

Side Meeting Sustainability Insights & POWEFF

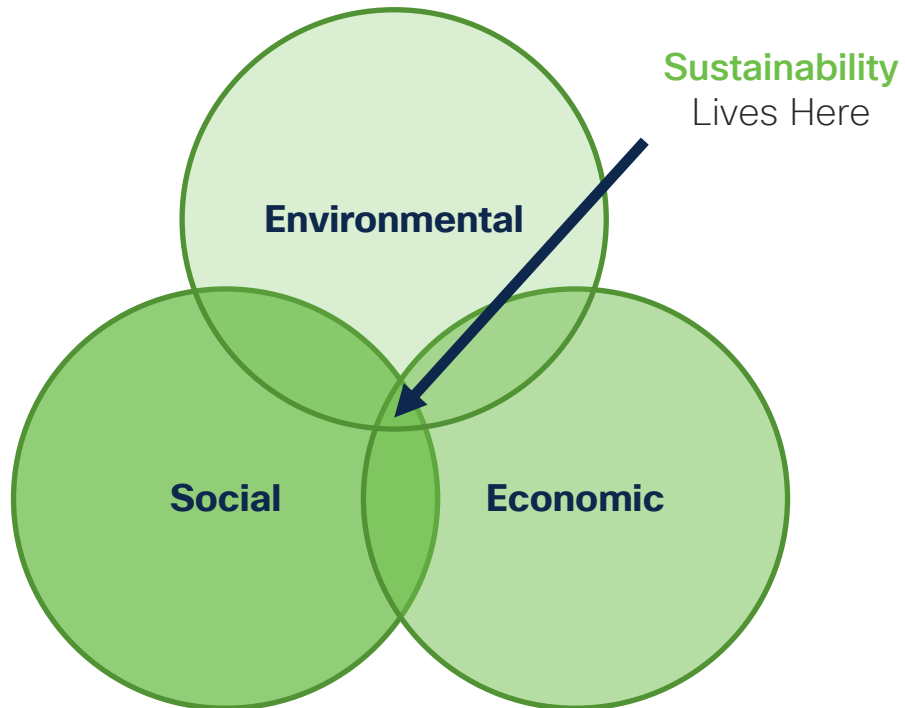
Monday Nov 6th 2023, IETF 118

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Agenda

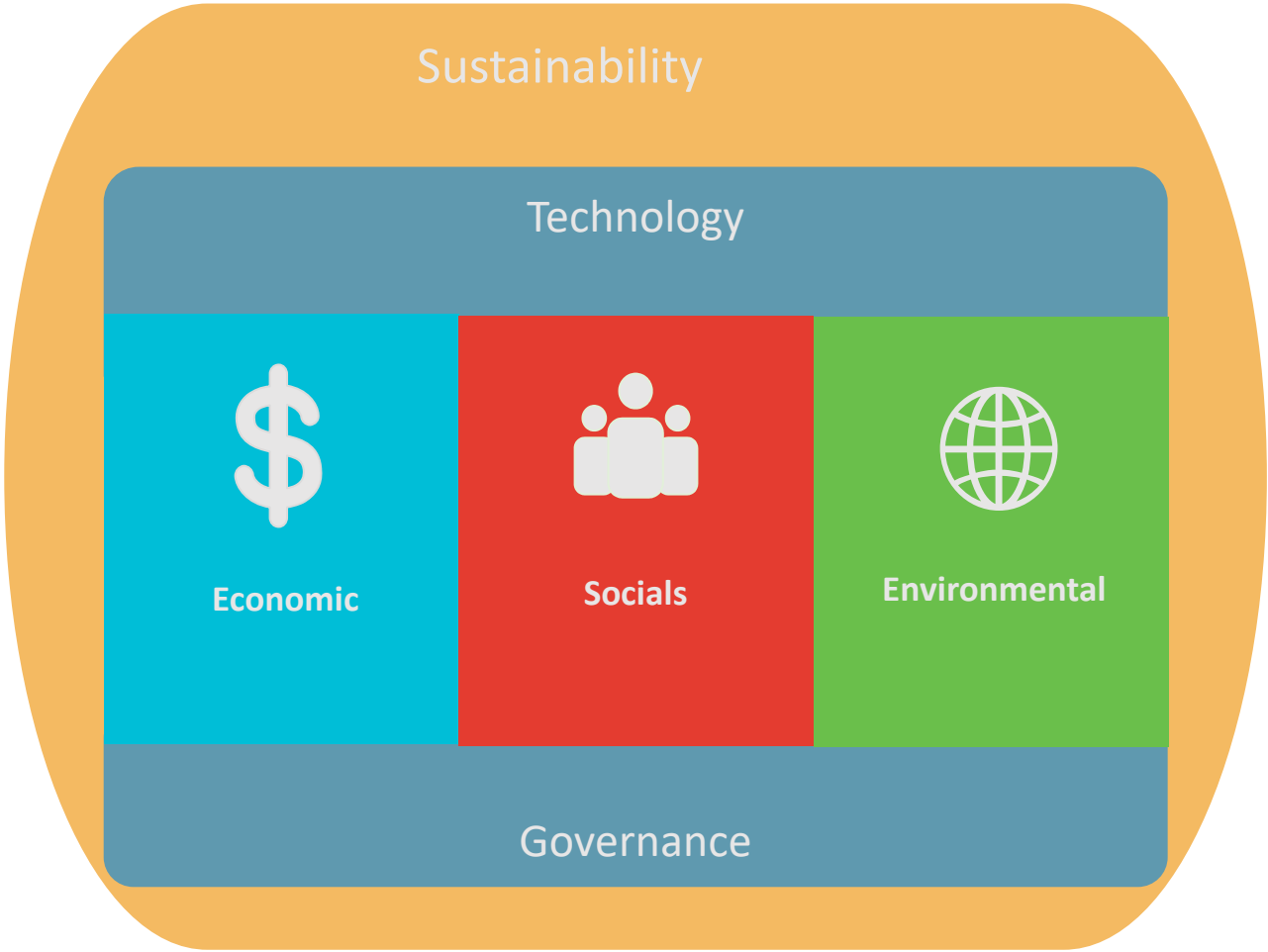
- Introduction
- Problem Statement & Motivation
- Use Cases

What is Sustainability?



Sustainability is a social goal for people to co-exist on Earth over a long time.

Specific definitions of this term are disputed and have varied with literature, context, and time.



Problem Statement

What are we measuring exactly?

- New concepts and metrics that "*sustainability*" brings:
 - CO2eq, TSCO, etc
 - Circularity: e-Waste management, transport, end of life, packaging...
- Metadata
- Accept current YANG and non-YANG modules – pointers

Focus for Side Meeting Today

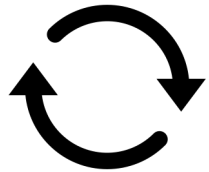
Optimize the use of the resources, from basic models to ML/AI approach

Who is making the decisions? and how?

It requires a solid data baseline to produce the right *insights*

Motivation

Circular Economy



- Tracking assets and components throughout their lifecycle
- Net Zero Goals require to reduce e-Waste. Work on Reuse, Repair, & Recycling
- SDGs have been defined to address NetZero by 2050

Normalization



- Scalability across Vendors
- Multivendor, legacy compliance, and External Data Sources integration will mandate Standardization/API

Optimization



- Metric visibility: simulated vs measured values
- Automation
- Recommendation logic across products and solutions

Accuracy & Granularity



- Granularity:
- frequency and aggregation of power metrics need to be adjusted to cost/time of the day.
 - Precision is required

Cross Domain



- Reporting against CO2eq looks to be the norm.
- Unified platform vs Controller Based as “silo” approach

Organized data in a way that improves current methods and protocols

Sustainability Insights

Use Cases Definition

Architecture Diagram

Sustainability Telemetry Data

Use Cases

- Velodrome
- STCO: Sustainability Total Cost of Ownership

Orange Vélodrome

Smart Power Delivery - Powered by Orange & Cisco



10k wifi guest / event
22 events / year

PoE energy for each Access Point



This wifi infrastructure is turned on 24/7.
The energy consumption is extrapolated.

