

WLCG Networking

Tony Cass, Edoardo Martelli 11th April 2015



- Parochial CERN issues
- LHCONE/LHCOPN
- IPv6
- SDN
- •



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Mobile Telephony Changes

 Swisscom replaces Sunrise as our mobile telephony operator from 1st July*

$$+41 (0)76 487 xxxx \rightarrow +41 (0)75 411 xxxx$$

*CERN-wide switch over may be earlier to avoid leap second introduction. The exact date will be agreed with the LHC operations coordination team.



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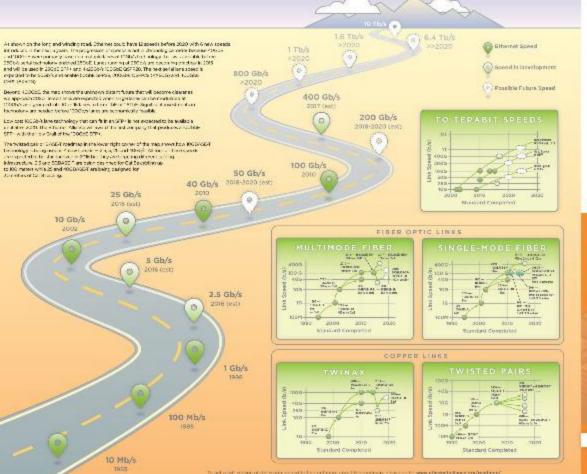
Wi-Fi Plans

- No further expansion of 802.11n coverage.
- Campus wide 802.11ac rollout planned*
 - Controller-based "wave 2" solution.
 - One access point per 3 offices. Dedicated Cat 6a cabling.
 - RF survey underway
 - Market Survey underway
 - Hardware selection in December 2015 (March 2016).
 - Deployment in 2016/7.

*But not funded.



2015 ETHERNET ROADMAP



MEDIA AND MODULES

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2015

ETHERNET ROADMAP

THE PAST PRESENT AND FUTURE OF STHERNET





NAMES ADDRESS OF THE PARTY.

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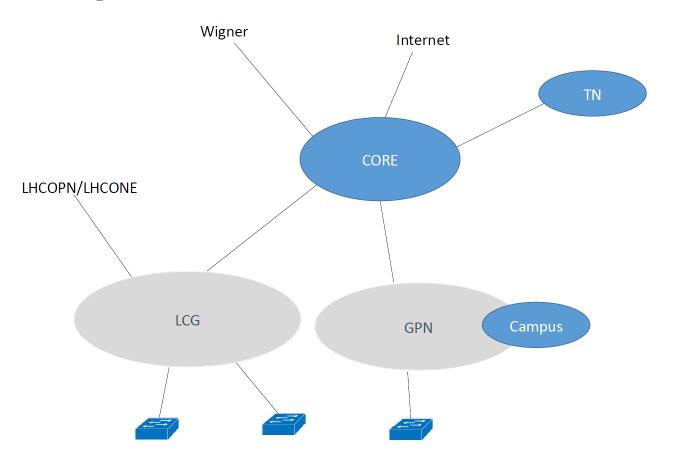
Computer Centre Network Changes



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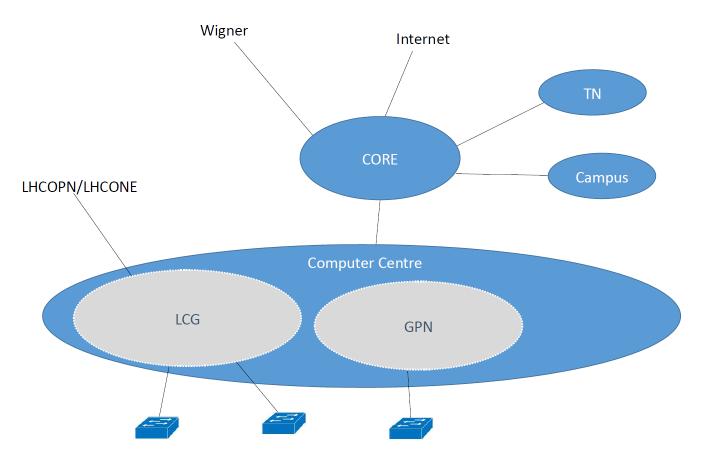
Today





