

A Framework for Network Complexity

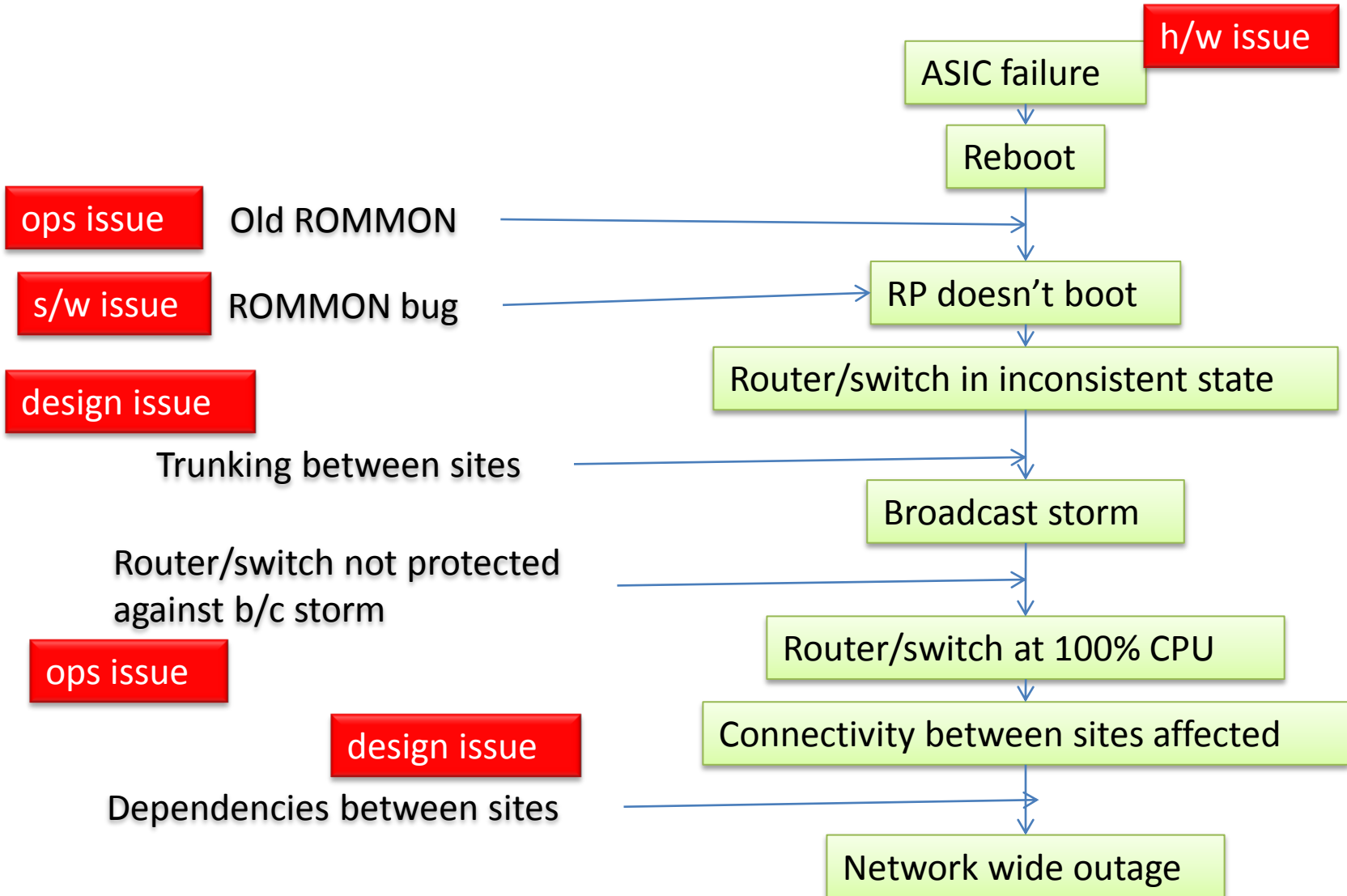
draft-behringer-complexity-framework-00

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<http://irtf.org/ncrg/>

What is Complexity?



Network Complexity

- Questions:
 - What is network complexity?
 - How to measure and compare complexity in:
 - Networks
 - Protocols
 - How to contain, control, reduce complexity
 - Use cases, examples

Objective

Quantifiable

Learning from mistakes

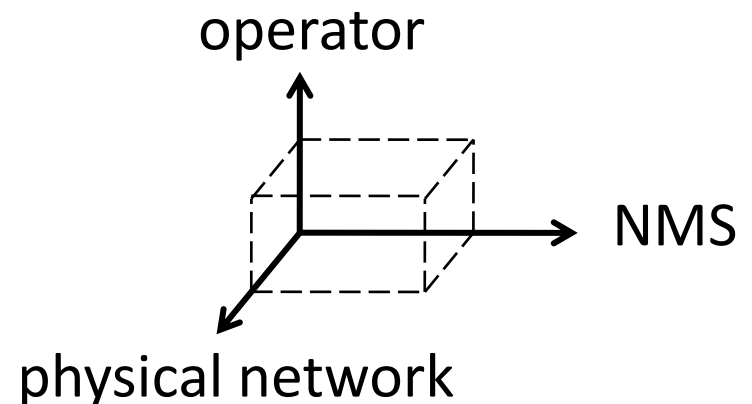
A Framework for Defining Network Complexity

1. Introduction
2. Current Understanding of Network Complexity
 - 2.1. The Behavior of a Complex Network
 - 2.2. Robust Yet Fragile
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3. Towards Defining Network Complexity
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4. Possible Directions of Research
 - 4.1. Definitions and Metrics
 - 4.2. Comparative Analysis
 - 4.3. Containment, Control or Reduction of Complexity
 - 4.4. Use Cases

Current Understanding

- Behavior of a Complex Network
 - Self-organization
 - Un-predictability
 - Emergence
 - Non-linearity
 - Fragility
- Robust Yet Fragile (RYF)
- Complexity Cube

Please help
expand this
section



Towards Defining Network Complexity

- Many “variables”
 - State in the network
 - Human operators
 - Classes/templates
 - Dependencies and interactions
 - Total cost of ownership (TCO)
 - Benchmark unit cost (BUC)
 - Churn / rate of change
- Technical Debt

Possible Directions of Research

- Definitions and Metrics
- Comparative Analysis
- Containment, control or reduction of complexity
- Use Cases
 - Examples of “catastrophic failure”
 - Complexity analysis of a particular network/protocol
 - Work in related areas, such as total cost of ownership, software complexity, ...