specifying the hourly intervals hour ending value (01 through 24).
MaxMW	MWType	Required field specifying the Maximum MW amount for the hour.
MinMW	MWType	Required field specifying the Minimum MW amount for the hour.
UpResponseRate	MWType	Optional field specifying the Up Response Rate for the hour.
DownResponseRate	MWType	Optional field specifying the Down Response Rate for the hour.

6.16.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

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- Invalid or improper XML.
- Market day is not open or hour not open or market day does not exist.
- Location for Price-Responsive-Demand resource does not exist.

6.16.4 Deleting and Replacing Submitted Data

You may delete or replace data up to 3 hours prior of the operating hour being changed.

You may delete the submitted parameters for a specified hourly interval by submitting an empty update for the same location and day and the same hourly interval. This is shown in the example below:

```
<PRDHourlyDaily location="xxx" day="yyyy-mm-dd">
   <PRDHourly hour="hh"/>
</PRDHourlyDaily>
```

To delete all hours you must supply an empty <PRDHourlyDaily> element. You can only delete hourly data 3 hours prior to the operating hour.

To replace or update the submitted parameters for an hour you merely resubmit the message with updated values

6.16.5 Querying for Submitted Data

You may query for the particular hourly values for a PRD using the message described below.

```
<QueryRequest>
  <QueryPRDHourly day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QueryPRDHourly>
</QueryRequest>
```


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The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryPRDHourly>	Complex Type	Specifies query for the hourly values of the PRD for the effective operating day.
day	YYYY-MM-DD	Required field specifying the operating day of the data requested.
<All/>	N/A	Optional field specifying that all submitted hourly values for all PRDs are to be returned. If <All/> is specified, you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field specifying the name of a resource identifier. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing resource location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

The response to the query request is the QueryResponse message shown below. All hours that have been submitted for unit update will be returned.

```
<QueryResponse>
   <PRDHourlyDailySet>
      <PRDHourlyDaily location="ssss" day="yyyy-mm-dd" >
         --- data ---
      </PRDHourlyDaily>
   </PRDHourlyDailySet>
</QueryResponse>
```


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The fields and their interpretation for the <PRDHourlyDaily> are the same as described for the <SubmitRequest> above. An instance of the <PRDHourlyDaily> message is returned for each individual PRD that satisfies the query request. All <PRDHourlyDaily> elements are returned in a single <PRDHourlyDailySet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

6.17 Submit Price-Responsive-Demand (PRD) Response Curve

6.17.1 Purpose

This message format is used to submit the response curve for a price-responsive-demand (PRD) resource. It must be submitted by 12 noon on the day before the operating day and also during the re-bid period of the operating day.

It is submitted as a price curve. Price curve segments must be submitted in monotonic increasing order.

6.17.2 Message Format

The submit request message format is shown below.

```
<SubmitRequest>
   <PRDResponseCurve location="ssss" day="yyyy-mm-dd">
      <PRDResponseCurveHourly hour="hh">
         <PRDResponseCurveSegment id="dd">
            <MW>9999.9</MW>
            <Price>999.99</Price>
         </PRDResponseCurveSegment>
      </PRDResponseCurveHourly>
   </PRDResponseCurve>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<PRDResponseCurve>	Complex Type	Specifies the response curve for the given location and the operating day.

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Element or Attribute	Data Type	Description
location	Character String	Required field specifying the PRD identifier.
day	YYYY-MM-DD	Required field specifying the operating day.
<PRDResponseCurveHourly>	Complex Type	Optional element specifying the response curve for the PRD for the given hour ending.
hour	HH	Required field specifying the hourly intervals hour ending value (01 through 24).
<PRDResponseCurveSegment>	Complex Type	Optional element that specifies an incremental energy in MW at the given price. May be repeated as needed.
id	Number(999)	Required field specifying the segment identifier as a number from 1 to 999. Segment numbers must be unique but not necessarily contiguous.
<MW>	MWType	Optional element that specifies the incremental energy for this pricing segment. If not specified then <Price> cannot be specified either to trigger delete logic (see next section on delete).
<Price>	MWPrice	Optional element that specifies the price in dollars per MW. If not specified then <MW> cannot be specified either to trigger delete logic (see next section on delete).

6.17.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
```


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```
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML.
- Market day is not open or hour not open or market day does not exist.
- Location for Price-Responsive-Demand resource does not exist.
-

6.17.4 Deleting and Replacing Submitted Data

To delete the submitted response curve for a given PRD location, the <PRDResponseCurve> element is submitted as an empty set as shown below:

```
<PRDResponseCurve location="xxx" day="yyyy-mm-dd" />
```

A delete may only be specified prior to market close at 12 Noon on the day before the operating day or during the re-bid period of the operating day.

To delete the response curve for a given hourly interval, you specify the hourly interval as an empty set as shown in the example below:

```
<PRDResponseCurve location="xxx" day="yyyy-mm-dd">
   <PRDResponseCurveHourly hour="hh"/>
</PRDResponseCurve>
```


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Individual curve segments can be deleted by submitting empty PRDResponseCurveSegment elements as shown below for only those segments to be deleted. Other curve segments not included are left in place.

```
<PRDResponseCurve location="xxx" day="yyyy-mm-dd">
   <PRDResponseCurveHourly hour="hh">
      <PRDResponseCurveSegment id="3"/>
   </PRDResponseCurveHourly>
</PRDResponseCurve>
```

Data may be replaced merely by resubmitting any portion of data to be modified. To replace all segments of the curve with new segments (possibly with new segment id) the previous segments should be deleted. Segments that are not deleted are replaced by new data if the same segment id is used. If a segment is not deleted and it is not replaced by a message then it is left intact.

6.17.5 Querying for Submitted Data

You may query for the particular response curve for a PRD using the message described below.

```
<QueryRequest>
  <QueryPRDResponseCurve day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QueryPRDResponseCurve>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryPRDHourly>	Complex Type	Specifies query for the response curve of the PRD for the effective operating day.
day	YYYY-MM-DD	Required field specifying the operating day of the data requested.
<All/>	N/A	Optional field specifying that all submitted hourly values for all PRDs are to be returned. If <All/> is specified, you cannot also specify <LocationName> or <PortfolioName>.

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Element or Attribute	Data Type	Description
<LocationName>	Character String	Optional field specifying the name of a resource identifier. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing resource location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

The response to the query request is the QueryResponse message shown below. All hours that have been submitted for unit update will be returned.

```
<QueryResponse>
   <PRDResponseCurveSet>
      <PRDResponseCurve location="ssss" day="yyyy-mm-dd">
         --- data ---
      </PRDResponseCurve>
   </PRDResponseCurveSet>
</QueryResponse>
```

The fields and their interpretation for the <PRDResponseCurve> are the same as described for the <SubmitRequest> above. An instance of the <PRDResponseCurve> message is returned for each individual PRD that satisfies the query request. All <PRDResponseCurve> elements are returned in a single <PRDResponseCurveSet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

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7 Generator Participant Data Submittal

The generator participant data submittal formats are described in this section. These message formats are used by generator companies for submitting their day-ahead market schedule offer, regulation offer, spinning reserve offer and other supporting generator information.

The following table summarizes the data submittal and queries described in this chapter.

`RegulationOffer` `QueryRegulationOffer`	This message is used to submit a regulation offer into the day-ahead market. All regulation offers are locked in by 6 pm on the day before they take effect. Regulation offers that have been submitted by the participant may be queried by the participant at anytime using the QueryRegulationOffer message.
`RegulationUpdate` `QueryRegulationUpdate`	This message is used to submit the hourly override values for the generator regulation parameters. This message must be submitted by 12 Noon on the day before the operating day. Regulation update data that has been submitted by the participant may be queried by the participant at anytime using the QueryRegulationUpdate message.
`ScheduleOffer` `QueryScheduleOffer`	This message is used by generators to submit their schedule offer into the market. If a schedule offer is to be used in the day-ahead market, it must be submitted by 12 Noon on the day before the operating day. Schedule offer data submitted by the participant can be queried by the participant at anytime using the QueryScheduleOffer message.
`ScheduleDetail` `QueryScheduleDetail`	This message is to provide detailed parameter values for a specified schedule. You can submit schedule detail data at anytime but to be effective for the day-ahead market, it must be submitted by 12 Noon on the day before the operating day. You may query schedule detail data at anytime using the QueryScheduleDetail message.

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ScheduleReserveOffer QueryScheduleOffer	This message is used to submit a day-ahead scheduling reserve offer into the day-ahead market. All day-ahead scheduling reserve offers are locked in by 12 Noon on the day before the operating day. Day-ahead scheduling reserve offers that have been submitted by the participant may be queried by the participant at anytime using the QuerySchedReserveOffer message
ScheduleSelection QueryScheduleSelection	This message is used to indicate which schedules are available for a particular operating day. You may submit the ScheduleSelection message at any time but to be effective for the day-ahead market, it must be submitted by 12 Noon on the day before the operating day. You may query schedule selection data at anytime using the QueryScheduleSelection message.
SpinningReserveOffer QuerySpinningReserveOffer	This message is used by a generator to submit spinning reserve service offers. All spinning reserve offers are locked in by 6 pm on the day before they take effect. You may query the spinning reserve offer you submitted at anytime using the QuerySpinningReserveOffer message.
SpinningReserveUpdate QuerySpinningReserveUpdate	This message is used to provide hourly updates or overrides to the spinning reserve values. You may submit this data at any time but to be effective in the day-ahead market it must be submitted before the specified operating hour. You may query any spinning reserve update data you submitted at any time using the QuerySpinningReserveUpdate message.
UnitDetail QueryUnitDetail	This message is used to provide generator operational parameters. You can submit unit detail values at anytime but for data to be effective in the day-ahead market it must be submitted by 12 Noon on the day before the operating day. You may query unit detail data at any time using the QueryUnitDetail message.

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UnitSchedules QueryUnitSchedules	This message is used by generator owners to associate a schedule with a generator unit.
UnitUpdate QueryUnitUpdate	This message is used to add or modify a generator unit's limits and commit status for the specified hours. This message may be submitted at anytime but to be effective for the operating hour it must be submitted prior to that hour. You may query submitted data at anytime using the QueryUnitUpdate message.
WeatherForecast	This message is used to submit the weather forecast at identified locations within the participant's area of influence. These weather forecasts are used to support the temperature sensitive limits defined for some generator units. The submitted forecast may be queried using the QueryWeatherForecast message.
ExceptionParameterLimits QueryExceptionParameterLimits	This message is used to submit an exception to the standing parameters limits for a generation resource. The submitted execption parameter limits may be queried using the QueryExceptionParameterLimits message.
WindForecastHourly QueryWindForecast	This message is used to query the wind forecast for an identified location for a hours of a given day.

All data submit actions are executed under transaction control and a transaction identifier is associated with each submittal request. This transaction identifier has limited lifetime (~months) and is provided so that data submitted by an earlier message can be easily retrieved or used as a reference for any dispute resolution with PJM.

The data submit is initiated using a data submit request element as shown below. This submit request is the payload that is enclosed by the SOAP Body element. Only one such submit request element can be specified. The SubmitRequest may contain one or more instances of individual data elements containing the submitted data.

Example of submit of data day-ahead or real-time market:

```
<?xml version="1.0"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
<env:Header/>
<env:Body>
   <SubmitRequest xmlns="http://emkt.pjm.com/emkt/xml">
      <ScheduleOffer>
```


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```
          -- elements of offer --
      </ScheduleOffer>
      <ScheduleSelection>
          -- elements of schedule selection --
      </ScheduleSelection>
      …
   </SubmitRequest>
</env:Body>
</env:Envelope>
```

The data submit messages defined later in this chapter do not include the XML namespace prefix as shown in the example above. You may choose your prefix according to the XML specification.

The response message is always returned as a SOAP wrapped payload indicating either success or error. The success indicator is the same for all types of data submit. The successful submit always has the same format as shown below:

```
<?xml version="1.0"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
<env:Header/>
<env:Body>
   <SubmitResponse xmlns="http://emkt.pjm.com/emkt/xml">
      <Success>
         <TransactionID>Abee3433</TransactionID>
      </Success>
   </SubmitResponse>
</env:Body>
</env:Envelope>
```

The format for each of the submit requests follows the same naming conventions.

The following example shows an error response as a result of some problems in the submit:

```
<?xml version="1.0"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
<env:Header/>
<env:Body>
   <SubmitResponse xmlns="http://emkt.pjm.com/emkt/xml">
      <Error>
         <Code>BlueGreen</Code>
         <Text>Market does not exist</Text>
      </Error>
   </SubmitResponse>
</env:Body>
</env:Envelope>
```

All private submit requests must be issued to the appropriate URL using the correct namespaces as documented in each section below.

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7.1 Submit Regulation Offer

7.1.1 Purpose

This message format is used to submit a regulation offer for the specified location which is a generator unit. The location is specified using the CPTU generator identifier.

All regulation offers are locked in by 6 pm on the day before they take effect. Regulation offers maybe submitted or updated at anytime prior to 6 pm of the day before the operating day.

7.1.2 Message Format

The submit message format is described below.

```
<SubmitRequest>
  <RegulationOffer location="zz" day="yyyy-mm-dd">
    <OfferMW>9999.9</OfferMW>
    <OfferPrice>999.99</OfferPrice>
    <OfferCost>999.99</OfferCost>
    <Unavailable>xxx</Unavailable>
    <SelfScheduled>xxx</SelfScheduled>
    <MinimumMW>9999999.9</MinimumMW>
    <EcoMaxHeatRate>99999.999</EcoMaxHeatRate>
    <RegMinHeatRate>99999.999</RegMinHeatRate>
    <VOMRate>999999.99</VOMRate>
    <FuelCost>999999.99</FuelCost>
    <EnergyStorageLoss>99999999.999</ EnergyStorageLoss>
    <RegType>x</RegType>
    <PerformanceOfferPrice>999.99</PerformanceOfferPrice>
    <PerformanceOfferCost>999.99</PerformanceOfferCost>
  </RegulationOffer>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<RegulationOffer>	Complex Type	The element specifies the regulation offer for the given generator location and the operating day.
location	Character String	Required field specifying the generator location as the generator CPTU name.

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Element or Attribute	Data Type	Description
day	YYYY-MM-DD	Required field specifying the operating day.
<OfferMW>	MWType	Optional element specifying the regulation offer MW capability. If not specified then a zero MW value is used. Negative MW values are not allowed.
<OfferPrice>	PriceType	Optional element specifying the regulation offer price in $ per MWH. If not specified then a zero price is assumed. Negative price values are not allowed.
<OfferCost>	PriceType	Optional element specifying the regulation offer cost in $ per MWH.
<Unavailable>	Boolean	Optional element specifying whether the unit is available for providing regulation. If specified as "true" then the generator unit is not available. The default value is "false".
<SelfScheduled>	Boolean	Optional element specifying whether the regulation is being self-scheduled. If not specified, the default value is "false".
<MinimumMW>	MWOfferType	Optional element specifying the mimimum regulation amount that must be assigned. If not specified then an amount of zero is assumed.
<EcoMaxHeatRate>	HeatRateType	Optional element specifying the heat rate at economic maximum. Used to validate offer cost.
<RegMinHeatRate>	HeatRateType	Optional element specifying the heat rate at regulation minimum. Used to validate offer cost.
<VOMRate>	VOMRateType	Optional element specifying the VOM rate for the unit. Used to validate offer cost.

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Element or Attribute	Data Type	Description
<FuelCost>	FuelCostType	Optional element specifying the fuel cost. Used to validate offer cost.
< EnergyStorageLoss>	MWType3Decimal	Optional element specifying the enery storage loss for batteries and flywheel resources.
<RegType>	RegType	Required field, Valid values are A for tradional resources and D for dynamic resources.
<PerformanceOfferPrice>	PriceType	Optional element specifying the performance offer price in $ per MWH. If not specified then a zero price is assumed. Negative price values are not allowed.
<PerformanceOfferCost>	PriceType	Optional element specifying the performance offer cost in $ per MWH.

7.1.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

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- Invalid or improper XML
- Invalid location or day.
- Violations of business rules.

7.1.4 Deleting and Replacing Submitted Data

You can delete a regulation offer if the delete occurs prior to the lock-in time of 6 pm on the day before the operating day. To delete a regulation offer, you supply the following message format within the <SubmitRequest> element:

```
<RegulationOffer location="xxx" day="yyyy-mm-dd"/>
```

To replace or update a regulation offer, the data must be resubmitted as desired.

7.1.5 Querying for Submitted Data

You may query for a particular generator locatioin using the message described below.

To query the for submitted Regulation Offer data the following QueryRequest is issued:

```
<QueryRequest>
  <QueryRegulationOffer day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QueryRegulationOffer>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryRegulationOffer>	Complex Type	Specifies the query for the regulation offer for the specified operating day.
day	YYYY-MM-DD	Required field specifying the operating day of the regulation offer data.

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Element or Attribute	Data Type	Description
<All/>	N/A	Optional field that specifies all submitted regulation offers for the given day shall be returned. If <All/> I specified you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field for specifying the generator cptu identifier. If specified, you cannot also specify the <PortfolioName>. You must specify either the <LocationName> or the <PortfolioName>.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing generator location names. If specified, you cannot also specify the <LocationName>. You must specify either the <PortfolioName> or the <LocationName>.

The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
  <RegulationOfferSet>
   <RegulationOffer location="zzz" day="yyyy-mm-dd">
      ---data---
       <PerformanceScore>9.999999</PerformanceScore>
      ---data---
   </RegulationOffer>
  </RegulationOfferSet>
</QueryResponse>
```

Note: The Performance Score posted in this section is based on a 100-hour rolling avagerage of verified unit-specific performance scores. This element is being shown in the query response above and not in the message format section because this is a read only element and is not part of the submit request message.

The fields and their interpretation for the <RegulationOffer> are the same as described for the <SubmitRequest> above. A <RegulationOffer> element is returned for each location and each day that satisfies the query request. All <RegulationOffer> elements are returned in a single <RegulationOfferSet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

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7.2 Submit Regulation Update

7.2.1 Purpose

This message is used to add or update details of a generator unit's regulation by overriding values on an hourly basis.

You may submit a Regulation Update message at any time but for the data to be effective during the operating day it must be submitted prior to the operating hour.

7.2.2 Message Format

The submit request message format is described below.

```
<SubmitRequest>
  <RegulationUpdate location="zzz" day="yyyy-mm-dd">
     <RegulationUpdateHourly hour="hh">
        <MW>9999.9</MW>
        <RegulationLimits minMW="9999.9" maxMW="9999.9"/>
        <Unavailable>xxx</Unavailable>
        <SelfScheduled>xxx</SelfScheduled>
        <Spilling>xxx</Spilling>
        <RegDMW>9999.9</RegDMW>
        <RegDUnavailable>xxx</RegDUnavailable>
        <RegDSelfScheduled>xxx</RegDSelfScheduled>
        <ReducedRampRatePct>999</ReducedRampRatePct>
     </RegulationUpdateHourly>
  </RegulationUpdate>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<RegulationUpdate>	Complex Type	This element specifies the regulation update data at a given location and operating day.
location	Character String	Required field specifying the generator unit location CPTU name.
day	YYYY-MM-DD	Required field specifying the operating day of the data.

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Element or Attribute	Data Type	Description
<RegulationUpdateHourly>	Complex Type	Specifies the data for the given hourly interval. May be repeated up to 25 times.
hour	HH	Required field specifying the hour ending value of the hourly interval of the data. Values specified range from 01 through 24.
<MW>	MWType	Optional element specifying the MW capability of the regulation for the specified hourly interval. If not specified, regulation capability is zero MW. Negative MW values are not allowed.
<RegulationLimits>	Singleton Type	Optional element specifying the regulation high and low limits in MW for the hourly interval. If not specified, the generator unit's default regulation high and low limit are used.
minMW	MWType	Specifies the minimum MW limit for regulation service.
maxMW	MWType	Specifies the maximum MW limit for regulation service.
<Unavailable>	Boolean	Optional element specifying whether the generator unit is available for regulation service during the given hourly interval. Default value is false, meaning that the unit is available.
<SelfScheduled>	Boolean	Optional element specifying whether the generator unit's regulation is self-scheduled during the specified hourly interval. Default value is false, meaning that it is not self-scheduled.
<Spilling>	Boolean	Optional element specifying whether the generator unit is in spilling mode for the hourly interval. Default value is false, meaning that the unit is not in spilling mode.

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Element or Attribute	Data Type	Description
<RegDMW>	MWType	Optional element specifying the MW capability of the regulation for a dynamic resource for the specified hourly interval If not specified, regulation capability is zero MW. Negative MW values are not allowed.
<RegDUnavailable>	Boolean	Optional element specifying whether the dynamic generator unit is available for regulation service during the given hourly interval. Default value is false, meaning that the unit is available.
<RegDSelfScheduled>	Boolean	Optional element specifying whether the dynamic generator unit's regulation is self-scheduled during the specified hourly interval. Default value is false, meaning that it is not self-scheduled.
<ReducedRampRatePct>	ReducedRampRatePctType	Optional elment specifying the percentage (0-100) of the reduced energy ramp rate

7.2.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.

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Element or Attribute	Data Type	Description
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- Invalid location name or operating day does not exist.
- MW limit values violate order check shown below:

  Emergency Min < Economic Min < Regulation Min < Regulation Max <

  Economic Max < Emergency Max

7.2.4 Deleting and Replacing Submitted Data

You may delete or update (replace) data prior to the operating hour of the data. To delete all hours of the effective day and generator unit location, the following empty <RegulationUpdate> message is submitted:

```
<RegulationUpdate location="xxx" day="yyyy-mm-dd"/>
```

To delete a given hourly submittal resulting in default values applying for that particular hour, the hourly interval is specified as an empty element as shown below:

```
<RegulationUpdate location="xxx" day="yyyy-mm-dd"
   <RegulationUpdateHourly hour="hh"/>
</RegulationUpdate>
```

Other data may be replaced by specifying the interval parameters according to the submittal definition described above. All parameters must be specified or their default actions apply. For example, to submit a new set of limits without modifying the other existing parameters, such as the <MW> value, you must submit all the other parameters using the same values as before. If they are not specified, the default values will be applied. In the example of the <MW> element, this means that the MW capability is set to zero.

7.2.5 Querying for Submitted Data

You may query for a particular effective day and generator unit location using the message described below.

