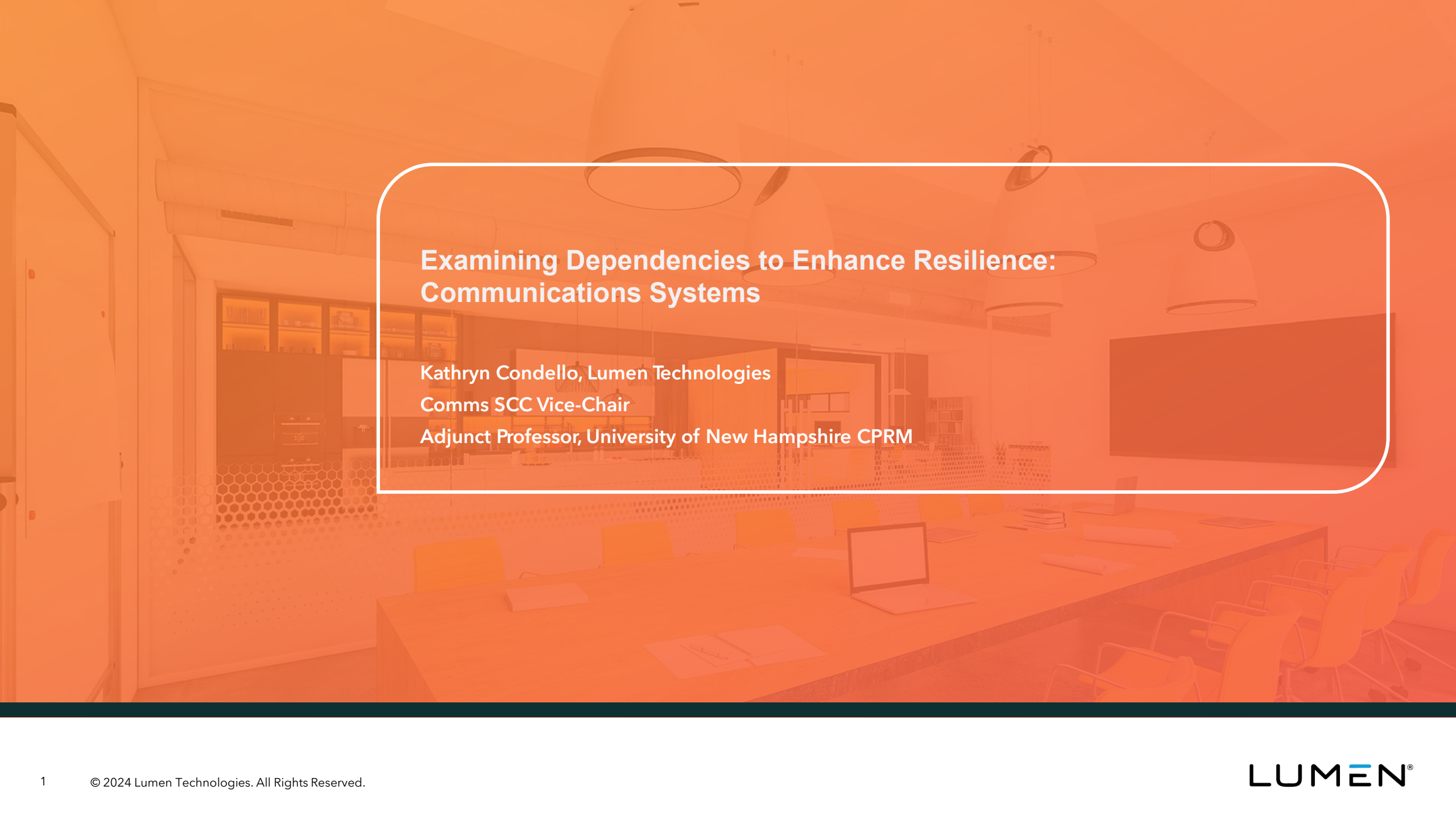




Examining Dependencies to Enhance Resilience: Communications Systems

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A few opening thoughts...