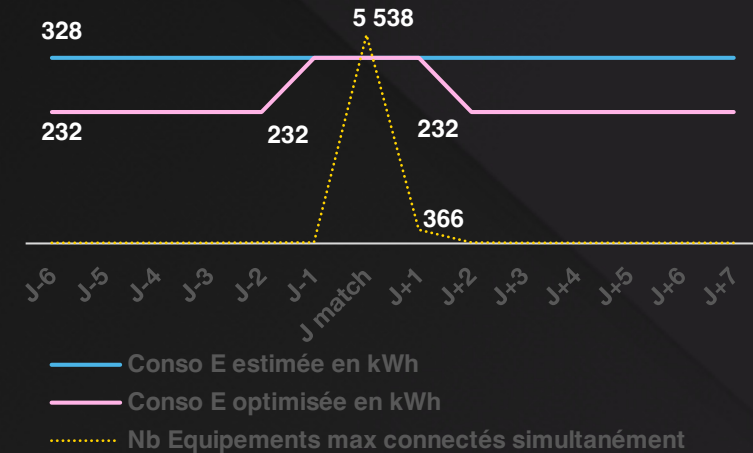
119M_{Wh/year}

24%

Based on the Orange Velodrome case study, the simulation for full seasons 2023 events show that we can save almost 25% of energy consumption.

Solution

A simple device connected to the current infrastructure monitoring all PoE devices. Based on usage, we schedule the shutdown and power up of the energy distribution on PoE Devices.



Total Savings



Wisdom

Benchmarking

Supplier selection

DC location

Assessment of market acceptance of new technologies

Internet be more sustainable?

What else?

?

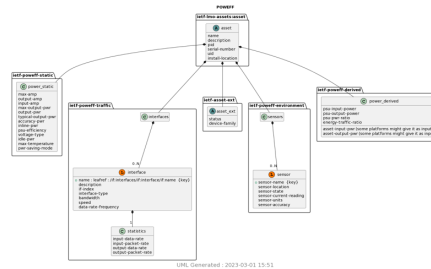
Knowledge

Estimated Investments and expenses (thousands of €)	Now	Year 1	Year 2	Year 3	Year 4	Year 5
One-Off Costs (CAPEX)						
Infrastructure	10,782	6,000	12,335	18,268	34,365	-
Implementation Services	526	286	473	729	1,290	-
Recurring Costs (OPEX)						
Power & cooling	-	490	733	1,178	1,851	3,155
Services & Operations	-	643	917	1,312	2,003	3,391
Sustainability						
??	??	??	??	??	??	??
Total	11,309	7,419	14,457	21,487	39,509	6,546



