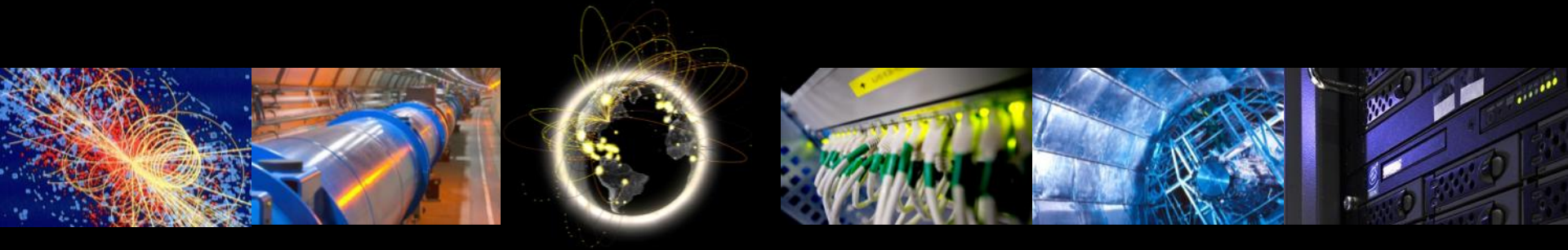# Network and Transfer WG Metrics Area Meeting

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Network and Transfer Metrics WG Meeting
18^h February 2015

WLCG
Worldwide LHC Computing Grid

Outline

- **Next Meetings**
  - 18 March, 8 Apr, 6 May, 3 June (all at 4pm CEST)

Today

- **perfSONAR Status and Plans**
- **Datastore demo**
- **Integration**
  - Experiment's interface to perfSONAR
  - FTS Performance
- **AOB**

perfSONAR Status

perfSONAR Status

- Update campaign finalized – deadline for sites was Monday – almost all instances now run 3.4.1
- Announced production instance of the infrastructure monitoring
  - http://pfomd.grid.iu.edu
- Pilot instances of datastore and dashboard
  - http://psds.grid.iu.edu (quick demo today)
  - http://psmad.grid.iu.edu (connects to psds)
- Many sites updated, but didn't re-configure, pfomd helps to identify issues, but follow up is needed
- Re-configuration campaign was run in LHCOPN and LHCONE bringing all instances to correct configuration
  - All LHCOPN instances OK
  - All LHCONE instances OK (except GEANT - working on update)

perfSONAR Status

- For LHCOPN/LHCONE started to investigate if sonars are consistently delivering metrics
  - Added new checks to OMD to query freshness of local MA (esmond) and identify missing links
- Analysis still on-going, but we have already found a bug in perfSONAR's regular testing
  - Several cases found when some of the regular tests stop and never recover – it was be linked to improper process clean-up by the regular testing daemon
- Other issues were reported based on our experience with 3.4.1 - fixes provided in 3.4.2 that should be out soon and deployed via auto-update
- Very good experience with mesh configuration interface
  - IPv6 testing mesh was setup by Duncan
  - Moved traceroute tests from latency to bandwidth nodes

Mesh Configurations

- Current
- All inter-cloud tests are disabled
- Latency
  - Full mesh within each cloud – btw LT nodes, continuous (10Hz) [1]
- Bandwidth
  - Full mesh within each cloud – btw BW nodes, every 6hrs (duration: 30s)
  - All WLCG – full mesh, btw BW nodes, once a week
- Traceroutes
  - All WLCG – btw BW nodes, hourly
  - LHCONE, USCMS, USATLAS, GOC – btw BW nodes, every 20mins

Mesh Configurations

- Proposed
- Keep all inter-cloud tests disabled
- Latency
  - Keep Full mesh within each cloud – btw LT nodes, continuous (10Hz) [1]
  - Add Top-k WLCG – full mesh btw. top 50 sites – ramp up to all sites once this is working (starting with LHCOPN and LHCONE)
  - In case specific links need to be investigated we can do it in parallel
- Bandwidth
  - Keep Full mesh within each cloud – btw BW nodes, every 6hrs (duration: 30s)
  - Disable All WLCG – full mesh, once a week
- Traceroutes
  - Keep All WLCG – btw BW nodes, hourly
  - Keep LHCONE, USCMS, USATLAS, GOC – btw BW nodes, every 20mins

