

# Leveraging perfSONAR 5.X at ESnet



**Andy Lake**  
Energy Sciences Network

# Telling stories with measurement data

- We have many stories to tell
  - **Operational Stories:**
    - *What* just happened to the network in the northeast?
    - *Who* is the source of that giant surge in new traffic?
  - **Planning/Engineering Stories:**
    - *When* will we run out of capacity to Europe?
    - *Where* are we seeing performance degradation?
  - **Community Engagement Stories:**
    - *How* has a project's use of the network changed in last year, and is there anything we can do facilitate better data transfer?
  - **Value Proposition Stories:**
    - *Why* is ESnet awesome? *full technicolor.*



A good story is more than points on a graph, it needs to relate back to the real world things people care about: *who, what, where, when, why, how*

- **Associating metadata to measurements is essential**

# ESnet Measurement WG Recommendations

## *Circa 2020*

### **Vision**

Measurement and Analysis services will provide excellent situational awareness and insights to enable data driven service design, end to end network visibility, and unparalleled service operation to empowered and knowledgeable stakeholders.

### **Summary Recommendations**

- increase our focus on internal use cases, be more selective about the technical risks we take and the cycles we expend using collaboration to share the load where appropriate.
- include all stakeholders in lifecycle engagements and sustain support of services with continual effort and refinement.
- replace internally developed components with external supported (possibly Open Source) components to reduce support burden and opportunity costs where appropriate to achieve a flexible data pipeline based approach using loose component coupling.

# Product Portfolio Production Services



**my.es.net**

*ESnet's measurement data portal*

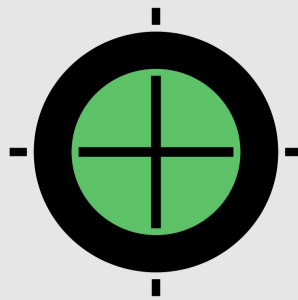
Provides a curated window for ESnet customers into measurement data



**Stardust**

*ESnet's measurement platform*

The foundation of ESnet network measurement handling data collection, curation, and presentation



**perfSONAR**

*Global active measurement toolkit*

Over 50 deployments on ESnet, thousands more around the world



**iperf3**

*Throughput measurement tool*

Most popular software project. A tool to measure network throughput

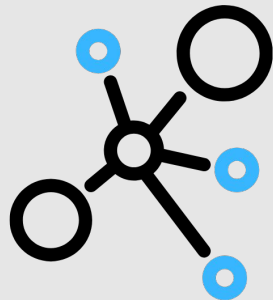
# Product Portfolio New Services



## High Touch

*ESnet's network microscope at scale*

Doing useful things with packets capture on routers at 100's gigabits per second.



## FUNCAP

*High Touch is fun, no cap*

An interface for capturing flows with High Touch



## TerraNova

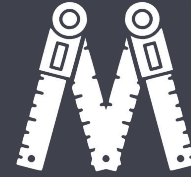
*ESnet's data-driven map editor*

Empowers users to build highly-customizable maps that can be published in a variety of formats

# Open Source Collaborations

perfSONAR

- Collaboration between ESnet, GEANT, Indiana University, Internet2, University of Michigan and RNP
- Over 2000 deployments around globe
- Packages a variety of tool for active network measurement