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To query the market for a submitted Regulation Update data and receive all the hourly intervals submitted:

```
<QueryRequest>
  <QueryRegulationUpdate day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QueryRegulationUpdate>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryRegulationUpdate>	Complex Type	Specifies query for the regulation update data for the given effective operating day.
day	YYYY-MM-DD	Required field specifying the operating day of the data requested.
<All>	N/A	Optional field that specifies all submitted regulation offers for the given day shall be returned. If <All/> I specified you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field specifying the generator cptu identifier. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing generator unit location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

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The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
  <RegulationUpdateSet>
   <RegulationUpdate location="zzz" day="yyyy-mm-dd">
      ---data---
   </RegulationUpdate>
  </RegulationUpdateSet>
</QueryResponse>
```

The fields and their interpretation for the <RegulationUpdate> are the same as described for the <SubmitRequest> above. A <RegulationUpdate> element is returned for each generator unit location that satisfies the query request. All hours submitted are returned. All <RegulationUpdate> elements are returned in a single <RegulationUpdateSet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

7.3 Submit Day-Ahead Scheduling Reserve Offer

7.3.1 Purpose

This message format is used to submit a day-ahead scheduling reserve offer for the specified location which is a generator unit. The location is specified using the CPTU generator identifier.

If a day-ahead scheduling reserve offer is used in the day-ahead market it must be submitted by 12 Noon on the day before the operating day.

7.3.2 Message Format

The submit message format is described below.

```
<SubmitRequest>
  <SchedReserveOffer location="zz" day="yyyy-mm-dd">
    <OfferPrice>999.99</OfferPrice>
  </SchedReserveOffer>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.

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Element or Attribute	Data Type	Description
<SchedReserveOffer>	Complex Type	The element specifies the day-ahead scheduling reserve offer for the given generator location and the operating day.
location	Character String	Required field specifying the generator location as the generator CPTU name.
day	YYYY-MM-DD	Required field specifying the operating day.
<OfferPrice>	PriceType	Optional element specifying the day-ahead scheduling reserve offer price in $ per MWH. If not specified then a zero price is assumed. Negative price values are not allowed.

7.3.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML

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- Invalid location or day.

- Violations of business rules.

7.3.4 Deleting and Replacing Submitted Data

You can delete a day-ahead scheduling reserve offer if the delete occurs prior to the lock-in time of 12 noon on the day before the operating day. To delete a day-ahead scheduling reserve offer, you supply the following message format within the <SubmitRequest> element:

```
<SchedReserveOffer location="xxx" day="yyyy-mm-dd"/>
```

To replace or update a day-ahead scheduling reserve offer, the data must be resubmitted as desired.

7.3.5 Querying for Submitted Data

You may query for a particular generator location using the message described below.

To query the for submitted Day-Ahead Scheduling Reserve Offer data the following QueryRequest is issued:

```
<QueryRequest>
  <QuerySchedReserveOffer day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QuerySchedReserveOffer>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QuerySchedReserveOffer>	Complex Type	Specifies the query for the day-ahead scheduling reserve offer for the specified operating day.
day	YYYY-MM-DD	Required field specifying the operating day of the day-ahead scheduling reserve offer data.

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Element or Attribute	Data Type	Description
<All/>	N/A	Optional field that specifies all submitted day-ahead scheduling reserve offers for the given day shall be returned. If <All/> I specified you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field for specifying the generator cptu identifier. If specified, you cannot also specify the <PortfolioName>. You must specify either the <LocationName> or the <PortfolioName>.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing generator location names. If specified, you cannot also specify the <LocationName>. You must specify either the <PortfolioName> or the <LocationName>.

The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
  <SchedReserveOfferSet>
   <SchedReserveOffer location="zzz" day="yyyy-mm-dd">
      ---data---
   </SchedReserveOffer>
  </SchedReserveOfferSet>
</QueryResponse>
```

The fields and their interpretation for the <SchedReserveOffer> are the same as described for the <SubmitRequest> above. A <SchedReserveOffer> element is returned for each location and each day that satisfies the query request. All <SchedReserveOffer> elements are returned in a single <SchedReserveOfferSet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

7.4 Submit Schedule Offer

7.4.1 Purpose

This message format is for submitting generation offers to the market. If a schedule offer is used in the day-ahead market it must be submitted by 12 Noon on the day before the operating day.

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A schedule offer is submitted as a price curve composed of at most 10 segments. The price curve segments may be interpreted in point-slope fashion or block offer mode. Price curve segments must be submitted in monotonic increasing order.

A schedule is uniquely identified by both the generator location CPTU name and the numeric schedule identifier code (1 through 99). For a description of the schedule types that are defined and available for use, see the query message (section 7 of this document) regarding QueryScheduleDefinitions.

7.4.2 Message Format

The submit request message format is described below.

```
<SubmitRequest>
  <ScheduleOffer location="zzz" schedule="xx" day="yyyy-mm-dd" slope="xx">
    <OfferSegment MW="999.9" price="99.99"/>
  </ScheduleOffer>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<ScheduleOffer>	Complex Type	This specifies the schedule offer for the schedule and generator unit location specified. Also, you specify whether the price curve is interpreted as point-slope or block mode.
location	Character String	Required field specifying the generator unit (CPTU) location name.
schedule	Numeric(2)	Required field specifying the one or two digit schedule type (1 through 99).
day	YYYY-MM-DD	Required field specifying the operating day of the schedule offer.
slope	Boolean	Optional field specifying whether the price curve is interpreted as a point slope or block. Point slope is specified by a true value. The default, if not specified, is false, which is a block mode curve.

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Element or Attribute	Data Type	Description
<OfferSegment>	Singleton Type	Optional element specifying a single segment of the offer price curve. This element can be repeated 0 to 10 times.
MW	MWType	Required field specifies the segment's MW value.
price	PriceType	Required field specifies the segment's offer price in $ per MWH

7.4.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- MW values must be positive
- Offer prices may not exceed $1000

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- Offer segments must be specified in monotonic increasing order.

7.4.4 Deleting and Replacing Submitted Data

You can delete a schedule offer completely or replace a schedule offer with another offer curve. To delete a schedule offer completely, submit the following empty element:

```
<ScheduleOffer location="xxx" schedule="xx" day="yyyy-mm-dd"/>
```

The slope attribute has no meaning on such a delete statement so it is not specified. If it is specified, it is merely ignored.

To replace a schedule offer you specify the schedule offer with all desired price curve segments completely. There is no notion of replacing only part of a schedule offer. You update or modify a schedule offer by replacing it entirely.

7.4.5 Querying for Submitted Data

Two different schedule query requests are provided. You may query for a schedule offer by specifying a particular schedule and generator unit name. The result if a single schedule offer that matches the request parameters. Or, you can request all schedules associated with a given unit or the units in a specified portfolio. The all qualifier can specify all schedules or all of the schedules that are available for a particular market date (day ahead or balancing).

To query the market for a specific submitted schedule offers, issue the following QueryRequest message:

```
<QueryRequest>
  <QueryScheduleOffer location="xxx" schedule="xx" day="yyyy-mm-dd"/>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryScheduleOffer>	Singleton Type	Specifies query for the schedule offer identified by the location, schedule, and day.

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Element or Attribute	Data Type	Description
location	Character String	Required field specifying the schedule offer generator unit CPTU location name.
schedule	Numeric(2)	Required field specifying the schedule's numeric type code.
day	YYYY-MM-DD	Required field specifying the schedule offers effective operating day.

The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
  <ScheduleOfferSet>
    <ScheduleOffer location="zzz" schedule="xx" day="yyyy-mm-dd">
      ---data---
    </ScheduleOffer>
  </ScheduleOfferSet>
</QueryResponse>
```

The fields and their interpretation for the <ScheduleOffer> are the same as described for the <SubmitRequest> above. A single instance of <ScheduleOfferSet> will be returned containing at most a single instance of <ScheduleOffer> as identified by the request parameters. If a schedule offer does not match the query parameters than the <ScheduleOfferSet> is returned empty.

To request all schedules associated with a unit location or the locations of a portfolio, execute the following query request.

```
<QueryRequest>
  <QueryAllScheduleOffer day="yyyy-mm-dd" available="xxx" >
    <All/>
    <LocationName>xxx</LocationName>
    <PortfolioName>xxx</PortfolioName>
  </QueryAllScheduleOffer>
</QueryRequest>
```

The following table describes each of the elements and attributes in the above <QueryRequest> message.

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Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryAllScheduleOffer>	Complex Type	Specifies query for the all schedules associated with the given unit location(s).
day	YYYY-MM-DD	Required field specifying the operating day (market date) of the data requested.
available	Boolean	Optional field specifying whether the request is for all schedules or only those schedules available for a particular market date. If specified with true value then the request is for all schedules that are available for the specified market date. If false, then the request is for all schedules defined for the unit location whether they are available or not. If not specified, the default value is false.
<All>	N/A	Optional field that specifies all submitted schedule offers for the given day shall be returned. If <All/> is specified you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field specifying the generator cptu identifier. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing generator unit location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

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The response message of the query request appears as follows:

```
<QueryResponse>
  <AllScheduleOfferSet>
   <ScheduleOffer location="zzz" schedule="xx" day="yyyy-mm-dd">
      ---data---
   </ScheduleOffer>
  </AllScheduleOfferSet>
</QueryResponse>
```

The <ScheduleOffer> data is the same as described above for the first query request format shown. The outer element containing the returned <ScheduleOffer> elements is the <AllScheduleOfferSet> element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

7.5 Submit Schedule Detail

7.5.1 Purpose

This message format is used to submit supporting data parameter for the generation schedule. You do not need to submit all parameters, only those that apply to your generator type and circumstance.

You can submit a <ScheduleDetail> message at any time but to be effective for a particular day it must be received by 12 Noon on the day before the operating day.

A schedule is uniquely identified by both the generator location CPTU name and the numeric schedule identifier code (1 through 99). For a description of the schedule types that are defined and available for use, see the query message (section 7 of this document) describing QueryScheduleDefinitions.

7.5.2 This Message Format

The submit request message format is described below.

```
<SubmitRequest>
  <ScheduleDetail location="zz" schedule="xx" day="yyyy-mm-dd">
    <Market>xxx</Market>
    <EconomicLimits minMW="999.9" maxMW="999.9"/>
    <EmergencyLimits minMW="999.9" maxMW="999.9"/>
    <Runtimes>
       <MinimumRuntime>zzz</MinimumRuntime>
       <MaximumRuntime>zzz</MaximumRuntime>
       <MinimumDowntime>zzz</MinimumDowntime>
       <HotToColdTime>zzz</HotToColdTime>
       <HotToIntermediateTime>zzz</HotToIntermediateTime>
       <ColdStartupTime>zzz</ColdStartupTime>
       <IntermediateStartupTime>zzz</IntermediateStartupTime>
```


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```
        <HotStartupTime>zzz</HotStartupTime>
        <ColdNotificationTime>zzz</ColdNotificationTime>
        <IntermediateNotificationTime>zzz</IntermediateNotificationTime>
        <HotNotificationTime>zzz</HotNotificationTime>
        <MaximumDailyStarts>zz</MaximumDailyStarts>
        <MaximumWeeklyStarts>zz</MaximumWeeklyStarts>
        <MaximumWeeklyEnergy>zz</MaximumWeeklyEnergy>
        <TtsTolerance>zzz</TtsTolerance>
        <ExtendedColdStartupTime>zzz</ExtendedColdStartupTime>
        <ExtendedColdNotificationTime>zzz</ExtendedColdNotificationTime>
        <Reason>abc</Reason>
        <EndDay>yyyy-mm-dd</EndDay>
    </Runtimes>
    <UseStartupNoLoad>xxx</UseStartupNoLoad>
    <StartupCosts>
        <NoLoadCost>999.99</NoLoadCost>
        <ColdStartupCost>999.99</ColdStartupCost>
        <IntermediateStartupCost>999.99</IntermediateStartupCost>
        <HotStartupCost>999.99</HotStartupCost>
    </StartupCosts>
    <FuelTypes>
        <Primary>xxx</Primary>
        <Sub>xxx</Sub>
    </FuelTypes>
    <Cir>999.9</Cir>
  </ScheduleDetail>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<ScheduleDetail>	Complex Type	This element specifies the schedule detail for the given location, schedule name, and operating day.
location	Character String	Required field specifying the generator unit CPTU identifier.
schedule	Numeric(2)	Required field specifying the schedule's numeric type code.
day	YYYY-MM-DD	Required field specifying the operating day.

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Element or Attribute	Data Type	Description
<Market>	(DayAhead, Balancing, Both)	Optional field specifying the market as being DayAhead, Balancing, or Both (day-ahead and balancing). The default value if not specified is "DayAhead".
<EconomicLimits>	Singleton Type	Optional field specifying the economic minimum and maximum energy limits to be used with this schedule. If not specified then the unit defaults apply.
minMW	MWType	Required field specifying the minimum MW limit.
maxMW	MWType	Required field specifying the maximum MW limit.
<EmergencyLimits>	Singleton Type	Optional field specifying the emergency minimum and maximum energy limits to be used with this schedule. If not specified then the unit defaults apply.
minMW	MWType	Required field specifying the minimum MW limit.
maxMW	MWType	Required field specifying the maximum MW limit.
<Runtimes>	Complex Type	Specifies the resource run times, starts, and maximum delivered energy. Can be specified at most one time. If not specified, all runtime elements are null.
<MinimumRuntime>	DeltaHour	Optional field specifying the minimum runtime of the resource. If not specified, there is no default minimum.
<MaximumRuntime>	DeltaHour	Optional field specifying the maximum runtime of the resource. If not specified, there is no default maximum.

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Element or Attribute	Data Type	Description
<MinimumDowntime>	DeltaHour	Optional field specifying the minimum downtime (between starts) of the resource. If not specified, there is no minimum downtime.
<HotToColdTime>	DeltaHour	Optional field specifying the Hot to Cold transition time. If not specified, there is no default value.
<HotToIntermediateTime>	DeltaHour	Optional field specifying the Hot to Intermediate transition time. If not specified, there is no default value.
<ColdStartupTime>	DeltaHour	Optional field specifying the cold startup time. If not specified, there is no default value.
<IntermediateStartupTime>	DeltaHour	Optional field specifying the intermediate startup time. If not specified, there is no default value.
<HotStartupTime>	DeltaHour	Optional field specifying the hot startup time. If not specified, there is no default value.
<ColdNotificationTime>	DeltaHour	Optional field specifying the time required to prior to starting a resource that is cold. If not specified, there is no default value.
<IntermediateNotificationTime>	DeltaHour	Optional field specifying the time required to prior to starting a resource that is started already. If not specified, there is no default value.
<HotNotificationTime>	DeltaHour	Optional field specifying the time required to prior to starting a resource that is hot. If not specified, there is no default value.
<MaximumDailyStarts>	Numeric(3)	Optional maximum daily starts allowed for the resource. If not specified, there is no default value.

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Element or Attribute	Data Type	Description
<MaximumWeeklyStarts>	Numeric(4)	Optional maximum weekly starts allowed for the resource. If not specified, there is no default value.
<MaximumWeeklyEnergy>	MWType	Optional maximum weekly energy delivery allowed for the resource. If not specified, there is no maximum limit.
<TtsTolerance>	DeltaHour	Optional, Tolerance value for time to start in number of hours. This value will be used to validate extended cold startup time and notification time parameters
<ExtendedColdStartupTime>	DeltaHour	Optional, The number of hours it takes to startup when in extended cold state.
<ExtendedColdNotificationTime>	DeltaHour	Optional, The Number of hours required to notify operator in advance to start up the unit in extended cold state.
<Reason>	Character String	Optional, reason why if the TTS tolerance is violated.
<EndDay>	YYYY-MM-DD	Optional, the end day that the tolerance will end being violated.
<UseStartupNoLoad>	Boolean	Optional element that specifies whether PJM should use the price-based startup and noload values in the scheduling process. Default value is false.
<StartupCosts>	Complex Type	Optional element that specifies the startup costs associated with the schedule. If not specified then the unit's default startup costs apply.
<NoLoadCost>	PriceType	Optional field specifying the noload cost. If not specified then the generator unit default values apply.

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Element or Attribute	Data Type	Description
<ColdStartupCost>	PriceType	Optional field specifying the cold startup cost. If not specified then the generator unit default values apply.
<IntermediateStartupCost>	PriceType	Optional field specifying the intermediate startup cost. If not specified then the generator unit default values apply.
<HotStartupCost>	PriceType	Optional field specifying the hot startup cost. If not specified then the generator unit default values apply.
<FuelTypes>	Complex Type	Optional field specifying the fuel type information for the schedule. If not specified then no fuel type information is recorded for the schedule.
<Primary>	Character String	Optional field specifying the primary fuel type. If not specified then the primary fuel type is null.
<Sub>	Character String	Optional field specifying the sub fuel type. If not specified then the sub fuel type is null.
<Cir>	MWType	Optional field, will be ignored on submit. This element is returned on the query response and holds the Capacity Interconnection Rights Mw value.

7.5.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

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Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- Invalid generator location name or schedule type code, invalid market date.
- Range violation of limits and other order dependent parameters as described below

  Emergency MinMW <= Economic MinMw <= Economic MaxMW <= Emergency MaxMW

  HotToColdTime >= HotToIntermediateTime

  ColdStartupTime >= IntermediateStartupTime >= HotStartupTime

  ColdStartupCost >= IntermediateStartupCost >= HotStartupCost

  ColdNotificationTime >= IntermediateNotificationTime >= HotNotificationTime

  MaximumDailyStarts <= MaximumWeeklyStarts

7.5.4 Deleting and Replacing Submitted Data

You may update or modify the schedule details at any time prior to being used in the market. To be effective on the operating day, updates must be submitted prior to 12 Noon on the day before the operating day.

Technically, you do not delete schedule detail data though you may submit schedule detail such that the defaults will apply or you replace or update parameter values directly.

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7.5.5 Querying for Submitted Data

Two different schedule query requests are provided. You may query for a schedule details by specifying a particular schedule and generator unit name. The result if a single schedule details message that matches the request parameters. Or, you can request all schedules associated with a given unit or the units in a specified portfolio. The all qualifier can specify all schedules or all of the schedules that are available for a particular market date (day ahead or balancing).

You may query for a particular market day and generator by location name and specific schedule identifier using the message described below.

```
<QueryRequest>
  <QueryScheduleDetail location="xxx" schedule="xx" day="yyyy-mm-dd"/>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryScheduleDetail>	Singleton Type	Specifies query for the schedule offer identified by the location, schedule, and day.
location	Character String	Required field specifying the schedule offer generator unit CPTU identifier.
schedule	Numeric(2)	Required field specifying the schedule's numeric type code.
day	YYYY-MM-DD	Required field specifying the schedule offers effective operating day.

The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
  <ScheduleDetailSet>
    <ScheduleDetail location="zzz" schedule="xx" day="yyyy-mm-dd">
      ---data---
    </ScheduleDetail>
  </ScheduleDetailSet>
</QueryResponse>
```


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The fields and their interpretation for the <ScheduleDetail> are the same as described for the <SubmitRequest> above. A single instance of the <ScheduleDetailSet> is returned containing at most a single instance of <ScheduleDetail>. If there are no schedule detail records that match the query parameters then the <ScheduleDetailSet> element is returned empty.

To request all schedules associated with a unit location or the locations of a portfolio, execute the following query request.

```
<QueryRequest>
  <QueryAllScheduleDetail day="yyyy-mm-dd" available="xxx" >
    <All/>
    <LocationName>xxx</LocationName>
    <PortfolioName>xxx</PortfolioName>
  </QueryAllScheduleDetail>
</QueryRequest>
```

The following table describes each of the elements and attributes in the above <QueryRequest> message.

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryAllScheduleDetail>	Complex Type	Specifies query for the all schedules associated with the given unit location(s).
day	YYYY-MM-DD	Required field specifying the operating day (market date) of the data requested.
available	Boolean	Optional field specifying whether the request is for all schedules or only those schedules available for a particular market date. If specified with true value then the request is for all schedules that are available for the specified market date. If false, then the request is for all schedules defined for the unit location whether they are available or not. If not specified, the default value is false.

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Element or Attribute	Data Type	Description
<All>	N/A	Optional field that specifies all submitted schedule detail messages for the given day shall be returned. If <All/> is specified you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field specifying the generator cptu identifier. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing generator unit location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

The response message of the query request appears as follows:

```
<QueryResponse>
  <AllScheduleDetailSet>
   <ScheduleDetail location="zzz" schedule="xx" day="yyyy-mm-dd">
      ---data---
   </ScheduleDetail>
  </AllScheduleDetailSet>
</QueryResponse>
```

The <ScheduleDetail> data is the same as described above for the first query request format shown. The outer element containing the returned <ScheduleDetail> elements is the <AllScheduleDetailSet> element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

7.6 Submit Schedule Selection

7.6.1 Purpose

This message format is used to:

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1. Indicate whether or not a particular generator's schedule is available on a particular operating day.

2. Indicate whether or not a particular generator’s schedule should be used in the event of a maximum generation emergency.

You may submit the Schedule Selection message at any time but to be effective is must be received by 12 Noon on the day before the operating day.

7.6.2 Message Format

The submit request message format is described below.

```
<SubmitRequest>
  <ScheduleSelection location="xxx" schedule="xx" day="yyyy-mm-dd">
    <Available>xxx</Available>
    <UseMaxGen>xxx</UseMaxGen>
  </ScheduleSelection>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<ScheduleSelection>	Complex Type	This specifies the schedule selection for the schedule and generator unit location specified
location	Character String	Required field specifying the generator unit (CPTU) location name.
schedule	Numeric(2)	Required field specifying the numeric schedule type (1 through 99).
day	YYYY-MM-DD	Required field specifying the operating day of the schedule offer.
<Available>	Boolean	Optional element that specifies the schedule's availability for the given operating day.

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Element or Attribute	Data Type	Description
<UseMaxGen>	Boolean	Optional element that specifies if the schedule should be used for the given operating day in the event of a maximum generation emergency. Applies only to price-based parameter limited schedules.

7.6.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- Location or schedule do not exist

7.6.4 Deleting and Replacing Submitted Data

You do not delete a schedule selection message. Instead, you may resubmit the message with a different value to cancel a previous submission.

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7.6.5 Querying for Submitted Data

Two different schedule query requests are provided. You may query for a schedule selection by specifying a particular schedule and generator unit name. The result if a single schedule details message that matches the request parameters. Or, you can request all schedules associated with a given unit or the units in a specified portfolio. The all qualifier can specify all schedules or all of the schedules that are available for a particular market date (day ahead or balancing).

You may query for a particular market day and generator location and schedule using the message described below.

To query the market for a single submitted schedule selection message for a given day, the following QueryRequest is issued:

```
<QueryRequest>
  <QueryScheduleSelection location="xxx" schedule="xx" day="yyyy-mm-dd"/>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryScheduleSelection>	Singleton Type	Specifies query for the schedule selection identified by the location, schedule, and day.
location	Character String	Required field specifying the schedule offer generator unit CPTU identifer.
schedule	Numeric(2)	Required field specifying the schedule's numeric type code.
day	YYYY-MM-DD	Required field specifying the schedule offers effective operating day.