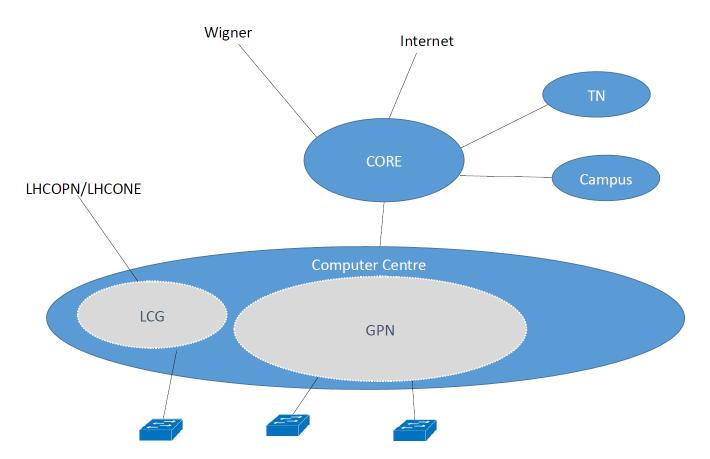
By Q3





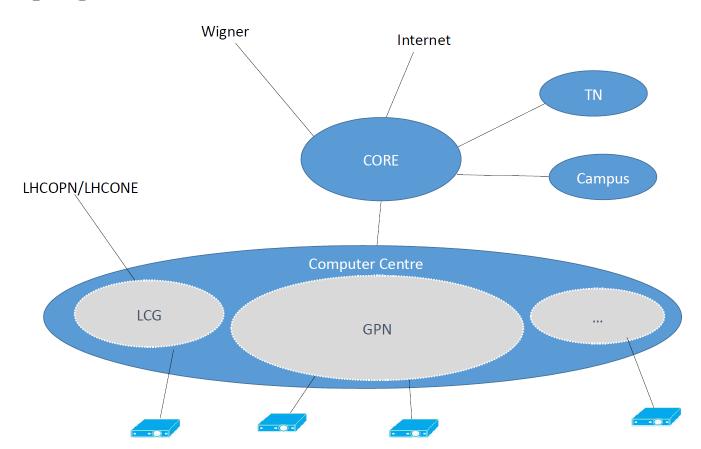
Move of services from LCG to GPN





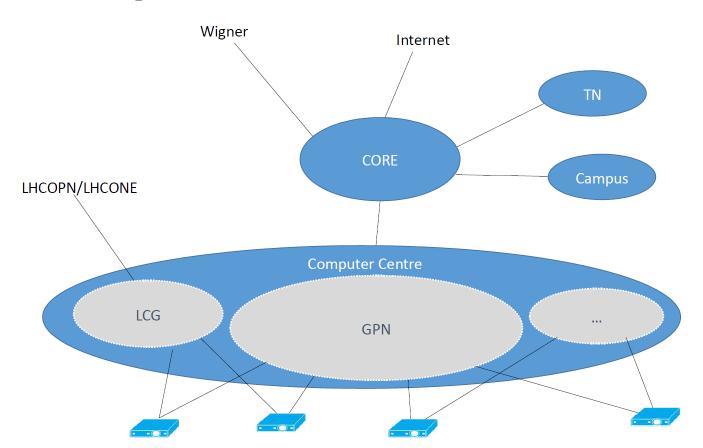
By Q4

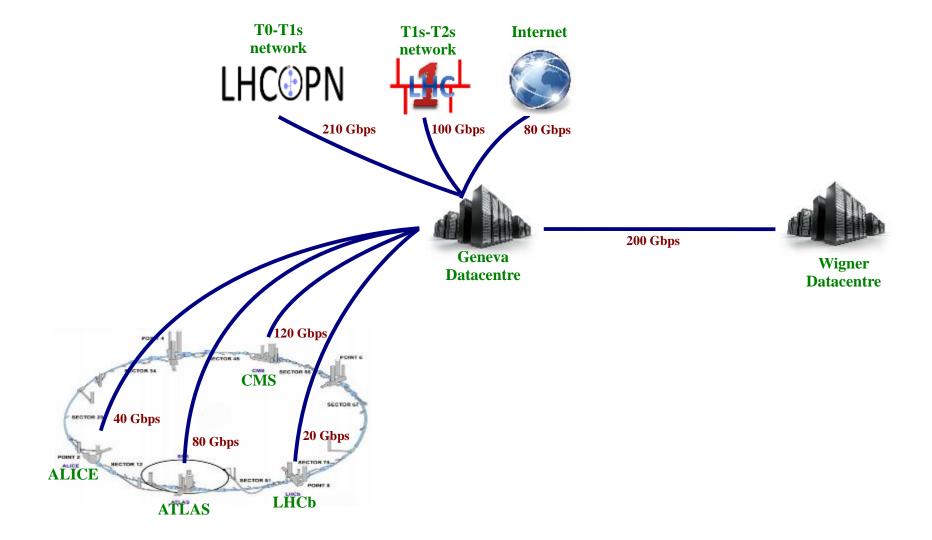




Possibly



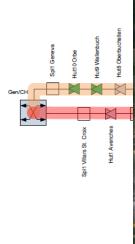


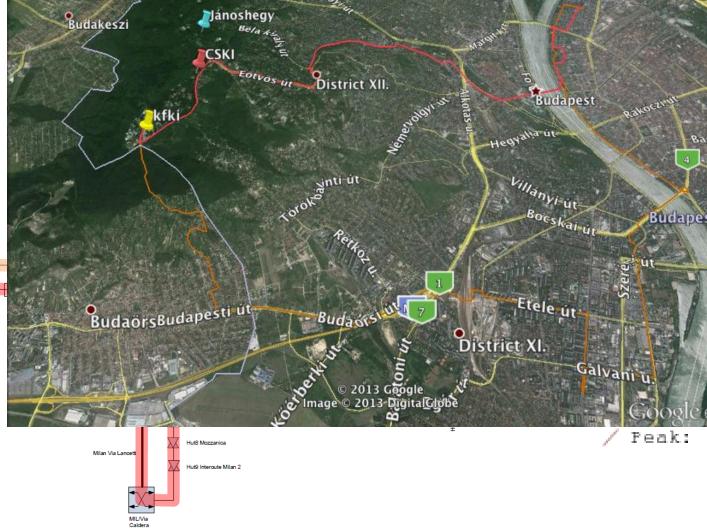


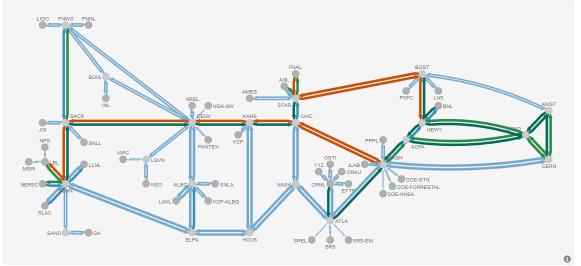
Optical paths

1st link

2nd link



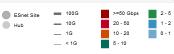






Network Wide Total Traffic

This map highlights the sites ESnet serves, the structure of the network and the current traffic load. Clicking on a node or edge will show details. Please note that this map does make some simplifications, click ③ on the map or chart for more details. The map of the transatlantic extension is a work in progress, more details are available in the info box.





