

YANG Data Models for Energy Efficiency Management

IETF GREEN Interim Meeting 06/16/2025

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Objectives We are Targeting in GREEN WG

The Working Group will concentrate on the following:

- ..
- **Developing YANG models to enable measuring and reporting of energy usage through metrics and attributes at component, device, and network levels.**
- **Providing YANG models to allow operators to optimize energy usage in network components, devices, and across the network, via configurable energy efficiency capabilities.**
- ...

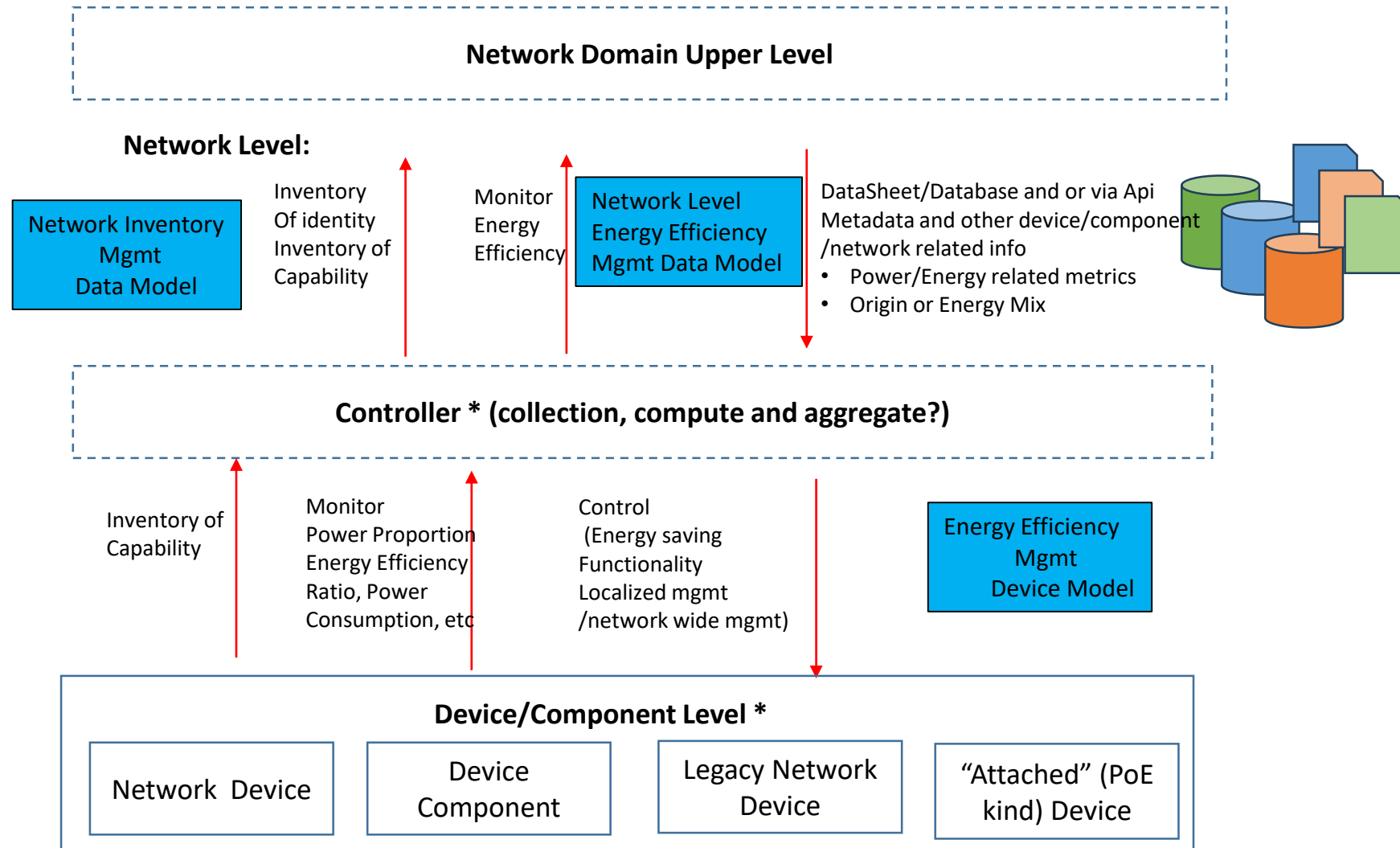
Work Items

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

- ...
- Standard Track definitions of ***YANG data models at the component level, device level, and network level for energy-efficient network management*** including energy usage monitoring and energy consumption management.