The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
  <ScheduleSelectionSet>
    <ScheduleSelection location="zzz" schedule="xx" day="yyyy-mm-dd">
      ---data---
```


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```
    </ScheduleSelection>
  </ScheduleSelectionSet>
</QueryResponse>
```

The fields and their interpretation for the <ScheduleSelection> are the same as described for the <SubmitRequest> above. A single instance of <ScheduleSelectionSet> is returned containing at most a single instance of <ScheduleSelection>. If there are no schedules that match the query parameters then the <ScheduleSelectionSet> is returned empty.

To request all schedules associated with a unit location or the locations of a portfolio, execute the following query request.

```
<QueryRequest>
  <QueryAllScheduleSelection day="yyyy-mm-dd" available="xxx" >
    <All/>
    <LocationName>xxx</LocationName>
    <PortfolioName>xxx</PortfolioName>
  </QueryAllScheduleDetail>
</QueryRequest>
```

The following table describes each of the elements and attributes in the above <QueryRequest> message.

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryAllScheduleSelection>	Complex Type	Specifies query for the all schedules associated with the given unit location(s).
day	YYYY-MM-DD	Required field specifying the operating day (market date) of the data requested.
available	Boolean	Optional field specifying whether the request is for all schedules or only those schedules available for a particular market date. If specified with true value then the request is for all schedules that are available for the specified market date. If false, then the request is for all schedules defined for the unit location whether they are available or not. If not specified, the default value is false.

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Element or Attribute	Data Type	Description
<All>	N/A	Optional field that specifies all submitted schedule selection messages for the given day shall be returned. If <All/> is specified you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field specifying the generator cptu identifier. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing generator unit location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

The response message of the query request appears as follows:

```
<QueryResponse>
  <AllScheduleSelectionSet>
   <ScheduleDetail location="zzz" schedule="xx" day="yyyy-mm-dd">
      ---data---
   </ScheduleDetail>
  </AllScheduleSelectionSet>
</QueryResponse>
```

The <ScheduleSelection> data is the same as described above for the first query request format shown. The outer element containing the returned <ScheduleSelection> elements is the <AllScheduleSelectionSet> element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

7.7 Submit Spinning Reserve Offer

7.7.1 Purpose

This message is submitted by a generating company to sell spinning reserve services.

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All spinning reserve offers are locked-in by 6 pm on the day before they take effect.

7.7.2 Message Format

The submit request message format is shown below:

```
<SubmitRequest>
   <SpinningReserveOffer location="xxx" day="yyyy-mm-dd">
      <OfferMW>999.9</OfferMW>
      <OfferPrice>999.99</OfferPrice>
      <CondenseAvailable>zzz</CondenseAvailable>
      <CondenseStartupCost>zzz</CondenseStartupCost>
      <CondenseEnergyUsage>zzz</CondenseEnergyUsage>
      <CondenseToGenCost>zzz</CondenseToGenCost>
      <SpinAsCondenser>xxx</SpinAsCondenser>
      <FullLoadHeatRate>99999.999</FullLoadHeatRate>
      <ReducedLoadHeatRate>99999.999</ReducedLoadHeatRate>
      <VOMRate>999999.99</VOMRate>
   </SpinningReserveOffer>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<SpinningReserveOffer>	Complex Type	Specifies the spinning reserve offer for the given generator location and the operating day.
location	Character String	Required field specifying the generator unit (CPTU) location name.
day	YYYY-MM-DD	Required field specifying the operating day of the schedule offer.
<OfferMW>	MWType	Optional field specifying the spinning reserve offer MW capability. If not specified, the default value is 0. Negative MW values are not allowed.
<OfferPrice>	PriceType	Optional field specifying the offer price. If not specified, the default value is 0.00. Negative price values are not allowed.

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Element or Attribute	Data Type	Description
<CondenseAvailable>	Boolean	Optional field specifying whether condensing is available for this unit. If not specified, the default value is "false".
<CondenseStartupCost>	PriceType	Optional field specifying the condensing startup cost in $. If not specified, the default value is 0.00.
<CondenseEnergyUsage>	MWType	Optional field specifying the limit of energy usage while in condensing mode.
<CondenseToGenCost>	PriceType	Optional field specifying cost associated with switching a generator unit from condencing to energy production. If not specified, the default value is 0.00.
<SpinAsCondenser>	Boolean	Optional field specifying whether spinning reserve operates in condensing mode (?). If not specified, default value is false.
<FullLoadHeatRate>	HeatRateType	Optional field specifying the full load heat rate in BTU/kWh.
<ReducedLoadHeatRate>	HeatRateType	Optional field specifying the reduced load heat rate in BTU/kWh.
<VOMRate>	VOMRateType	Optional field specifying the variable operating and maintenance rate in $/MBTU if heat rates are not null (non-condensing units). If heat rates are null, the VOMRate will be entered in $/Hr (condensers).

7.7.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```


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The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- Generator does not exist

7.7.4 Deleting and Replacing Submitted Data

You may delete a submitted spinning reserve offer by submitting an empty offer for the same location and day. This is shown in the example below:

```
<SpinningReserveOffer location="xxx" day="yyyy-mm-dd"/>
```

To replace or update a spinning reserve offer you merely resubmit the message with updated values.

7.7.5 Querying for Submitted Data

You may query for a particular market day and generator location using the message described below.

To query the for a submitted spinning reserve offer data use the following query request:

```
<QueryRequest>
  <QuerySpinningReserveOffer day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QuerySpinningReserveOffer>
</QueryRequest>
```


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The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QuerySpinningReserveOffer>	Complex Type	Specifies query for the spinning reserve offer data for the effective operating day.
day	YYYY-MM-DD	Required field specifying the operating day of the data requested.
<All/>	N/A	Optional field specifying that all submitted spinning reserve offers are to be returned. If <All/> is specified, you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field specifying the name of a generator unit location. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing generator unit location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
  <SpinningReserveOfferSet>
   <SpinningReserveOffer location="zzz" day="yyyy-mm-dd">
      ---data---
   </SpinningReserveOffer>
  </SpinningReserveOfferSet>
</QueryResponse>
```


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The fields and their interpretation for the <SpinningReserveOffer> are the same as described for the <SubmitRequest> above. An instance of the <SpinningReserveOffer> message is returned for each individual location and date that satisfies the query request. All <SpinningReserveOffer> elements are returned in a single <SpinningReserveOfferSet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

7.8 Submit Spinning Reserve Update

7.8.1 Purpose

This message is submitted to add or update a generator unit's spinning reserve override values on an hourly basis.

For changes to take effect you must submit the update prior to the operating hour.

7.8.2 Message Format

The submit request message format is shown below:

```
<SubmitRequest>
   <SpinningReserveUpdate location="xxx" day="yyyy-mm-dd">
      <SpinningReserveUpdateHourly hour="hh">
         <OfferMW>999.9</OfferMW>
         <SpinMAX>999.9</SpinMAX>
         <Unavailable>xxx</Unavailable>
         <SelfScheduledMW>999.9</SelfScheduledMW>
      </SpinningReserveUpdateHourly>
   </SpinningReserveUpdate>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<SpinningReserveUpdate>	Complex Type	Specifies the spinning reserve update for the given generator location and the operating day.
location	Character String	Required field specifying the generator unit CPTU identifier.

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Element or Attribute	Data Type	Description
day	YYYY-MM-DD	Required field specifying the operating day of the schedule offer.
<SpinningReserveUpdateHourly>	Complex Type	Optional element specifying the hourly update interval for the given hour ending.
hour	HH	Required field specifying the hourly intervals hour ending value (01 through 24).
<OfferMW>	MWType	Optional element specifying the spinning reserve MW capability. If not specified then the default value is 0.0. Negative MW values are not allowed.
<SpinMAX>	MWType	Optional element specifying the spinning reserve maximum limit. If not specified then the limit used is the unit's default spin maximum.
<Unavailable>	Boolean	Optional element specifying whether the unit is available for spinning reserve for this hourly interval. The default value is false indicating that the unit is available for spinning reserve service.
<SelfScheduledMW>	MWType	Optional element specifying the amount of spinning reserve that is self-scheduled. If not specified then the default value is 0.0.

7.8.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

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Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- Generator does not exist

7.8.4 Deleting and Replacing Submitted Data

You may delete a submitted spinning reserve update for a specified hourly interval by submitting an empty offer for the same location and day and the same interval. This is shown in the example below:

```
<SpinningReserveUpdate location="xxx" day="yyyy-mm-dd">
   <SpinningReserveUpdateHourly hour="hh"/>
</SpinningReserveUpdate>
```

The effect of the message above is to submit the default values for the specified hourly interval which effectively deletes the spinning reserve offer.

To delete all hours you must supply an empty <SpinningReserveUpdateHourly> element for each hour. You can only delete hourly data prior to the operating hour.

To replace or update a spinning reserve update you merely resubmit the message with updated values.

7.8.5 Querying for Submitted Data

You may query for a particular market day and generator location using the message described below.

To query the for a submitted spinning reserve update data use the following query request:

```
<QueryRequest>
```


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```
  <QuerySpinningReserveUpdate day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QuerySpinningReserveOffer>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QuerySpinningReserveUpdate>	Complex Type	Specifies query for the spinning reserve update data for the effective operating day.
day	YYYY-MM-DD	Required field specifying the operating day of the data requested.
<All/>	N/A	Optional field specifying that all submitted spinning reserve updates are to be returned. If <All/> is specified, you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field specifying the name of a generator unit cptu identifier. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing generator unit location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

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The response to the query request is the QueryResponse message shown below. All hours that have been submitted for spinning reserve update will be returned.

```
<QueryResponse>
  <SpinningReserveUpdateSet>
   <SpinningReserveUpdate location="zzz" day="yyyy-mm-dd">
      ---data---
   </SpinningReserveUpdate>
  </SpinningReserveUpdateSet>
</QueryResponse>
```

The fields and their interpretation for the <SpinningReserveUpdate> are the same as described for the <SubmitRequest> above. An instance of the <SpinningReserveUpdate> message is returned for each individual location and date that satisfies the query request. All <SpinningReserveUpdate> elements are returned in a single <SpinningReserveUpdateSet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

7.9 Submit Unit Detail

7.9.1 Purpose

This message is submitted to add or update a generator unit's default operating parameters.

For changes to take effect you must submit the update prior to 12 Noon on the day before the operating day.

7.9.2 Message Format

The submit request message format is shown below:

```
<SubmitRequest>
   <UnitDetail location="xxx" day="yyyy-mm-dd">
      <DefaultCommitStatus>xxx</DefaultCommitStatus>
      <FixedGen>xxx</FixedGen>
      <DefaultLimits>
         <Economic minMW="999.9" maxMW="999.9"/>
         <Emergency minMW="999.9" maxMW="999.9"/>
         <Cir>999.9</Cir>
         <Regulation minMW="999.9" maxMW="999.9"/>
         <Spinning maxMW="999.9"/>
         <Temperature>
            <EconomicRange>
               <Low MW="999.9" temperature="999.9"/>
               <Middle MW="999.9" temperature="999.9"/>
               <High MW="999.9" temperature="999.9"/>
            </EconomicRange>
            <EmergencyRange>
               <Low MW="999.9" temperature="999.9"/>
```


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```
                <Middle MW="999.9" temperature="999.9"/>
                <High MW="999.9" temperature="999.9"/>
             </EmergencyRange>
          </Temperature>
       </DefaultLimits>
       <DefaultStartupCosts interval="x">
          <UseCostBasedStartup>xxx</UseCostBasedStartup>
          <NoLoad>xxx</NoLoad>
          <ColdStartup>xxx</ColdStartup>
          <IntermediateStartup>xxx</IntermediateStartup>
          <HotStartup>xxx</HotStartup>
       </DefaultStartupCosts>
       <DefaultRampRate>999.9</DefaultRampRate>
       <EnergyRampRateCurve>
          <RampRate MW="9999.9" rate="999.9"/>
       </EnergyRampRateCurve>
       <SpinRampRateCurve>
          <RampRate MW="9999.9" rate="999.9"/>
       </SpinRampRateCurve>
       <CondenseAvailable>xxx</CondenseAvailable>
       <CondenseStartupCost>xxx</CondenseStartupCost>
       <CondenseEnergyUsage>xxx</CondenseEnergyUsage>
       <CondenseNotificationTime>xxx</CondenseNotificationTime>
       <CondenseHourlyCost>xxx</CondenseHourlyCost>
       <CombinedCycleParameters>
          <MinTimeBetweenStartups>xxx</MinTimeBetweenStartups>
          <AllowSimpleCycle>xxx</AllowSimpleCycle>
          <CombinedCycleFactor>xxx</CombinedCycleFactor>
       </CombinedCycleParameters>
       <PumpStorageParameters>
          <PumpingFactor>0.91</PumpingFactor>
          <InitialMWH>10</InitialMWH>
          <FinalMWH>100</FinalMWH>
          <MaxMWH>2.5</MaxMWH>
          <MinMWH>1.5</MinMWH>
       </PumpStorageParameters>
       <PumpStorageLimits>
          <MinGenMW>45</MinGenMW>
          <MinPumpMW>50</MinPumpMW>
       </PumpStorageLimits>
       <SelfSupply>false</SelfSupply>
       <ReducedRampRatePct>999</ReducedRampRatePct>
       <UseExtendedCold>false</UseExtendedCold>
    </UnitDetail>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<UnitDetail>	Complex Type	Specifies the generator unit detail for the given generator location and the operating day.

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Element or Attribute	Data Type	Description
location	Character String	Required field specifying the generator unit CPTU identifier.
day	YYYY-MM-DD	Required field specifying the effective date of the data.
<DefaultCommitStatus>	(Unavailable, Economic, Emergency, MustRun)	Required element giving the unit's default commit status.
<FixedGen>	Boolean	Optional element specifying the default fixed generation indicator for the unit. If not specified, the default value is false.
<DefaultLimits>	Complex Type	Required element specifying the unit's default limit sets.
<Economic>	Singleton Type	Required element specifying the economic limits.
minMW	MWType	Required field specifying the minimum energy limit.
maxMW	MWType	Required field specifying the maximum energy limit.
<Emergency>	Singleton Type	Required element specifying the emergency limits.
minMW	MWType	Required field specifying the minimum energy limit.
<Cir>	MWType	Optional field, will be ignored on submit. This element is returned on the query response and holds the Capacity Interconnection Rights Mw value.
maxMW	MWType	Required field specifying the maximum energy limit.
<Regulation>	Singleton Type	Optional element specifying the regulation limits. If not specified then the default values are null.

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Element or Attribute	Data Type	Description
minMW	MWType	Required field specifying the minimum energy limit.
maxMW	MWType	Required field specifying the maximum energy limit.
<Spinning>	Singleton Type	Optional element specifying the regulation limits. If not specified then the default values are null.
maxMW	MWType	Required field specifying the maximum spinning energy limit.
<Temperature>	Complex Type	Optional element for specifying the temperature based limits used with CT generator units. If not specified, there are no temperature limits for this generator unit.
<EconomicRange>	Complex Type	Optional element specifying the temperature range values for the Economic limits.
<Low>	Singleton Type	Optional element specifying the low temperature point production energy in MW. If not specified, there is no low temperature point.
MW	MWType	Required field specifying the energy production in MW for this temperature point.
temperature	Numeric(4.1)	Required field specifying the temperature in the range of –100.0 to 150.0
<Middle>	Singleton Type	Optional element specifying the middle temperature point production energy in MW. If not specified, there is no low temperature point.
MW	MWType	Required field specifying the energy production in MW for this temperature point.

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Element or Attribute	Data Type	Description
temperature	Numeric(4.1)	Required field specifying the temperature in the range of –100.0 to 150.0
<High>	Singleton Type	Optional element specifying the high temperature point production energy in MW. If not specified, there is no low temperature point.
MW	MWType	Required field specifying the energy production in MW for this temperature point.
temperature	Numeric(4.1)	Required field specifying the temperature in the range of –100.0 to 150.0
<EmergencyRange>	Complex Type	Optional field specifying the temperature range values for the emergency limits. The structure of <EmergencyRange> is identical to <EconomicRange> and is not duplicated here.
<DefaultStartupCosts>	Complex Type	Optional field specifying the startup costs for the given interval.
interval	Numeric(1)	Required field specifying the operating 6-month interval. This is specified as a value of 1 or 2.
<UseCostBasedStartup>	Boolean	Required element specifying whether cost based startup is to be used for this interval.
<ColdStartup>	PriceType	Required element specifying the cold startup cost for this six month interval.
<IntermediateStartup>	PriceType	Required element specifying the intermediate startup cost for this six month interval.
<HotStartup>	PriceType	Required element specifying the hot startup cost for this six month interval.

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Element or Attribute	Data Type	Description
<DefaultRampRate>	MWRateType	Required element specifying the default ramp rate for the unit.
<EnergyRampRateCurve>	Complex Type	Optional element specifying the energy production ramp rate for the unit. If not specified, the default ramp rate applies.
<RampRate>	Singleton Type	Required element specifying the ramp rate point. May be repeated up to 10 times. Ramp rate points must be specified in monotonic increasing order.
MW	MWType	Required field specifying the ramp rate.
rate	MWRateType	Required field specifying the rate in MW per minute.
<SpinRampRateCurve>	Complex Type	Optional element specifying the spinning reserve production ramp rate curve. If not specified, the energy ramp rate or default ramp rate applies. This element is identical in structure to the <EnergyRampRateCurve> element and is not duplicated here.
<CondenseAvailable>	Boolean	Optional element specifying whether condensing is available for this unit. If not specified, the default value is false.
<CondenseStartupCost>	PriceType	Optional element specifying the condensing startup cost in $. If not specified, the startup cost value is $0.00.
<CondenseEnergyUsage>	MWType	Optional element specifying the energy production allowed while in condensing mode. If not specified, there is no limit.

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Element or Attribute	Data Type	Description
<CondenseToGenCost>	PriceType	Optional element specifying the cost in $ associated with switching a unit from condensing to energy production. If not specified, the default value is $0.00.
<CondenseNotificationTime>	DeltaHour	Optional element specifying the notification time to switch to condensing operation. If not specified, the default value is zero.
<CondenseHourlyCost>	PriceType	Optional element specifying the hourly cost of operating a unit in condensing mode. If not specified, there is no hourly cost.
<CombinedCycleParameters>	Complex Type	Optional element specifying the parameters used for combined cycle modeling.
<MinTmeBetweenStartups>	DeltaHour	Optional element specifying the number of hours between startups of the CT's that make up the combined cycle unit.
<AllowSimpleCycle>	Boolean	Optional element specifying if the CT's can be committed without the steam unit.
<CombinedCycleFactor>	Numeric (4.1)	Option element specifying the output of the steam unit based on the output of the CT's.
<PumpStorageParameters>	ComplexType	Optional element specifying the parameters ued for pump storage modeling.
<PumpingFactor>	Numeric (5.2)	Optional element specifying the pumping efficiency as a factor (i.e. MWH gen for each MWH pumped).
<InitialMWH>	MWType	Optional element specifying the initial contens of MWH reservoir.

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Element or Attribute	Data Type	Description
<FinalMWH>	MWType	Optional element specifying the target contents of the MWH reservoir.
<MaxMWH>	MWType	Optional element specifying the maximum storage.
<MinMWH>	MWType	Optional element specifying the minimum storage.
<PumpStorageLimits>	Singleton Type	Optional element specifying limits associated with pump storage units.
<MinGenMW>	MWType	Optional element specifying the minimum MW dispatch when the unit is in generator mode.
<MinPumpMW>	MWType	Optional element specifying the minimum MW dispatch when the unit is in pumping mode.
<SelfSupply>	Boolean	Optional element specifying if the unit is using its output to supply power for its own use.
<ReducedRampRatePct>	ReducedRampRatePctType	Optional elment specifying the percentage (0-100) of the reuced energy ramp rate
<UseExtendedCold>	Boolean	Optional element indicates whether to use extended cold startup and notification time parameters for this unit

7.9.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

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Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- Generator does not exist
- Limit order is violated as required and shown below:

  Emergency MinMW < Economic MinMW < Economic MaxMW < Emergency MaxMW

- Other business or constraint violations

7.9.4 Deleting and Replacing Submitted Data

You may not delete submitted data though you may replace data.

7.9.5 Querying for Submitted Data

You may query for a particular generator location using the message described below.

To query the for a submitted unit detail data use the following query request:

```
<QueryRequest>
  <QueryUnitDetail day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QueryUnitDetail>
</QueryRequest>
```


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The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryUnitDetail>	Complex Type	Specifies query for the unit detail data for the effective operating day.
<All/>	N/A	Optional field specifying that all submitted unit's owned by the participant should be included in the query request. If <All/> is specified then you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field specifying the name of a generator unit cptu identifier. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing generator unit location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

The response to the query request is the QueryResponse message shown below.

```
<QueryResponse>
  <UnitDetailSet>
   <UnitDetail location="zzz" day="yyyy-mm-dd">
      ---data---
   </UnitDetail>
  </UnitDetailSet>
</QueryResponse>
```

The fields and their interpretation for the <UnitDetail> are the same as described for the <SubmitRequest> above. An instance of the <UnitDetail> message is returned for each individual location that satisfies the query request. All <UnitDetail> elements are returned in a single <UnitDetailSet> container element.

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If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

7.10 Submit Unit Schedules

7.10.1 Purpose

This message is submitted to associate a cost or price based schedule with a generating unit. Also, using this message, a name and description is given to the schedule associated with the unit.

Before a schedule can be created (that is, submitting schedule detail) or submitted into the day-ahead market, it must be associated with a generating unit. Schedules are defined as either cost based or price based as determined by the value of the numeric schedule code.

7.10.2 Message Format

The submit request message format is shown below:

```
<SubmitRequest>
   <UnitSchedules location="xxx">
      <UnitSchedule schedule="dd">
         <ScheduleName>xxx</ScheduleName>
         <ScheduleDescription>xxx</ScheduleDescription>
      </UnitSchedule>
   </UnitSchedules>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<UnitSchedules>	Complex Type	Specifies the unit schedules to be associated with the given generator.
location	Character String	Required field specifying the generator unit CPTU identifier.

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Element or Attribute	Data Type	Description
<UnitSchedule>	Complex Type	Optional element specifying a given schedule identified by the schedule code. Repeated as necessary.
schedule	Number(2)	Required field specifying the numeric schedule code from 1 to 99. Only one schedule of each code value can be associated with a generator unit.
<ScheduleName>	Character String (8)	Required element specifying the short name of the schedule. This name must be unique among schedules associated with this unit.
<ScheduleDescription>	Character String	Optional element specifying a descriptive string.

7.10.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

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- Invalid or improper XML
- Generator does not exist
- Invalid schedule code.

