HotRFC@IETF114, Philadelphia, PA  
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Callenges and Opportunities in Green Networking

see also:

Challenges and Opportunities in Green Networking  
Alex Clemm, Cedric Westphal, Jeff Tantsura, Laurent Ciavaglia, Marie-Paule Odini

Green Networking Metrics  
Alex Clemm, Lijun Dong, Greg Mirsky, Laurent Ciavaglia, Jeff Tantsura, Marie-Paule Odini

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Why Green Networking?

• Reducing carbon footprint to “Net Zero” one of mankind’s “grand challenges”
• Networking applications are a key enabler in this, but is this enough?
  • Substantial footprint enabler for a lot of “green” already
  • But, networks consume lots of energy themselves
  • Net Zero mandates will apply to network providers as well
• Key contributors to network energy efficiency today
  • General hardware advances (e.g. Moore’s law – but slowing)
  • Deployment factors (e.g. Nordic locations for datacenters)
  • Antenna technology
• What about network-specific factors?
  • What are ways in which the IETF can contribute?
  • Even if just a small slice of the pie, everything counts…
Potential opportunities (and challenges)

• Device / equipment level
  • Proper instrumentation (common denominator and enabler for control loops)

• Protocol level
  • Traffic adaptation (e.g. bursty vs smoothed transmissions to maximize efficiency)
  • Data volume reduction (e.g. codings, retransmission avoidance)
  • Enabling network energy saving mechanisms (e.g. fast discovery, state reconvergence)
  • Network addressing (e.g. smaller tables to maintain)

• Network level
  • Energy-aware routing & path configuration
  • Energy-related control protocol extensions

• Architecture level
  • Facilitate organization of application to minimize energy consumption
  • Examples: retrieval of content, placement of computation
    (compare CDN/ICN/COIN but from energy perspective)

The good news: does not require one grand solution, but allows for many incremental pieces
Next steps

• Two drafts on this topic have been posted
  • Problem statement (Challenges and Opportunities)
  • Metrics (as a first specific work item)
  • Actually, three: draft-eckert-ietf-and-energy-overview
    • Just a starting point - much more will be needed

• Looking for collaborators (and landing spot)

• Informal side meeting on Tuesday 13:00-14:00 in Salon 9
  • Open working meeting between draft authors
  • Please join if you would like to contribute

• Comments? Questions? Please contact us
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THANK YOU!