Total Sustainability Cost of Ownership

Information



Sustainability Insights Framework POWEFF Data Model

Data

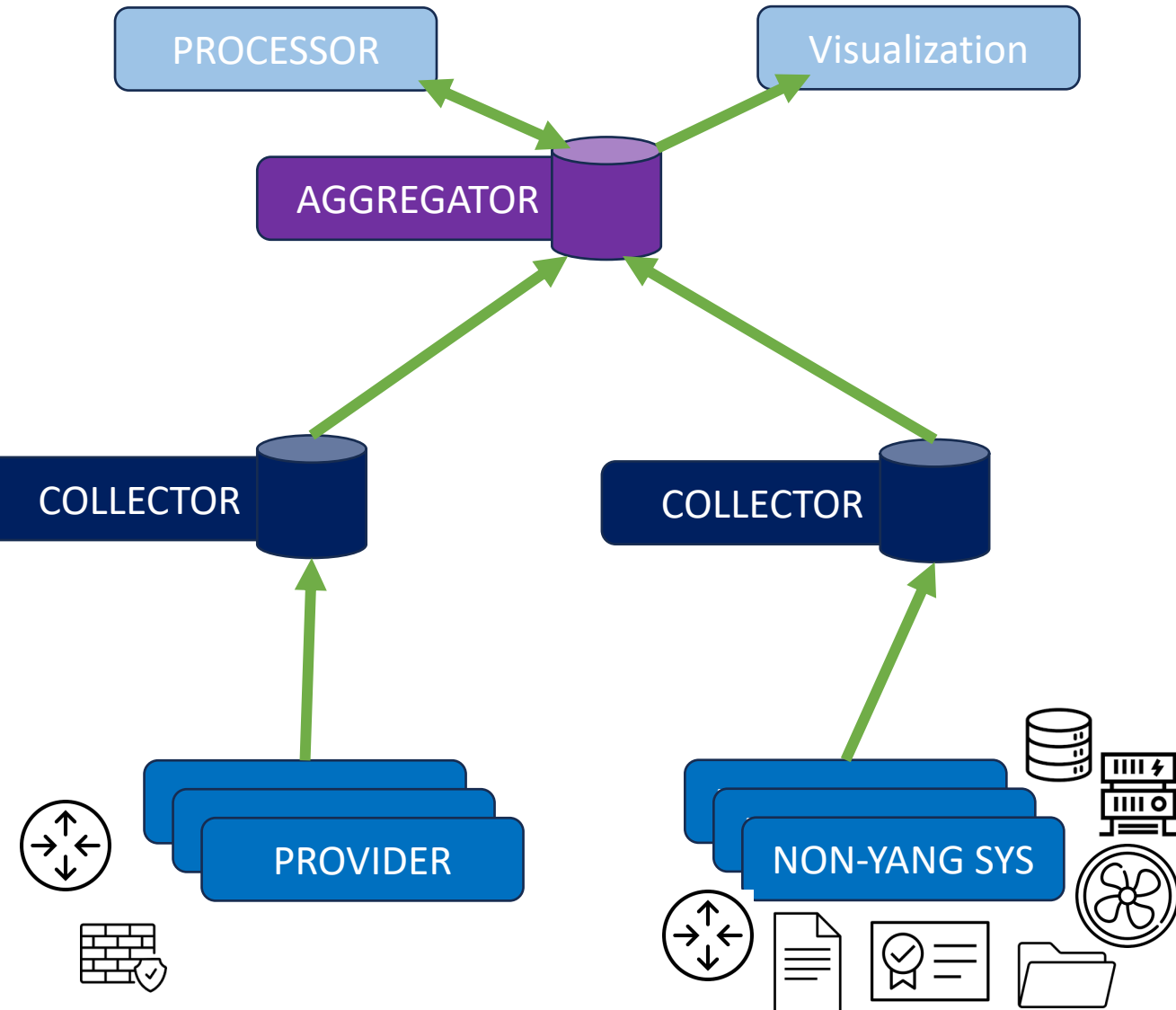
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BGL-14-ASR1001#show environment
Number of Critical alarms: 0
Number of Major alarms: 0
Number of Minor alarms: 0

