TNLC Meeting

LHCOPN Status

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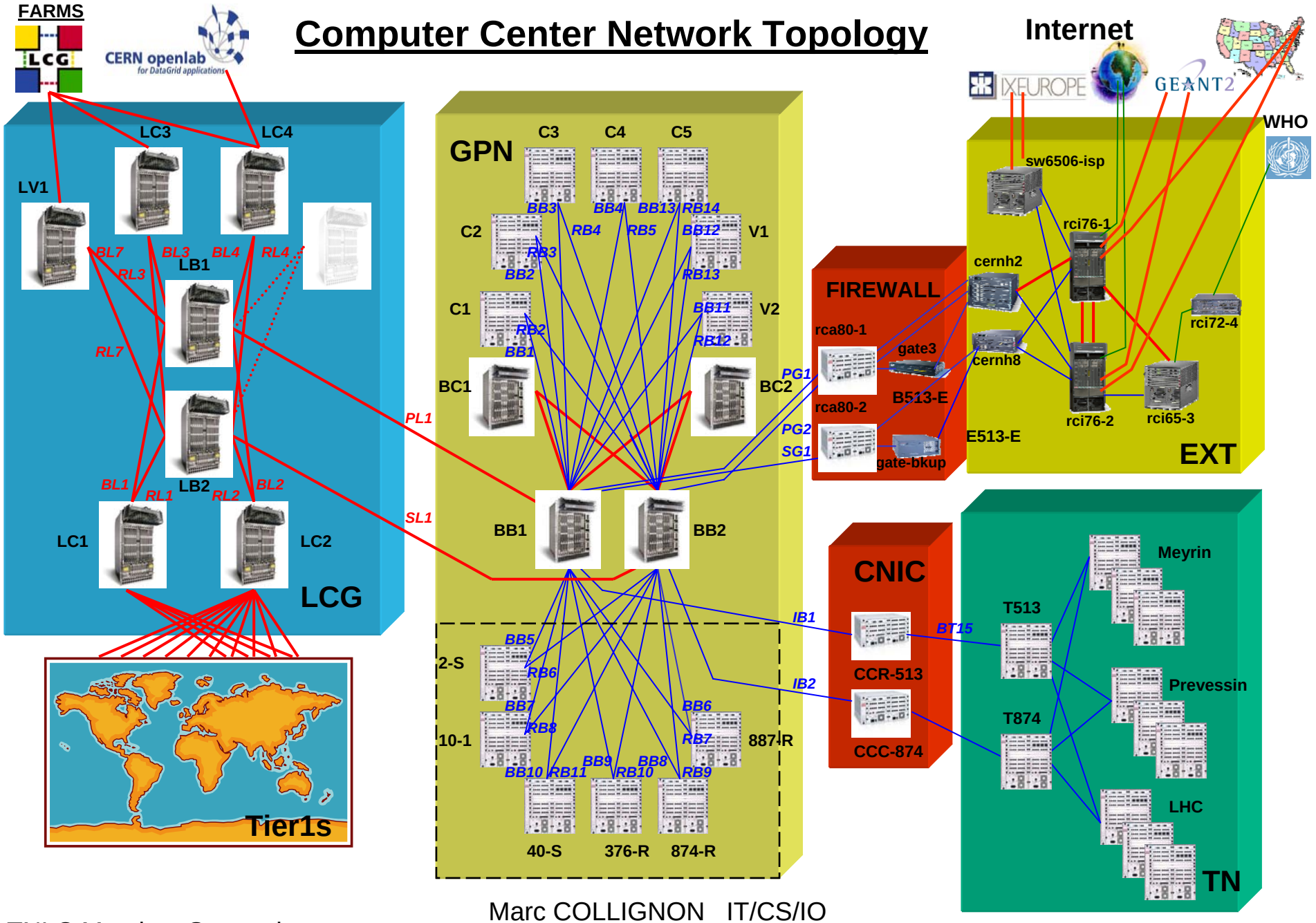
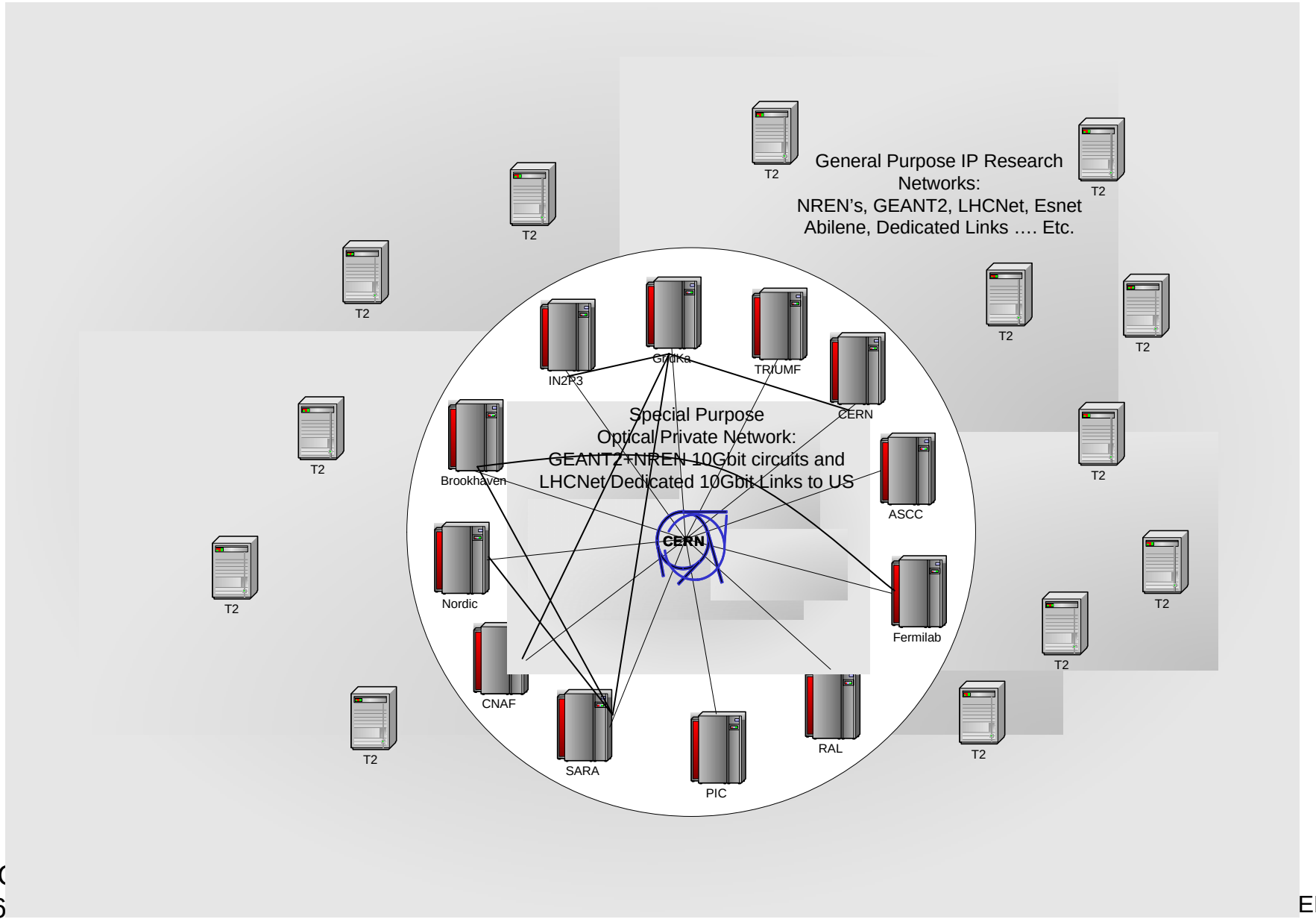
Computer Center Network Topology



