perfSonar Analytics

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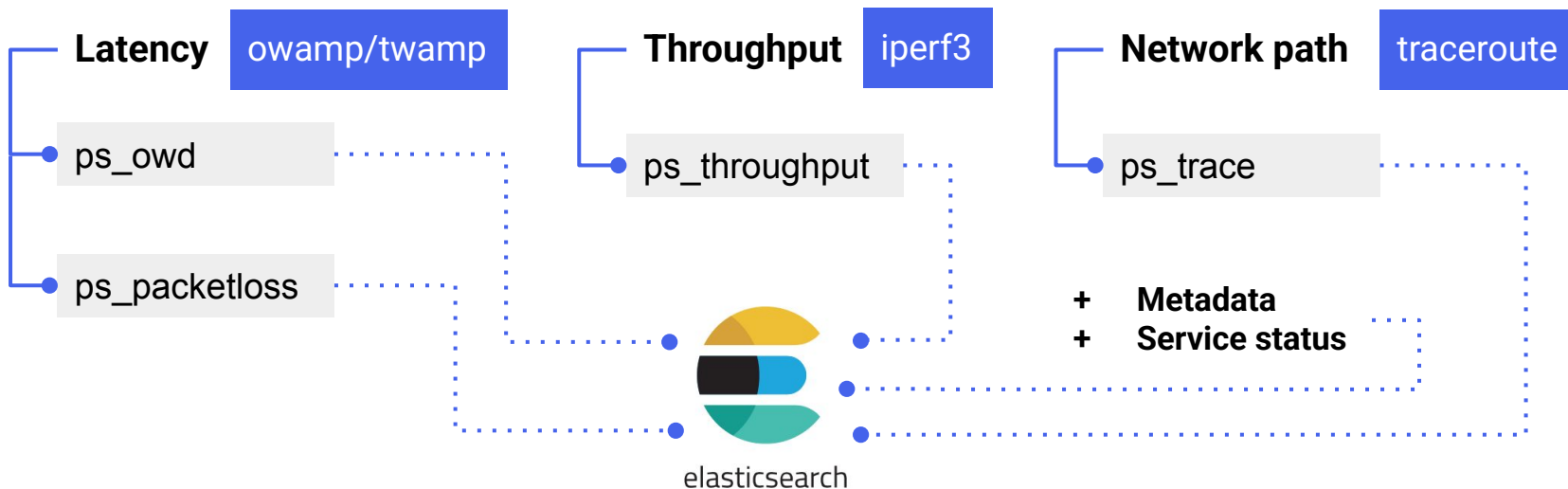
Making Sense of the R&E Networks

