Terminology for Energy Efficiency Network Management

draft-bclp-green-terminology-04

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Why This Document in GREEN WG?

The Working Group will concentrate on the following:

- ..
- **Defining terms and definitions related to energy efficiency metrics.** Where possible, terms and definitions in existing **RFCs will be reused.**
- ...

Work Items

The GREEN Working Group will initially focus on the following deliverables:

- Informational document(s) that (1) defines **common terminology** and metric definitions, (2) **categorizes various types of metrics and measurements** at component, device, and network levels.

Excerpt from the GREEN WG Charter

Document Status

- Presented in IETF 121, IETF 122 and 1st interim meeting since IETF 122
  - Receive majority support during adoption poll
  - Thanks Benoit, Emile, Carlos, Gen Chen, Shailesh and many others for valuable review.
- The github has been setup for terminology draft
  - https://github.com/billwuqin/draft-bclp-green-terminology
  - Open issues can be tracked here
    - https://github.com/billwuqin/draft-bclp-green-terminology/issues
- The latest version is v-04, changes compared to v-00 presented in IETF 121
  - Add one new section on Operations and Manageability Considerations;
  - Add 5 new energy efficiency related terms based on comments raised during the interim meeting;
  - Update 2 existing terms such as energy efficiency metric definition, energy efficiency management based on comments raised on the list.
  - Update Energy Efficiency Capability Definition.

Key Document Contribution

- Defines a set of terms to be used within the IETF when discussing Energy efficiency networks
  - The document does not intend to define a comprehensive list of energy-related terms, or sustainability in general
  - Only key terms are defined
  - Some of these terms are extracted from existing IETF documents and beyond

- Provides a list of currently used metrics and measurement methods to assess/calculate energy-related consumption, efficiency ratio, etc.

- Inventory of SDOs where relevant energy efficiency effort is ongoing
  - Will be removed in future versions, but the intent is to check the consistency of our proposed terms and leverage existing metrics

17 Core Terms Are Currently Defined

1. Energy
2. Power
3. Energy Management
4. Energy Monitoring
5. Energy Control
6. **Energy Efficiency**
7. *Energy Efficiency Management*
8. **Energy Efficiency Observability**
9. **Energy Efficiency Control**
10. **Energy Efficiency Capabilities**
11. *Energy Efficiency Metric*
12. **Energy Proportionality**
13. Energy Efficiency/Energy Efficiency Ratio (EER)
14. Power Usage Effectiveness (PUE)
15. Network Level Energy Efficiency (NLEE)
16. Device Level Energy Efficiency (DLEE)
17. Component Level Energy Efficiency (CLEE)

Let us know if any key term is missing or if any can be removed

Two existing Terms Updated

Energy Efficiency Metric: Refers to a metric that is used for the evaluation and assessment of energy consumption of a network, device, or component. One or more metrics can be defined. These metrics are also used for network performance purposes to characterize the effectiveness of an Energy Efficiency management strategy.

Energy Efficiency Network Management: Refers to the ability to control the use of available energy in an optimized manner (e.g., in a resource conserved manner and at low cost) in a network.

Energy Efficiency Metric: Refers to a metric that is used for the assessment of energy consumption of a network, device, or component. One or more metrics can be defined. These metrics are also used for network performance purposes to characterize the effectiveness of an Energy Efficiency management strategy. Developing energy efficiency metrics for internetworking and associated measurement methodologies and conditions as well as consistently collecting this data over time are essential to demonstrating Energy Efficiency improvements. An example of a common outcome-oriented metric is energy consumption per data volume or traffic unit.

Energy Efficiency Management: Refers to a set of processes used to maintain an inventory of capabilities, use specific metrics to measure, report and assess energy consumption of the network, and control the use of available energy in an optimized manner. The overall goal is to ensure that the network and underlying devices use energy in a resource conserved manner and at low cost for the nature of the the services it provides and the cost constraints while achieving the network’s functional and performance requirements (e.g., improving overall network utilization).

5 New Terms introduced

Energy Efficiency: Refers to optimize energy usage in network components, devices, and across the network to minimize energy use as possible, eliminating thus energy waste. Examples to improve Energy efficiency include, but not limited to, deactivation of some or all components of network nodes during specific periods (e.g., periods with low-traffic) or adjusting interface speed of an interface based on network traffic load change, or switching to more efficient power supplies and silicon or developing more efficient transmission or signal processing algorithms.

Energy Proportionality Is the correlation between energy used and the associated useful output. For internetworking this is generally interpreted as the proportionality of traffic or traffic throughput and energy used. This concept is broadly applicable to networking infrastructure, data center, and other communication architectures. There might not a one-to-one correlation between traffic and energy use, notably due to the materially significant idle power use by devices, as well as the overall network capacity being allocated to serve at times of highest traffic utilization.

Energy Efficiency Observability: Is part of Energy Efficiency Management that deals with collecting, reporting, and reading metrics information from devices and evaluating the effectiveness of energy-aware policies to aid in Energy Efficiency Management.

Energy Efficiency Control: Is part of Energy Efficiency Management that deals with directing influence over devices.

Energy Efficiency Capabilities: Network Capabilities to optimize energy usage in network components, devices, and across the network through configurable static attributes (e.g., power saving capable attribute which can be applied to both component level and device level, or power setting attributes which specify who provide power, who consume, who is the meter, temperature setting, voltage, ampere setting).

Questions & Next Step

- Any comment about the current scope & approach?
  - Explore some terms such as **Energy Proportionality** from draft-pignataro-enviro-sustainability-terminology and incorporate them into this draft
- Consider WG adoption