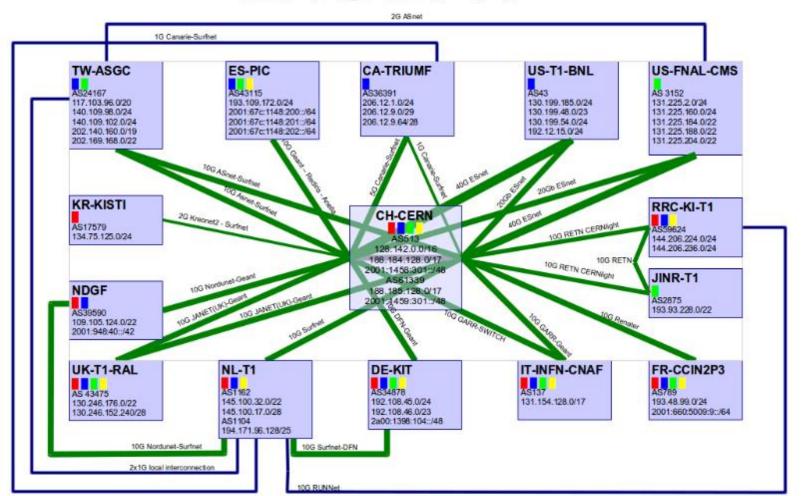




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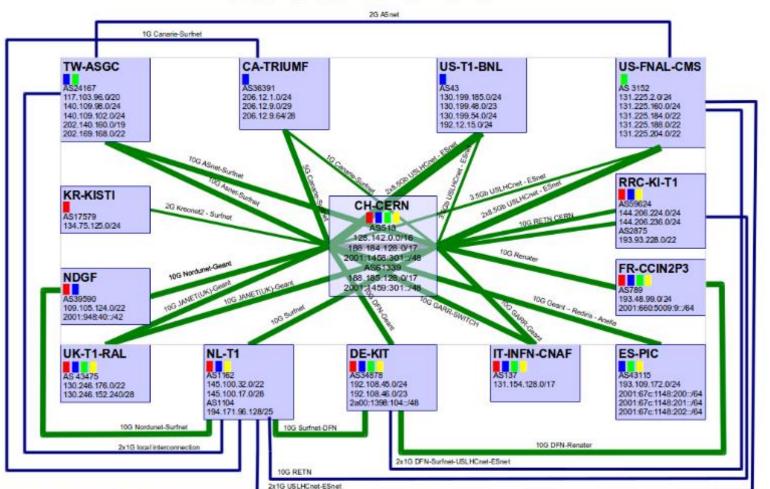


LHC PN



192.16.166.0/24 - 2001:1458:302::/4





LHCONE: A global infrastructure for the High Energy Physics (LHC and Belle II) data management GÉANT CANARIE **NORDUnet** JANET SURFsara Canada UK Nordic Nikhef (UTor) IHEP-ATLAS GLORIAD UAID TRIUMF-T1 NDGF-T1 Netherlands NDGF-T1b (global) KIAE STNet/CERNet2 SImFraU NDGF-T1c Kurchatov IHEP-CMS MREN (Chicago) Starlight NetherLight CERN SINET PNWG (Chicago) (Amsterdam) (CERNLight) Japan (Seattle) Korea Geneva CIC KEK T1 Geneva OmniPoP CERN-T1 (Chicago) ICEPP India U Tokyo DFN MAN LAN Korea **ESnet** Germany (New York) USA DE-KIT-T1 FNAL-T1 PNNL-T1 BNL-T1 KREONET2 **PacWave** Korea SLAC UCSD (Sunnyvale), AGLT2 AGLT2 UM KCMS GÉANT CESNET Indiana CERN GigaPoP, Czech CENIC CERN **←** pregueicg2 USA UChi Caltech ASGC (MWT2) ARNES Taiwan RENATER Solvenia acificwave ASGC-T1 WIX France INZP3 SIGNET (Los CEA (MWT2) (MWT2) (Washington) ASGC2 Angeles) CC-IN2P3-T1 MIT NCU NTU UFlorida GLakes GARR RoEduNet TEIN Vanderbill RedIRIS Harvard Internet2 Romania UAIC (proposed) Spain USA CNAF-T1 NIHAM ISS ITIM PIC-T1 NIPNE K3 AMPATH (Miami) CERN# NKN CUDI India 5 April 2015 - WEJohnston, ESnet, wej@es.net Mexico canane MARK NI STERLIGHT LHC Tier 1/2/8 ALTAS and CMS yellow outline LHCONE VRF domein Indicates Belle II Tier 1/2 LHC+Belle II RNP LHCONE VRF aggregator network SAMPA LHC ALICE or LHCb HEPGrid Brazil SAMPA INF. Sites that manage their own LHCONE routing or link/VLAN provider Communication links: 1, 10, 20/30/40, and 100Gb/s See http://lhcone.net for details.