The WLCG sites we test

170
Active perfSONARs
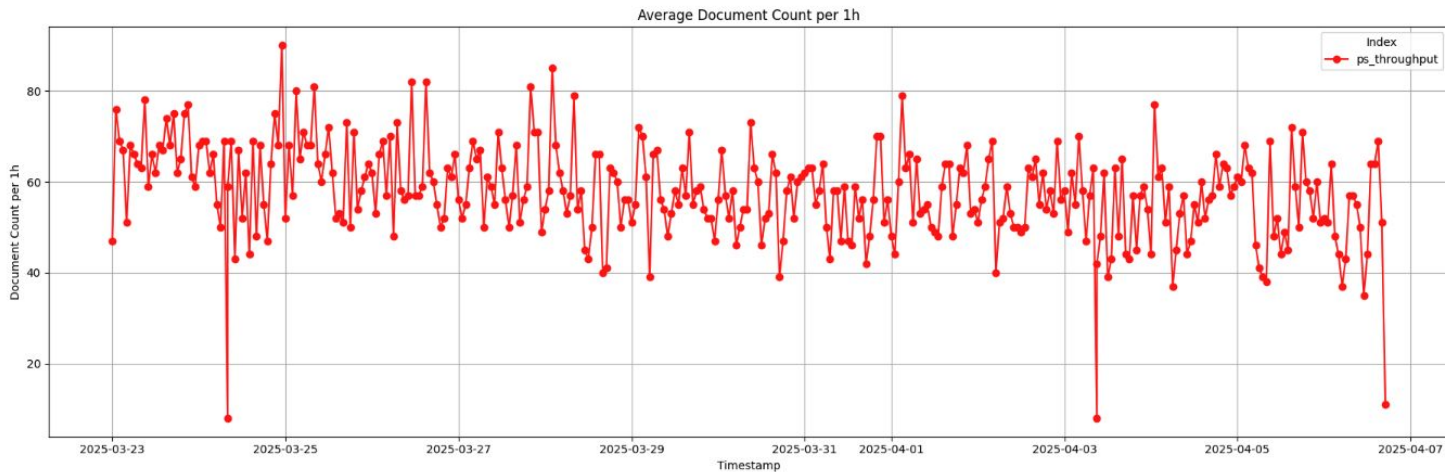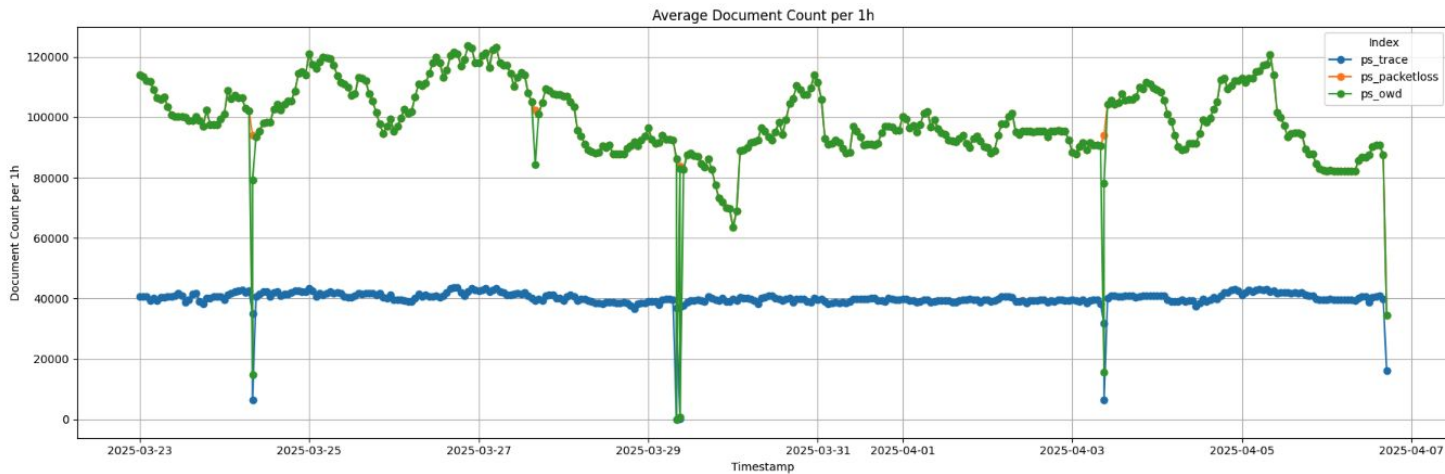
Measurements

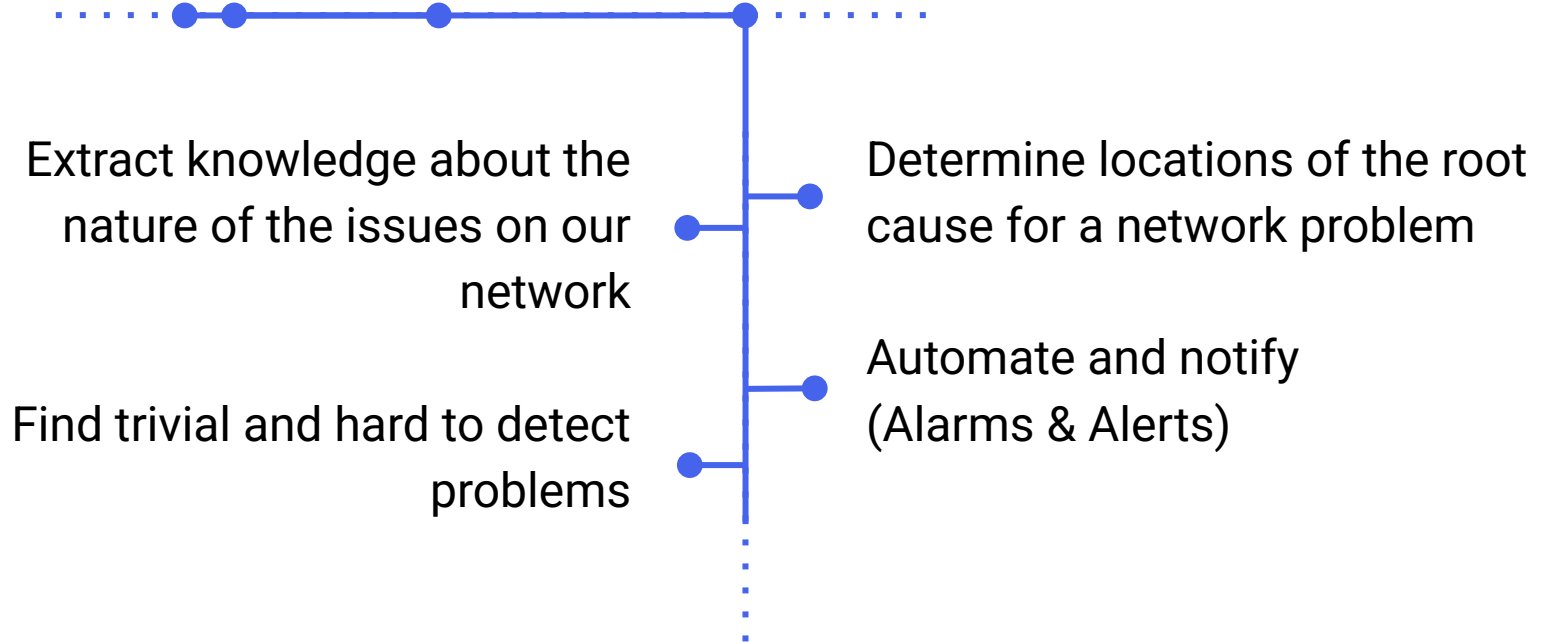All data from the **perfSonar** toolkits is stored in an ElasticSearch database @ UChicago

Latency owamp/twamp

- ps_owd
- ps_packetloss

Throughput iperf3

- ps_throughput

Network path traceroute

- ps_trace

- **Metadata**
- **Service status**

elasticsearch

Rate of tests/hour for a period of 14 days

~7000 tested links daily

Average Document Count per 1h

Goals

Extract knowledge about the nature of the issues on our network

Determine locations of the root cause for a network problem