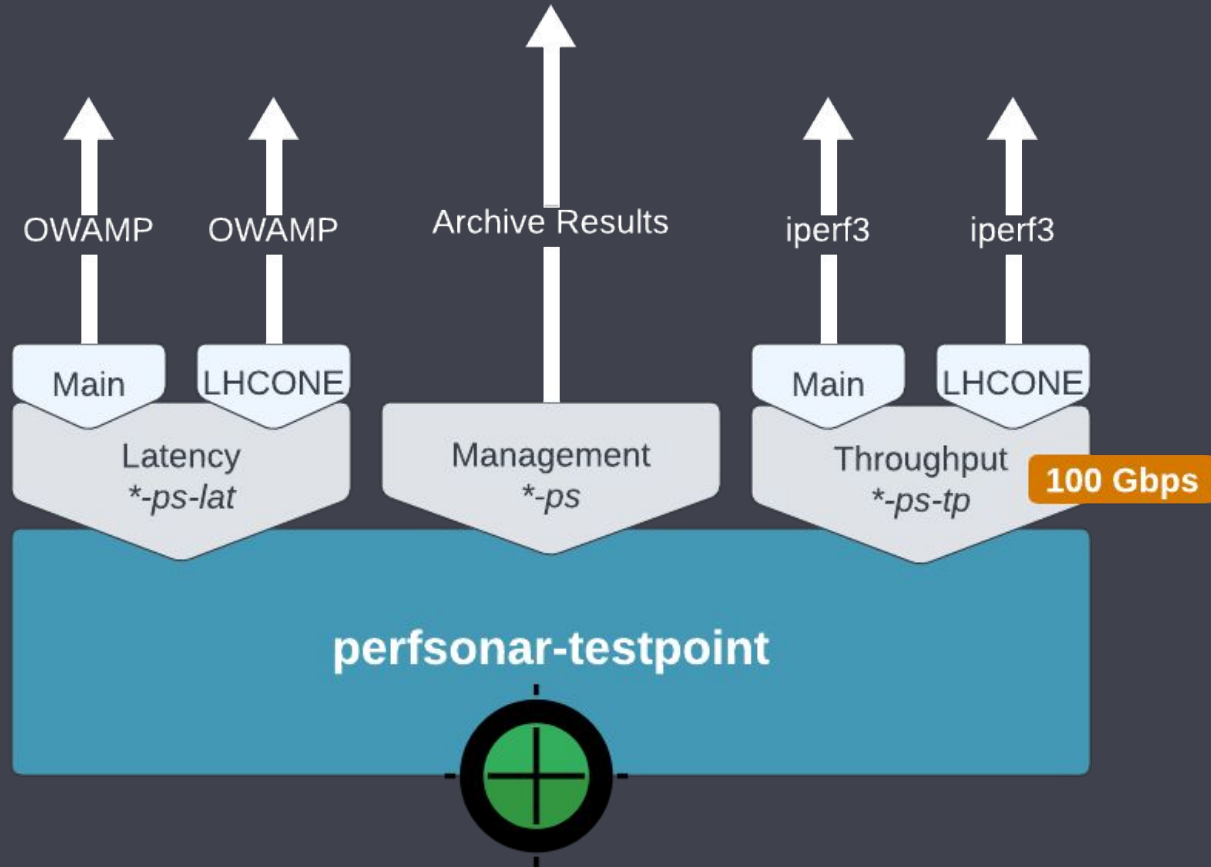
*Coming Soon*

**MetrANOVA**

- New consortium formed in September 2023 between ESnet, GEANT, Indiana University, Internet2 and TACC
- Leverage ideas from multiple projects to impact broader community
- More info at I2 CommEx 2024

# ESnet's perfSONAR Infrastructure

- Over 50 hosts at each router location
- 100 Gbps Throughput Interface
- Run perfSONAR testpoint and archive results centrally





# Stardust

## Multi Datasource

### Low and High Cardinality

- Network Traffic Flows
- Interface Usage
- Optical Line System Performance
- perfSONAR
- High Touch measurements
- LHC Firefly measurements

## Flexible aggregation

### Variable time buckets and dimension reduction

- Summarize in time
  - ◆ Hourly summary
- Summarize by dimension
  - ◆ All NERSC traffic
- Variable retention
  - ◆ hourly data for a year
  - ◆ 30 sec data for 90 days