- Dependency analysis is the cornerstone of resilience planning
 - What are the most important things that I do?
 - What Comms are necessary to keep it working?
 - How long can Comms be down?
 - Redundant or Diversity solutions
- Impacts often don't cascade immediately
 - Especially in redundant systems
 - But...
 - It can change the risk calculus significantly
 - It can increase criticality other system components
 - It can heighten demand for substitution resources



A few more thoughts...

- Most systems have both internal and external dependencies
- Dependency risk may accrete in unexpected ways
- Dependency has a strong temporal component
 - Might be no impact in short term, but huge impact in long term
- National vs. regional vs. local dependencies

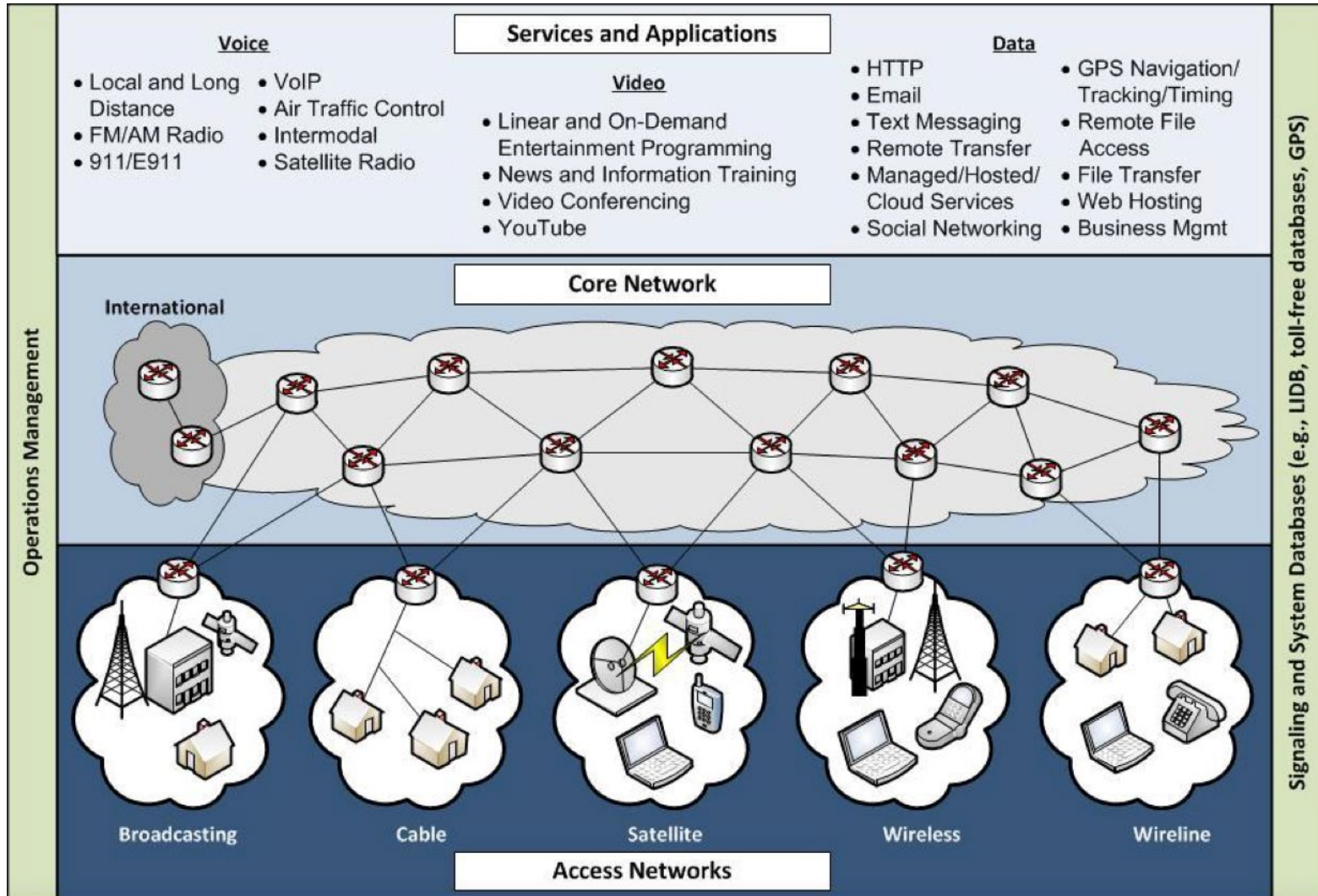


Intra-sector Dependency Example: Communications “National Critical Functions” (NCFs)