Find trivial and hard to detect problems

Automate and notify (Alarms & Alerts)

The Alarms & Alerts

INFRASTRUCTURE

bandwidth decreased on multiple sites
path changed between sites
unresolvable hosts
no tests for a host

NETWORK

destination cannot be reached
source cannot reach any destination
bad owd measurements
large clock correction
complete packet loss
firewall issue
path changed
ASN path anomalies

OTHER

bandwidth increased
bandwidth decreased (on a single pair)
high packet loss

pSDash

The Site Status Dashboard - a **visual summary** of network and infrastructure status across multiple sites, helping users quickly identify issues
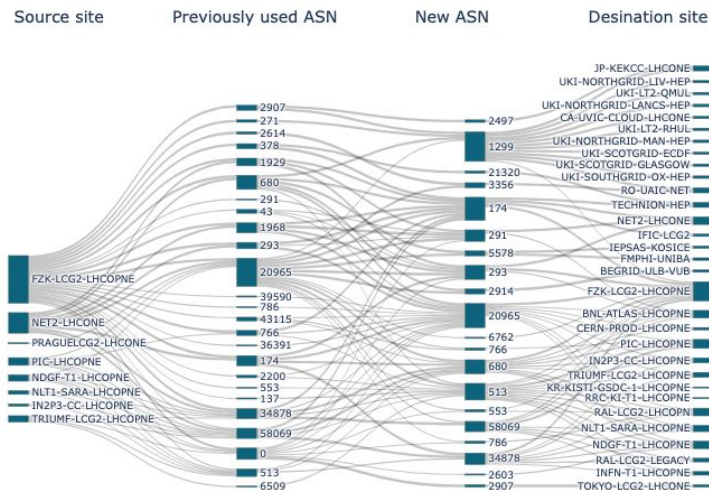
Understanding the paths