## Multi Datasource

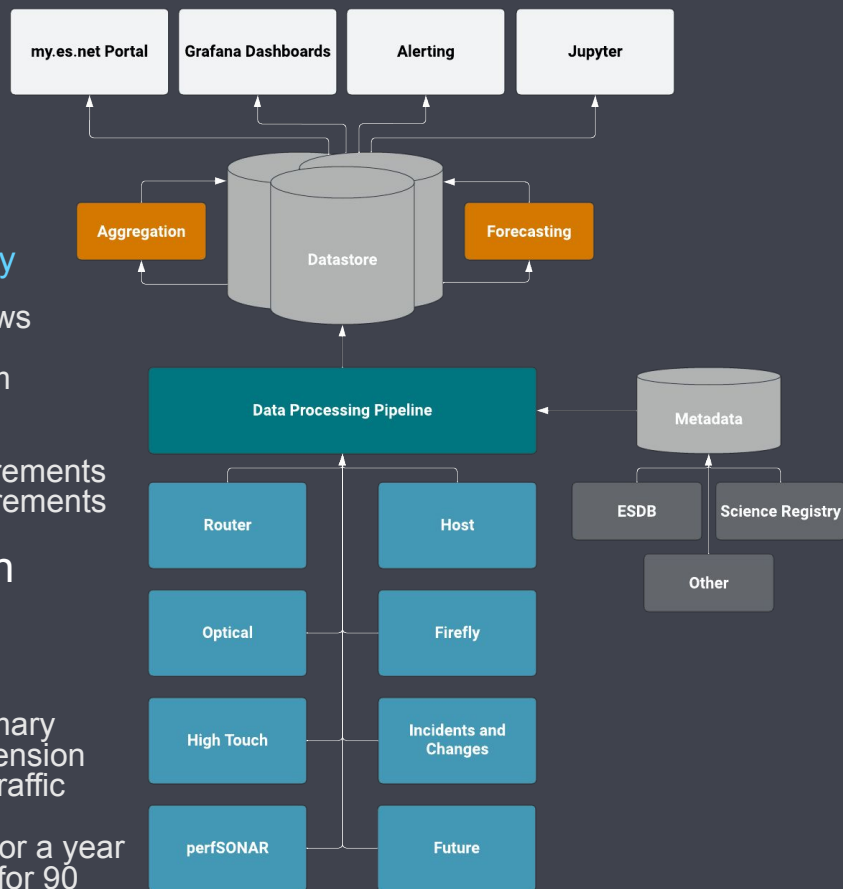
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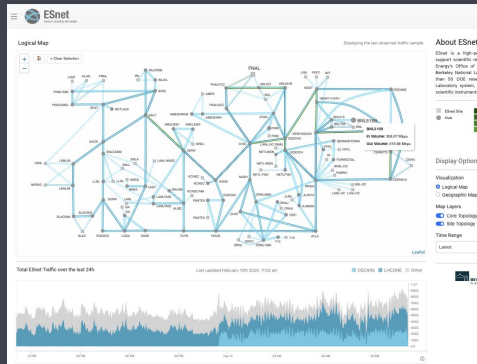
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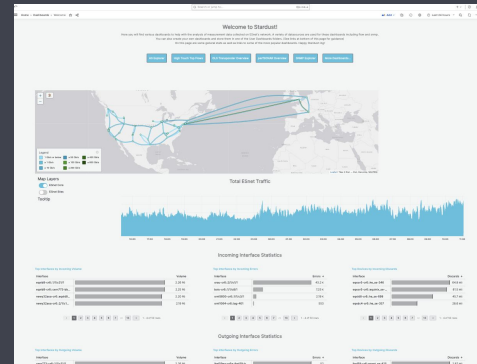




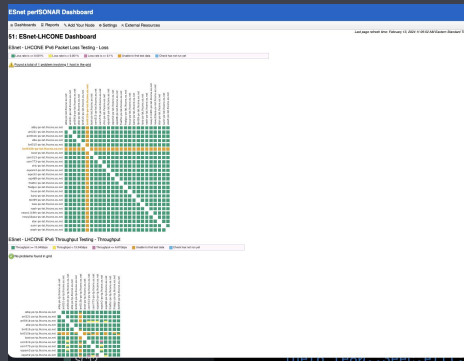
# Accessing the Data (Pre-May 2024)



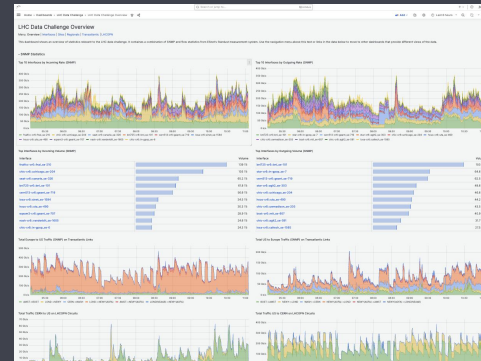
my.es.net



dashboard.stardust.es.net  
(internal only)

