GREEN Framework & Use Cases

IETF Hackathon

IETF 123
18-19 July 2025
Madrid

Use Cases
draft-stephan-green-use-cases

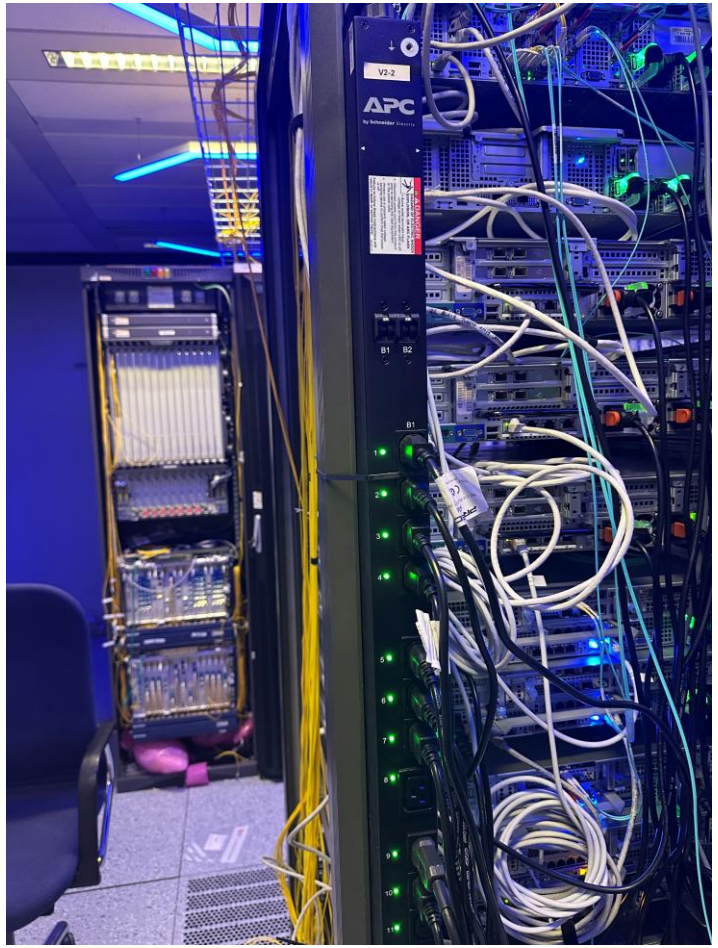
1. Incremental Application of the GREEN Framework
   Gradual adoption of energy efficiency features, including legacy device support.
2. Selective Reduction of Energy Consumption Proportional to Traffic Levels
   Energy-saving actions based on traffic patterns, such as sleep modes or shutting down modules.
3. Reporting on Lifecycle Management
   Reporting embedded carbon, manufacturing energy costs, recyclability, and disposal impacts.
4. Real-time Energy Metering of Virtualised or Cloud-native Network Functions
   Fine-grained energy monitoring for virtualized or cloud-native environments.
5. Indirect Energy Monitoring and Control
   Monitoring/control via other entities in the power distribution chain (e.g., PoE, PDUs).
6. Consideration of Other Domains for End-to-End Metrics
   Aligning KPIs across domains like 3GPP and IETF for full-network energy insights.
7. Dynamic Adjustment of Throughput in Wireless Transport Networks
   Adjusting power of wireless transport components (e.g., microwave links) based on traffic.
8. Video Streaming Use Case
   Reducing traffic volume via multicast, caching, or encoding strategies to lower energy usage.
9. WLAN Network Energy Saving
   Power modes for Wi-Fi APs (PoE-off, hibernation, low-power) and dynamic adjustment.
10. Fixed Network Energy Saving
    Periodic traffic patterns used to switch interface speeds, shut down ports, or cores dynamically.
11. Energy Efficiency Network Management
    Network-wide visibility of energy consumption trends and enabling strategic optimizations.
12. ISAC-enabled Energy-Aware Smart City Traffic Management
    Integrated sensing and communication for smart traffic control with dynamic energy optimization.
13. Double Accounting (Open Issue)
    Avoiding redundant energy metering in power distribution (ex. PDU and device levels)

Goals

- Exercise the notion of framework even partially (i.e., observability)
- Different use cases with different focus
  - With video steaming we want to demonstrate the possibility of identifying consumption per flow / customer, and aggregation of energy consumption across domains
  - Avoid the double counting in smart PDU collecting information directly from the device and from the PDU
  - Other goals to be defined

Streaming setup (from EU Exigence Project)

Telefónica data collection from routers



Power Monitoring

DC

Power controller

- **3 Fleximonitors x 16 Shunts**
  48 monitorable devices or circuits
- **Remote monitoring and control**
  Web and SNMP