Marc COLLIGNON IT/CS/IO

LHCOPN Architecture (2004-2006)

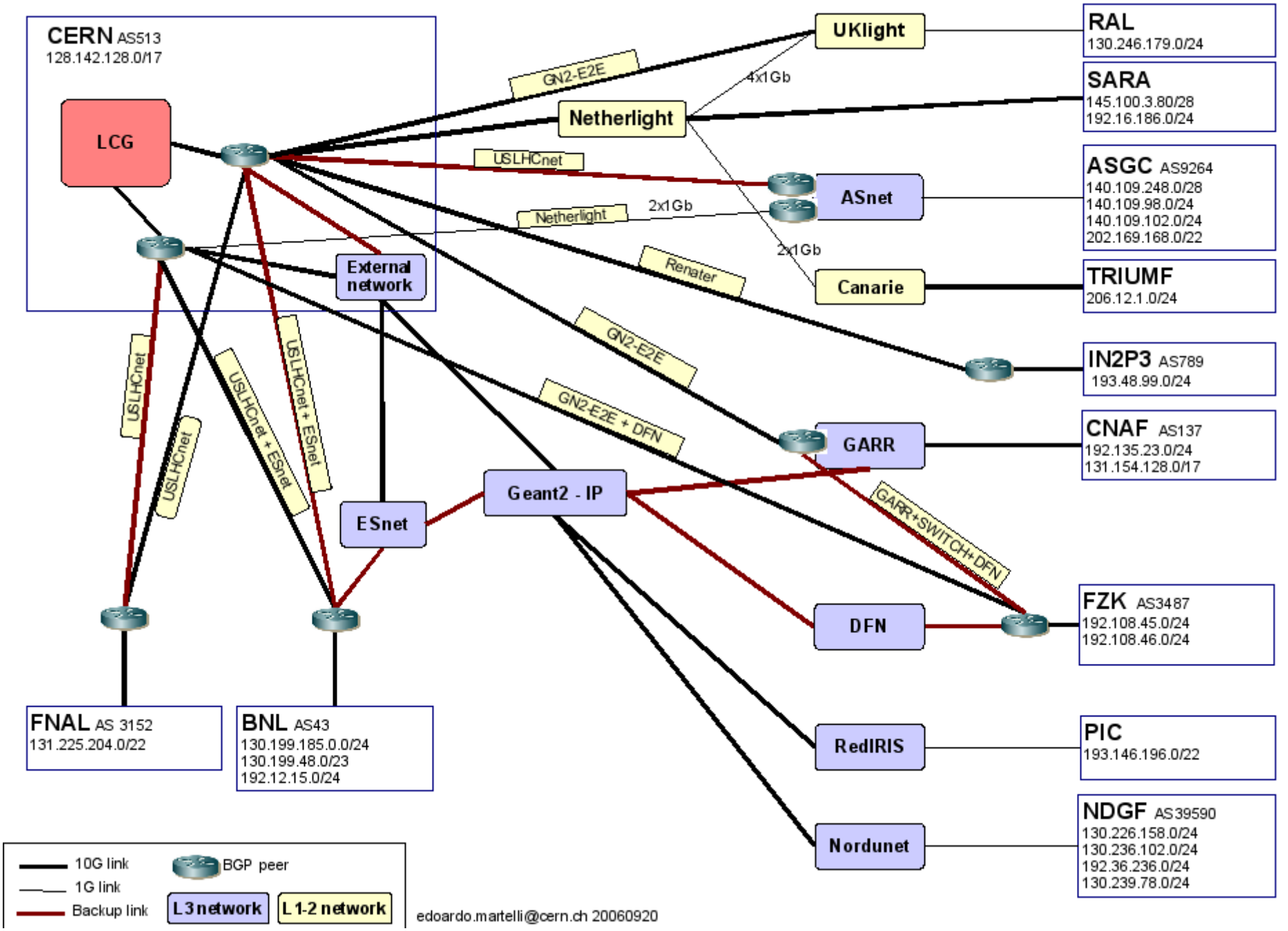


Global Inter-Site Rates

Centre	*T0->T1*	*T1->T2*	*T2->T1*	*T1<->T1*
	Predictable – Data Taking	*Bursty – User Needs*	Predictable – Simulation	Scheduled Reprocessing
IN2P3, Lyon	**168.9**	**286.2**	**85.5**	**498.0**
GridKA, Germany	**179.3**	**384.9**	**84.1**	**395.6**
CNAF, Italy	**214.7**	**321.3**	**58.4**	**583.8**
FNAL, USA	**110**	**415.0**	**52.6**	**417.0**
BNL, USA	**186.5**	**137.7**	**24.8**	**358.0**
RAL, UK	**111.1**	**108.3**	**36.0**	**479.4**
