IETF Hackathon

GREEN Framework and UseCases

IETF 123
19–20 July 2025
Madrid, Spain

GREEN Framework for Service Level Energy Efficiency

- Device/component energy consumption report with information collected directly from the device or PDU connected.
- Ways of collecting information across Domains.
- VIDEO Streaming End to End Use Case.

ttps://datatracker.ietf.org/doc/draft-stephan-green-use-cases/
https://datatracker.ietf.org/doc/draft-belmq-green-framework/
https://datatracker.ietf.org/doc/draft-petra-path-energy-api/

What got done

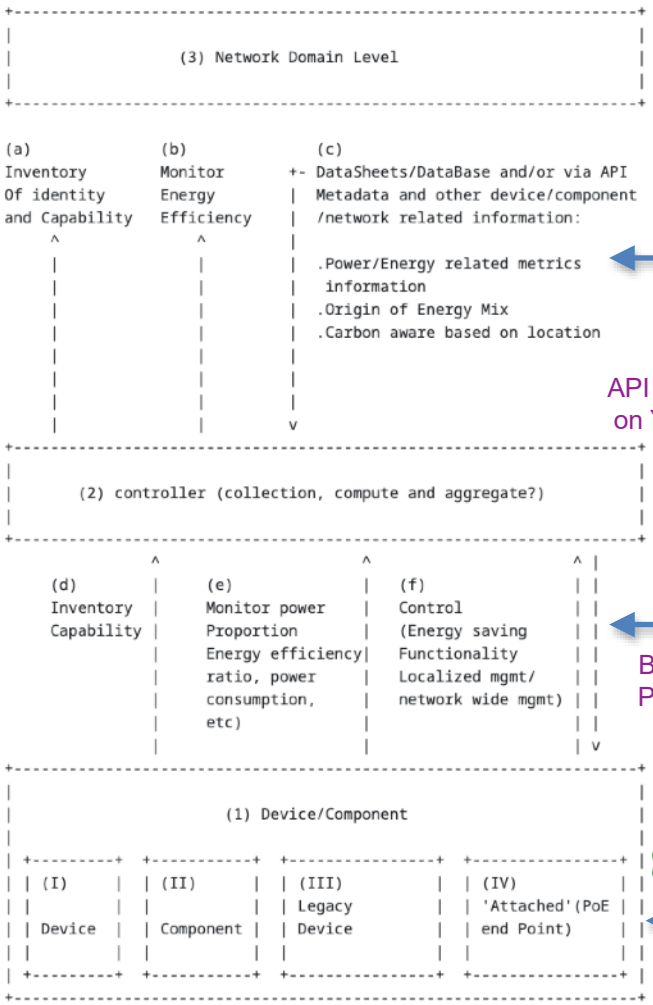


Figure 1: GREEN Reference Model

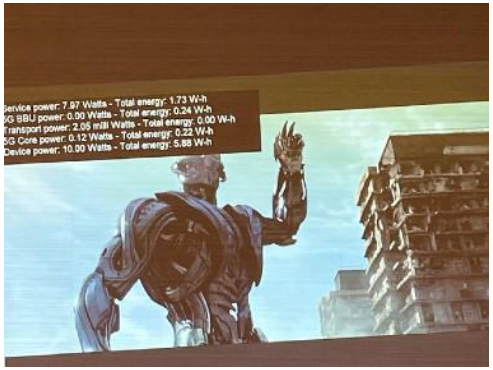
Telefónica

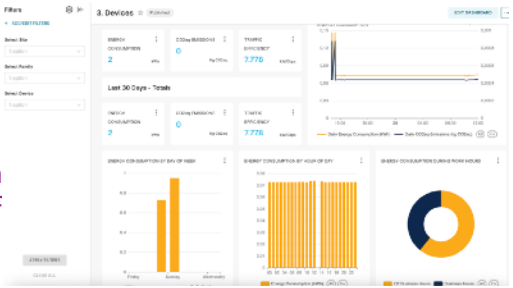
HUAWEI

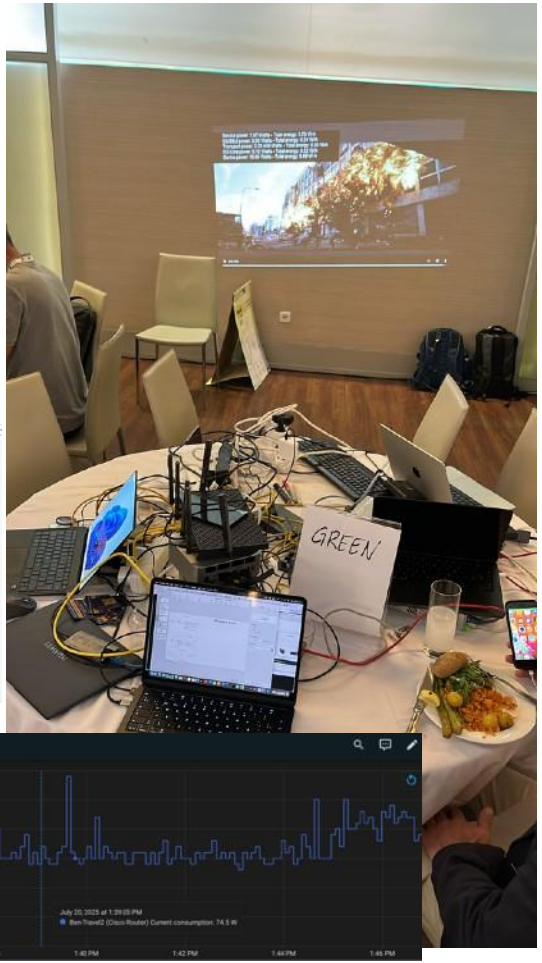
API based on YANG

CISCO

Based on POWEFF







What did we learn?

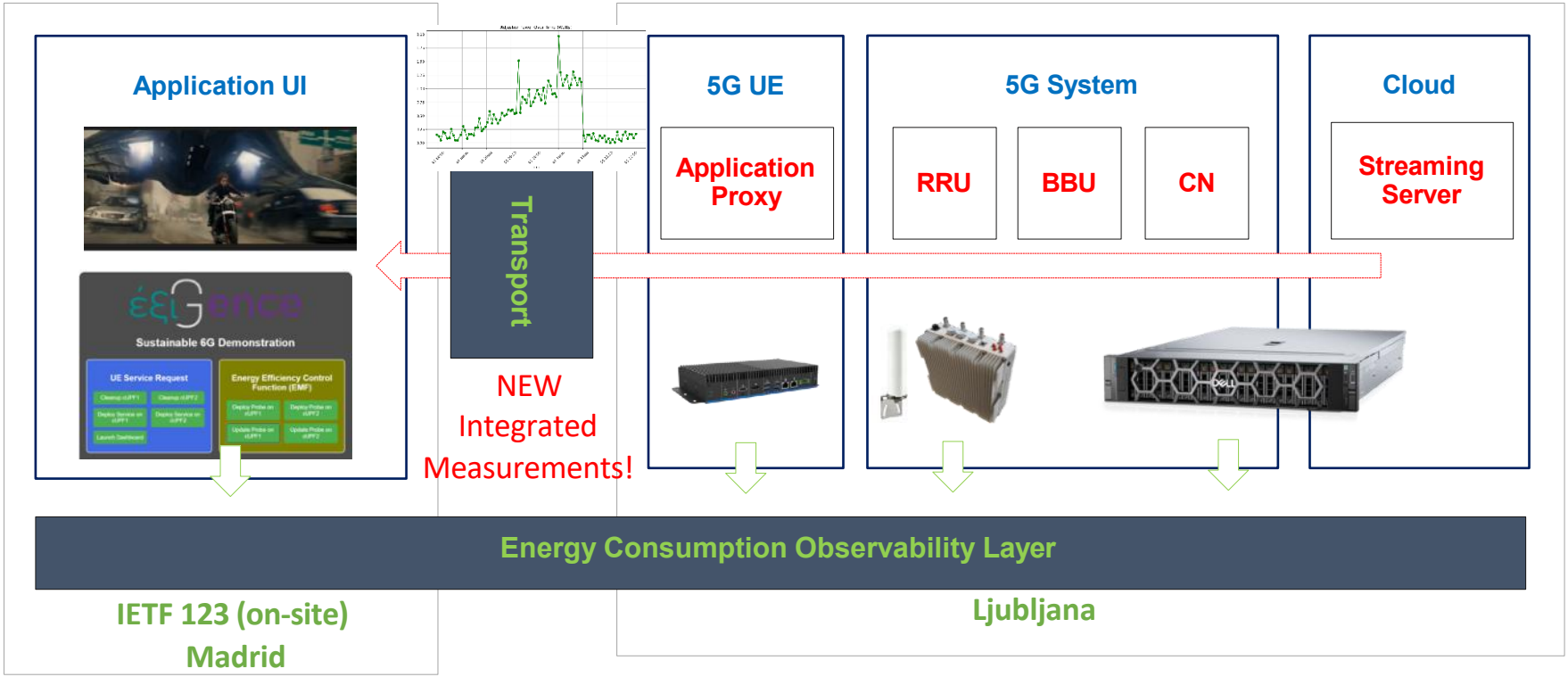
- “Dynamic modeling” being able to load new models dynamically to adapt to the network domain of the devices.
- Baseline of power consumption, increases with device load, network traffic and resource utilization.