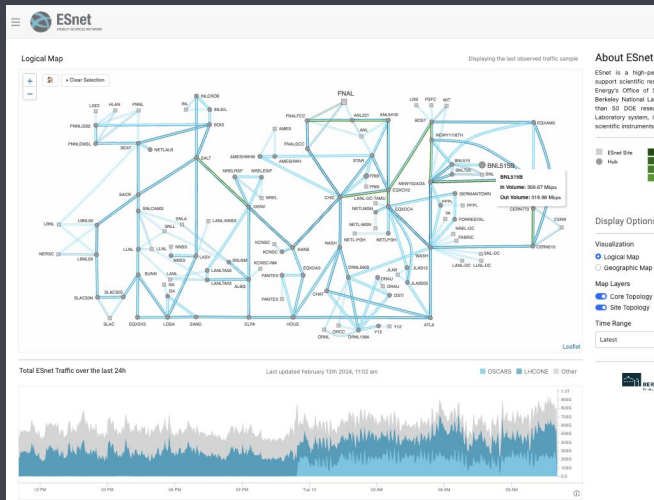


ps-dashboard.es.net

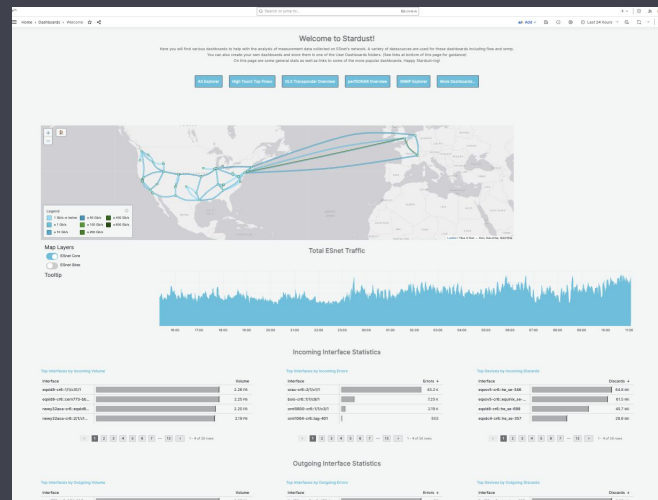


public.stardust.es.net

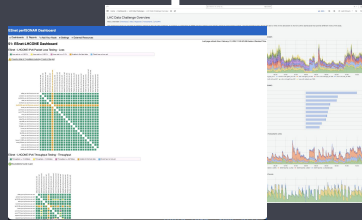
# Accessing the Data (May 2024-Now)