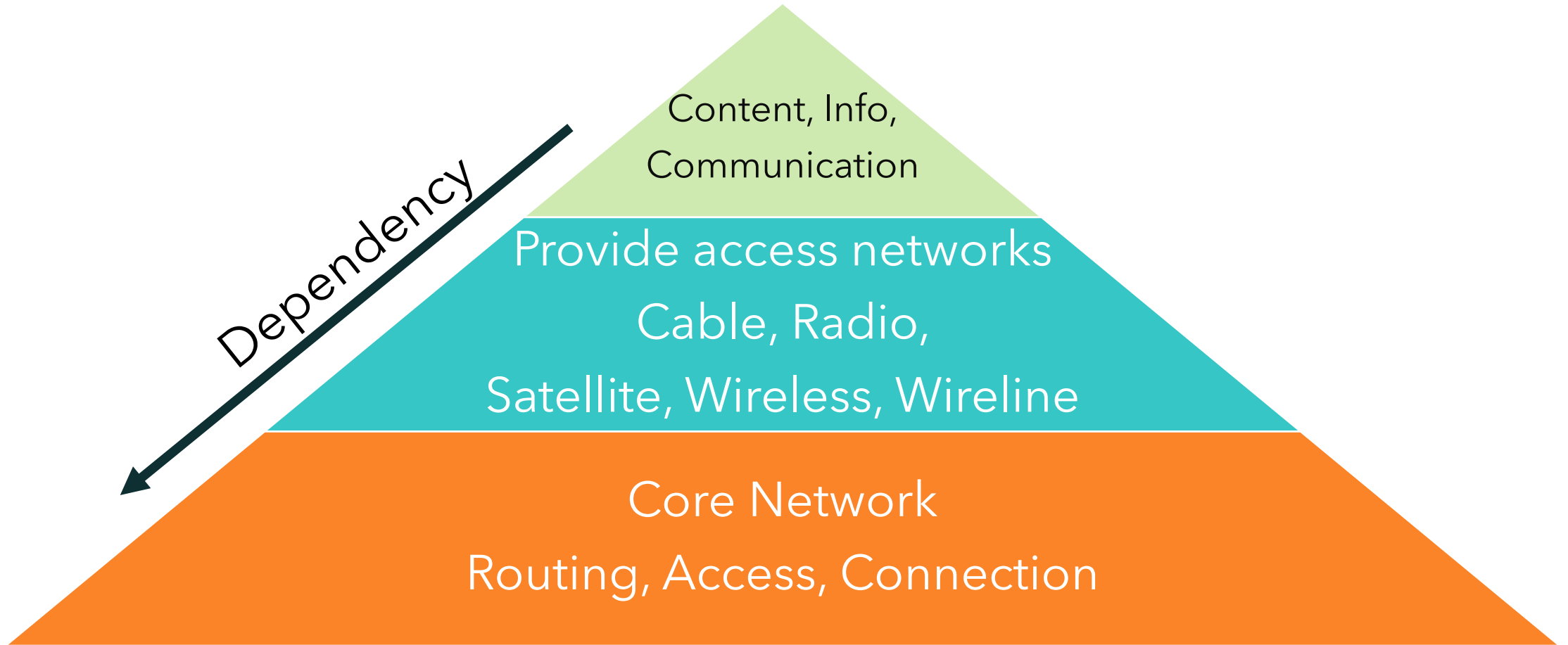
- NCF 3: Provide Internet Based Content, Information, and Communication Services
- NCF 52: Provide IT products and services

- NCF 1: Operate Core Network
- NCF 4: Provide Internet Routing, access, and connection services