7.10.4 Deleting and Replacing Submitted Data

You may delete a submitted unit schedule for a specified schedule code by submitting an empty <UnitSchedule>. This is shown in the example below:

```
<UnitSchedules location="xxx">
   <UnitSchedule schedule="98"/>
</UnitSchedules>
```

The effect of the message above is to delete the association between schedule 98 and the specified unit.

7.10.5 Querying for Submitted Data

You may query for all schedules associated with a given generator unit.

To query the for a submitted unit schedules data use the following query request:

```
<QueryRequest>
  <QueryUnitSchedules>
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QueryUnitSchedules>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryUnitSchedules>	Complex Type	Specifies query for the unit update data for the effective operating day.
day	YYYY-MM-DD	Required field specifying the operating day of the data requested.

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Element or Attribute	Data Type	Description
<All/>	N/A	Optional field specifying that all units owned by the participant are to be included in the result set. If <All/> is specified then you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field specifying the name of a generator unit cptu identifier. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing generator unit location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

The response to the query request is the QueryResponse message shown below.

```
<QueryResponse>
  <UnitSchedulesSet>
   <UnitSchedules location="zzz">
      ---data---
   </UnitSchedules>
  </UnitSchedulesSet>
</QueryResponse>
```

The fields and their interpretation for the <UnitSchedules> are the same as described for the <SubmitRequest> above. An instance of the <UnitSchedules> message is returned for each individual location that satisfies the query request. All <UnitSchedules> elements are returned in a single <UnitSchedulesSet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

7.11 Submit Unit Update

7.11.1 Purpose

This message is submitted to add or update a generator unit's potential on an hourly basis.

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For changes to take effect you must submit the update prior to the operating hour.

7.11.2 Message Format

The submit request message format is shown below. Note, in the message defined below, the <DefaultEconomicLimits> and <DefaultEmergencyLimits> are query result value only. These elements are not required on submittal. If they are specified, they will be ignored.

```
<SubmitRequest>
   <UnitUpdate location="xxx" day="yyyy-mm-dd">
      <UnitUpdateHourly hour="hh">
         <EconomicLimits minMW="999.9" maxMW="999.9"/>
         <EmergencyLimits minMW="999.9" maxMW="999.9"/>
         <CommitStatus>xxx</CommitStatus>
         <FixedGen>xxx</FixedGen>
         <DefaultEconomicLimits minMW="999.9" maxMW="999.9"/>
         <DefaultEmergencyLimits minMW="999.9" maxMW="999.9"/>
         <NotificationTime>20.0</NotificationTime>
         <PumpStorageLimits>
            <MinGenMW>45</MinGenMW>
            <MinPumpMW>50</MinPumpMW>
         </PumpStorageLimits>
         <Cir>999.9</Cir>
      </UnitUpdateHourly>
   </UnitUpdate>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<UnitUpdate>	Complex Type	Specifies the generator unit update for the given generator location and the operating day.
Location	Character String	Required field specifying the generator unit CPTU identifier.
Day	YYYY-MM-DD	Required field specifying the operating day of the schedule offer.
<UnitUpdateHourly>	Complex Type	Optional element specifying the hourly update interval for the given hour ending.

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Element or Attribute	Data Type	Description
Hour	HH	Required field specifying the hourly intervals hour ending value (01 through 24).
<EconomicLimits>	Singleton Type	Optional element specifying the economic limits for the hourly interval. If not specified, the unit default limits apply.
minMW	MWType	Optional field specifying the minimum energy limit. If not specified, the unit default value shall be used.
maxMW	MWType	Optional field specifying the maximum energy limit. If not specified, the unit default value shall be used.
<EmergencyLimits>	Singleton Type	Optional element specifying the emergency limits for the hourly interval. If not specified, the unit default limits apply.
minMW	MWType	Optional field specifying the minimum energy limit. If not specified, the unit default value shall be used.
maxMW	MWType	Optional field specifying the maximum energy limit. If not specified, the unit default value shall be used.
<CommitStatus>	(Unavailable, Economic, Emergency, MustRun)	Optional element specifying commit status for the unit for this hourly interval. If not specified, the default is Economic.
<FixedGen>	Boolean	Optional element specifying the fixed generation indicator for the unit for this hour. If not specified, the fixed generation value is set to the unit's default fixed generation status.

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Element or Attribute	Data Type	Description
<DefaultEconomicLimits>	Singleton Type	Optional element specifying the economic default limits for the hourly interval. This is a query result element only, it is not specified on submittal. If specified on submittal, it is ignored.
minMW	MWType	Field specifying the minimum energy limit.
maxMW	MWType	Field specifying the maximum energy limit.
<DefaultEmergencyLimits>	Singleton Type	Optional element specifying the emergency default limits for the hourly interval. This is a query result element only, it is not specified on submittal. If specified on submittal, it is ignored.
minMW	MWType	Field specifying the minimum energy limit.
maxMW	MWType	Field specifying the maximum energy limit.
<NotificationTime>	DeltaHour	Optional element that overrides the daily schedule hot/cold/intermediate notification times.
<PumpStorageLimits>	Singleton Type	Optional element specifying limits associated with pump storage units.
<MinGenMW>	MWType	Optional element specifying the minimum MW dispatch when the unit is in generator mode.
<MinPumpMW>	MWType	Optional element specifying the minimum MW dispatch when the unit is in pumping mode.

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Element or Attribute	Data Type	Description
<Cir>	MWType	Optional field, will be ignored on submit. This element is returned on the query response and holds the Capacity Interconnection Rights Mw value.

7.11.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or improper XML
- Generator does not exist
- Limit order is violated as required and shown below:

  Emergency MinMW < Economic MinMW < Economic MaxMW < Emergency MaxMW

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7.11.4 Deleting and Replacing Submitted Data

You may delete a submitted unit update for a specified hourly interval by submitting an empty update for the same location and day and the same hourly interval. This is shown in the example below:

```
<UnitUpdate location="xxx" day="yyyy-mm-dd">
   <UnitUpdateHourly hour="hh"/>
</UnitUpdate>
```

The effect of the message above is to submit the default values for the specified hourly interval which effectively deletes the unit update.

To delete all hours you must supply an empty <UnitUpdateHourly> element for each hour. You can only delete hourly data prior to the operating hour.

To replace or update a spinning reserve update you merely resubmit the message with updated values.

7.11.5 Querying for Submitted Data

You may query for a particular market day and generator location using the message described below.

To query the for a submitted unit update data use the following query request:

```
<QueryRequest>
  <QueryUnitUpdate day="yyyy-mm-dd">
     <All/>
     <LocationName>zzz</LocationName>
     <PortfolioName>zzz</PortfolioName>
  </QueryUnitUpdate>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryUnitUpdate>	Complex Type	Specifies query for the update data for the effective operating day.

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Element or Attribute	Data Type	Description
Day	YYYY-MM-DD	Required field specifying the operating day of the data requested.
<All/>	N/A	Optional field specifying that all units owned by the participant are to be included in the result set. If <All/> is specified then you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional field specifying the name of a generator unit cptu identifier. If not specified then the PortfolioName must be specified. You can specify either the location name or the portfolio name but not both.
<PortfolioName>	Character String	Optional field specifying the name of a portfolio containing generator unit location names. If not specified then the name of a location must be specified with the element defined above. You can specify either the location name or the portfolio name but not both.

The response to the query request is the QueryResponse message shown below. All hours that have been submitted for unit update will be returned.

```
<QueryResponse>
  <UnitUpdateSet>
   <UnitUpdate location="zzz" day="yyyy-mm-dd">
      ---data---
   </UnitUpdate>
  </UnitUpdateSet>
</QueryResponse>
```

The fields and their interpretation for the <UnitUpdate> are the same as described for the <SubmitRequest> above. An instance of the <UnitUpdate> message is returned for each individual location and date that satisfies the query request. All <UnitUpdate> elements are returned in a single <UnitUpdateSet> container element.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

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7.12 Submit Weather Forecast

7.12.1 Purpose

This message format is used to submit weather forecast for specified geographic locations defined as weather points. The weather forecast is submitted in support of the temperature based limits of some CT generator units. Only those participants who have such temperature dependent data may be called to submit a weather forecast.

The weather forecast is submitted for a given operating day. For each defined weather point, the daytime and nighttime temperatures are specified. The weather points themselves are established outside the scope of this specification.

7.12.2 Message Format

The submit request message format is described below.

```
<SubmitRequest>
  <WeatherForecast day="yyyy-mm-dd">
    <WeatherPoint name="zzz">
       <DaytimeTemperature>zzz</DaytimeTemperature>
       <NighttimeTemperature>zzz</NighttimeTemperature>
    </WeatherPoint>
  </WeatherForecast>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<WeatherForecast>	Complex Type	The element specifying the weather forecast for the specified effective date.
Day	YYYY-MM-DD	Required field specifying the effective day of the forecast.
<WeatherPoint>	Complex Type	Specifies the weather forecast for a given weather point. This element can be repeated as required.
Name	Character String	Required field specifying the name of the weather point.

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Element or Attribute	Data Type	Description
<DaytimeTemperature>	Numeric(4.1)	Specifies the daytime temperature at the given weather point. Optional, if not specified there is no temperature value available. Temperature must be in the range of –100 to 150 degrees Fahrenheit.
<NighttimeTemperature>	Numeric(4.1)	Specifies the nighttime temperature at the given weather point. Optional, if not specified there is no temperature value available. Temperature must be in the range of –100 to 150 degrees Fahrenheit.

7.12.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or malformed XML
- Effective day is not valid for the data being submitted.
- Weather point is not defined.

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7.12.4 Deleting and Replacing Submitted Data

You may not delete weather temperature data though you may update or modify submitted data.

To replace or update the weather forecast, the message can be resubmitted to overwrite the current values.

7.12.5 Querying for Submitted Data

You may query for a particular effective day and weather point using the message described below.

To query the system for a submitted weather forecast of a one or more weather points for a given day, the following QueryRequest is issued:

```
<QueryRequest>
  <QueryWeatherForecast day="yyyy-mm-dd">
     <WeatherPointName>zzz</WeatherPointName>
  </QueryWeatherForecast>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryWeatherForecast>	Complex Type	Specifies a query for weather forecast on the specified effective date.
day	YYYY-MM-DD	Specifies the effective date of the data.
<WeatherPointName>	Character String	Required element specifying the name of a weather point.

The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
   <WeatherForecast day="yyyy-mm-dd">
      ---data---
   </WeatherForecast>
```


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```
</QueryResponse>
```

The fields and their interpretation for the <WeatherForecast> are the same as described for the <SubmitRequest> above. A <WeatherForecast> element is returned for each effective day that satisfies the query request.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

7.13 Submit Parameter Limit Exception

7.13.1 Purpose

This message format is used to submit an exception to the standing parameter limits for a generation resource.

7.13.2 Message Format

The submit request message format is described below.

```
<SubmitRequest>
   <ExceptionParameterLimits>
      <Location>xyz</Location>
      <MinimumRuntimeLimit>zzz</MinimumRuntimeLimit>
      <MinimumDowntimeLimit>zzz</MinimumDowntimeLimit>
      <MaximumDailyStartsLimit>zzz</MaximumDailyStartsLimit>
      <MaximumWeeklyStartsLimit>zzz</MaximumWeeklyStartsLimit>
      <TurnDownRatioLimit>zzz</TurnDownRatioLimit>
      <RequestType>abc</RequestType>
      <StartDate>yyyy-mm-dd</StartDate>
      <EndDate>yyyy-mm-dd</EndDate>
      <Status>xyz</Status>
      <Justification>xyz</Justification>
      <EDARTTicketNumber>zzz</EDARTTicketNumber>
   </ExceptionParameterLimits>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	ComplexType	The root element for all submit requests. Occurs just once and placed within the SOAP envelope Body element.
<ExceptionParameterLimits>	Complex Type	The element specifying the exception to the standing parameter limits for the given interval.

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Element or Attribute	Data Type	Description
<Location>	Character String (30)	The required element specifying the name of the resource the exception applies to.
<MinimumRuntimeLimit>	Numeric(8.2)	The required element specifying the minimum runtime limit for the exception.
<MinimumDowntimeLimit>	Numeric(8.2)	The required element specifying the minimum downtime limit for the exception.
<MaximumDailyStartsLimit>	Numeric(5)	The required element specifying the maximum daily starts limit for the exception.
<MaximumWeeklyStartsLimit>	Numeric(5)	The required element specifying the maximum weekly starts limit for the exception.
<TurnDownRatioLimit>	Numeric(3.2)	The required element specifying the turn down ratio limit for the exception.
<RequestType>	Character String (20)	The required element specifying the type of exception. Currently the only valid type is “Daily”
<StartDate>	YYYY-MM-DD	The required element specifying the start date of the exception.
<EndDate>	YYYY-MM-DD	The required element specifying the end date of the exception.
<Status>	Character String (20)	The required element specifying the status of the request. Currently the only valid type is “Pending”.
<Justification>	Character String (80)	The required element specifying the reason for the exception.
<EDARTTicketNumber>	Character String (10)	The optional element specifying the EDART ticket number.

7.13.3 Response Message

The Success (ACK) response message is described below.

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```
<SubmitResponse>
  <Success>
     <TransactionID>xxx</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element of all submit response elements. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation. Occurs just once.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be reported include:

- Invalid or malformed XML
- Effective day is not valid for the data being submitted.

7.13.4 Deleting and Replacing Submitted Data

You may not delete, update or modify submitted data.

7.13.5 Querying for Submitted Data

You may query for a particular effective day and weather point using the message described below.

To query the system for submitted exceptions for a given interval, the following QueryRequest is issued:

```
<QueryRequest>
   <QueryExceptionParameterLimits>
      <All/>
      <LocationName/>
      <PortfolioName/>
      <StartDate>yyyy-mm-dd</StartDate>
      <EndDate>yyyy-mm-dd</EndDate>
      <Status>zzz</Status>
      <RequestType>zzz</RequestType>
   </QueryExceptionParameterLimits>
```


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```
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryExceptionParameterLimits>	Complex Type	Specifies a query for weather forecast on the specified effective date.
<All/>	N/A	Optional element specifying that ALL submitted demand bids for the market operating day specified are to be returned. If you specify <All/>, you cannot also specify either <LocationName> or <PortfolioName>.
<LocationName>	Character String (30)	Optional element to specify the desired bid location pricing node id. If not specified, then the portfolio name must be specified for a valid query request. You cannot specify both the location node name and the portfolio name.
<PortfolioName>	Character String (40)	Optional element specifying a portfolio to designate the location nodes of the desired query. If not specified then the <LocationName> element must be specified for a valid query. You cannot specify both the portfolio name and the location node name.
<StartDate>	YYYY-MM-DD	The required element specifying the start date for the interval used for querying exceptions.
<EndDate>	YYYY-MM-DD	The required element specifying the end date for the interval used for querying exceptions.

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Element or Attribute	Data Type	Description
<Status>	Character String (20)	The required element specifying the status of the exceptions returned by the query. Valid types are (All, Pending, Denied, Approved, Withdrawn)
<RequestType>	Character String (20)	The required element specifying the type of exception. Currently the only valid type is “Daily”

The response to the query request is the QueryResponse message shown below:

```
<QueryResponse>
   <ExceptionParameterLimits>
      ---data---
   </ExceptionParameterLimits>
</QueryResponse>
```

The fields and their interpretation for the <ExceptionParameterLimits> element are the same as described for the <SubmitRequest> element above.

If an error is returned, for example, the operating day does not exist or the XML is malformed then the <Error> elements are returned as necessary as part of the <QueryResponse> as documented in Chapter 4 of this specification.

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8 Reports: Public and Private

The public and private data query is the request method for receiving pre-defined public or private data sets from PJM. Public data query is equivalent to displaying a public web page or downloading a public report. Although these are queries for public data, all XML messaging via the programmatic API requires authenticated users. Private data is data, such as market clearing results, which is private to the participant making the request. Except for this notion of private, the mechanism for the query of data is the same for both public and private.

The data query is initiated using a query request element as shown below. This query request is the payload that is enclosed by the SOAP Body element. Only one such query request element can be specified in the SOAP body. As shown, the query request encloses individual query elements that are unique to the query type. There can be multiple query elements given in one query request message.

Example of query request for private market clearing results and the day ahead demand summary:

```
<?xml version="1.0"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
<env:Header/>
<env:Body>
   <QueryRequest xmlns="http://emkt.pjm.com/emkt/xml">
      <QueryMarketResults day="2003-03-01" type="Demand">
          <LocationName>Hub1</LocationName>
      </QueryMarketResults>
      <QueryDemandSummary day="2003-03-01"/>
   </QueryRequest>
</env:Body>
</env:Envelope>
```

The message formats specified in later sections of this chapter do not include the XML namespace prefix as shown in the example above. It is up to you to choose the appropriate handling of namespaces by either specifying an explicit prefix or relying upon a global setting. Either method is acceptable as long as the XML and SOAP requirements are maintained. You may choose the prefix names, where to place xmlns attributes. Note that SOAP does require certain handling of namespaces and schemas and the SOAP standard and schema definition should be read and understood.

The elements that are children of <QueryRequest> can appear in any order. You may repeat a given element using different qualifier values. The response elements returned under <QueryResponse> listed below are returned in the same order as requested.

The response message is always returned as a SOAP wrapped payload and each individual query request response data is returned in the same order that the requests were made. Some requests may result in a null data set on return, in those situations, the containing element is always returned as documented in for each message.

For example, the response packet for the above example may appear as shown below.

```
<?xml version="1.0"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
```


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```
<env:Header/>
<env:Body>
   <QueryResponse xmlns="http://emkt.pjm.com/emkt/xml">
      <MarketResults location="Hub1" type="Demand" day="2003-03-01">
          -- data in response to request --
      </MarketResults>
      <DemandSummary day="2003-03-01">
          -- data in response to request --
      </DemandSummary>
   </QueryResponse>
</env:Body>
</env:Envelope>
```

Also, the same comment regarding namespace prefixes applies to the response data.

The following example shows an error response when the query goes bad:

```
<?xml version="1.0"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
<env:Header/>
<env:Body>
   <QueryResponse xmlns="http://emkt.pjm.com/emkt/xml">
      <Error>
         <Code>Blue</Code>
         <Text>Requested data does not exist</Text>
      </Error>
   </QueryResponse>
</env:Body>
</env:Envelope>
```

All query requests must be issued to appropriate URL as described earlier per the message and data set types. Also, all messages must reference the correct name spaces as described in each section that follows.

8.1 Query for Bid Node List

8.1.1 Purpose

This message format is used query for a list of all pricing nodes that have ever been referenced by previous bids by the participant. This is a private report.

The node list is updated periodically due to bidding activity of the participant or loss of historical context over time.

8.1.2 Message Format

The query request is shown below:

```
<QueryRequest>
  <QueryBidNodes/>
</QueryRequest>
```


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The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryBidNodes>	Singleton Type	Specifies the query for the participant's bid nodes.

8.1.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
  <BidNodes>
    <BidNode>
       <NodeName>xxx</NodeName>
       <NodeType>xxx</NodeType>
       <PnodeID>xxx</PnodeID>
       <CanSubmitFixed>xxx</CanSubmitFixed>
       <CanSubmitPriceSensitive>xxx</CanSubmitPriceSensitive>
       <CanSubmitIncrement>xxx</CanSubmitIncrement>
       <CanSubmitDecrement>xxx</CanSubmitDecrement>
    </BidNode>
  </BidNodes>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<BidNodes>	Complex Type	Specifies the bid node list collection.
<BidNode>	Complex Type	Specifies a single bid node including its name and type and pnodeid and bidding permissions. Repeated as required.

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Element or Attribute	Data Type	Description
<NodeName>	Character String (30)	Specifies the name of the node.
<NodeType>	(Hub, Zone, Interface, Bus, 500, Aggregate)	Specifies the type of the node.
<PnodeID>	Number(15)	Specifies the pnodeid (sequence number) of the pnode.
<CanSubmitFixed>	Boolean	If true then this pnode can be specified on a fixed demand bid.
<CanSubmitPriceSensitive>	Boolean	If true then this pnode can be specified on a price-sensitive demand bid.
<CanSubmitIncrement>	Boolean	If true then this pnode can be specified on a virtual increment bid.
<CanSubmitDecrement>	Boolean	If true then this pnode can be specified on a virtual decrement bid.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.

8.2 Query Binding Limits

8.2.1 Purpose

The binding limits report describes which constraints apply for a particular hour on a specified date. Data is available upon day-ahead market close at 4 pm on the day ahead of the operating day.

8.2.2 Message Format

The request for binding limits is shown below:

```
<QueryRequest>
  <QueryBindingLimits day="yyyy-mm-dd"/>
</QueryRequest>
```


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The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryBindingLimits>	Singleton Type	Specifies that a query for the binding limits on the specified day is requested.
day	YYYY-MM-DD	Required field specifying the operational date of the binding limits data.

8.2.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
  <BindingLimits day="yyyy-mm-dd" >
    <BindingLimitsHourly hour="hh">
      <BindingLimit>
        <BranchName>zzz</BranchName>
        <ContingencyName>yyy</ContingencyName>
        <MarginalValue>xxx</MarginalValue>
      </BindingLimit>
    </BindingLimitsHourly>
  </BindingLimits>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<BindingLimits>	Singleton Type	The element containing the constraints for the specified date.
day	YYYY-MM-DD	Specifies the operational date of the data.

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Element or Attribute	Data Type	Description
<BindingLimitsHourly>	Complex Type	Specifies a given hourly interval. Repeated as necessary for each hour a binding limit exists.
hour	HH	Specifies the hour-ending of the interval.
<BindingLimit>	Complex Type	Specifies a given binding limit as a branch name and a contingency name. Repeated as necessary.
<BranchName>	Character String (90)	Specifies the constraint branch name.
<ContingencyName>	Character String (80)	Specifies the contingency whose outage results in the binding limit on the specified branch.
<MarginalValue>	Numeric (10.2)	Specifies the marginal value of the violation.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.
- Error reported if the specified market date does not exist.

8.3 Query for Demand Summary

8.3.1 Purpose

This message format is used to query for the day-ahead demand summary reporting the overall system demand forecast versus cleared energy by area. The day-ahead summary also includes the reserve requirement for each area.

Data is available when the day-ahead market closes at 4 pm on the day-ahead of the operating day.

8.3.2 Message Format

The demand summary query request is shown below:

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```
<QueryRequest>
  <QueryDemandSummary day="yyyy-mm-dd"/>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryDemandSummary>	Complex Type	Specifies the query for the day-ahead demand summary for the specified market operating date.
Day	YYYY-MM-DD	Required field specifying operating day.

8.3.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
  <DemandSummary day="yyyy-mm-dd">
    <DemandSummaryHourly hour="hh">
       <DemandSummarySet>
          <ForecastMW>xxx</ForecastMW>
          <DemandBidMW>xxx</DemandBidMW>
          <ReserveMW>xxx</ReserveMW>
          <Area>xxx</Area>
       </DemandSummarySet>
    </DemandSummaryHourly>
  </DemandSummary>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.

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Element or Attribute	Data Type	Description
<DemandSummary>	Complex Type	Element specifies the day ahead demand summary for the requested operating day.
Day	YYYY-MM-DD	Specifies the operating day.
<DemandSummaryHourly>	Complex Type	Specifies the demand summary for the hourly interval.
Hour	HH	Specifies the hour-ending.
<DemandSummarySet>	Complex Type	Specifies the demand summary set for the area or reserve zone. Repeats as required.
<ForecastMW>	MWType	Reports the forecast MW value for the hour.
<DemandBidMW>	MWType	Reports the cleared MW demand value for the hour.
<ReserveMW>	MWType	Reports the reserve MW requirement value for the hour.
<Area>	Character String (40)	Specifies the control area name.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.
- Error reported if the specified market day does not exist.
- Error reported if the market has not cleared.

8.4 Query for Dispatch Lambda

8.4.1 Purpose

This query is used to obtain the details of the lambda generation for the current day for given generators.

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8.4.2 Message Format

The dispatch lambda query request is shown below.