NIKHEF, NL	**107.0**	**34.1**	**6.1**	**310.4**
ASGC, Taipei	**72.7**	**126.5**	**19.3**	**241.2**
PIC, Spain	**55.3**	**167.1**	**23.3**	**294.5**
Nordic Data Grid Facility	**41.8**	-	-	**62.4**
TRIUMF, Canada	**19.2**	-	-	**59.0**

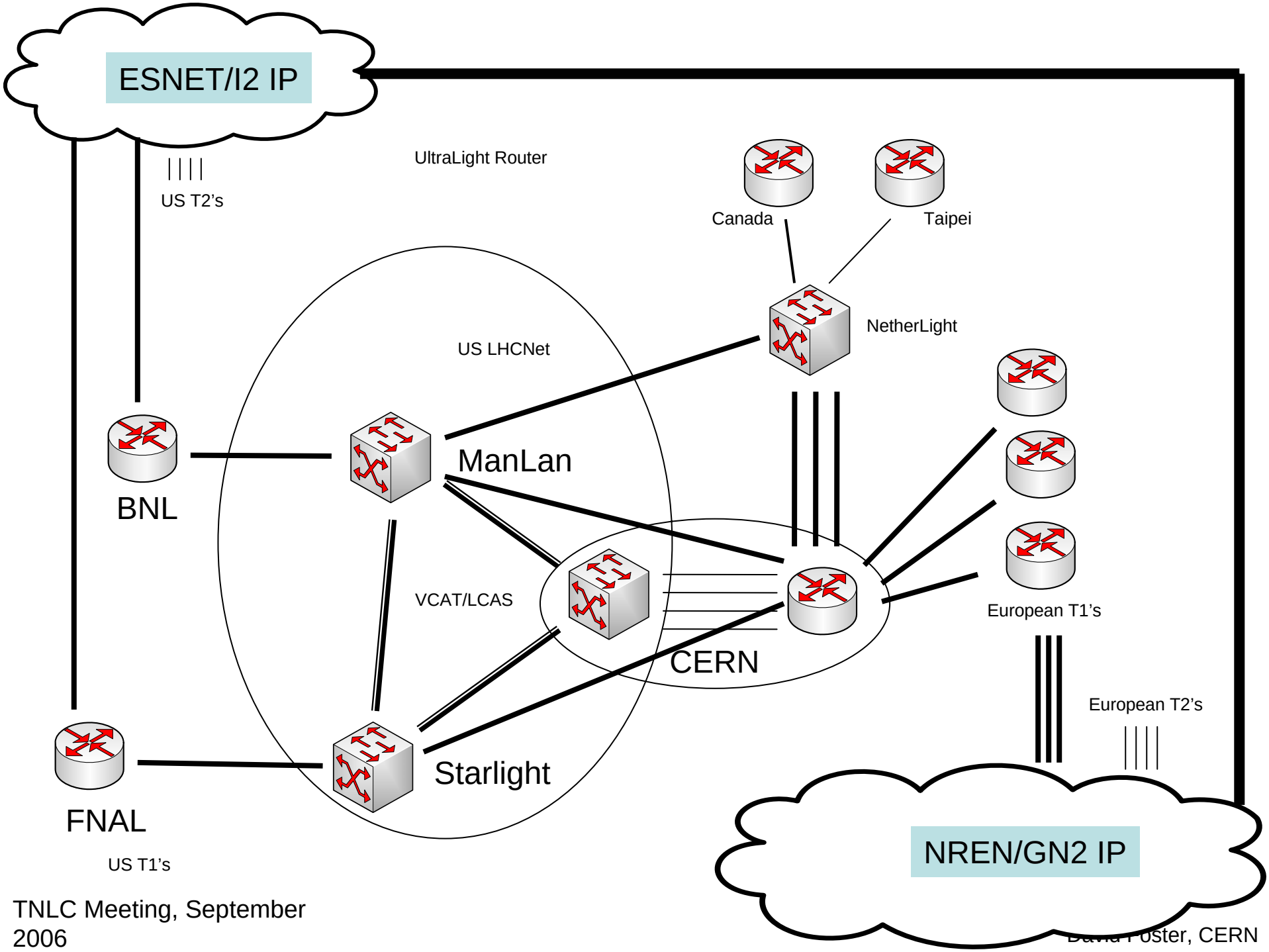
- Taken from the LCG data gathering exercise so-called “megatable”
- Not everyone agrees with the results.
- Perhaps does not take into account periodic “refresh” of T2 data.
  - CMS have 200TB at (some) T2’s
  - 1x10G link can move 100TB in 1 day.