Participants

- Luis M. Contreras (luismiguel.contrerasmurillo@telefonica.com)
- Marisol Palmero (marisol.ietf@gmail.com)
- Jan Lindblad (jan.lindblad+ietf@for.eco)
- Benjamin Schwarz
- (ben@greeningofstreaming.org)
- Artur Hecker (Artur.Hecker@huawei.com)
- Osama Abboud (osama.abboud@huawei.com)
- Per Andersson (per.ietf@ionio.se)
- Emile Stephan (emile.stephan@orange.com)
- Benoit Claise (benoit.claise@huawei.com)
- Qin Wu (bill.wu@huawei.com)
- Carlos J. Bernardos (cjbc@it.uc3m.es)
  Alberto Rodriguez Natal (natal@cisco.com)
- Prasad KN (skabbina@cisco.com)
- Josei Tolentino (jotolent@cisco.com)
- Fernando Muñoz (fmunozma@cisco.com)
- Ignacio Fite (nfitelop@cisco.com)
- Roberto Carrero (roberto.carrerorodriguez.ext@telefonica.com)
- Fernando Sanz (fernando.sanzgarcia.ext@telefonica.com)

Architecture of the Video Streaming

https://projectexigence.eu/



New hackathon outcomes: yang model for EC exchange, transport router measurements, EC testing of the cisco router

https://projectexigence.eu/

Application UI

Telefónica

```
module energy-monitor {
namespace "http://example.com/energy-monitor";
prefix em;

description
  "YANG model for energy monitoring of PDUs and services.";

revision "2025-07-17" {
  description "Initial version with PDU and service energy monitoring.";
}

container energy-monitor {
  description "Top-level container for energy monitoring data.";

  list pdu {
    key "pdu-id";
    description "Energy data per PDU and outlet.";

    leaf pdu-id {
      type uint8;
      description "PDU identifier.";
    }

    list outlet {
      key "outlet-id";
      description "Energy metrics for each outlet on the PDU.";

      leaf outlet-id {
        type uint8;
        description "Outlet identifier.";
      }

      leaf watts {
        type decimal64 {
          fraction-digits 2;
        }
        description "Current power usage in watts.";
      }

      leaf amps {
        type decimal64 {
          fraction-digits 3;
        }
        description "Current draw in amperes.";
      }

      leaf kwh {
        type decimal64 {
          fraction-digits 3;
        }
        description "Energy consumed in kilowatt-hours.";
      }
    }
  }

  list service {
    key "service-id";
    description "Energy consumption per service node or workload.";

    leaf service-id {
      type string;
      description "Unique identifier for the service (e.g., pod, VM, container).";
    }

    leaf watts {
      type decimal64 {
        fraction-digits 2;
      }
      description "Estimated power consumption of the service.";
    }
  }
}
```