

# **LHCOPN/LHCONE evolution workshop at CERN - summary -**

Rome, 28<sup>th</sup> of April 2014  
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# Attendance



## Very good participations

~60 people representing:

- 11 Tier1s
- 4 Experiments
- 11 Network providers
- Asian, American and European Tier2s

30 presentations

Lively discussions

# Reports from the Users

## Conclusions

- ❑ Networking has been shown to be a very stable and functional service for WLCG
  - Has enabled us to significantly evolve the computing models
- ❑ Networking is key for the future evolution of WLCG
- ❑ Bandwidths needed will fit within the expected evolution of technology (given 25 year history), even on the HL-LHC timescale
- ❑ No reason to change to current way of using LHCOPN or the general Tier-Tier connectivity
- ❑ The real problem to be addressed is the connectivity to Eastern Europe, Asia, Africa, etc.

## Summary

- The success of the ALICE computing model depends on accurate and continuously updated network map
- File access is based on storage auto-discovery, which critically depends on the above
- Sufficient bandwidth and good routing between sites is critical for efficient resources utilization, especially with 'tight' storage capacities, ever increasing data rates and storage federation concepts brought into practice
- New Grid sites are emerging in places where the network is still underdeveloped – they will need help
- LHCONE will help reaching the 'ideal' picture, where random data access will be sufficiently efficient to dilute even more the tiered Grid structure

## Implications for the Network



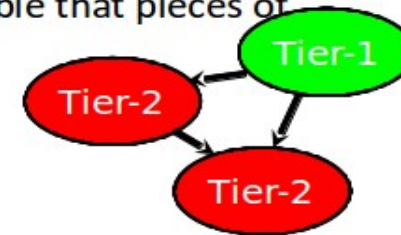
SLAC

- Massive, policy-driven, predictable data distribution will continue, but growth will be modest.
- Bursty traffic (there are idle CPUs in xxx so replicate some data from yyy as quickly as possible) will become very important.
- Real time remote access to data will become important:
  - ATLAS does not yet fully understand how network bandwidth and latency will constrain this access
  - It won't be used where it doesn't work well!



- The **value** of the OPN connectivity is that it will make possible that pieces of the system to work together for Run2

- Distributed Prompt Reco
- Shared Re-Reco



- We will exercise the raw-data file movements for reprocessing and the sharing of the Tier-1 storage resources for shared workflows during summer
  - we expect a Tier-1 to Tier-1 network increase
- We expect to be resource limited in 2015 because of the increased trigger rate and pile up. The network allows us more choices about optimizations
  - We will expand to federation of resources, provided there is adequate connectivity to treat it as *'one center'*

## LHCOPN

- is perfectly adequate for LHCb
- we support LHCOPN upgrades as required by the GPDs

## LHCONE

- LHCb has no specific policy on LHCONE at present.
- Most of our Tier2 activity today is “just fine” on NRENs. Hence today we see no “clear and present problem” with any site upon which we depend (except see below).
- There is no imperative coming from the LHCb computing model per se.
- This is seen as mainly a national/site issue – we understand some sites may need LHCONE due to NREN limitations.
  - LHCb would be perfectly happy to try to engage if some T2 site needed LHCONE connection. We would look into technical implications, but we would not be able to invest more than minimal manpower from the experiment side.

## Concerns

- Link CERN ↔ CBPF (Brazil) is inadequate somewhere. ~ 100 MB/s max
- Possibly this could benefit from LHCONE



# Experiments - summary



WAN connectivity more and more important to better exploit the resources available all around the globe

Tier1s and Tier2s getting very similar

More bandwidth needed at Tier2s

Connectivity outside Europe and North America needs to be improved

# Tier1/2s sites



Tier1s happy with LHCOPN

Tier2s in general happy with LHCONE L3VPN, but some doesn't see the need

All sites are planning upgrades of WAN connectivity.  
Many US sites planning to adopt 100G

Demands for

- better network monitoring
- better LHCONE operations

# About LHCONE P2P service



CMS may exploit this service

Sites don't have a clear need for it

Over-provisioning vs Complexity

No clear resource allocation policies (priority, billing...)

# **Actions for the Network Operators**

# LHCOPN Actions



Keep LHCOPN as it is.

Increase bandwidth if necessary and affordable.

Tier1s can move their T1-T1 traffic to LHCONE, if LHCOPN topology is not optimal

LHCONE may be used as primary backup for LHCOPN, if Tier1s prefers

# LHCONE L3VPN Actions



High capacity and reliable networks for T1-T1, T1-T2, T2-T2.  
Operators must take T1-T1 traffic into account.

Better/shared/more\_efficient use of ONE/OPN resources

Improve support

- clearer procedures on how to get support
- tracking system
- one cross organizational helpdesk/NOC team

Improve monitoring

- improve perfsonar infrastructure
- unify/harmonize all the available monitoring
- perfsonar in the VRFs

# LHCONE L3VPN Actions



## **Keep constrains to allow statefull firewall bypass:**

- sites can announce only LHC prefixes
- must guarantee symmetric traffic

# LHCONE P2P actions



Define scope of the experiment

Find interested sites and developers



# More information



Workshop's presentation:

<https://indico.cern.ch/event/289679/>