We've implemented two ways of detecting routing changes. Both establish some notion of what is the common path between a pair of sites. However, the left side type is more sensitive to short-term changes.
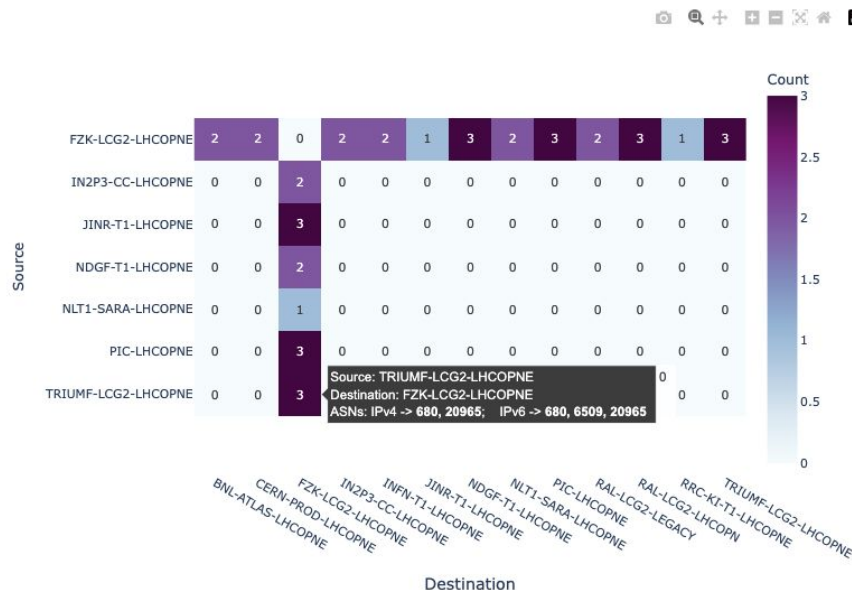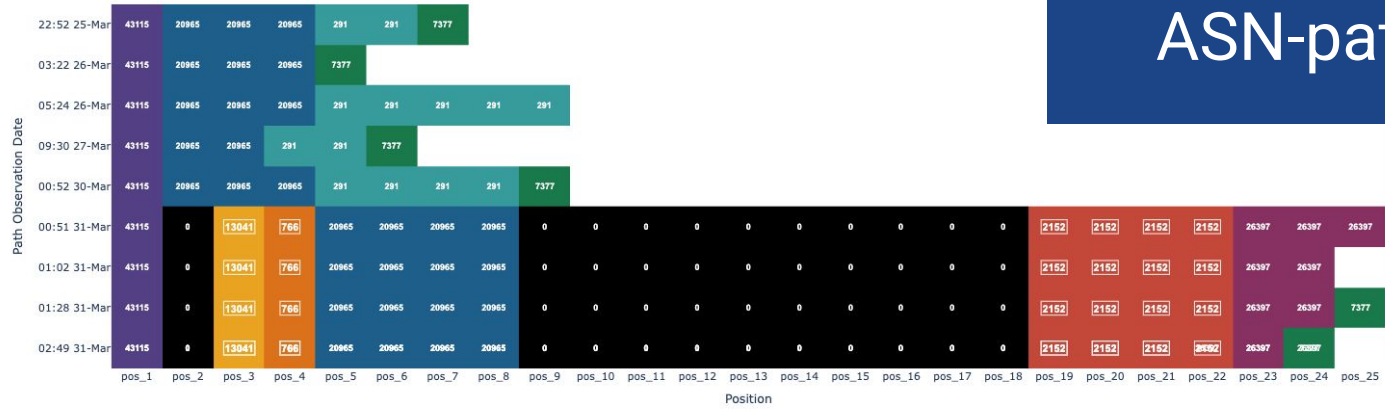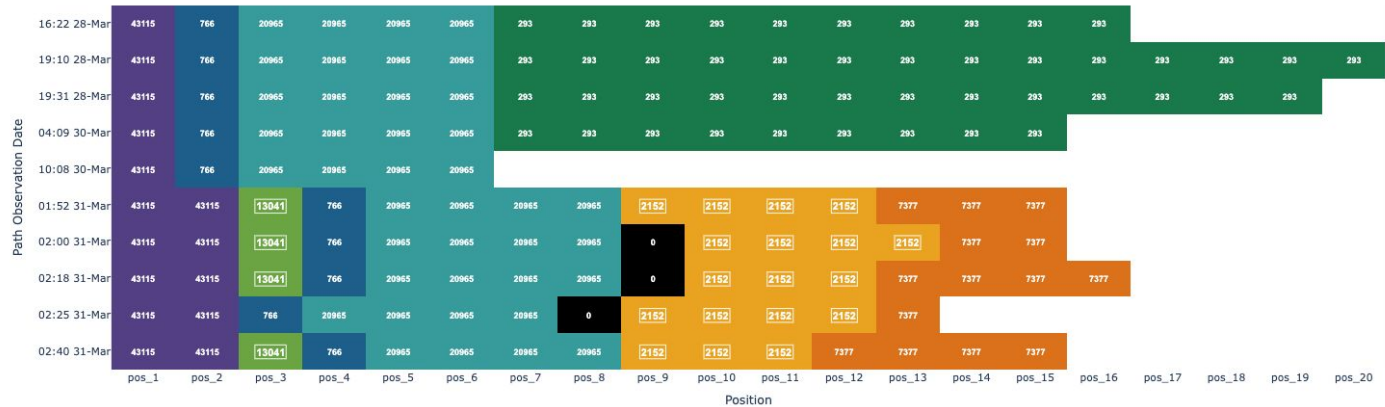
Short term path deviations