```
<QueryRequest>
  <QueryDispatchLambda>
    <All/>
    <LocationName>zzz</LocationName>
    <PortfolioName>xxx</PortfolioName>
  </QueryDispatchLambda>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryDispatchLambda>	Complex Type	Specifies query for current dispatch lambda for the requested generators.
<All/>	N/A	Optional element specifying that all generator units owned by the participant should be included in the response. If <All/> is specified you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional element specifying the name of a generator CPTU identifier. If not specified, then the <PortfolioName> element must be specified. You must choose between <LocationName> and <PortfolioName> but you cannot specify both in the same query request.
<PortfolioName>	Character String	Optional element specifying the name of a portfolio of locations. If not specified, then the <LocationName> element must be specified. You must choose between <LocationName> and <PortfolioName> but you cannot specify both in the same query request.

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8.4.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
 <DispatchLambdaSet>
  <DispatchLambda location="xxx" interval="yyyy-mm-ddThh:mm:ss">
    <ScheduleDescription>xxx</ScheduleDescription>
    <RegMWAssignment>999.9</RegMWAssignment>
    <LambdaDispatchRate>999.99</LambdaDispatchRate>
    <LambdaMW>999.9</LambdaMW>
    <DeviationMW>999.9</DeviationMW>
    <EnergyMin>999.9</EnergyMin>
    <EnergyMax>999.9</EnergyMax>
    <CapacityMax>999.9</CapacityMax>
    <Status>xxx</Status>
    <NonRampLambdaMW>999.9</NonRampLambdaMW>
  </DispatchLambda>
 </DispatchLambdaSet>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<DispatchLambdaSet>	Complex Type	A container element wrapping all returned instances of <DispatchLambda> elements.
<DispatchLambda>	Complex Type	Specifies the dispatch lambda for the given generator at the time of the request.
location	Character String	Specifies the generator CPTU name.
interval	YYYY-MM-DDThh:mm:ss	Specifies the current date and time of the data.
<ScheduleDescription>	Character String (40)	Specifies the schedule description of the schedule used for dispatch.
<RegMWAssignment>	MWType	Specifies the regulation MW assigned to the generator.

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Element or Attribute	Data Type	Description
<LambdaDispatchRate>	MWRateType	Specifies the lambda dispatch rate.
<LambdaMW>	MWType	Specifies the Lambda Generation in MW.
<DeviationMW>	MWType	Specifies the deviation from current generation in MW.
<EnergyMin>	MWType	Specifies energy minimum in MW.
<EnergyMax>	MWType	Specifies energy maximum in MW.
<CapacityMax>	MWType	Specifies capacity maximum in MW.
<Status>	Character String (80)	Specifies optional status string.
<NonRampLambdaMW>	MWType	Specifies non-ramp lambda generation in MW.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.
- Error reported if the specified market day does not exist.

8.5 Query for Interface Limits

8.5.1 Purpose

This query is for the report describing the hourly operating limits used in the day-ahead scheduling process between PJM interfaces and neighboring control areas. This is a public report.

This report is available daily at 4 pm on the day before the operating day.

8.5.2 Message Format

The query for interface limits is shown below:

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```
<QueryRequest>
  <QueryInterfaceLimits day="yyyy-mm-dd"/>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryInterfaceLimits>	Singleton Type	Specifies the query for the interface limits for the specified operating day.
day	YYYY-MM-DD	Required field specifying the operating day.

8.5.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
  <InterfaceLimits day="yyyy-mm-dd">
     <InterfaceLimitsHourly hour="hh">
        <InterfaceLimit>
           <InterfaceLimitName>xxx</InterfaceLimitName>
           <FlowMW>999.9</FlowMW>
           <LimitMW>999.9</LimitMW>
        </InterfaceLimit>
     </InterfaceLimitsHourly>
  </InterfaceLimits>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<InterfaceLimits>	Complex Type	Specifies the Interface Limits for the given day requested.

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Element or Attribute	Data Type	Description
day	YYYY-MM-DD	Specifies the operating day.
<InterfaceLimitsHourly>	Complex Type	Specifies the hourly interval of data. Repeated as required.
hour	HH	Specifies the hourly interval hour ending value.
<InterfaceLimit>	Complex Type	Specifies an interface limit. Repeated as required.
<InterfaceLimitName>	Character String (55)	Specifies the interface limit name.
<FlowMW>	MWType	Specifies the flow in MW across the interface.
<LimitMW>	MWType	Specifies the limit in MW of the interface.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.
- Error reported if the specified market date does not exist.

8.6 Query for Market Prices

8.6.1 Purpose

This query returns the day-ahead market clearing prices for the requested locations. This is a public report. The report is an hourly report for the requested operating day.

The market clearing prices are available daily at 4 pm on the day before the operating day.

The query results are distinguished by how the type specifier (Public, Demand, Generation, LoadResponse) and the <All/> location specifier are used together. The query logic is described in the following table.

Type	Description

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Type	Description
Public	If <All/> is specified then the pricing nodes returned in the response include all publicly available pnodes that have a price. All Public queries are independent of participant identity or resource ownership.
Demand	If <All/> is specified then the pricing nodes returned in the response include all pnodes ever specified by the participant for a demand or virtual increment/decrement bid.
Generation	If <All/> is specified then then all generators locations owned by the participant are included in the response.
LoadResponse	If <All/> is specified then all load response resources that are owned by the participant are included in the response.

8.6.2 Message Format

The Market Prices Query request is shown below:

```
<QueryRequest>
  <QueryMarketPrices type="xxx" day="yyyy-mm-dd">
     <All/>
     <LocationName>xxx</LocationName>
     <PortfolioName>xxx</PortfolioName>
  </QueryMarketPrices>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.

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Element or Attribute	Data Type	Description
<QueryMarketPrices>	Complex Type	Specifies query for day-ahead market clearing prices for the given operating day and locations.
type	(Public, Generation, Demand, LoadResponse)	Required field specifying the type of market response data to query. This field determines the interpretation of the locations specified by <All/>, <LocationName>, or <PortfolioName>.
day	YYYY-MM-DD	Required field specifying the operating day.
<All/>	N/A	Optional element specifying that all *resources* of the type specified (see type description above in section 7.6.1).
<LocationName>	Character String	Optional element specifying identifier of the resource of the type specified above. If not specified, then the <PortfolioName> element must be specified or the <All/> element must be specified. You must choose between <All/>, <LocationName>, or <PortfolioName> but you cannot specify more than one of these qualifiers in the same query request.
<PortfolioName>	Character String	Optional element specifying the name of a portfolio of locations. See comments above for the <LocationName> element.

8.6.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
 <MarketPricesSet>
  <MarketPrices type="xxx" location="xxx" day="yyyy-mm-dd">
     <MarketPricesHourly hour="hh">
        <LMP>999.99</LMP>
        <LossLMP>999.99</LossLMP>
        <CongestionLMP>999.99</CongestionLMP>
     </MarketPricesHourly>
  </MarketPrices>
```


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```
 </MarketPricesSet>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<MarketPricesSet>	Complex Type	Container of all returned <MarketPrices> elements.
<MarketPrices>	Complex Type	Specifies the market clearing price for the given location and operating day.
type	(Generation, Demand, LoadResponse)	Specifies the type of resource identified by location.
location	Character String	Specifies the pricing node location.
day	YYYY-MM-DD	Specifies the operating day.
<MarketPricesHourly>	Complex Type	Specifies the hourly interval. Repeated as required.
hour	HH	Specifies the hour-ending value for the hourly interval.
<LMP>	PriceType	Specifies the clearing price.
<LossLMP>	Price Type	Specified the loss component of the clearing price.
<CongestionLMP>	PriceType	Specifies the congestion component of the clearing price.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.
- Invalid operating day or location does not exist.

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8.7 Query for Market Results

8.7.1 Purpose

This query returns the day-ahead market results and prices for the requested locations. This is a private report. The report is an hourly report for the requested operating day.

The market clearing prices are available daily at 4 pm on the day before the operating day.

This query request is used by all bid or resource types: demand, virtual, generation, and load response. The interpretation of these attributes are:

- Demand – specifies that market results for physical energy demand are to be returned. The location names specified by the query parameters identify pnodes that the participant is able to submit demand bids.

- Virtual – specifies that market results are for virtual energy, both increment and decrement, are to be returned. The location names specified by the query parameters identify pnodes that the participant is able to submit virtual bids.

- Generation – specifies that the market results are for physical energy generated and offered into the market. The query parameters identify generators using the CPTU identifier.

- LoadResponse – specifies that the market results are for physical energy curtailed and offered into the market. The query parameters identify load response resources.

The interpretation on the query type attribute and the <All/> location qualifiers is described in the table below.

Type	Description
Demand	If <All/> is specified then the pricing nodes returned in the response include all pnodes ever specified by the participant for a fixed demand or price-sensitive demand bid.
Generation	If <All/> is specified then then all generators locations owned by the participant are included in the response.
LoadResponse	If <All/> is specified then all load response resources that are owned by the participant are included in the response.
Virtual	If <All/> is specified then all submitted virtual bid locations (whether increment or decrement) are included in the response.

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8.7.2 Message Format

The Market Results Query request is shown below:

```
<QueryRequest>
  <QueryMarketResults type="xxx" day="yyyy-mm-dd">
     <All/>
     <LocationName>xxx</LocationName>
     <PortfolioName>xxx</PortfolioName>
  </QueryMarketResults>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryMarketResults>	Complex Type	Specifies query for day-ahead market clearing results for the given operating day and locations.
type	(Generation, Demand, Virtual, LoadResponse)	Required field specifying the type of location.
day	YYYY-MM-DD	Required field specifying the operating day.
<All/>	N/A	Optional element specifying that all resources of the type requested that have been submitted into the market. If you specify <All/> you cannot also specify <LocationName> or <PortfolioName>.

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Element or Attribute	Data Type	Description
<LocationName>	Character String	Optional element specifying the location of the source of the given type: demand, virtual, load response, or generator. If not specified, then to choose specific locations, the <PortfolioName> element must be specified. If you are not specifying <All/>, you must choose between <LocationName> and <PortfolioName> but you cannot specify both in the same query request.
<PortfolioName>	Character String	Optional element specifying the name of a portfolio of locations. See the description above for <LocationName>.

8.7.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
 <MarketResultsSet>
  <MarketResults type="xxx" location="xxx" day="yyyy-mm-dd">
     <MarketResultsHourly hour="hh">
        <ClearedMW>999.9</ClearedMW>
        <ClearedIncMW>999.9</ClearedIncMW>
        <ClearedDecMW>999.9</ClearedDecMW>
        <ClearedPrice>999.9</ClearedPrice>
        <PriceCapped>xxx</PriceCapped>
       <ConstraintName>xyz</ConstraintName>
        <ContingencyName>xyz</ContingencyName>
        <Schedule>xx</Schedule>
        <OnReason>xyz</OnReason>
     </MarketResultsHourly>
  </MarketResults>
 </MarketResultsSet>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.

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Element or Attribute	Data Type	Description
<MarketResultsSet>	Complex Type	Container for all returned <MarketResults> elements.
<MarketResults>	Complex Type	Specifies the market results for the given location and operating day.
type	(Generation, Demand, Virtual, LoadResponse)	Specifies the type of the resource identified by location.
location	Character String	Specifies the pricing node location.
day	Character String	Specifies the operating day.
<MarketResultsHourly>	Complex Type	Specifies the hourly interval. Repeated as required.
hour	HH	Specifies the hour-ending value for the hourly interval.
<ClearedMW>	MWType	Optional. Specifies the cleared physical energy in MW. Cleared physical energy is returned only when the type is: Generation, Demand, or LoadResponse.
<ClearedIncMW>	MWType	Optional. Specifies the cleared virtual increment MW. Cleared virtual energy is returned only when the request is for Virtual results.
<ClearedDecMW>	MWType	Specifies the cleared virtual decrement MW. Cleared virtual energy is returned only when the request is for Virtual results.
<ClearedPrice>	PriceType	Specifies the clearing price in $ per MWH.
<PriceCapped>	Boolean	Optional. If the location is of type Generation then if the offer was price capped in clearing this element appears with a value of true. By default, this value is false (and it may not appear in the XML).

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Element or Attribute	Data Type	Description
<ConstraintName>	Character String	Optional. If the location is of type generation then if the offer was price capped this element contains the name of the associated constraint.
<ContingencyName>	Character String	Optional. If the location is of type generation then if the offer was price capped this element contains the name of the associated contingency.
<Schedule>	Numeric(2)	Optional. If the location is of type Generation then this is the numeric schedule code of the schedule used in market clearing. By default, for non-generation locations, this element does not appear.
<OnReason>	Character String	Optional. The reason the day ahead case turned on the resource.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.
- Invalid operating day or location does not exist.
- Market has not cleared.

8.8 Query for Messages

8.8.1 Purpose

This query returns messages that have been issued by the market operator. All messages are considered public.

Each message has an associated priority field from 0 through 999. This priority value is entered by the market operator and used to order the messages on the web displays. There is no meaning other than relative ordering of the appearance of messages.

Each message is defined in a time interval beginning with the effective time and ending with the termination time. Messages that are not currently active can be queried by specifying an optional active date and time in the query.

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8.8.2 Message Format

The Market Results Query request is shown below:

```
<QueryRequest>
  <QueryMessages>
     <ActiveDateTime>yyyy-mm-ddThh:mm:ss</ActiveDateTime>
     <PriorityThreshold>xxx</PriorityThreshold>
  </QueryMessages>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryMessages>	Complex Type	Specifies the query of messages. The default realm is public.
<ActiveDateTime>	YYYY-MM-DDThh:mm:ss	Optional query parameter specifying the active date time to use when querying messages. By default, the current date and time are used.
<PriorityThreshold>	Number(3)	Optional query parameter specifying the priority threshold to use on filtering the messages. All messages with a priority of this threshold value or less are returned. By default, the threshold value is 999, meaning that all messages are returned.

8.8.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
 <MessageSet>
  <Message realm="public">
    <EffectiveTime>yyyy-mm-ddThh:mm:ss</EffectiveTime>
    <TerminationTime>yyyy-mm-ddThh:mm:ss</TerminationTime>
    <Priority>xxx</Priority>
    <Text>xxx</Text>
```


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```
  </Message>
 </MessageSet>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<MessageSet>	Complex Type	Container for all returned <Message> elements.
<Message>	Complex Type	Specifies a single message.
realm	Public	Specifies the realm of the message. All messages are public.
<EffectiveTime>	YYYY-MM-DDThh:mm:ss	Specifies the effective date and time of the message.
<TerminationTime>	YYYY-MM-DDThh:mm:ss	Specifies the termination date and time of the message.
<Priority>	Number(3)	Specifies the message's relative priority.
<Text>	Character String (1024)	Specifies the text of the message.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.

8.9 Query for Net Tie Schedules

8.9.1 Purpose

This query is for the report describing the hourly power flowing between PJM and its neighbors for a specific operating day. This is a public report.

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This report is available daily at 4 pm on the day before the operating day.

8.9.2 Message Format

The query for net tie schedules is shown below:

```
<QueryRequest>
  <QueryNetTieSchedule day="yyyy-mm-dd"/>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryNetTieSchedule>	Singleton Type	Specifies the query for the net tie schedules for the specified operating day.
day	YYYY-MM-DD	Required field specifying the operating day.

8.9.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
  <NetTieSchedule day="yyyy-mm-dd">
     <NetTieScheduleHourly hour="hh">
        <NetTieArea>
           <MW>999.9</MW>
           <AreaName>xxx</AreaName>
        </NetTieArea>
     </NetTieScheduleHourly>
  </NetTieSchedule>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description

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Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<NetTieSchedule>	Complex Type	Specifies the net tie schedule for the requested operating day.
day	YYYY-MM-DD	Specifies the operating day.
<NetTieScheduleHourly>	Complex Type	Specifies the hourly interval of data. Repeated as required.
hour	HH	Specifies the hourly interval hour ending value.
<NetTieArea>	Complex Type	Specifies the net tie for a particular area. Repeated as necessary.
<MW>	MWType	Optional element that specifies the net tie schedule in MW.
<AreaName>	Character String (40)	Specifies the area name.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.
- Error reported if the specified market date does not exist.

8.10 Query for Node List

8.10.1 Purpose

This message format is used query for a list of all pricing nodes defined in the market. This is a public report.

The node list is updated periodically by PJM as it receives new details posted to PJM.

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Also see Query for Bid Nodes, an alternate query for nodes that restricts the result to those nodes that the participant has a bidding history.

8.10.2 Message Format

The query request is shown below:

```
<QueryRequest>
  <QueryNodeList day="yyyy-mm-dd"/>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryNodeList>	Singleton Type	Specifies the query for the current node list.
day	YYYY-MM-DD	Specifies the operating day.

8.10.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
  <NodeList day="yyyy-mm-dd">
    <Node>
       <NodeName>xxx</NodeName>
       <NodeType>xxx</NodeType>
       <PnodeID>xxx</PnodeID>
    </Node>
  </NodeList>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.

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Element or Attribute	Data Type	Description
<NodeList>	Complex Type	Specifies the node list collection.
day	YYYY-MM-DD	Specifies the operating day.
<Node>	Complex Type	Specifies a single pnode including its name and type and pnodeid. Repeated as required.
<NodeName>	Character String (30)	Specifies the name of the node.
<NodeType>	(Hub, Zone, Interface, Bus, 500, Aggregate)	Specifies the type of the node.
<PnodeID>	Number(15)	Specifies the pnodeid (sequence number) of the pnode.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.

8.11 Query for Day-Ahead Scheduling Reserve Bilaterals

8.11.1 Purpose

This message is used to query for the day-ahead scheduling reserve bilateral schedules that are operative for a particular day. The query response returns all bilaterals for the participant who is a party to the schedule (as a buyer or a seller). This is a private report.

The bilateral schedules are available at 6 pm for the next day.

8.11.2 Message Format

The query request for day-ahead scheduling reserve bilaterals is shown below:

```
<QueryRequest>
  <QuerySchedReserveBilaterals day="yyyy-mm-dd"/>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

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Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QuerySchedReserveBilaterals>	Singleton Type	Specifies query for the bilaterals for the given operating day.
day	YYYY-MM-DD	Required field specifying the operating day of the schedules.

8.11.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
  <SchedReserveBilaterals day="yyyy-mm-dd">
     <SchedReserveBilateralSchedule>
       <Confirmed>xxx</Confirmed>
       <BilateralID>xxx</BilateralID>
       <Buyer>xxx</Buyer>
       <Seller>xxx</Seller>
       <MW>xxx</MW>
       <StartTime>xxx</StartTime>
       <StopTime>xxx</StopTime>
       <ConfirmationTime>xxx</ConfirmationTime>
       <AreaName>xxx</AreaName>
     </SchedReserveBilateralSchedule>
  </SchedReserveBilaterals>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<SchedReserveBilaterals>	Complex Type	Specifies the day-ahead scheduling reserve bilaterals for a specific operating day.
day	YYYY-MM-DD	Specifies the operating day.

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Element or Attribute	Data Type	Description
<SchedReserveBilateral Schedule>	Complex Type	Specifies an instance of a bilateral schedule between a seller and a buyer. Repeated as required.
<Confirmed>	Boolean	Optional element specifying whether the bilateral schedule has been confirmed. Default value is false.
<BilateralID>	Number(10)	Internal unique identifier of bilateral schedule.
<Buyer>	Character String (40)	Specifies the buyer name.
<Seller>	Character String (40)	Specifies the seller name.
<MW>	MWType	Scheduled MW.
<StartTime>	YYYY-MM-DDThh:mm:ss	Schedule Start date and time.
<StopTime>	YYYY-MM-DDThh:mm:ss	Schedule Stop date and time.
<ConfirmationTime>	YYYY-MM-DDThh:mm:ss	Optional. Confirmation date and time. If not specified then bilateral schedule has not been confirmed.
<AreaName>	Character String (40)	Area name.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.
- Date does not exist.

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8.12 Query for Day-Ahead Scheduling Reserve Results

8.12.1 Purpose

This message is used to query for the day-ahead scheduling reserve market results showing the day-ahead scheduling reserve market clearing price and cleared scheduling reserve MW per hour of a given operating day. This is a public report.

This report is published and available hourly during the operating day.

8.12.2 Message Format

The query request is shown below:

```
<QueryRequest>
   <QuerySchedReserveResults day="yyyy-mm-dd".>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QuerySchedReserveResults>	Complex Type	Specifies the query for day-ahead scheduling reserve market results for the specified operating day.
day	YYYY-MM-DD	Specifies the operating day.

8.12.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
  <SchedReserveResults day="yyyy-mm-dd">
    <SchedReserveResultsHourly hour="hh">
       <SchedReserveResultsByArea>
          <DASRMCP>999.99</RMCP>
          <RequiredMW>999.9</RequiredMW>
          <AwardedMW>999.9</AwardedMW>
          <AreaName>xxx</AreaName>
       </SchedReserveResultsByArea>
```


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```
    </SchedReserveResultsHourly>
  </SchedReserveResults>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<SchedReserveResults>	Complex Type	Specifies the day-ahead scheduling reserve results for the requested operating day.
Day	YYYY-MM-DD	Specifies the date of the operating day.
<SchedReserveResultsHourly>	Complex Type	Specifies the hourly interval. Repeated as required.
Hour	HH	Specifies the hour-ending for the hourly interval.
<SchedReserveResultsByArea>	Complex Type	Specifies the day-ahead scheduling reserve results for the named area. Repeats as required.
<DASRMCP>	PriceType	Specifies the day-ahead scheduling reserve results clearing price in $ per MWH.
<RequiredMW>	MWType	Specifies the required MW.
<AwardedMW>	MWType	Specifies the awarded day-ahead scheduling reserve MW.
<AreaName>	Character String (40)	Specifies the area name.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.