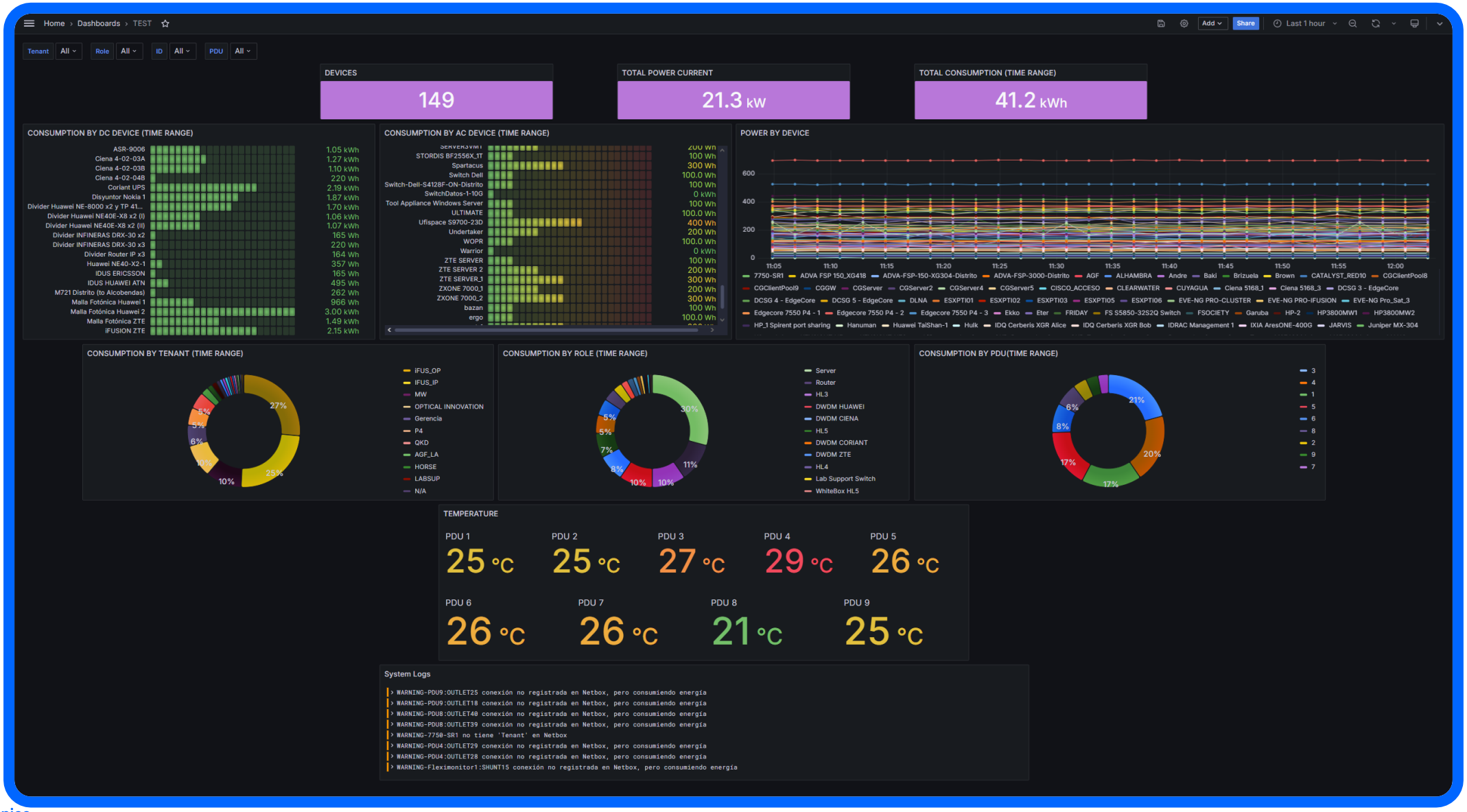
AC

Schneider APC NetShelter
Smart PDU

- **9 PDU x 40 Outlets**
  360 monitorable devices
- **Multiple supported connectors**