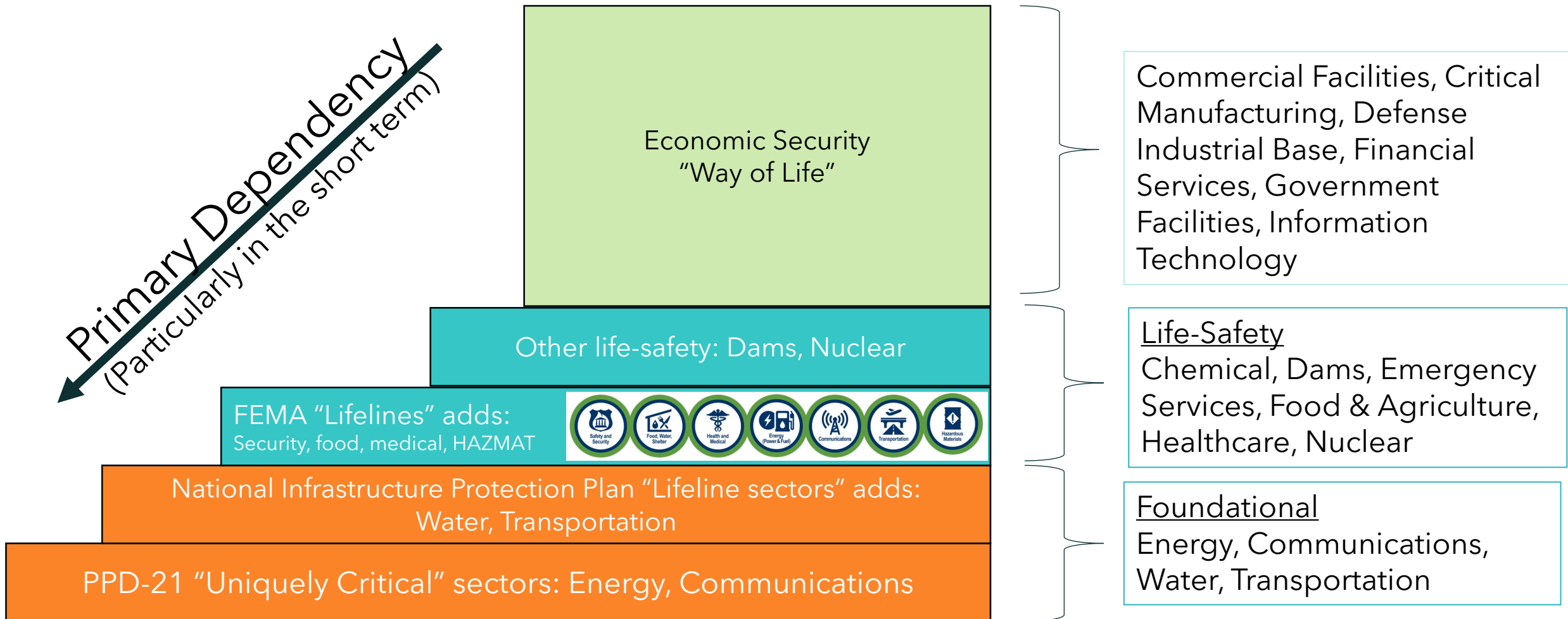
- Provide Access Service
 - NCF 2: Cable
 - NCF 6: Radio
 - NCF 7: Satellite
 - NCF 8: Wireless
 - NCF 9: Wireline



Communications NCFs: Logical dependency



Cascading Dependencies – across sectors



Mitigating Risk from Dependency & Interdependency

- Blue-sky
 - Identify your most critical functions/missions and what communications support them.
 - Detailed analysis of dependencies - COOP planning helps
 - Business Process Analysis, Business Impact Analysis
 - Think through alternate sources for critical needs
 - Does everyone have the same alternate source(s)? Can they scale?
 - Clear discussions among customers and suppliers/vendors
 - If you need high redundancy/reliability, negotiate it and put it in the contract
 - Dig more than one layer deep on dependencies
 - Output?
 - Portfolio of Redundant and Diverse Measures to better assure your mission has the communications you need.
- In Crisis
 - Understand that previously less important chokepoints/material will become critical