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- Requested day does not exist or market has not yet cleared.

8.13 Query for Regulation Bilaterals

8.13.1 Purpose

This message is used to query for the regulation bilateral schedules that are operative for a particular day. The query response returns all bilaterals for the participant who is a party to the schedule (as a buyer or a seller). This is a private report.

The bilateral schedules are available at 6 pm for the next day.

8.13.2 Message Format

The query request for regulation bilaterals is shown below:

```
<QueryRequest>
  <QueryRegulationBilaterals day="yyyy-mm-dd"/>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryRegulationBilaterals>	Singleton Type	Specifies query for the bilaterals for the given operating day.
day	YYYY-MM-DD	Required field specifying the operating day of the schedules.

8.13.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
  <RegulationBilaterals day="yyyy-mm-dd">
     <BilateralSchedule>
       <Confirmed>xxx</Confirmed>
       <BilateralID>xxx</BilateralID>
       <Buyer>xxx</Buyer>
       <Seller>xxx</Seller>
```


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```
        <MW>xxx</MW>
        <StartTime>xxx</StartTime>
        <StopTime>xxx</StopTime>
        <ConfirmationTime>xxx</ConfirmationTime>
        <AreaName>xxx</AreaName>
      </BilateralSchedule>
  </RegulationBilaterals>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<RegulationBilaterals>	Complex Type	Specifies the regulation bilaterals for a specific operating day.
day	YYYY-MM-DD	Specifies the operating day.
<BilateralSchedule>	Complex Type	Specifies an instance of a bilateral schedule between a seller and a buyer. Repeated as required.
<Confirmed>	Boolean	Optional element specifying whether the bilateral schedule has been confirmed. Default value is false.
<BilateralID>	Number(10)	Internal unique identifier of bilateral schedule.
<Buyer>	Character String (40)	Specifies the buyer name.
<Seller>	Character String (40)	Specifies the seller name.
<MW>	MWType	Scheduled MW.
<StartTime>	YYYY-MM-DDThh:mm:ss	Schedule Start date and time.
<StopTime>	YYYY-MM-DDThh:mm:ss	Schedule Stop date and time.

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Element or Attribute	Data Type	Description
<ConfirmationTime>	YYYY-MM-DDThh:mm:ss	Optional. Confirmation date and time. If not specified then bilateral schedule has not been confirmed.
<AreaName>	Character String (40)	Area name – before Shortage Pricing Locale name – after Shortage Pricing

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.
- Date does not exist.

8.14 Query for Regulation Results

8.14.1 Purpose

This message is used to query for the regulation market results showing the market clearing prices and cleared regulation MW per hour of a given operating day. This is a public report.

This report is published and available hourly during the operating day.

8.14.2 Message Format

The query request is shown below:

```
<QueryRequest>
   <QueryRegulationResults day="yyyy-mm-dd"/>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.

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Element or Attribute	Data Type	Description
<QueryRegulationResults>	Complex Type	Specifies the query for regulation market results for the specified operating day.
day	YYYY-MM-DD	Specifies the operating day.

8.14.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
  <RegulationResults day="yyyy-mm-dd">
       <RegulationResultsHourly hour="hh">
       <RegulationResultsByArea>
          <SelfScheduledMW>999.9</SelfScheduledMW>
          <ProcuredMW>999.9</ProcuredMW>
          <TotalMW>999.9</TotalMW>
          <RequiredMW>999.9</RequiredMW>
          <DeficiencyMW>999.9</DeficiencyMW>
          <PerformanceScore>9.999999</PerformanceScore>
          <AreaName>xxx</AreaName>
          <RegdSelfScheduleMW>999.9</RegdSelfScheduleMW>
          <RegdProcuredMW>999.9</RegdProcuredMW>
          <RegaMileage>99.9<RegaMileage>
          <RegdMileage>99.9<RegdMileage>
       </RegulationResultsByArea>
    </RegulationResultsHourly>
  </RegulationResults>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<RegulationResults>	Complex Type	Specifies the regulation results for the requested operating day.
day	YYYY-MM-DD	Specifies the date of the operating day.
<RegulationResultsHourly>	Complex Type	Specifies the hourly interval. Repeated as required.

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Element or Attribute	Data Type	Description
hour	HH	Specifies the hour-ending for the hourly interval.
<RegulationResultsByArea>	Complex Type	Specifies the regulation results for the named area. Repeats as required.
<SelfScheduledMW>	MWType	Specifies the self-scheduled MW.
<ProcuredMW>	MWType	Specifies the procured regulation MW.
<TotalMW>	MWType	Specifies the total MW.
<RequiredMW>	MWType	Specifies the required MW.
<DeficiencyMW>	MWType	Specifies the deficiency MW.
<PerformanceScore>	Decimal	Specifies the average performance scores for all regulating resources for the market hour (x.xxxxxx).
<AreaName>	Character String (40)	Specifies the area name.
<RegdSelfScheduleMW>	MWType	Specifies the self-schedule MW for reg d.
RegdProcuredMW	MWTYPE	Specifies the procured reulation D MW.
<RegaMileage>	Decimal	Daily mileage ratio for reg A. The value will be the same for each hour of the day.
<RegdMileage>	Decimal	Daily mileage ratio for reg D. The value will be the same for each hour of the day.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.

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- Requested day does not exist or market has not yet cleared.

8.15 Query for Spin Reserve Bilaterals

8.15.1 Purpose

This message is used to query for the spinning reserve bilateral schedules that are operative for a particular day. The query response returns all spinning reserve bilaterals for the participant who is a party to the bilateral (as a buyer or a seller). This is a private report.

The spinning reserve bilateral schedules are available as entered for the requested operating day.

8.15.2 Message Format

The query request for spinning reserve bilaterals is shown below:

```
<QueryRequest>
  <QuerySpinReserveBilaterals day="yyyy-mm-dd"/>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QuerySpinReserveBilaterals>	Singleton Type	Specifies query for the spinning reserve bilaterals for the given operating day.
day	YYYY-MM-DD	Required field specifying the operating day of the bilaterals.

8.15.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
  <SpinReserveBilaterals day="yyyy-mm-dd">
     <SpinBilateralSchedule>
       <Confirmed>xxx</Confirmed>
```


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```
        <BilateralID>xxx</BilateralID>
        <Buyer>xxx</Buyer>
        <Seller>xxx</Seller>
        <MW>xxx</MW>
        <Percent>xxx</Percent>
        <StartTime>xxx</StartTime>
        <StopTime>xxx</StopTime>
        <ConfirmationTime>xxx</ConfirmationTime>
        <AreaName>xxx</AreaName>
        <ReserveZone>xxx</ReserveZone>
      </SpinBilateralSchedule>
  </SpinReserveBilaterals>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<SpinReserveBilaterals>	Complex Type	Specifies the spinning reserve bilaterals for a specific operating day.
day	YYYY-MM-DD	Specifies the operating day.
<SpinBilateralSchedule>	Complex Type	Specifies an instance of a spinning reserve bilateral schedule between a seller and a buyer. Repeated as required.
<Confirmed>	Boolean	Optional element specifying whether the bilateral schedule has been confirmed. Default value is false.
<BilateralID>	Number(10)	Specifies the internal unique bilateral ID for this bilateral schedule.
<Buyer>	Character String (40)	Specifies the buyer name.
<Seller>	Character String (40)	Specifies the seller name.

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Element or Attribute	Data Type	Description
<MW>	MWType	Scheduled MW. Optional element. If not specified then scheduled amount must be specified by <Percent> element.
<Percent>	MWType	Scheduled MW as a percentage of obligation. Optional element. If not specified then scheduled amount must be specified by <MW> element.
<StartTime>	YYYY-MM-DDThh:mm:ss	Schedule Start date and time.
<StopTime>	YYYY-MM-DDThh:mm:ss	Schedule Stop date and time.
<ConfirmationTime>	YYYY-MM-DDThh:mm:ss	Optional schedule confirmation date and time. Null if not confirmed.
<AreaName>	Character String (40)	Optional area name – before Shortage Pricing Locale name – after Shortage Pricing Null if not applicable.
<ReserveZone>	Character String (40)	Optional reserve zone. Null if not applicable.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.
- Date does not exist.

8.16 Query for Spin Reserve Results

8.16.1 Purpose

This message is used to query for the spinning reserve market results showing the market clearing prices and cleared MW per hour of a given operating day. The data is reported hourly. This is a public report.

This report is published and available hourly during the operating day.

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8.16.2 Message Format

The query request is shown below:

```
<QueryRequest>
   <QuerySpinReserveResults day="yyyy-mm-dd"/>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QuerySpinReserveResults>	Complex Type	Specifies the query for spinning reserve market results for the specified operating day.
day	YYYY-MM-DD	Specifies the operating day.

8.16.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
  <SpinReserveResults day="yyyy-mm-dd">
       <SpinReserveResultsHourly hour="hh">
       <SpinReserveResultsByArea>
          <RequiredMW>999.9</RequiredMW>
          <Tier1MW>999.9</Tier1MW>
          <Tier2MW>999.9</Tier2MW>
          <AvailableTransferMW>999.9</AvailableTransferMW>
          <SelfScheduledMW>999.9</SelfScheduledMW>
          <Tier2AssignedMW>999.9</Tier2AssignedMW>
          <TotalMW>999.9</TotalMW>
          <DeficiencyMW>999.9</DeficiencyMW>
          <AreaName>xxx</AreaName>
          <ReserveZone>xxx</ReserveZone>
       </SpinReserveResultsByArea>
    </SpinReserveResultsHourly>
  </SpinReserveResults>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

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Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<SpinReserveResults>	Complex Type	Specifies the spinning reserve results for the requested operating day.
day	YYYY-MM-DD	Specifies the date of the operating day.
<SpinReserveResultsHourly>	Complex Type	Specifies the hourly interval. Repeated as required.
hour	HH	Specifies the hour-ending for the hourly interval.
<SpinReserveResultsByArea>	Complex Type	Specifies the spinning reserve results for the named area. Repeats as required.
<RequiredMW>	MWType	Specifies the required MW. Optional (see comment below).
<Tier1MW>	MWType	Specifies the Tier 1 estimated MW. Optional (see comment below).
<Tier2MW>	MWType	Specifies the Tier 2 required MW. Optional (see comment below).
<AvailableTransferMW>	MWType	Specifies the Available Transfer MW. Optionals (see comments below).
<SelfScheduledMW>	MWType	Specifies the self-scheduled MW. Optional (see comment below).
<Tier2AssignedMW>	MWType	Specifies the Tier 2 assigned MW. Optional (see comment below).
<TotalMW>	MWType	Specifies the total MW. Optional (see comment below).

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Element or Attribute	Data Type	Description
<DeficiencyMW>	MWType	Specifies the deficiency MW. Optional (see comment below).
<AreaName>	Character String (40)	Specifies the area name if it applies to the results. Optional.
<ReserveZone>	Character String (40)	Specifies the reserve zone if it applies to the results. Optional.

Note: a number of fields (see above) are defined as optional (zero or one occurrence in the XML schema). These optional values are declared as such primarily to handle two situations. One, where only Tier 1 results are available. Two, when the market has not cleared for that hour due to an unusual situation.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.
- Requested day does not exist or market has not yet cleared.

8.17 Query for Spinning Reserve and Regulation Award

8.17.1 Purpose

This message is used to query for the spinning reserve and regulation award for requested generators. This is a private report.

The data is published hourly during the operating day.

8.17.2 Message Format

The query request is shown below:

```
<QueryRequest>
  <QuerySPREGAward day="yyyy-mm-dd">
     <All/>
     <LocationName>xxx</LocationName>
     <PortfolioName>xxx</PortfolioName>
     <Hour>hh</Hour>
  </QuerySPREGAward>
</QueryRequest>
```


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The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QuerySPREGAward>	Complex Type	Specifies query for spinning reserve and regulation award for the given operating day and location. The hour ending of a desired hour is optional.
day	YYYY-MM-DD	Required field specifying the operating day.
<All/>	N/A	Optional element specifying that all generator resources cleared in the market should be returned in the response. If <All/> is specified you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional element specifying generator CPTU identifier. If not specified, then the <PortfolioName> element must be specified. You must choose between <LocationName> and <PortfolioName> but you cannot specify both in the same query request.
<PortfolioName>	Character String	Optional element specifying the name of a portfolio of locations. If not specified, then the <LocationName> element must be specified. You must choose between <LocationName> and <PortfolioName> but you cannot specify both in the same query request.
<Hour>	HH	Optional element requesting a specific hourly interval to be included in the response. If not specified, all hours available as result data is returned.

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8.17.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
 <SPREGAwardSet>
  <SPREGAward location="xxx" day="yyyy-mm-dd">
    <SPREGAwardHourly hour="hh">
       <Tier>xxx</Tier>
       <SpinOfferMW>999.9</SpinOfferMW>
       <RegOfferMW>999.9</RegOfferMW>
       <Tier1MW>999.9</Tier1MW>
       <SelfScheduledMW>999.9</SelfScheduledMW>
       <Tier2MW>999.9</Tier2MW>
       <RegAwardedMW>999.9</RegAwardedMW>
       <TPSResult>zzz</TPSResult>
       <RegOfferPriceUsed>99999999.99</RegOfferPriceUsed>
       <PerformanceScore>9.999999</PerformanceScore>
       <RegdOfferMW>999.9</RegdOfferMW>
       <RegdMW>999.9</RegdMW>
    <SPREGAwardHourly>
  </SPREGAward>
 </SPREGAwardSet>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<SPREGAwardSet>	Complex Type	Container element including all <SPREGAward> elements.
<SPREGAward>	Complex Type	Specifies the spinning reserve and regulation award for the request generator and operating day (and optional requested hour). Repeats as required.
location	Character String	Specifies the generator CPTU name.
day	YYYY-MM-DD	Specifies the date of the node list.
<SPREGAwardHourly>	Complex Type	Specifies the hourly interval of spinning reserve and regulation award data. Repeated as required.

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Element or Attribute	Data Type	Description
hour	HH	Specifies the hour-ending of the hourly interval.
<Tier>	(TIER1, TIER2)	Specifies the tier. After SP go live, this value will always be TIER2.
<SpinOfferMW>	MWType	Specifies the spinning reserve offer MW.
<RegOfferMW>	MWType	Specifies the regulation offer MW. After PBR go live, this element will show regulation A offer MW.
<Tier1MW>	MWType	Specifies the Tier 1 MW.
<SelfScheduledMW>	MWType	Specifies the self-scheduled MW.
<Tier2MW>	MWType	Specifies the Tier 2 MW.
<RegAwardedMW>	MWType	Specifies the regulation awarded MW. After PBR go live, this element will show regulation A awarded MW.
<TPSResult>	Character String	Optional element that specifies the result of the TPS test, Value is either PASS or FAIL.
<RegOfferPriceUsed>	MWPriceType	Optional element that specifies the offer price used in the TPS test. After PBR go live, this element will show the regulation offer price of the regulation type that is cleared. If the resource is not cleared for regulation then this element will be NULL.
<PerformanceScore>	Decimal	Optional element that specifies the actual hourly performance Score for the resource for that market hour (x.xxxxxx). After PBR go live, this element will show the performance score of the regulation type that is cleared. If the resource is not cleared for regulation then this element will be NULL.

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Element or Attribute	Data Type	Description
<RegdOfferMW>	MWType	This element will show the regulation D offer MW if exists.
RegdMW	MWType	This element will show the regulation D awarded MW.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.
- Invalid location, invalid operating day.
- Market has not cleared for requested day or hour.

8.18 Query for DSR Synchronized Reserve and Regulation Award

8.18.1 Purpose

This message is used to query for the synchronized reserve and regulation award for requested resources. This is a private report.

The data is published hourly during the operating day.

8.18.2 Message Format

The query request is shown below:

```
<QueryRequest>
  <QueryDSRSRREGAward day="yyyy-mm-dd">
     <All/>
     <LocationName>xxx</LocationName>
     <PortfolioName>xxx</PortfolioName>
     <Hour>hh</Hour>
  </QueryDSRSRREGAward>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description

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Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryDSRSRREGAward>	Complex Type	Specifies query for synchronized reserve and regulation award for the given operating day and location. The hour ending of a desired hour is optional.
day	YYYY-MM-DD	Required field specifying the operating day.
<All/>	N/A	Optional element specifying that all generator resources cleared in the market should be returned in the response. If <All/> is specified you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional element resource identifier. If not specified, then the <PortfolioName> element must be specified. You must choose between <LocationName> and <PortfolioName> but you cannot specify both in the same query request.
<PortfolioName>	Character String	Optional element specifying the name of a portfolio of locations. If not specified, then the <LocationName> element must be specified. You must choose between <LocationName> and <PortfolioName> but you cannot specify both in the same query request.
<Hour>	HH	Optional element requesting a specific hourly interval to be included in the response. If not specified, all hours available as result data is returned.

8.18.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

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```
<QueryResponse>
 <DSRSRREGAwardSet>
  <DSRSRREGAward location="xxx" day="yyyy-mm-dd">
    <DSRSRREGAwardHourly hour="hh">
       <SynchOfferMW>999.9</SpinOfferMW>
       <RegOfferMW>999.9</RegOfferMW>
       <SelfScheduledMW>999.9</SelfScheduledMW>
       <SynchAwardedMW>999.9</SynchAwardMW>
       <RegAwardedMW>999.9</RegAwardedMW>
       <TPSResult>zzz</TPSResult>
       <RegOfferPriceUsed>99999999.99</RegOfferPriceUsed>
       <PerformanceScore>9.999999</PerformanceScore>
       <RegdOfferMW>999.9</RegdOfferMW>
       <RegdMW>999.9</RegdMW>
    <DSRSRREGAwardHourly>
  </DSRSRREGAward>
 </DSRSRREGAwardSet>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<DSRSRREGAwardSet>	Complex Type	Container element including all <DSRSRREGAward> elements.
<DSRSRREGAward>	Complex Type	Specifies the synchronized reserve and regulation award for the request generator and operating day (and optional requested hour). Repeats as required.
location	Character String	Specifies the generator CPTU name.
day	YYYY-MM-DD	Specifies the date of the node list.
<DSRSRREGAwardHourly>	Complex Type	Specifies the hourly interval of synchronized reserve and regulation award data. Repeated as required.
hour	HH	Specifies the hour-ending of the hourly interval.
<SynchOfferMW>	MWType	Specifies the synchronized reserve offer MW.

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Element or Attribute	Data Type	Description
<RegOfferMW>	MWType	Specifies the regulation offer MW. After PBR go live, this element will show regulation A offer MW.
<SelfScheduledMW>	MWType	Specifies the self-scheduled MW.
<SynchAwardedMW>	MWType	Specifies the synch awarded MW.
<RegAwardedMW>	MWType	Specifies the regulation awarded MW. After PBR go live, this element will show regulation A awarded MW.
<TPSResult>	Character String	Optional element that specifies the result of the TPS test, Value is either PASS or FAIL.
<RegOfferPriceUsed>	MWPriceType	Optional element that specifies the offer price used in the TPS test. After PBR go live, this element will show the regulation offer price of the regulation type that is cleared. If the resource is not cleared for regulation then this element will be NULL.
<PerformanceScore>	Decimal	Optional element that specifies the actual hourly performance Score for the resource for that market hour (x.xxxxxx). After PBR go live, this element will show the performance score of the regulation type that is cleared. If the resource is not cleared for regulation then this element will be NULL.
<RegdOfferMW>	MWType	This element will show the regulation D offer MW.
<RegdMW>	MWType	This element will show the regulation D awarded MW.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.
- Invalid location, invalid operating day.
- Market has not cleared for requested day or hour.

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8.19 Query for Generator Day-Ahead Scheduling Reserve Award

8.19.1 Purpose

This message is used to query for the Generator Day-Ahead Scheduling Reserve requested resources. This is a private report.

The data is published hourly during the operating day.

8.19.2 Message Format

The query request is shown below:

```
<QueryRequest>
  <QuerySchedReserveAward day="yyyy-mm-dd">
     <All/>
     <LocationName>xxx</LocationName>
     <PortfolioName>xxx</PortfolioName>
     <Hour>hh</Hour>
  </QuerySchedReserveAward>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QuerySchedReserveAward>	Complex Type	Specifies query for day-ahead scheduling reserve award for the given operating day and location. The hour ending of a desired hour is optional.
day	YYYY-MM-DD	Required field specifying the operating day.
<All/>	N/A	Optional element specifying that all generator resources cleared in the market should be returned in the response. If <All/> is specified you cannot also specify <LocationName> or <PortfolioName>.

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Element or Attribute	Data Type	Description
<LocationName>	Character String	Optional element resource identifier. If not specified, then the <PortfolioName> element must be specified. You must choose between <LocationName> and <PortfolioName> but you cannot specify both in the same query request.
<PortfolioName>	Character String	Optional element specifying the name of a portfolio of locations. If not specified, then the <LocationName> element must be specified. You must choose between <LocationName> and <PortfolioName> but you cannot specify both in the same query request.
<Hour>	HH	Optional element requesting a specific hourly interval to be included in the response. If not specified, all hours available as result data are returned.

8.19.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
 <SchedReserveAwardSet>
  <SchedReserveAward location="xxx" day="yyyy-mm-dd">
    <SchedReserveAwardHourly hour="hh">
       <AreaName>aaa</AreaName>
       <DASRAwardedMW>999.9</DASRAwardedMW>
    <SchedReserveAwardHourly>
  </SchedReserveAward>
 </SchedReserveAwardSet>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<SchedReserveAwardSet>	Complex Type	Container element including all <SchedReserveAward> elements.

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Element or Attribute	Data Type	Description
<SchedReserveAward>	Complex Type	Specifies the day-ahead scheduling reserve award for the requested generator resource and operating day (and optional requested hour). Repeats as required.
location	Character String	Specifies the generator resource CPTU name.
day	YYYY-MM-DD	Specifies the date of the node list.
<SchedReserveAwardHourly>	Complex Type	Specifies the hourly interval of day-ahead scheduling reserve award data. Repeated as required.
hour	HH	Specifies the hour-ending of the hourly interval.
<AreaName>	Character String	Specifies the area name for the location.
<DASRAwardedMW>	MWType	Specifies the day-ahead scheduling reserve awarded MW.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.
- Invalid location, invalid operating day.
- Market has not cleared for requested day or hour.