my.es.net

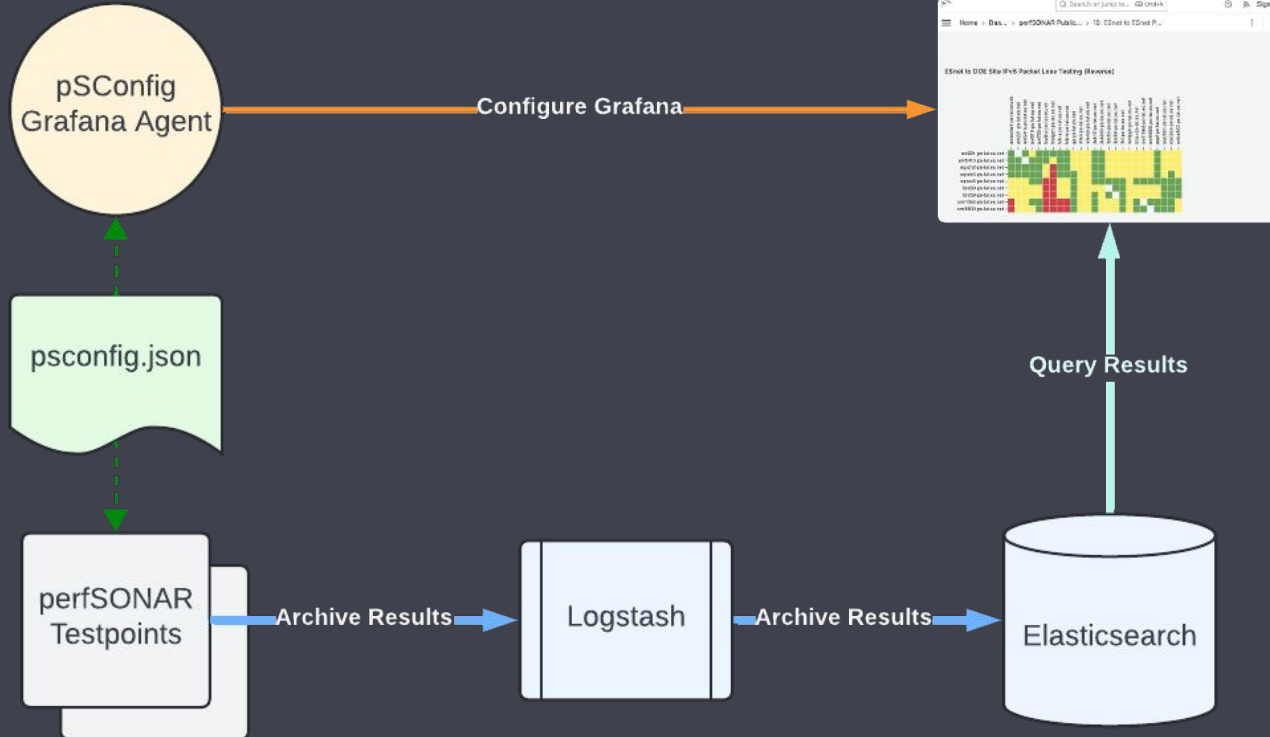


dashboard.stardust.es.net

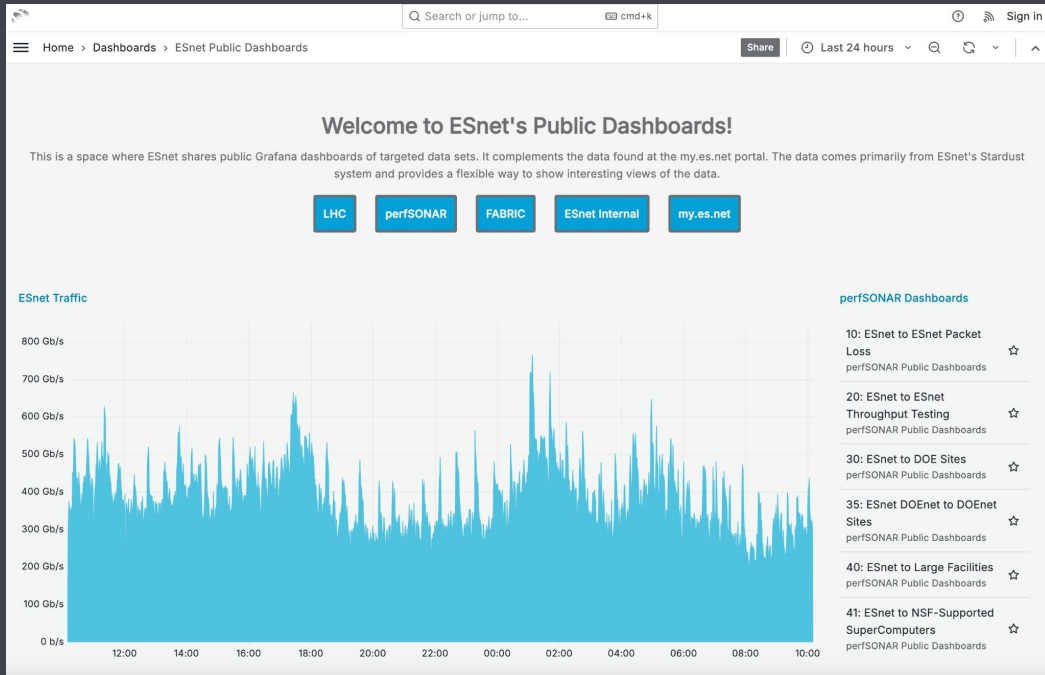


Consolidated into single grafana instance

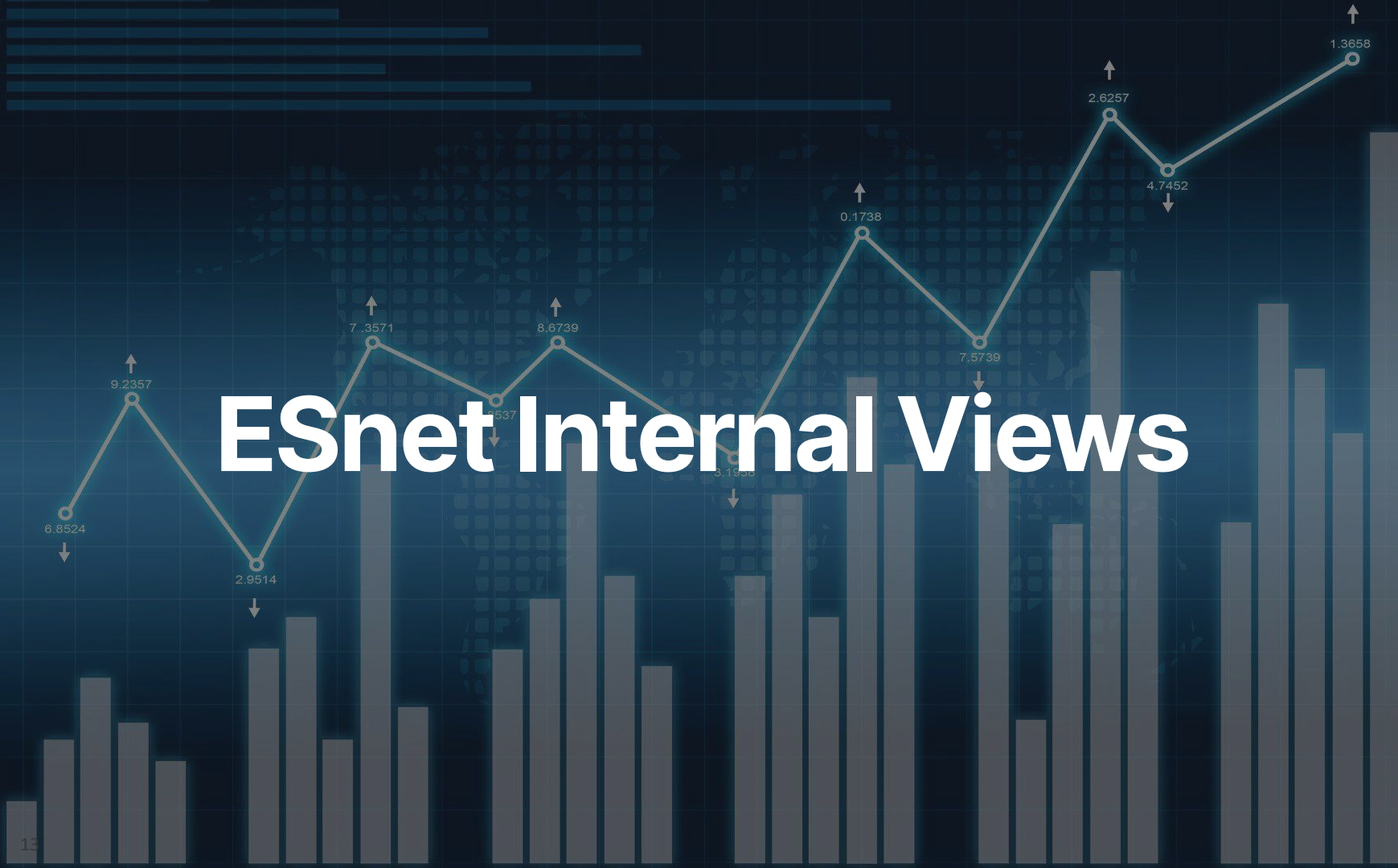
# ESnet perfSONAR Dashboard Setup



# https://dashboard.stardust.es.net/



# ESnet Internal Views





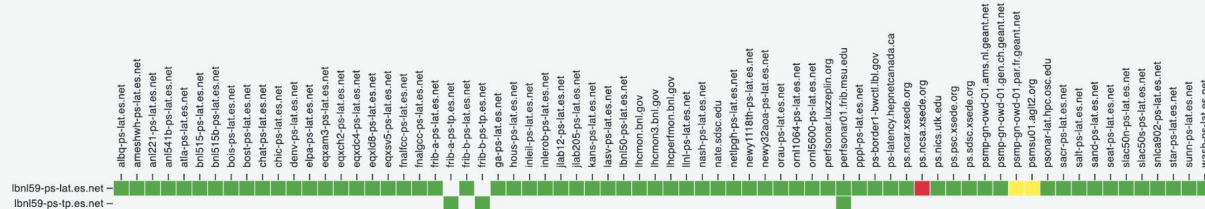
# What tests is a host running?

