Environmental Impact of Internet Applications and Systems Workshop
Report & conclusions & next-steps?

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Report draft-iab-ws-environmental-impacts-report
Workshop page
IETF e-impact list page
What & Why

An IAB workshop with 73 participants from the IETF, research, and adjacent communities
• Participation was through submission of position papers – 26 accepted ones

Ensuring a good environment for humans is clearly a worthwhile, shared goal
• Reduced environmental impact is in many cases also a business requirement

The Internet is a powerful tool, helps our societies, but it can also amplify harmful issues

Can we help with the costs or benefits, better understanding, or start useful research?
• Workshop sessions: big picture, what we [don’t] know, improvements, and conclusions
Workshop Conclusions

Internet needs to both help the society and reduce its own environmental impacts.

This is not entirely new for the Internet or the IETF (video conferencing etc.)

The problems are large, complex, and go far beyond Internet technology itself – we need to build better understanding.

It is crucial also to understand the different tradeoffs and constraints, e.g., jitter, peak capacity, etc.

Detailed technical directions include:

- Beyond protocols: implementations, green energy, etc.
- Metrics, measurements, and data
- Enable a more dynamic ability to slow down, sleep, or be awareness of energy availability
- Data format choices
- Multicast (?)
- Designing for low-power systems may be beneficial in general
- Avoid proof-of-work crypto assets
- “Environmental Considerations” (?)
What is “the Internet”? Studies differ widely
- Age; considerations of: CPE; UE; embodied energy; data centers

Our IAB paper uses a few sources to arrive at a range of: 0.5% – 1.17%

One possible derivation:
“SMARTer2030 report” states that ICT has a CO2 “footprint” of 2.7% of global emissions in 2020
- Numbers from 2012: telecom electricity = ICT / 3
- If this relationship still holds, then roughly, worldwide 2020 GHG emissions from telecom: 0.9%
Workshop example: Schooler; Malmodin; Schien

Growth
Workshop example: Krishnan & Pignataro
Sustainability considerations for networking equipment

Optimizing for:

Phase 1
Visibility

Phase 2
Insights and Recommendations

Phase 3
Self-Optimization & Automation
Workshop example: Moran & Bormann
Energy impact of data size by encoding

Energy comparison of JSON vs CBOR

• SenML example
• LoRa overhead reduces impact
  • Sensitive to packet count
  • Quantized to 127 bytes
  • Per-packet overhead
    • Favors reduction across packet count
• Energy reduction in all cases
  • Often 30% or better