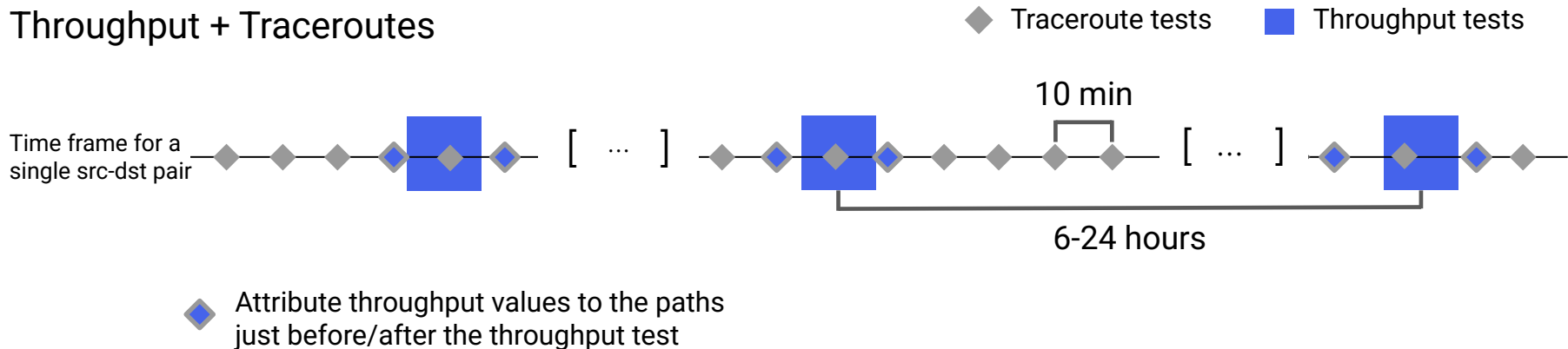ASN path signature between PIC-LHCOPNE and UCSDT2-LHCONE for IPv4 paths

ASN path signature between PIC-LHCOPNE and UCSDT2-LHCONE for IPv6 paths

ASN-path anomalies

Plans and current work

- **Combine** the different test types
- Possibly **augment** the perfSonar data with BGP
- **Build** a realistic representation of the underlying **topology**
- Apply Deep Learning and look for **anomalies**, predict **failures**

Throughput + Traceroutes

◆ Traceroute tests   ■ Throughput tests

Time frame for a single src-dst pair

10 min

6-24 hours

◆ Attribute throughput values to the paths just before/after the throughput test

Final words

Our data is **public**

We would love to **connect/collaborate** with people doing **similar research**

Link to our **database**

Contact us: **net-discuss@umich.edu**
Contact me: **petyav@umich.edu**

Join our weekly meetings

Acknowledgements

Thank you!

Any questions?