Datastore Demo

Datastore

- esmond – Postgress + Cassandra
  - populated by RSV probes
- REST API available – python/perl libs
  - curl "http://archive.example.net/esmond/perfsonar/archive/fce0483e51de49aaa7fcf8884d053134/histogram-owdelay/base?time-range=86400"
- Data organized in events
  - packet-trace
  - histogram-owdelay – one way delays over time period
  - ntp-delay – round trip delay time to NTP server
  - packet-loss-rate – number of packets lost/packets sent
  - packet-count-sent – packets sent
  - packet-count-lost – packets lost
  - packet-retransmits – packets retransmitted for a transfer using TCP
  - throughput – observer amount of data sent over period of time
  - failures – record of test failures

Structure

```
[
    {
        "source":"10.1.1.1",
        "destination":"10.1.1.2",
        "event-types":[
            {
                "base-uri":"/esmond/perfsonar/archive/f6b732e9f351487a96126f0c25e5e546/packet-retransmits/base",
                "event-type":"packet-retransmits",
                "summaries":[

                ],
                "time-updated":1397482734
            },
            {
                "base-uri":"/esmond/perfsonar/archive/f6b732e9f351487a96126f0c25e5e546/throughput/base",
                "event-type":"throughput",
                "summaries":[
                    {
                        "summary-type":"average",
                        "summary-window":"86400",
                        "time-updated":1397482735,
                        "uri":"/esmond/perfsonar/archive/f6b732e9f351487a96126f0c25e5e546/throughput/averages/86400"
                    }
                ],
                "time-updated":1397482735
            },
        "input-source":"host1.example.net",
        "input-destination":"host2.example.net",
        "ip-transport-protocol":"tcp",
        "measurement-agent":"10.1.1.1",
        "metadata-key":"f6b732e9f351487a96126f0c25e5e546",
        "subject-type":"point-to-point",
        "time-duration":"20",
        "time-duration":"14400",
        "tool-name":"bwctl/iperf3",
        "uri":"/esmond/perfsonar/archive/f6b732e9f351487a96126f0c25e5e546/"
    }
]
```

Throughput vs OWdelay vs Trace

```
[
    {
        "ts":1397421672,
        "val":7016320000.0
    },
    {
        "ts":1397442692,
        "val":7225480000.0
    },
    {
        "ts":1397466492,
        "val":7095460000.0
    },
    {
        "ts":1397482700,
        "val":7042540000.0
    }
]
```

```
[
    {
        "ts":1397504013,
        "val":{
            "34.4":506,
            "34.5":85,
            "34.6":5,
            "34.7":4
        }
    },
    {
        "ts":1397504052,
        "val":{
            "34.4":510,
            "34.5":80,
            "34.6":7,
            "34.7":3
        }
    },
.....
]
```

```
{
    "ts":1397566094,
    "val":[
        {
            "error_message":null,
            "ip":"198.124.238.65",
            "mtu":"9000",
            "query":"1",
            "rtt":"0.246",
            "success":1,
            "ttl":"1"
        },
        {
            "error_message":null,
            "ip":"198.124.238.65",
            "mtu":"9000",
            "query":"2",
            "rtt":"0.195",
            "success":1,
            "ttl":"1"
        },
```

Use Cases and Pilot Projects on Integration

Use cases

- Feedback received from all experiments, but still missing some specific input – please add it ASAP

- Common use cases:
  - Provide latency and trace routes that can be integrated with throughput from transfer systems
  - Provide mapping between sites/storages and sonars
  - Uniform access to the network monitoring
  - Follow up on the WAN issues and help commission new links

- More details in [1]

Pilot projects

- ## Experiment's Interface to perfSONAR/esmond
  - Backed by LHCb
  - Provide experiment agnostic prototype implementation to access datastore
  - Understand and propose solutions for the underlying issues – mappings, translations and post-processing needed
  - Initially focused on DIRAC, but intent is to come up with an implementation that can be used by other experiments

Pilot projects

- ## FTS performance
  - Currently done in ATLAS to identify bad links – possibility to extend this to other experiments
    - Global report (cronned): http://egg.bu.edu/atlas/adc/fts/plots/
    - Single channel report:http://egg.bu.edu/atlas/adc/fts/plots/singles/T1-T2D_internal/BNL-NET2/plots/index.html
    - IP level summary: http://egg.bu.edu/net2/studies%7btype:egg.Hatch%7d/internet-NET2-May-13/US_internet_from_NET2.html
  - Similar activity is also starting in the FTS dashboard
    - http://dashb-fts-transfers.cern.ch/ui/#
  - Integration of FTS and perfSONAR beneficial to follow up on bad links, but also useful to tune up FTS optimizer

AOB