LHCONE Acceptable Use Policy (AUP)

As agreed upon by the participants LHCOPN-ONE meeting on 2015/02/10. The final deadline for comments is 2015/02/27.

- ↓ LHCONE Acceptable Use Policy (AUP)
 - ↓ Preamble
 - ↓ Definitions
 - Participating Collaborations and related information
 - ↓ Scope
 - ↓ LHCONE L3VPN Acceptable Use Policy (AUP)
 - ↓ Announcement of IP Prefixes for LHCONE Traffic (LHCONE Prefix)
 - Authorized source and destinations nodes (LHCONE Nodes)
 - ↓ Eligibility for Becoming a LHCONE Site
 - ↓ Non-compliance with the AUP
 - ↓ Compromised Security
 - ↓ Roles and Responsibilities
 - ↓ Related documents

https://twiki.cern.ch/twiki/bin/view/LHCONE/LhcOneAup



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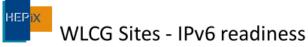
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IPv6 growth (global Google clients)



Survey in summer 2014



IPv6 Requirements

HEPIX IPv6

6 WLCG Site Survey and 60% of Tier 2s t started with IPv6! in 1 year

hin 1-2 year

HEP X

perfSONAR dashboard

Tier 1s provide a dual stack PerfSONAR il 2015

sses (in next 1-2 years) ers

Ds provide a dual stack PerfSONAR machine

Dual-Stack Mesh Config - IPv6 Bandwidth Test http://maddash.aglt2.org/ Warning: IPv6 currently showing same as IPv4 - will be fixed!

eady to host dual-stack data services (FAX)

2014)

a substantial fraction of CMS data accessible IPv6 by end 2015 - to use from IPv6-only WN : & IPv6

riments in 2014

Pv6-only (IPv4 gone!)

e cases r LHC Run 2

address

- Must be able to access federated storage services
- Storage services must be dual-stack
- And central services too (VOMS, catalogues, info etc)

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24/03/2015 26

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WLCG Networking 2

SDN

- openlab project established with Brocade
 - "Goal of the project is to build an intelligent system that can optimize the routing of data traffic entering and leaving an organization and drop network attacks. The optimal routing or drop will be decided based on the information coming from the network itself, from a database of trusted applications and other data sources, like black-lists of known threats."



WLCG Networking



Network Engineers are investigating interesting solutions.

How would you really use P2P? Do you care

with today's bandwidth?

What are your problems?





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CDN

- Physics requirements?
 - reduced load on long distance links
 - improved performance for poorly connected sites
- Solutions?
 - cache servers placed in strategic locations of the Internet or LHCONE, a la Google cache or Akamai (i.e. based on peerings rather than geolocalisation)
 - [ipv6] multicast: datasets continuously streamed into multicast groups
 - solution yet to be designed and developed!



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