Slot Sensor Current State Reading Threshold(Minor, Major, Critical, Shutdown)
-----
P0 Vin Normal 229 V AC na
P0 Iin Normal 1 A na
P0 Vout Normal 12 V DC na
P0 Iout Normal 18 A na
P0 Temp1 Normal 30 Celsius (na, na, na, na) (Celsius)
P0 Temp2 Normal 26 Celsius (na, na, na, na) (Celsius)
P0 Temp3 Normal 34 Celsius (na, na, na, na) (Celsius)
P1 Vin Normal 0 V AC na
P1 Iin Normal 0 A na
P1 Vout Normal 5 V DC na
P1 Iout Normal 0 A na
P1 Temp1 Normal 32 Celsius (na, na, na, na) (Celsius)
P1 Temp2 Normal 29 Celsius (na, na, na, na) (Celsius)
P1 Temp3 Normal 28 Celsius (na, na, na, na) (Celsius)
R0 VRRX1: VX1 Normal 1005 mV na

```

Sustainability Insights Framework

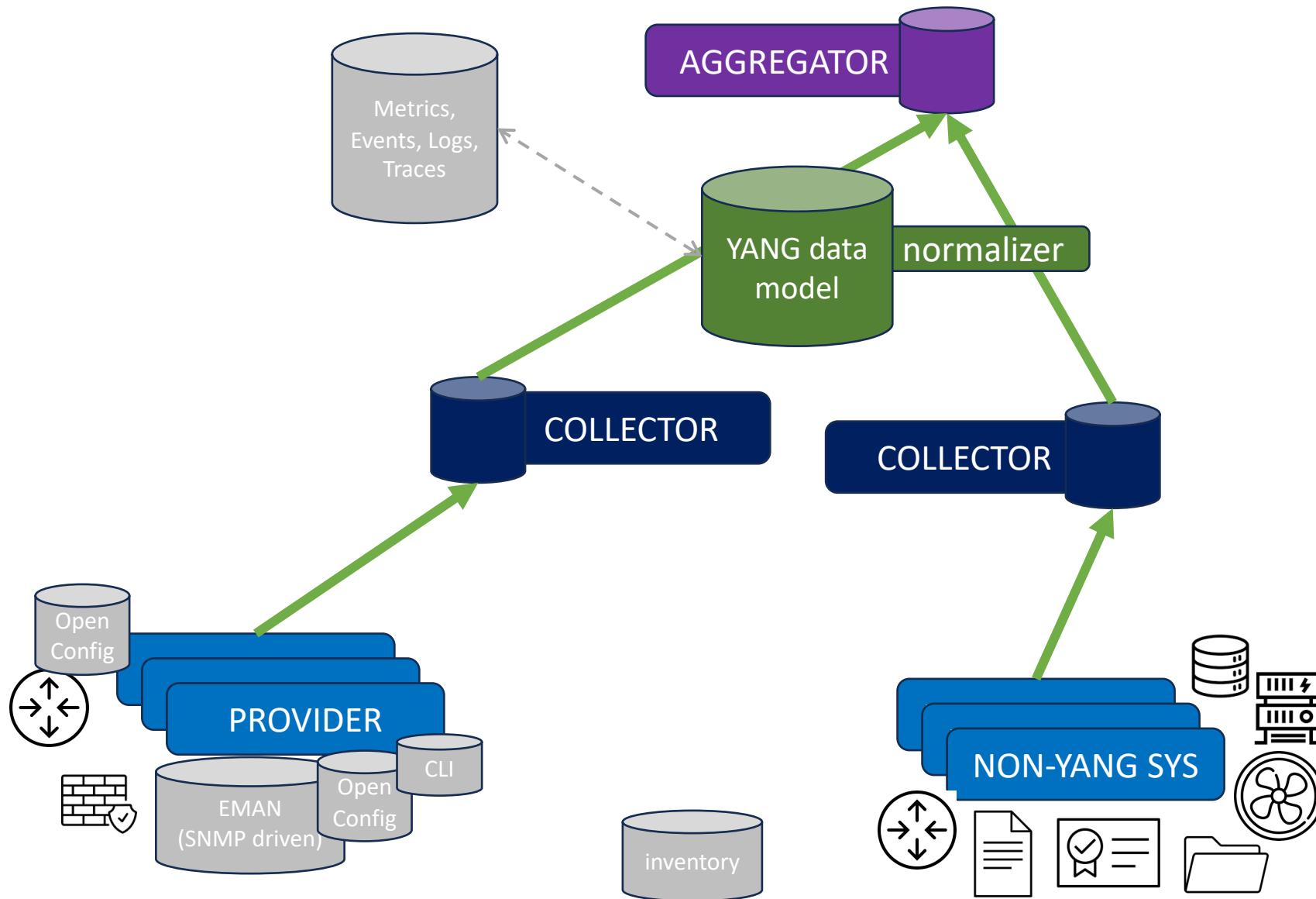


Data Normalization

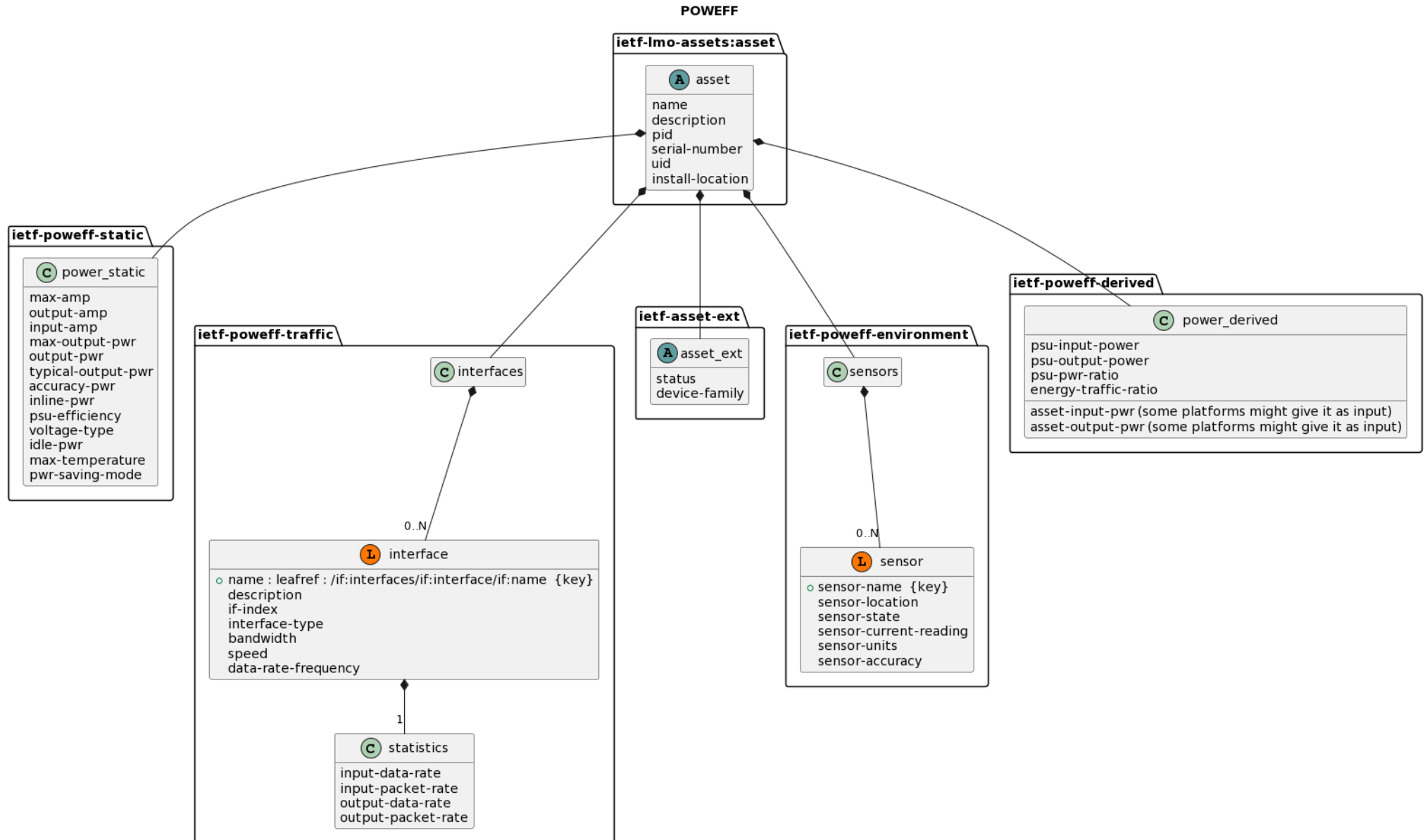