8.20 Query for DSR Day-Ahead Scheduling Reserve Award

8.20.1 Purpose

This message is used to query for the DSR Day-Ahead Scheduling Reserve requested resources. This is a private report.

The data is published hourly during the operating day.

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8.20.2 Message Format

The query request is shown below:

```
<QueryRequest>
  <QueryDSRSchedReserveAward day="yyyy-mm-dd">
     <All/>
     <LocationName>xxx</LocationName>
     <PortfolioName>xxx</PortfolioName>
     <Hour>hh</Hour>
  </QueryDSRSchedReserveAward>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryDSRSchedReserve Award>	Complex Type	Specifies query for day-ahead scheduling reserve award for the given operating day and location. The hour ending of a desired hour is optional.
day	YYYY-MM-DD	Required field specifying the operating day.
<All/>	N/A	Optional element specifying that all demand-side resources cleared in the market should be returned in the response. If <All/> is specified you cannot also specify <LocationName> or <PortfolioName>.
<LocationName>	Character String	Optional element resource identifier. If not specified, then the <PortfolioName> element must be specified. You must choose between <LocationName> and <PortfolioName> but you cannot specify both in the same query request.

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Element or Attribute	Data Type	Description
<PortfolioName>	Character String	Optional element specifying the name of a portfolio of locations. If not specified, then the <LocationName> element must be specified. You must choose between <LocationName> and <PortfolioName> but you cannot specify both in the same query request.
<Hour>	HH	Optional element requesting a specific hourly interval to be included in the response. If not specified, all hours available as result data are returned.

8.20.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
 <DSRSchedReserveAwardSet>
  <SchedReserveAward location="xxx" day="yyyy-mm-dd">
    <SchedReserveAwardHourly hour="hh">
       <AreaName>aaa</AreaName>
       <DASRAwardedMW>999.9</DASRAwardedMW>
    <SchedReserveAwardHourly>
  </SchedReserveAward>
 </DSRSchedReserveAwardSet>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<DSRSchedReserveAwardSet>	Complex Type	Container element including all <SchedReserveAward> elements.
<SchedReserveAward>	Complex Type	Specifies the day-ahead scheduling reserve award for the request demand-side resource and operating day (and optional requested hour). Repeats as required.

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Element or Attribute	Data Type	Description
location	Character String	Specifies the demand-side resource CPTU name.
day	YYYY-MM-DD	Specifies the date of the node list.
<SchedReserveAwardHourly>	Complex Type	Specifies the hourly interval of day-ahead scheduling reserve award data. Repeated as required.
hour	HH	Specifies the hour-ending of the hourly interval.
<AreaName>	Character String	Specifies the area name for the location.
<DASRAwardedMW>	MWType	Specifies the day-ahead scheduling reserve awarded MW.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.
- Invalid location, invalid operating day.
- Market has not cleared for requested day or hour.

8.21 Query for Reliability Assessment Results

8.21.1 Purpose

This message is used to query for the reliability assessment results. This is a public report.

The data is published for each operating day.

8.21.2 Message Format

The query request is shown below:

```
<QueryRequest>
  <QueryRAScheduleMW day="yyyy-mm-dd"/>
</QueryRequest>
```


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The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryRASchedMW>	Complex Type	Specifies query for reliability assessment results for the given operating day.
day	YYYY-MM-DD	Required field specifying the operating day.

8.21.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
 <RASchedMW day="yyyy-mm-dd">
  <RASchedMWReason>
   <Reason>XYZ</Reason>
   <SumEconMax>999.9</SumEconMax>
  </RASchedMWReason>
 </RASchedMW>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<RASchedMW>	Complex Type	Container element including all <RASchedMWReason> elements for the operating day.
<RASchedMWReason>	Complex Type	Contains a <Reason> and <SumEconMW> element. Repeats as required.

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Element or Attribute	Data Type	Description
<Reason>	String	Specifies the reason and the associated number of MW that were scheduled.
<SumEconMW>	MWType	Specifies the number of MW scheduled for the associated reason by reliability assessment.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.
- Invalid location, invalid operating day.

8.22 Query for Unit Parameter Limits

8.22.1 Purpose

This message is used to query for the parameter limits associated with the units belonging to a participant. This is a private report.

The data is published for each operating day.

8.22.2 Message Format

The query request is shown below:

```
<QueryRequest>
  <QueryUnitParameterLimit day="yyyy-mm-dd">
     <All/>
     <LocationName>xxx</LocationName>
     <PortfolioName>xxx</PortfolioName>
  </QueryUnitParameterLimit>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description

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Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryUnitParameterLimit>	Complex Type	Specifies query for parameter limits for the given operating day.
day	YYYY-MM-DD	Required field specifying the operating day.
<All/>	N/A	Optional element specifying that the parameter limits for all units should be returned in the response. If <All/> is specified you cannot also specify <LocationName> or <PortfolioName>, or in other words, you must choose between the <All/>, <LocationName> and <PortfolioName> elements.
<LocationName>	Character String	Optional element resource identifier. If not specified then either the <PortfolioName> element or <All/> element must be specified.
<PortfolioName>	Character String	Optional element specifying the name of a portfolio of locations. If not specified, then either the <LocationName> element or <All/> element must be specified.

8.22.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
  <UnitParameterLimitSet day="2008-10-14">
    <UnitParameterLimits location="89010101">
      <MinimumRuntimeLimit>1.75</MinimumRuntimeLimit>
     <MinimumDowntimeLimit>1.25</MinimumDowntimeLimit>
     <MaximumDailyStartsLimit>2</MaximumDailyStartsLimit>
     <MaximumWeeklyStartsLimit>4</MaximumWeeklyStartsLimit>
     <LimitDescription>Combined Cycle Unit</LimitDescription>
    </UnitParameterLimits>
  </UnitParameterLimitSet>
</QueryResponse>
```


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The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<UnitParameterLimitSet>	Complex Type	Container element including all <UnitParameterLimits> elements for the operating day.
day	YYYY-MM-DD	Required field specifying the operating day.
<UnitParameterLimits>	Complex Type	Contains the set of limits for the specified resource. Repeats as required.
location	String	Specifies the generator resource CPTU name.
<MinimumRuntimeLimit>	DeltaHour	The limit applied to the minimum runtime.
<MinimumDowntimeLimit>	DeltaHour	The limit applied to the minimum downtime.
<MaximumDailyStartsLimit>	Numeric(3)	The limit applied to the maximum daily starts.
<MaximumWeeklyStartsLimit>	Numeric(3)	The limit applied to the maximum weekly starts.
<LimitDescription>	String	The description of the parameter set associated with the resource.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.
- Invalid location, invalid operating day or portfolio.

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8.23 Query for Schedule Definitions

8.23.1 Purpose

This message is used to query for schedule definitions. This is a public report.

8.23.2 Message Format

The query request is shown below:

```
<QueryRequest>
  <QueryScheduleDefintions/>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryScheduleDefinitions>	Complex Type	Specifies query for schedule definitions.

8.23.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
 <ScheduleDefinitions>
  <ScheduleDefinition>
   <Schedule>1</Schedule>
   <Type>1<Type/>
   <LMPCapped>false</LMPCapped>
   <ParameterLimited>true</ParameterLimited>
  </ScheduleDefinition>
 </ScheduleDefinitions>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description

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Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<ScheduleDefinitions>	Complex Type	Container element including all ScheduleDefinition elements.
<ScheduleDefinition>	Complex Type	Contains the elements describing a single schedule.
<Schedule>	String	A number between 1 and 99.
<Type>	String	The schedule is either cost or price based.
<LMPCapped>	Boolean	True means the schedule is LMP capped.
<ParameterLimited>	Boolean	True means the schedule is parameter limited.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.

8.24 Query for Up To Transactions Results

8.24.1 Purpose

This message is used to query for up to transactions results. This is a private report.

The data is published for each operating day.

8.24.2 Message Format

The query request is shown below:

```
<QueryRequest>
  <QueryUpToTransactionResults day="YYYY-MM-DD" TransactionID="999999.9"/>
</QueryRequest>
```


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The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryUpToTransactionResults>	Complex Type	Specifies query for up to transaction results.
day	YYYY-MM-DD	Required field specifying the operating day.
TransactionID	Numeric	Optional. The ID of the Up To Transaction to query.

8.24.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
  <UpToTransactionResultsSet>
    <UpToTransactionResults day="2011-07-21" TransactionID="123455678.9">
      <UpToTransactionResultsHourly hour="01">
        <SourceLocation>234567</SourceLocation>
        <SinkLocation>345678</SinkLocation>
        <ClearedMW>45.6</ClearedMW>
        <SourceLMP>12.34</SourceLMP>
        <SinkLMP>23.45</SinkLMP>
      </UpToTransactionResultsHourly>
    </UpToTransactionResults>
  </UpToTransactionResultsSet>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<UpToTransactionResultsSet>	Complex Type	Container element including all UpToTransactionResults elements.

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Element or Attribute	Data Type	Description
<UpToTransactionResults>	Complex Type	Contains the elements describing an up to transaction results for a day. Repeated as required.
day	YYYY-MM-DD	The operating day.
TransactionID	Numeric	The ID of the Up To Transaction cleared in the operating day.
<UpToTransactionResultsHourly>	Complex Type	Specifies the hourly values cleared for the Up To Transaction. Repeated as required.
hour	HH	Specifies the hour-ending of the hourly values.
<SourceLocation>	String	Optional. The Source Location of the cleared Up To Transaction.
<SinkLocation>	String	Optional. The Sink Location of the cleared Up To Transaction.
<ClearedMW>	MWType	Optional. Specifies the number of cleared MW.
<SourceLMP>	MWPriceType	Optional. Specifies the LMP at the source
<SinkLMP>	MWPriceType	Optional. Specifies the LMP at the sink.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.

8.25 Query for New Up To Transaction ID

8.25.1 Purpose

This message is used to query for the next up to transaction id for a participant. This is a private report.

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8.25.2 Message Format

The query request is shown below:

```
<QueryRequest>
  <QueryNewUpToTransactionID />
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryNewUpToTransactionID>	Complex Type	Specifies query for new up to transaction id.

8.25.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
  <NewUpToTransactionID>
      <UpToTransactionID>123458.1</UpToTransactionID>
  </NewUpToTransactionID>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<NewUpToTransactionID>	Complex Type	Container element including the new upto transaction id element.
UpToTransactionID	Numeric	The ID of the New Up To Transaction ID.

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The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.

8.26 Query for Wind Forecast Hourly

8.26.1 Purpose

This message is used to query the wind forecast for an identified location for a hours of a given day.

8.26.2 Message Format

The query request is shown below:

```
<QueryRequest>
  <QueryWindForecast day="yyyy-mm-dd">
     <All/>
     <LocationName>xxx</LocationName>
     <PortfolioName>xxx</PortfolioName>
  </QueryWindForecast>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryWindForecast>	Complex Type	Specifies query for wind forecast for the given operating day.
day	YYYY-MM-DD	Required field specifying the operating day.

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Element or Attribute	Data Type	Description
<All/>	N/A	Optional element specifying that the parameter limits for all units should be returned in the response. If <All/> is specified you cannot also specify <LocationName> or <PortfolioName>, or in other words, you must choose between the <All/>, <LocationName> and <PortfolioName> elements.
<LocationName>	Character String	Optional element resource identifier. If not specified then either the <PortfolioName> element or <All/> element must be specified.
<PortfolioName>	Character String	Optional element specifying the name of a portfolio of locations. If not specified, then either the <LocationName> element or <All/> element must be specified.

8.26.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
  <WindForecastSet>
      <WindForecast location="xxx" day="yyyy-mm-yy">
          <WindForecastHourly hour="hh" isDuplicateHour="false">
               <MW>999.9</MW>
          </WindForecastHourly>
      </WindForecast>
  </WindForecastSet>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<WindForecastSet>	Complex Type	Container element including all <WindForecast>

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Element or Attribute	Data Type	Description
<WindForecast>	Complex Type	Container elment including all the elements for a operating day and location
location	String	Specifies the generation resource CPTU name.
day	YYYY-MM-DD	The operating day.
<WindForecastHourly>	Complex Type	Container element including the hour and the forecasted MW
hour	HH	Specifies the hourly interval hour ending value.
<MW>	MWType	The MW forecasted.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.

8.27 Query for Primary Reserve

8.27.1 Purpose

This message is used to query the primary reserve for an identified location for a hours of a given day.

8.27.2 Message Format

The query request is shown below:

```
<QueryRequest>
  <QueryPrimaryReserveResults day="yyyy-mm-dd">
     <LocaleName>xxx</LocaleName>
     <LocaleTypeName>xxx</LocaleTypeName>
  </QueryPrimaryReserveResults>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description

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Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryPrimaryReserveResults>	Complex Type	Specifies query for primary reserve for the given operating day.
day	YYYY-MM-DD	Required field specifying the operating day.
<LocaleName>	Character String	Optional element locale identifier.
<LocaleTypeName>	Character String	Optional element locale type.

8.27.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
  <PrimaryReserveResults day="yyyy-mm-yy">
          <PrimaryReserveResultsHourly hour="hh" isDuplicateHour="false">
               <PrimaryReserveResultsByLocale>
                   <RequiredMW>999.9</RequiredMW>
                   <Tier1MW>999.9</Tier1MW>
                   <SelfScheduleMW>999.9</SelfScheduleMW>
                   <AvailableTransferMW>999.9</AvailableTransferMW>
                   <Tier2AssingedMW>999.9</Tier2AssingedMW>
                   <NonSyncReserveMW>999.9</NonSyncReserveMW>
                   <TotalMW>999.9</TotalMW>
                   <DeficiencyMW>999.9</DeficiencyMW>
                   <LocaleName>xxxxx</LocaleName>
                   <LocaleTypeName>xxxx</LocaleTypeName>
               </PrimaryReserveResultsByLocale>
          </PrimaryReserveResultsHourly>
  </PrimaryReserveResults>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.

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Element or Attribute	Data Type	Description
<PrimaryReserveResults>	Complex Type	Container element including all <WindForecast>
day	YYYY-MM-DD	The operating day.
<PrimaryReserveResultsHourly>	Complex Type	Container element for each interval hour
hour	HH	Specifies the hourly interval hour ending value.
<PrimaryReserveResultsByLocale>	Complex Type	Container element for each locale for the hour.
<RequiredMW>	MWType	The required MW.
<Tier1MW>	MWType	The tier1 MW.
<SelfScheduleMW>	MWType	The self schedule MW.
<AvailableTransferMW>	MWType	The available transfer MW.
<Tier2AssignedMW>	MWType	The tier2 assigned MW.
<NonSyncReserveMW>	MWType	The non-sync reserveMW.
<TotalMW>	MWType	The total MW.
<DeficiencyMW>	MWType	The deficiency MW.
<LocaleName>	LocaleNameType	The name of the locale.
<LocaleTypeName>	LocaleTypeNameType	The type of locale it is.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.

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8.28 Query for Nonsynchronized Reserve Bilaterals

8.28.1 Purpose

This message is used to query the nonsynchronized reserve bilaterals for a given month.

8.28.2 Message Format

The query request is shown below:

```
<QueryRequest>
  <QueryASBilaterals day="yyyy-mm-dd">
     <ProductType>xxx</ProductType>
  </QueryASBilaterals >
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryASBilaterals>	Complex Type	Specifies query for primary reserve for the given operating day.
day	YYYY-MM-DD	Required field specifying the operating day.
<ProductType>	Character String	The product type, value is optional.

8.28.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
  <ASBilateral day=”yyyy-mm-yy”>
      <ASBilateralSchedule>
              <ProductType>xxx</ProductType>
              <Confirmed>false</Confirmed>
              <BilateralID>9999999</BilateralID>
              <Buyer>xxxx</Buyer>
              <Seller>yyyyy</Seller>
              <MW>999.9</MW>
              <StartTime>YYYY-MM-DDTHH:MM:SS.sss</StartTime>
```


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```
            <StopTime>YYYY-MM-DDTHH:MM:SS.sss</StopTime>
            <ConfirmationTime>YYYY-MM-DDTHH:MM:SS.sss</ConfirmationTime>
            <LocaleName>xxx</LocaleName>
            <LocaleTypeName>xxx</LocaleTypeName>
      </ASBilateralSchedule>
  </ASBilateral>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<ASBilaterals>	Complex Type	Container element including all <ASBilateralSchedules>
day	YYYY-MM-DD	The operating day.
<ASBilateralSchedules>	Complex Type	Container element for each schedule
<ProductType>	ASProductType	The product type
<Confirmed>	boolean	Has the schedule been confirmed or not.
<BilateralID>	Numeric	The id of the schedule
<Buyer>	String	Name of the buyer
<Seller>	String	Name of the seller
<MW>	MWType	The MW.
<StartTime>	dateTime	The start time of the schedule.
<StopTime>	dateTime	The stop time of the schedule.
<CofirmationTime>	dateTime	The date the schedule was confirmed.
<LocaleName>	LocaleNameType	The name of the locale.

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Element or Attribute	Data Type	Description
<LocaleTypeName>	LocaleTypeNameType	The type of locale it is.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.

8.29 Query for DA Reliability Results

8.29.1 Purpose

This message is used to query for the DA reliability results. This is a public report.

The data is published for each operating day.

8.29.2 Message Format

The query request is shown below:

```
<QueryRequest>
  <QueryDASchedMW day="yyyy-mm-dd"/>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryRequest>	Complex Type	The root element containing all query request elements in this message. Query request elements can be intermixed within the message. Occurs just once and specified in the SOAP Body element.
<QueryDASchedMW>	Complex Type	Specifies query for reliability assessment results for the given operating day.
day	YYYY-MM-DD	Required field specifying the operating day.

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8.29.3 Response Message

The Success (ACK) response message contains the data requested in the order requested.

```
<QueryResponse>
 <DASchedMW day="yyyy-mm-dd">
  <DASchedMWReason>
   <Reason>XYZ</Reason>
   <SumEconMax>999.9</SumEconMax>
  </DASchedMWReason>
 </DASchedMW>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element containing all response elements. Occurs just once and located in the response SOAP Body element.
<DASchedMW>	Complex Type	Container element including all <DASchedMWReason> elements for the operating day.
<DASchedMWReason>	Complex Type	Contains a <Reason> and <SumEconMW> element. Repeats as required.
<Reason>	String	Specifies the reason and the associated number of MW that were scheduled.
<SumEconMW>	MWType	Specifies the number of MW scheduled for the associated reason by DA reliability.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. Errors that may be encountered by this query include:

- Invalid or improper XML request.
- Invalid location, invalid operating day.

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9 Querying By Transaction Identifier

9.1 Description of Transactions

Every successful submit is identified by a unique transaction ID that is returned in response to the SubmitRequest as part of the SubmitResponse <Success> element. The transaction governs all data submitted as part of the SubmitRequest. This can be different sets of data depending on how the participant organized the submittal.

The transactions are described by a transaction log retained in the market database. This transaction log includes important descriptive information about the transaction. More information on this log and its usage can be found in Chapter 4 of this document.

In general, with XML, any data submitted may be retrieved by using the Query By Transaction message described below. This query will retrieve the data as submitted and prior to any database insertion.

The Query by Transaction message is submitted to a special URL server address. This address is documented in section 4.2 of this specification.

9.1.1 Querying By Transaction Identifier

To query by transaction identifier you must have the TransactionID that was returned by some previous data submittal. You may query for any previous submittal as long as the data is available. Data is historically retained for a given amount of time and query by transaction only operates on data still available in the market database. Once the transaction has been archived, the data is no longer available for query. Once archival of data has taken place, the data may still be available by calling the PJM help desk.

To query by transaction, you submit the following QueryByTransaction message. Note that this message is not enclosed within a <QueryRequest> element and the query is issued to a specific URL defined for this purpose (see section 4.2).

