EACP REQUIREMENTS

draft-retana-rtgwg-eacp

Goal

- Catalogue proposed solutions to reduce power
  - Ways in which to save energy, rather than algorithms designed to take advantage of those mechanisms
  - Shut down links, shut down line cards, sleeps, microsleeps, etc.
- Examine possible problems caused by these various mechanisms
- Catalogue issues proposals in this space need to address
  - Go between the algorithms and the techniques
  - If you're going to propose a system that uses microsleeps, then you need to consider…

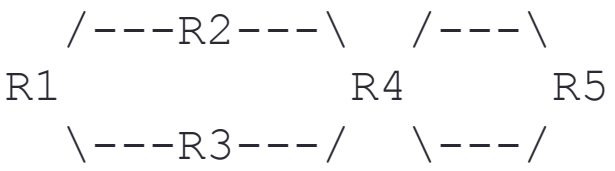
Organization

- Introduction
  - Describes the problem
  - Describes business and application drivers
- Framework
  - Catalogues methods of reducing energy usage that have been proposed in the past
  - Discusses local verses global control
- Requirements
  - Discusses one issue at a time
  - Gives requirements to protocol designers to consider

Requirements

- Energy Efficiency and Bandwidth
  - Cutting out links or devices reduces the aggregate bandwidth through the network
- Energy Efficiency and Stretch
  - Reducing the size of the topology always increases stretch for at least some source/destination pairs
- Energy Efficiency and Fast Recovery
  - To be renamed “Energy Efficiency and Resilience”
- Introducing Jitter through Microsleeps
  - Discusses the relationship between sleep states and jitter
- Need to add…
  - Something on packet loss to compliment the sections considering quality of service

Requirements (Example)



In the network illustrated, if a modification is made to the control plane in order to remove the link between R1 and R4 in order to save energy, all the destinations shown in the diagram remain reachable. However, from the perspective of R1, the best path available to reach R2 has increased in length by two hops. The original path is R1->R2, the new path is R1->R3->R4->R2. This represents a stretch of 2.

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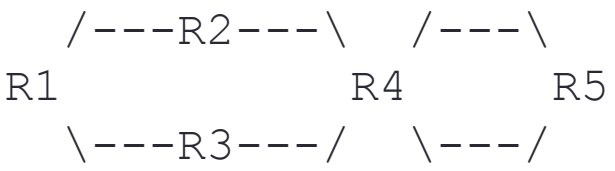
Designers who propose modifications to control plane protocols to achieve network energy efficiency SHOULD analyze the impact of their mechanisms on the stretch in typical network topologies, and SHOULD include such analysis when explaining the applicability of their proposals.

Requirements (Example)



Such schemes introduce delay and jitter into the network path directly; if a packet arrives while the link to the next hop, or the next hop itself, is in a reduced energy state, the packet must wait until the link or next hop device enter a normal operational mode before it can be forwarded. Most of the time the proposed sleep states are so small as to be presumably inconsequential on overall packet delay, but multiple packets crossing a series of links, each encountering different links in different states, could take very different amounts of time to pass along the path.

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Protocol designers SHOULD analyze the impact of accumulated jitter when proposing mechanisms that rely on microsleeps in either equipment or links. This analysis SHOULD include both worst case and best case scenarios, as well as an analysis of how coordinated clocks are to be handled in the case of coordinated sleep states.

Next Steps

- Review and add to fill in where needed
- Bring this on board as a working group document