

Resilience in System Planning



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- Resilience Criteria – Range of Possibilities
 - Do “no harm” (i.e. don’t make an existing problem worse)
 - Opportunistic – incorporate resilience as a factor in RTEP proposal selections
 - Standalone - address resilience as a stand-alone driver
- Resilience Criteria would require new analytical procedures and tools
 - Assess Vulnerabilities
 - Develop Resilience Indices

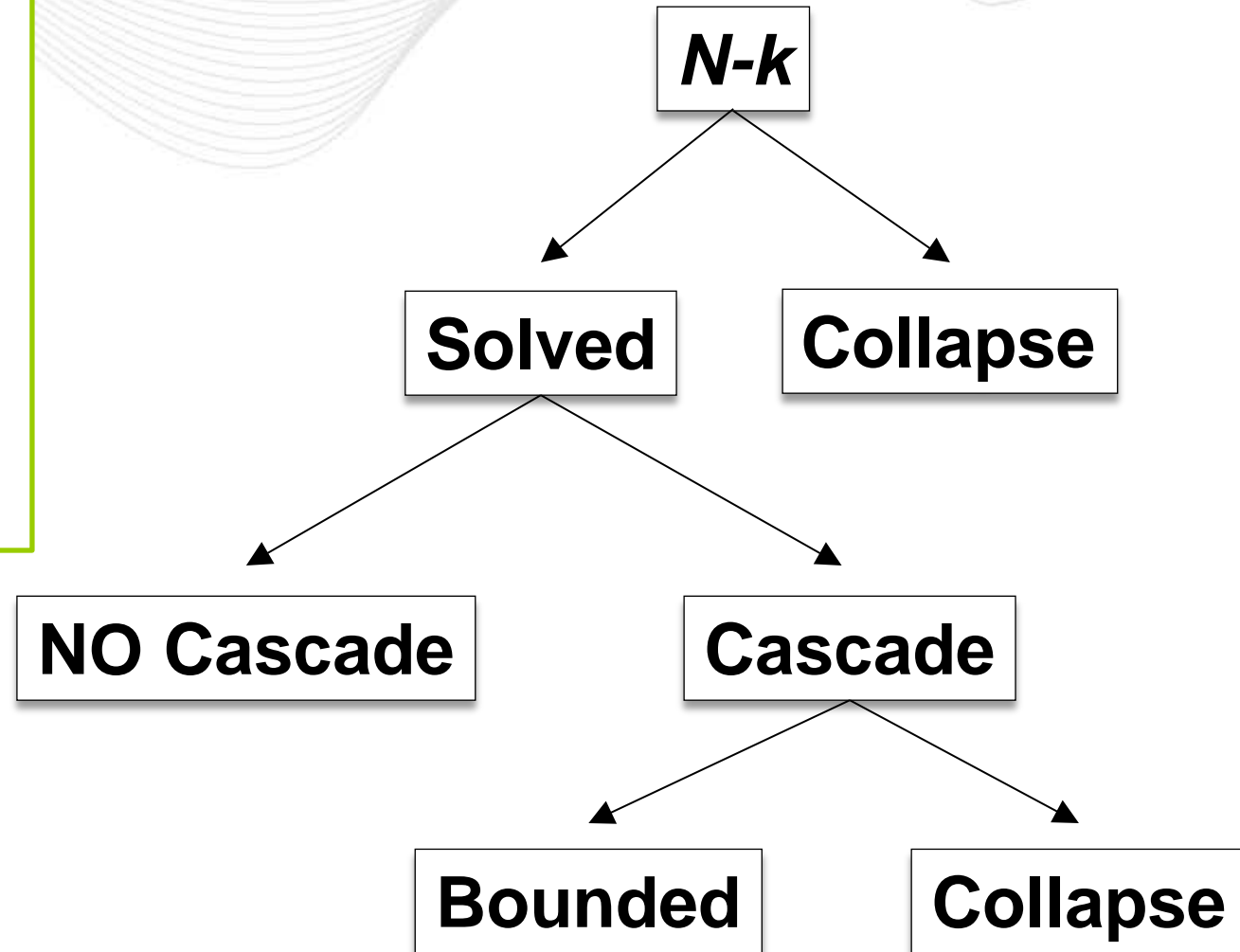
- Do No Harm approach when considering network changes
 - Consider upstream and downstream impact of local upgrades
 - Shift of power flow, voltage impact, etc.
 - Potential examples

- Metrics & Criteria
- What's the difference?
 - **Metrics:** a standard for measuring or evaluating something, especially one that uses figures or statistics
 - **Criterion:** a rule or principle for evaluating or testing something

- Event (and associated contingency definitions) Evaluation
 - All NERC TPL “P0 through P7” already included in RTEP infrastructure planning
 - Consider “Table 1 – Steady State & Stability Performance Extreme Events” and similar events
- Tools
 - Utilize existing commercially available power flow software combined with PJM developed automation
 - Use to simulate, produce metrics, summarize results, etc.

Simulation Result

- No cascading
- Bounded
- Collapse



- Cascade Analysis
 - Percentage improvement or degradation
 - Transmission facilities involved in triggering events (i.e. the contingencies)
 - Transmission facilities involved in resulting cascade events
 - Identify “repeat” and “worst” offenders
 - Bounded vs. Collapse

- Development of Simulation Data Metrics
 - Collapse likelihood (%)
 - Load at risk (MW)
 - Generation at risk (MW)
 - Headroom increase (i.e. reduction in loading on other facilities)
 - Others

- Resilience Challenges
 - RTEP Approval and Inclusion
 - Transparency & Stakeholder Communication
 - Siting given States historic preferences
 - Cost and cost allocation