- Where?

Proposed solution: XXX

Sustainability Insights Framework



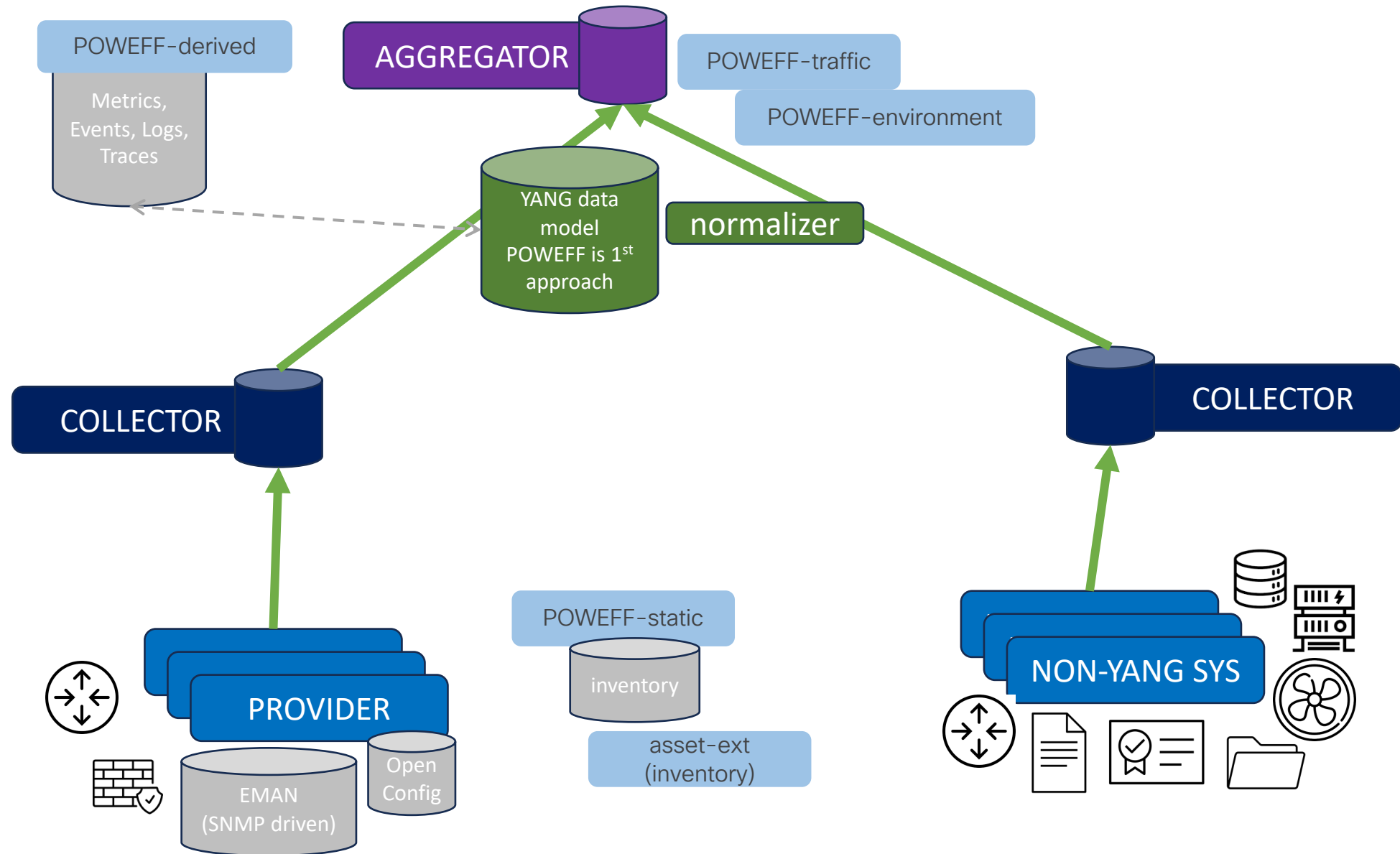
POWEFF Data Model



Metrics under POWEFF-derived

Metric	Description
Energy consumption (kWh)	This represents the energy consumed by the device. Represented by the Power Draw
Power to traffic ratio (watts/Gbps)	Power measure on device (watts) / Traffic throughput (Kbps)
Extrapolated CO2 emissions (g CO2eq)	Use current energy consumption (kwh) and the device geo-location (e.g. -34.6037°, -58.3816°) to query carbon factor (ie from Electricity Maps) and calculate extrapolated CO2 emissions,
PSU ratio (%)	Power supply efficiency (offered powered vs consumed power)

Sustainability Insights Framework & POWEFF



Open Questions

Prior work: overlap with other work/people think that this is relevant to other forums

IVY vs OPSA vs other groups?

Does POWEFF-derived report the right metrics?

Should metrics be defined in YANG?

Should be use cases like TSCO covered @IETF?

How can IETF influence in forums like ETSI, CENELEC, CIRPASS, ITU?

Next Steps

POWEFF

- Extend YANG modules
 - Add some specifics or examples of using the modeled data to reflect a composite energy efficiency metric.
 - What compute interfaces wouldn't fit with what you're currently modeling in the interfaces? UCS?
 - Eman reference to be included
 - Include comments from Med (Orange) and Vesna (RIPE)
-
- How the work should progress
 - Integration with the philatelist draft
 - Interest of group, right venue?

Thank you