LHCOPN – current status



OPN Organisation

- LHCOPN Meetings 4 times a year
  - Organised as a sub-activity of the GDB
- Current Working groups
  - Operations (Dante)
  - Monitoring (USA)
  - Routing (CERN)
  - Security (UK)
- Working group evolution
  - Routing will become a long term technical body
  - Monitoring will evolve to become more technical network management including tool selection and deployment
  - Operations will continue to be the problem determination and resolution
  - Security will continue to be an advisory and policy body.


ESNET/I2 IP
US T2's
UltraLight Router
Canada
Taipei
NetherLight
US LHCNet
ManLan
BNL
VCAT/LCAS
CERN
European T1's
European T2's
Starlight
FNAL
US T1's
NREN/GN2 IP

OPN Status Summary

Link	Status	Nominal E2e Capacity	Provider Changes	Expected
BNL	OPN Production	10G	Colt->Colt	1/11/06
FNAL	OPN Production	10G	GC->Qwest	1/1/07?
TRIUMF	OPN Production	2G (limited CERN-AMS)	GN2 Lambda CERN-AMS	Q4/06 (Need OME 6500 at CERN)
ASGC	OPN Production	2G (2.5G to AMS)	GN2 Lambda CERN-AMS	Q4/06 (Need OME 6500 at CERN)
NDGF	GN2 IP		GN2 lambda	Q1/07
SARA	OPN Production	10G	SurfNet->GN2	Q4/06
RAL	OPN TEST	10G		Oct 1st 2006
FZK	OPN TEST/GN2 IP	10G		Oct 15th 2006
CNAF	OPN Production	10G		
IN2P3	OPN Production	10G		
PIC	GN2 IP		GN2 lambda	Barcalona-CERN Mid Oct. PIC -> Rediris a problem

CBF Status Summary

Link	Status	Nominal E2e Capacity	Provider Changes	Expected
SARA - NDGF		10G		Q1/07
SARA - FZK	In Test	10G		Oct 06
FZK - CNAF	In Place	10G		
FZK - CERN		10G	DFN/Switch	Mid 07
BNL - FNAL	In Place (from GC)	10G	To ESnet	Q2 07
FZK – IN2P3		10G		End 06