```
<QueryByTransaction>
  <TransactionID>xxx</TransactionID>
</QueryByTransaction>
```

The message fields and elements are described in the table below:

Element or Attribute	Data Type	Description
<QueryByTransaction>	Complex Type	Specifies that the query request is a query by transaction. May be specified only once per request.
<TransactionID>	Character String	Specifies the transaction identifier for the query by transaction. May be

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Element or Attribute	Data Type	Description
		repeated as desired.

The response to a successful query by transaction is a message that contains exactly what was submitted by the transaction. This includes the entire message, including the SOAP envelope, body elements, and <SubmitRequest> content. The following message is an example of such a typical response to QueryByTransaction:

```
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
<env:Header/>
<env:Body>
   <SubmitRequest xmlns=" http://emkt.pjm.com/emkt/xml">
      <ScheduleOffer>
          -- elements of data --
      </ScheduleOffer>
      …
   </SubmitRequest>
</env:Body>
</env:Envelope>
```

If the response include errors, such as invalid transaction identifier, then the <Error> element will be returned as part of a <QueryResponse> element. The <QueryResponse> element is only used when returning errors. For a description of the format for the errors, see chapter 12 of this document.

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10 Portfolio Management

The portfolio is a folder that is defined by the participant to manage subsets of resources by their pnode location. These folders can be used to manage an otherwise huge amount of information.

Portfolios are designed primarily for usage by the web browser interface. They allow the participant to view subsets of data and not be overcome by a plethora of rows and data values on the web screen. And, also because a subset is defined, the performance of accessing the market database and the web transfer is improved.

By using portfolios, participants may organize resources in a matter suited to their business. A single resource can appear in multiple portfolios. Portfolios are named by the participant to describe the nature and usage of the portfolio. Thus, a portfolio name serves as both a name and a description of the portfolio contents. The name is allowed to be any 40 character string (except, leading and trailing whitespace is not allowed).

The participant company has total control over the portfolio naming conventions that might be employed. Portfolios unique to an individual (a single user) can use a name that includes the the user's initials for example.

Portfolios are shared among all the users registered for a given participant. Any user may access and use or modify any portfolio owned by the participant company. At this time, there is no actual limit to the number of portfolios that can be created but there are practical limits. For example, the drop-down list selection boxes that appear on the browser based web pages show all of a participant's portfolios. If there are too many portfolios, this list becomes unwieldly and awkward to use.

Portfolios can also be used by the XML interface. In particular, it is probably easier to manage large sets of data via XML than the web browser interface and therefore portfolios are not as necessary. However, portfolio management is supported by the XML messages defined in this chapter. Portfolio management includes the creation, update, and removal of portfolios. Portfolios managed by XML are the same portfolios used by the web browser interface.

Portfolios are collections of locations where a location can be one of the following:

- Pricing Node Name (PNODE)
- Generator Name (CPTU name)
- Load Response unique Identifier

Portfoliios have types. A portfolio is defined to contain pnodes, generators, or load response identifiers. A given participant may have portfolios of any type.

The following table summarizes the data submittal and queries described in this chapter.

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Portfolios	This message is used to submit portfolio creation, update, or removal actions. This message is also the QueryRequest response element. The main element collected under Portfolios is the Portfolio element that defines a named portfolio action. Multiple Portfolio elements may be collected under a single Portfolios element.

All data submit actions are executed under transaction control and a transaction identifier is associated with each submittal request. This transaction identifier has limited lifetime and is provided so that data submitted by an earlier message can be easily retrieved or used as a reference for any dispute resolution with PJM.

The data submit is initiated using a data submit request element as shown below. This submit request is the payload that is enclosed by the SOAP Body element. Only one such submit request element can be specified. The SubmitRequest may contain one or more instances of individual data elements containing the submitted data.

Example of submit of Portfolios creation:

```
<?xml version="1.0"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
<env:Header/>
<env:Body>
   <SubmitRequest xmlns="http://emkt.pjm.com/emkt/xml">
      <Portfolios>
         <Portfolio name="zzz" action="Create">
            ---elements of portfolio---
         </Portfolio>
      <Portfolios>
   </SubmitRequest>
</env:Body>
</env:Envelope>
```

The data submit messages defined later in this chapter do not include the XML namespace prefix as shown in the example above. You may choose your prefix according to the XML specification.

The response message is always returned as a SOAP wrapped payload indicating either success or error. The success indicator is the same for all types of data submit. The successful submit always has the same format as shown below:

```
<?xml version="1.0"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
<env:Header/>
<env:Body>
   <SubmitResponse xmlns="http://emkt.pjm.com/emkt/xml">
      <Success>
         <TransactionID>A3433</TransactionID>
      </Success>
   </SubmitResponse>
</env:Body>
</env:Envelope>
```


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The format for each of the submit requests follows the same naming conventions.

The following example shows an error response as a result of some problems in the submit:

```
<?xml version="1.0"?>
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
<env:Header/>
<env:Body>
   <SubmitResponse xmlns="http://emkt.pjm.com/emkt/xml">
      <Error>
         <Code>Red23</Code>
         <Text>Portfolio pnode value is undefined</Text>
      </Error>
   </SubmitResponse>
</env:Body>
</env:Envelope>
```

All private submit requests must be issued to the appropriate URL using the correct namespaces as documented in each section below.

10.1 Creating, Updating, or Removing a Portfolio

10.1.1 Purpose

This message format is used to create, update, or remove a participant's portfolio. Each portfolio is a named association of locations (see discussion above on the nature of locations).

The **action** field in the message below specifies the update action to perform. The following values are supported:

Create	Means to create a new portfolio. A portfolio by the same name must not already exist.
Replace	Means to replace an existing portfolio. A portfolio must exist in order to replace it.
Remove	Means to remove an existing portfolio (the content elements are ignored for this action). The entire portfolio is removed.
AddTo	Means to add new elements to an existing portfolio.
RemoveFrom	Means to remove elements from an existing portfolio.

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10.1.2 Message Format

The submit request message is described below:

```
<SubmitRequest>
   <Portfolios>
      <Portfolio name="zzz" action="zzz">
         <Location name="xxx" type="xxx"/>
      </Portfolio>
   </Portfolios>
</SubmitRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	Complex Type	The root element containing all Portfolio manipulation commands. Occurs just once and located in the SOAP Body element.
<Portfolios>	Complex Type	Used to create, replace, update, or remove a portfolio. Occurs 0 to many times but typically specified only once.
<Portfolio>	Complex Type	Used to create, replace, update, or remove a portfolio. Occurs 0 to many times.
name	Character String (40)	Required field specifies the name of the portfolio. Occurs just once. Portfolio names must be at least one character in length and less than 40 characters. Portfolio names are unique to the participant company and may be shared among users registered with the same company.
action	(Create, Replace, Remove, AddTo, RemoveFrom)	Optional field specifies the action to be performed as one of the enumerated values. The default action is Create.

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Element or Attribute	Data Type	Description
<Location>	Singleton Type	Specifies a location to be included in the portfolio. A location is either a CPTU generator unit, a demand or virtual pnodeid, or a load response identifier. May be repeated as necessary.
name	Character String	Name of the location of the given type. See type argument below.
type	(Demand, Generator, LoadResponse)	If type is Demand then name is specified as a pnodeid (used for demand and virtual inc/dec bids). If type is Generator then name is the generator unit CPTU identifier. If type is LoadResponse then name is a Load Response identifier id.

10.1.3 Response Message

The Success (ACK) response message is described below.

```
<SubmitResponse>
  <Success>
    <TransactionID>zzz</TransactionID>
  </Success>
</SubmitResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitResponse>	Complex Type	The root element for all submit responses. Occurs just once.
<Success>	Complex Type	The element indicating a successful submit operation.
<TransactionID>	Character	Specifies the transaction identifier associated with the successful submit operation. Always returned.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. The following errors may be reported:

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- Invalid or malformed XML
- Attempt to duplicate an existing portfolio on a create action. Attempt to remove or replace a portfolio that does not exist.
- Attempt to add locations to a generator portfolio or generators to a pricing node location portfolio.
- Location node name does not exist.

10.2 Querying Portfolios

10.2.1 Purpose

This message format is used to query for Portfolios. The query can request all portfolios owned by the participant or only those portfolios specifically named.

10.2.2 Message Format

The query request message is described below:

```
<QueryRequest>
   <QueryPortfolios>
      <All/>
      <PortfolioName>zzz</PortfolioName>
   </QueryPortfolios>
</QueryRequest>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<SubmitRequest>	Complex Type	The root element containing all Portfolio manipulation commands. Occurs just once and located in the SOAP Body element.
<QueryPortfolios>	Complex Type	Used to query the specified portfolios. May be repeated.

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Element or Attribute	Data Type	Description
<All/>	N/A	Optional element specifying that all portfolios owned by the participant are to be returned in the response. If not specified, the portfolio must be named by the PortfolioName element. May occur at most one time.
<PortfolioName>	Character String	Optional element specifying a portfolio by name. This element can be specified at most one time. If multiple portfolios are required, the QueryRequest might be repeated.

10.2.3 Response Message

The response message is described below.

```
<QueryResponse>
  <Portfolios>
    <Portfolio name="zzz" >
      <Location name="zzz" type="xxx"/>
    </Portfolio>
  </Portfolios>
</QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<QueryResponse>	Complex Type	The root element for all query responses. Occurs just once.
<Portfolios>	Complex Type	The element containing all portfolios that satisfy the query. This element may be returned empty. Occurs 1 to many times but typically occurs just once.
<Portfolio>	Complex Type	The element returned for each portfolio that satisfies the query request. Occurs zero to many times.
name	Character String	Specifies the name of the portfolio.
<Location>	Singleton Type	Same as above for submittal.

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Element or Attribute	Data Type	Description
name	Character String	Same as above for submittal.
type	(Demand, Generator, LoadResponse)	Same as above for submittal.

The Unsuccessful (NAK) response is an error report as described in Chapter 4 {Error Response} of this specification. The following errors may be reported:

- Invalid or malformed XML

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11 Error Response

The error response message format is described below:

```
<SubmitResponse>  or  <QueryResponse>
   <Error>
      <Code>zzz</Code>
      <Text>zzz</Text>
      <Line>zzz</Line>
   </Error>
</SubmitReponse>  or  </QueryResponse>
```

The following table describes each of the elements and attributes and how they are used:

Element or Attribute	Data Type	Description
<Error>	Complex Type	Specifies a single error report. Occurs 1 to many times (hopefully not too many times).
<Code>	Character String	Specifies the error code. Error codes may be associated with various software modules. Error codes have meaning only when reporting problems to PJM or requesting help on a given error type. Occurs just once.
<Text>	Character String	Specifies the text of the error message. Occurs 1 to many times. Normally, occurs just once, sometimes two or three <Text> elements are used per error.
<Line>	Character String	Line number indicator provided only when it is available and when it has meaning. Occurs 0 or 1 times.

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12 Usage Examples

[To Be Completed After Final Approval]

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13 Cross Reference: OLD and NEW XML Formats

This section describes the differences between the old (prior to Market Growth 2003) and the new XML Formats specified by this document. This section is provided as a help for participants to migrate from the old to the new.

This help aid is divided into three sections. The first section describes the major architectural differences between the old XML formats and the new. The Common Features Differences discusses the differences that span multiple messages, such as the use of location or day attributes or the repeating hourly data. And, the Cross-reference table describes the differences on a message by message basis.

13.1 Architectural Differences

This section describes key architectural differences between the old XML messaging system and the new XML specification.

13.1.1 XML Schema and XML Namespaces

The old XML specification relied upon a DTD (document type definition) to describe the elements and the content for each XML message. This specification uses XML Schema only. There is no DTD.

The XML Schema is declared indirectly via a name space. This name space is used to associate the element and attribute names in an instance document with a particular schema.

Therefore, XML Schemas and Namespaces are required features of XML used by this message system.

13.1.2 XML Soap

XML Soap is used to *wrap* messages according to a standard header and body format. Soap is used to provide a higher layer that might be used in future applications. Currently, Soap is used as a message wrapper only. More sophisticated use of Soap, as an RPC, or a Web Services protocol handler are not used by this specification at this time but they are planned for the near future.

13.1.3 Submit Request, Query Response Symmetry

In the old XML specification you could not query exactly the same data you submitted. The messages were not identical nor did they have the same fields in a number of cases.

This new specification provides total symmetry on all message submits for queried data. That is, anything submitted can be queried using exactly the same message format.

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13.1.4 Portfolio Content and Management

The old XML specification supported Portfolios for the Web user only. In this new XML specification, Portfolios are available to both the web and the XML user. Portfolios can be created using the web or XML and used with either Web or XML requests.

Portfolios are not unique to the user as in the old PJM system. Portfolios are unique to the participant company. If there are a dozen users for a given participant, they share the same portfolio name space. If a user wishes to manage a user private portfolio, this can be done by a convention, such as prefixing the portfolio name with the user's initials. This is a convention only as this user specified portfolio is still global to the participant.

13.1.5 Structure Differences

One of the more obvious differences in the XML message formats is that the old XML messages were rather flat and the new messages are structured with nested repeating groups. For example, the following example shows the data input to define a unit ramp rate using the old XML formats:

```
<?xml version="1.0"?>
<UNITRAMPRATE>
   <UNITID>12345678</UNITID>
   <MW>100</MW>
   <RAMPRATE>20</RAMPRATE>
</UNITRAMPRATE>
<UNITRAMPRATE>
   <UNITID>12345678</UNITID>
   <MW>200</MW>
   <RAMPRATE>30</RAMPRATE>
</UNITRAMPRATE>
<UNITRAMPRATE>
   <UNITID>12345678</UNITID>
   <MW>300</MW>
   <RAMPRATE>30</RAMPRATE>
</UNITRAMPRATE>
```

The same information submittal using the new XML structure appears in the following example (the SOAP wrapping is left off for clarity):

```
<?xml version="1.0"?>
<UnitDetail location="12345678">
   <EnergyRampRateCurve>
      <RampRate MW="100" rate="20"/>
      <RampRate MW="200" rate="30"/>
      <RampRate MW="300" rate="30"/>
   </EnergyRampRateCurve>
</UnitDetail>
```

The new format above is easier to read and understand the structure of the data. In the old message, the actual repeat structure is not as obvious. This new format also allows much greater validation checking to be performed by XML validation. For example, in this particular message, the XML validation constrains the number of <RampRate> elements to 10 maximum per <EnergyRampRateCurve>.

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13.1.6 Programmatic API

The old XML specification did not support a programmatic API. That is, there were no defined rules for the protocol or handshake process. This XML specification defines a protocol (see Chapter 4) so that participant's can write their own software handlers to interact with the PJM market server.

13.2 Common Features Differences

13.2.1 Location Names

Location names are the abstraction of various equipment or pricing node names. This abstraction is used to provide a cleaner XML definition and to enable a more sophisticated method of defining portfolios.

The location name is a character string that may be used to specify one of the following unique resource names:

- Pricing node name (pnode)
- Generator CPTU name.
- Load Response Identifier name.

The old XML schema used a plethora of name types some of which were nothing other than internal database sequence numbers or others were either short names, long names, or both. In this new XML schema, the only naming mechanism is the location.

13.2.2 Schedule Identifier

Schedules are considered attachments to generators and therefore they do not have a unique identifier in this new XML specification. The old schedule identifier, commonly referred to as the CPTUS name is not used by this XML specification.

Instead, the schedule is always referred to by its generator location name (the CPTU name) and the numeric schedule identifier (1-99).

13.3 Cross-Reference Table

The following table shows a cross reference between the old messages and the new messages defined by this specification. This table refers to the old messages by the section number and title as it is defined in the External Interface Specification. The new messages are referred to by the new XML element name. The comments describe salient differences. If there are no major differences (other than the differences in schema), the comment column is blank.

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Old XML Message	New XML Message	Comments
5. Demand Bid	<Demand Bid> <VirtualBid>	DemandBid handles both fixed and price-sensitive hourly demand bids. Inc/Dec bids that were submitted using the old Demand Bid message format are submitted by the <VirtualBid> message format.
5. Node Definition	<DistributionFactors>	Same basic data, slightly different format and structure.
5. Portfolio	<Portfolios>	Portfolio management is now handled by common messages for both demand and generator participants. Portfolios are defined globally per participant rather than per user.
5. Load Response Daily	<LoadResponse>	This message is used to convey both the daily offer data and the hourly profile.
5. Load Response Hourly	<LoadResponse>	See above.
6. Regulation Offers	<RegulationOffer>	Same basic data, slightly different format and structure.
6. Regulation Unit Hourly	<RegulationUpdate>	Same basic data, slightly different format and structure.
6. Schedule	<UnitSchedule>	Same basic data, slightly different format and structure. Schedule is uniquely identified using the generator CPTU location name and the numeric schedule code specified by the schedule attribute field.

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Old XML Message	New XML Message	Comments
6. Schedule Bid	<ScheduleOffer>	Changed name from a bid to an offer since this is considered an offer to sell energy. Otherwise, same basic data, slightly different format and structure. Schedule is uniquely identified using the generator CPTU location name and the numeric schedule code specified by the schedule attribute field.
6. Schedule Detail	<ScheduleDetail>	Same basic data, slightly different format and structure. Condensing unit data is moved to synchronized reserve offer message. Schedule is uniquely identified using the generator CPTU location name and the numeric schedule code specified by the schedule attribute field.
6. Schedule Selection	<ScheduleSelection>	Same basic data, slightly different format and structure. Schedule is uniquely identified using the generator CPTU location name and the two-digit schedule code specified by the schedule attribute field.
6. Synchronized Reserve Offers	<SynchronizedReserveOffer>	Same basic data, slightly different format and structure.
6. Synchronized Reserve Hourly	<SynchronizedReserveUpdate>	Same basic data, slightly different format and structure.

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Old XML Message	New XML Message	Comments
6. Synchronized Reserve Unit Ramp Rate	<UnitDetail>	Specified using the <RampRateCurve> element defined for <UnitDetail> and specifying the type attribute field with the value of "synchronized" or "both". Regular energy ramp rage is the default type but can be explicit with "energy". You can define a single ramp rate used for both energy and synchronized by specifying the type "both".
6. Unit	<UnitDetail>	Combined Synchronized Ramp Rate with Unit data (see above). Also grouped data into various categories. Individual categories can be left out or specified separately.
6. Unit Hourly Detail	<UnitUpdate>	Same basic data, slightly different format and structure.
6. Unit Ramp Rate	<UnitDetail>	Specified using the <RampRateCurve> element in <UnitDetail> and specifying type of "energy" (default). See discussion comments for synchronized reserve ramp rate above.
6. Weather Forecast	<WeatherForecast>	Same basic data, slightly different format and structure.
7. Bid Types	N/A	Not implemented as the bid type data is not used in the same manner with this XML format.
7. Binding Limits	<QueryBindingLimits> <BindingLimits>	Same basic data, slightly different format and structure. The response message format is given in the second line at left.

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Old XML Message	New XML Message	Comments
7. Demand Bids	<QueryDemandBid> <DemandBid>	Same basic data, slightly different format and structure. The response message format is given in the second line at left. Response element <DemandBid> is the same as the data submittal element.
7. Demand By Participant	<QueryMarketResults> <MarketResults>	By specifying demand side pnode locations, the market results reports the cleared results of the demand bids submitted by the participant. The response message format is given in the second line at left. Constrast with other uses for <QueryMarketResults> described below.
7. Dispatch Lambda	<QueryDispatchLambda> <DispatchLambda>	Same basic data, slightly different format and structure. The response message format is given in the second line at left.
7. Generation By Participant	<QueryMarketResults> <MarketResults>	By specifying generator CPTU locations, the market results reports the cleared results of the generator offers submitted by the participant. The response message format is given in the second line at left. Constrast with other uses for <QueryMarketResults>.
7. Interface Limit	<QueryInterfaceLimits> <InterfaceLimits>	Same basic data, slightly different format and structure. The response message format is given in the second line at left.

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Old XML Message	New XML Message	Comments
7. Load Response	<QueryMarketResults> <MarketResults>	By specifying load response unique identifier as locations, the market results reports the cleared results of the load response offers submitted by the participant. The response message format is given in the second line at left. Constrast with other uses for <QueryMarketResults>.
7. Load Response Daily	<QueryLoadResponse> <LoadResponse>	Same basic data, slightly different format and structure. The response message format is given in the second line at left. Response element <LoadResponse> is the same as the data submittal element.
7. Load Response Hourly	<QueryLoadResponse> <LoadResponse>	See Above.
7. Net Tie Schedules	<QueryNetTieSchedules> <NetTieSchedules>	Same basic data, slightly different format and structure. The response message format is given in the second line at left.
7. Node	<QueryNodeList> <NodeList>	Same basic data, slightly different format and structure. The response message format is given in the second line at left.

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Old XML Message	New XML Message	Comments
7. Node Definitions	<QueryDistributionFactors> <DistributionFactors>	Same basic data, slightly different format and structure. The response message format is given in the second line at left. Response element <DistributionFactors> is the same as the data submittal element.
7. Portfolio	<Portfolios>	Portfolio management is now handled by common messages for both demand and generator participants.
7. Pricing	<QueryMarketPrices> <MarketPrices>	Same basic data, slightly different format and structure. The response message format is given in the second line at left.
7. Quantity	<QueryDemandSummary> <DemandSummary>	Same basic data, slightly different format and structure. The response message format is given in the second line at left.
7. Regulation Bilaterals	<QueryRegulationBilaterals> <RegulationBilaterals>	Same basic data, slightly different format and structure. The response message format is given in the second line at left.
7. Regulation Offers	<QueryRegulationOffer> <RegulationOffer>	Same basic data, slightly different format and structure. The response message format is given in the second line at left. Response element <RegulationOffer> is the same as the data submittal element.

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Old XML Message	New XML Message	Comments
7. Regulation Unit Hourly Detail	<QueryRegulationUpdate> <RegulationUpdate>	Same basic data, slightly different format and structure. The response message format is given in the second line at left. Response element <RegulationUpdate> is the same as the data submittal element.
7. Regulation Market Results	<QueryRegulationResults> <RegulationResults>	Same basic data, slightly different format and structure. The response message format is given in the second line at left.
7. Regulation Results	N/A	Not implemented. This is the pre-synchronized reserve market implementation which is replaced by the regulation results message described above.
7. Schedule	<QueryUnitSchedule> <UnitSchedule>	Same basic data, slightly different format and structure. The response message format is given in the second line at left. Schedule is uniquely identified as a generator CPTU name specified as the location and the schedule numeric code specified as the schedule field.

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Old XML Message	New XML Message	Comments
7. Schedule Bid	<QueryScheduleOffer> <ScheduleOffer>	Same basic data, slightly different format and structure. The response message format is given in the second line at left. The <ScheduleOffer> element is the same as the submittal element. Schedule is uniquely identified as a generator CPTU name specified as the location and the schedule numeric code specified as the schedule field.
7. Schedule Detail	<QueryScheduleDetail> <ScheduleDetail>	Same basic data, slightly different format and structure. The response message format is given in the second line at left. The <ScheduleDetail> element is the same as the submittal element. Schedule is uniquely identified as a generator CPTU name specified as the location and the schedule numeric code specified as the schedule field.

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Old XML Message	New XML Message	Comments
7. Schedule Selection	<QueryScheduleSelection> <ScheduleSelection>	Same basic data, slightly different format and structure. The response message format is given in the second line at left. The <ScheduleSelection> element is the same as the submittal element. Schedule is uniquely identified as a generator CPTU name specified as the location and the schedule numeric code specified as the schedule field.
7. Schedule Type	<QueryScheduleDefinitions> <ScheduleDefinitions>	Same basic data, slightly different format and structure. The response message format is given in the second line at left.
7. Synchronized Reserve Bilaterals	<QuerySpinReserveBilaterals> <SpinReserveBilaterals>	Same basic data, slightly different format and structure. The response message format is given in the second line at left.
7. Synchronized Reserve Market Results	<QuerySpinReserveResults> <SpinReserveResults>	Same basic data, slightly different format and structure. The response message format is given in the second line at left.
7. Synchronized Reserve Offers	<QuerySynchronizedReserveOffer> <SynchronizedReserveOffer>	Same basic data, slightly different format and structure. The response message format is given in the second line at left.

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Old XML Message	New XML Message	Comments
7. Spin Unit Hourly	<QuerySynchronizedReserveUpdate> <SynchronizedReserveUpdate>	Same basic data, slightly different format and structure. The response message format is given in the second line at left. Response element <SynchronizedReserveUpdate> is the same as the data submittal element.
7. Spin Unit Ramp Rate	<QueryUnitDetail> <UnitDetail>	The spin unit ramp rate is returned as an instance of the <RampRateCurve> element in the <UnitDetail>.
7. Synchronized Reserve and Regulation Award	<QuerySPREGAward> <SPREGAward>	Same basic data, slightly different format and structure. The response message format is given in the second line at left.
7. Unit	<QueryUnitDetail> <UnitDetail>	Data slightly different, removed unnecessary data so that the format is the same as the submittal. The response element <UnitDetail> is the same as the submittal element.
7. Unit Hourly	<QueryUnitUpdate> <UnitUpdate>	Same basic data, slightly different format and structure. The response message format is given in the second line at left. Response element <UnitUpdate> is the same as the data submittal element.

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Old XML Message	New XML Message	Comments
7. Unit Ramp Rate	<QueryUnitDetail> <UnitDetail>	The ramp rate is an instance of the <RampRateCurve> element in the <UnitDetail> element. Response element <UnitUpdate> is the same as the data submittal element.
7. Weather Forecast	<QueryWeatherForecast> <WeatherForecast>	Same basic data, slightly different format and structure. The response message format is given in the second line at left. Response element <WeatherForecast> is the same as the data submittal element.

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