## Summary of All Tests on This Host

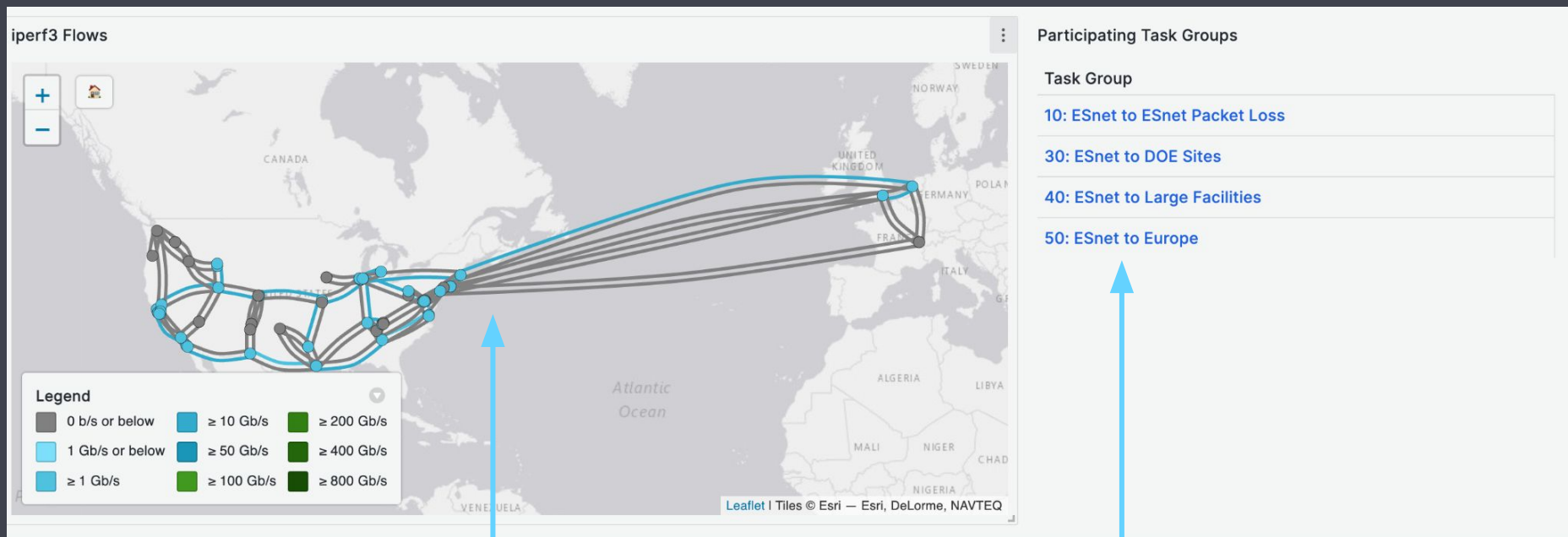
### Packet Loss - Forward



### Packet Loss - Reverse



# What parts of network is a host testing?



iperf3 flows where host is source or destination

List of grids containing host



# Is my perfSONAR host affected by known issues?

Incidents/Changes Related to lbnl59-ps

Opened At	Closed At	System ID	Task Number	Task Type	Description
2024-01-25 12:21:42	-	<a href="#">da21be8cdb...</a>	<a href="#">ESNET-CHG0036602</a>	change_request	LBNL59 -- E3-09 and E3-10 Power Maintenance



ServiceNow tickets that may be affecting the host

## What's next?

- Grafana Workshop at TNC24 where you can learn more about building custom dashboards
- 5.0 Grafana Cookbook:  
[https://docs.perfsonar.net/grafana\\_cookbook.html](https://docs.perfsonar.net/grafana_cookbook.html)
- Experiment with your own Grafana instance and share experiences

Thank you!

