RIPE-62
Network Complexity BoF

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Michael Behringer, Cisco

Network Complexity

- Goal: Understand complexity and try to control it

- Several trains of thought:

  Document "catastrophic failure", try to learn from it

  Compare two architectures, try to derive complexity metrics

  Analyse protocol behaviour on a local level to understand global level

  Yours?

- Today's BoF:

  A case of "catastrophic failure" (Michael Behringer)

  (Geoff Huston)

  BGP Complexity (Marco Canini)
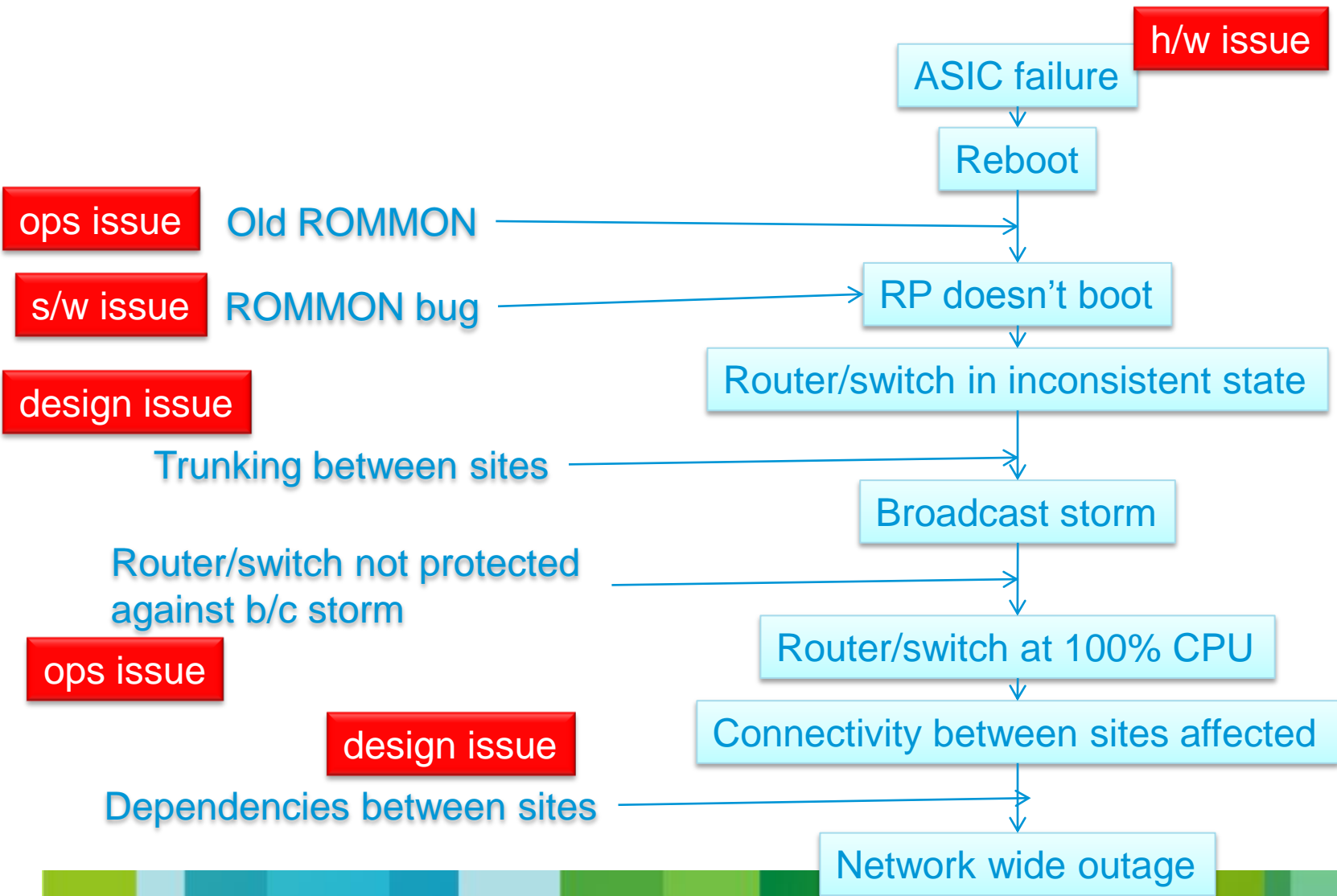
  Discussion

See also: http://networkcomplexity.org/

Documenting Cases of Catastrophic Failure – Case 1

Situation

- Two data centres, some 10s of km distance

- Connected via trunking

- Observed:

  Application level outages

  Two router/switches at 100% CPU

  One router in ROMMON (reboot did not help)

  Broadcast storm

Sequence of Events

h/w issue

ASIC failure

↓

Reboot

ops issue Old ROMMON ⟶

↓

s/w issue ROMMON bug ⟶ RP doesn't boot

↓

design issue

Router/switch in inconsistent state

Trunking between sites ⟶

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Broadcast storm

Router/switch not protected against b/c storm ⟶

↓

ops issue

Router/switch at 100% CPU

↓

design issue

Connectivity between sites affected

Dependencies between sites ⟶

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Network wide outage

Summary and Next Steps

- Catastrophic failures may have many causes

- All causes (!) must be effective for the outage to occur

- Can we predict dependencies, potential issues before they occur?

Next Steps:

- Collect cases of "catastrophic failure"

- Analyse common issues

Research collected at: http://networkcomplexity.org/

(ask mbehring@cisco.com for login to add material)