Other Links Summary

Link	Status	Nominal E2e Capacity	Provider Changes	Expected
ManLan - Netherlight	Ordered	10G	GC	1/1/07
Netherlight - CERN	Surfnet to make request to GN2 Exec	10G	GN2	1/1/07

Operational Status

- Several links “in production” but coherent operational management across organisational domains must be organised.
  - Agreement has been reached to deploy one initial monitoring tool “Perfsonar” across all domains.
  - Workshops have been held (Dante)
    - Munich 19 July 06: DANTE, DFN, REDIRIS, GARR, SURFnet, NORDUnet, RENATER, CERN (and LRZ-Munich)
    - Toronto 18-19 September 06: DANTE, I2, ESnet, TRIUMF, Canarie, FNAL, USLHCNET
- End-to-End coordination unit (E2ECU) being implemented by Dante as part of the overall NOC – Full Operation January 2007.
- ENOC providing information integration with Grid Operations (EGEE-SA2) working closely with E2ECU
- All operational information documented on the LHCOPN Twiki:

http://lhcopn.cern.ch

Current Monitoring Activities

- VCs every two weeks to discuss progress, issues and timetable for e2e monitoring data being made available

- CNAF-CERN (T1-T0) monitored e2e
- CNAF-GRIDKa (T1-T1) partly done

- Most EU NRENs expect to be ready before end of 2006
- Non-EU networks – coming soon!

Perfsonar Status

NREN	HW	Status info	perfSONAR Installation	Expected RFS
GEANT2	Alcatel	Available	Done	Ready
DFN	Huawei	3 weeks ?	Done	End October
RENATER	Alcatel	November	Done	Mid-Nov.
REDiris	Nortel 8010	Unknown	TDB	Jan. 07 ?
NORDunet	Not disclosed	Stated available	October	Dec. 06 ?
GARR	Juniper/ADVA	Available	Done	Ready
SURFnet	Nortel	Available	Ongoing	End October
UKERNA	Nortel+Ciena	Available ?	Ongoing	Dec. 06 ?
SWITCH	Sorento	Available	Done	Ready

Conclusions (Meeting 21 Sept 2006)

- Clarity on OPN
  - Does it carry T2-* traffic – NO
  - Does it carry T1-T1 traffic – YES
  - Does it include CBF links – YES
  - A lightpath is part of the OPN (circuit governed by OPN policies). This may be less than a physical lambda which carries other types of traffic. This should be documented however.
- Backup Paths
  - Can we understand the dynamics? Are we sure that we understand how (over)loading will work. (Edoardo)
  - What is missing for a complete(!) plan? (Edoardo)
  - Test Plan – test automation and functioning also at the application level. (Don+Kors+Bruno)
  - Critical due to expected support hours (limited in many cases to extended working hours)
- T1-T1 traffic to be announced. (Edoardo)
- RAL needs to move to a public AS number (Robin)
- Security/Operations Policy – are sites taking it seriously? Is there any need for an “operations” officer and what tools would he have?
  - Long term tech ops working group - evolution of the routing working group
  - ENOC could do the surveillance given the right tools.
  - Active monitoring tools? How should we organise this? (DF to organise)
    - E2e service quality – active tools
    - Traffic sampling and analysis
    - Applicable also for t2-t1 circuits?
- How to advise on T2 connectivity?
  - Instrumentation at T2’s, distributed by LCG. US-Atlas will deploy NDT in the US. Has a kernel requirement.
  - Remote T2’s connectivity.
- Global extension of the E2ECU beyond Europe. (Roberto)
- PR Tool – weathermap, globe, links, (Roberto)
- Need work plan for the ENOC beyond transition. (Mathieu)
- Next Meeting When? (12t^{h} Jan) Where: Cambridge (Florida Intl Uni. Miami - Spring)