- **Remote monitoring and control**
  Web, SNMP, CLI, Redfish API

Dashboard Energy
Overview



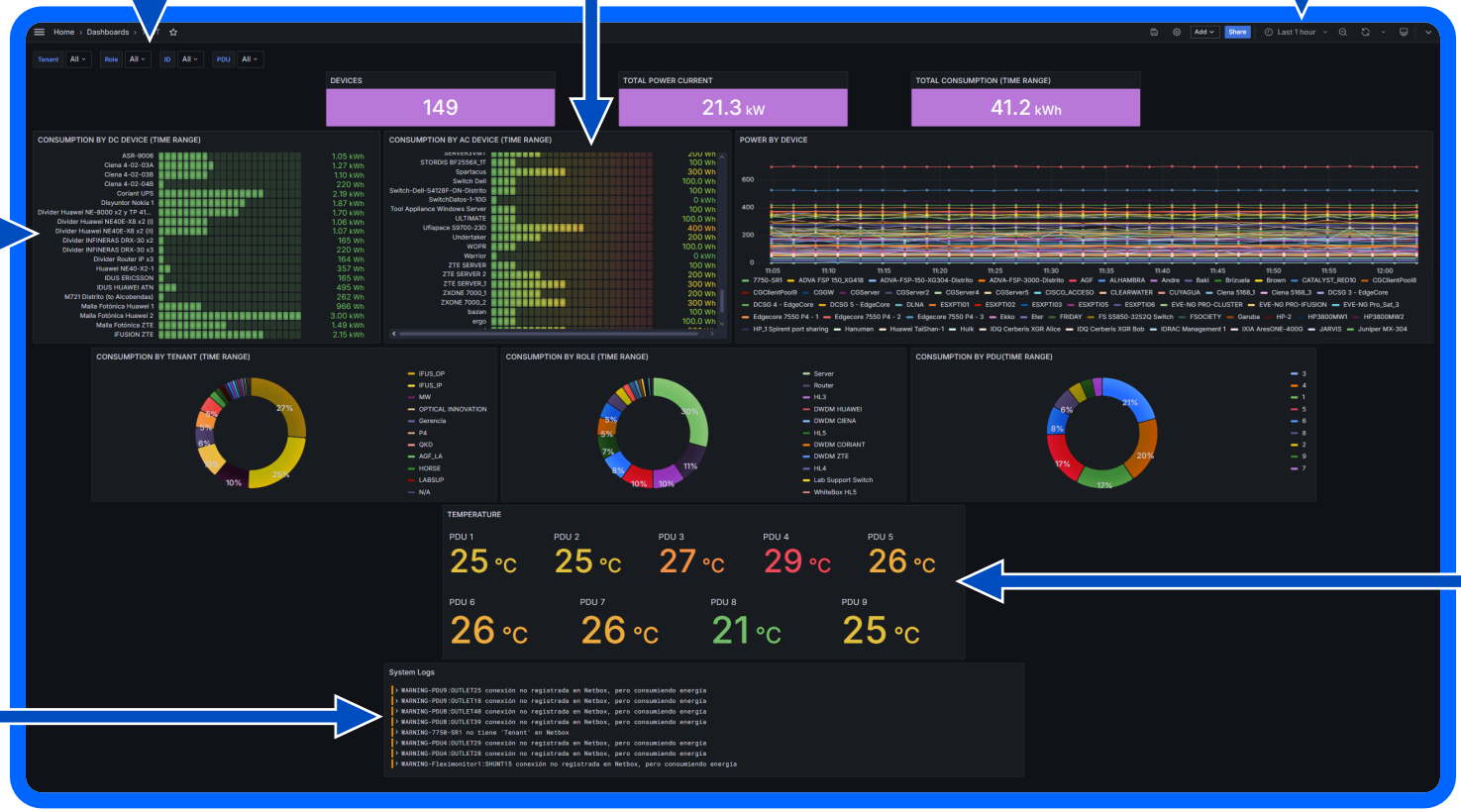
Dashboard Energy
Overview

Filter selectors

AC Devices

Time range selector

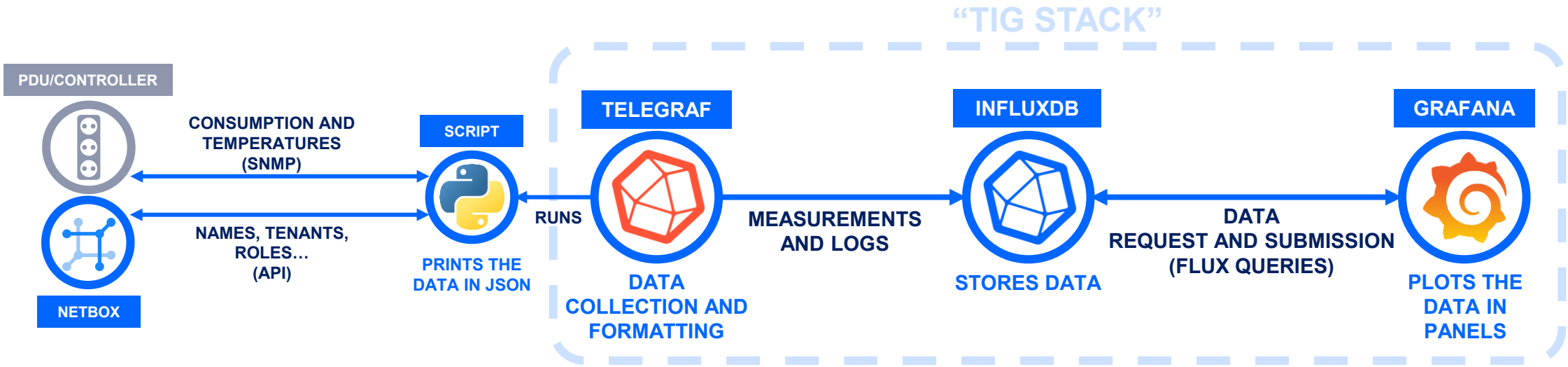
DC Circuits or Devices



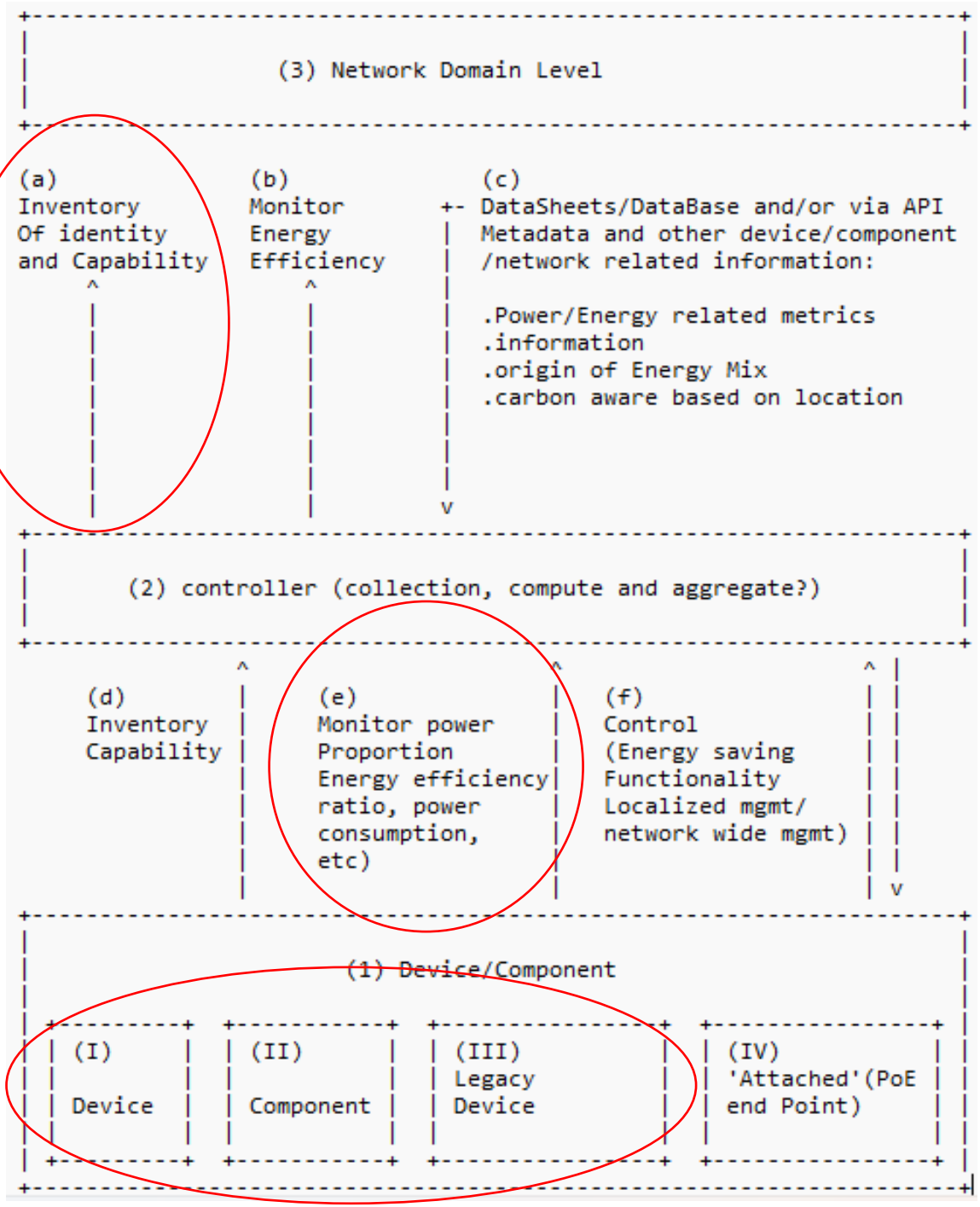
PDU temperatures

Inventory and system logs

Dashboard Energy
System



GREEN framework



Next steps

- Registration of the activity on the hakathon activity
- Finalize discussion on what to provide to the hackathon in terms of devices / equipment / scenarios
  - Additional stuff could be provided
- Complete description in the hackathon wiki