excerpt from the GREEN WG Charter

Energy Efficiency Management Framework



(*) Energy Efficiency Management Function is implemented inside the device or in a controller

Relevant YANG Data Model Work

- Split draft-cwbgp-green-energy-saving-management into three I-Ds with each focusing on specific uses:
 - I-D.cwbgp-green-common-energy-management
 - Meant to be reused by various energy efficiency-related modules.
 - Only feature, identities, type, and groupings are defined.
 - I-D.cwbgp-green-inventory-energy-management
 - Energy efficiency capability exposure for each NE
 - Temperature and voltage threshold, rated power for the component
 - I-D.cwbgp-green-topology-energy-management
 - Dynamic energy consumption metrics both at the network and device level
- draft-li-green-power-00
 - Device Level Power Management Management
- Open issues tracked in the GitHub, comments are welcome
 - <https://github.com/boucadair/draft-cwbgp-energy-saving-management/issues>

Energy Saving Model Design

Parameters for energy saving capability for the device

- Supported energy saving modes/methods

Energy related attributes for the component

- Temperature Upper/middle/lower bound
- Related power
- Low/high voltage bound/fatal

Energy efficiency Dynamic Statistics parameters

- Network/Node Level:
 - Total energy consumption/saved energy exposure
 - Energy saving modes and methods management
- Component Level:
 - Real-time power/voltage/temperature reporting



ietf-ni-energy-saving

ietf-ntw-energy-saving

augments

import

import

augments

ietf-network-inventory (I-D.ietf-ivy-network-inventory-yang)

ietf-energy-efficiency-common

ietf-network (RFC 8345)

Common Energy Model Overview

- Feature
 - energy-saving: Indicates the support for energy saving.
- Identities
 - Energy-saving-mode
 - basic/standard/deep
 - Energy-saving-method
 - unused-high-speed-interface-shutdown/unused-port-shutdown/unused-board-shutdown/...
 - Energy-saving-power-state
 - off-state/sleep-state/low-power-state/full-power-state
- Type
 - Energy-saving-operator: power-on/off for energy saving.
- Groupings
 - energy-consumption-data: real-time fluctuating power/voltage/temperature
 - energy-saving-modes: a list for energy saving modes and methods
 - power-parameters: operational thresholds related to temperature and voltage, as well as rated power
 - energy-power-consumption-stats: comprehensive energy consumption, and EER (energy efficiency rating)

Power state vs Energy Saving Mode

- Github issue ticket: <https://github.com/boucadair/draft-cwbgp-energy-saving-management/issues/57>
- Energy-saving-mode
 - basic/standard/deep
- Energy-saving-power-state
 - off-state/sleep-state/low-power-state/full-power-state

Is Energy Saving Model applied to both NE level and Network level

- Github issue: <https://github.com/boucadair/draft-cwbgp-energy-saving-management/issues/47>
- I-D.cwbgp-green-inventory-energy-management
 - Network Level Model
- I-D.cwbgp-green-topology-energy-management
 - Network Level Model

Next Steps

- Request the WG adoption call on the Common Energy Efficiency Module
 - Could it be served as a common building block for a number of yang models?
 - Is the current definition of types, identities, groupings sufficient or a good starting point?
- Continue to align with terminology document
- Address issue tickets raised in the GitHub
 - <https://github.com/boucadair/draft-cwbgp-energy-saving-management/issues>