



ALICE



RU-SPbSU cluster of St. Petersburg University today and ALICE data processing in the Russian GRID segment.

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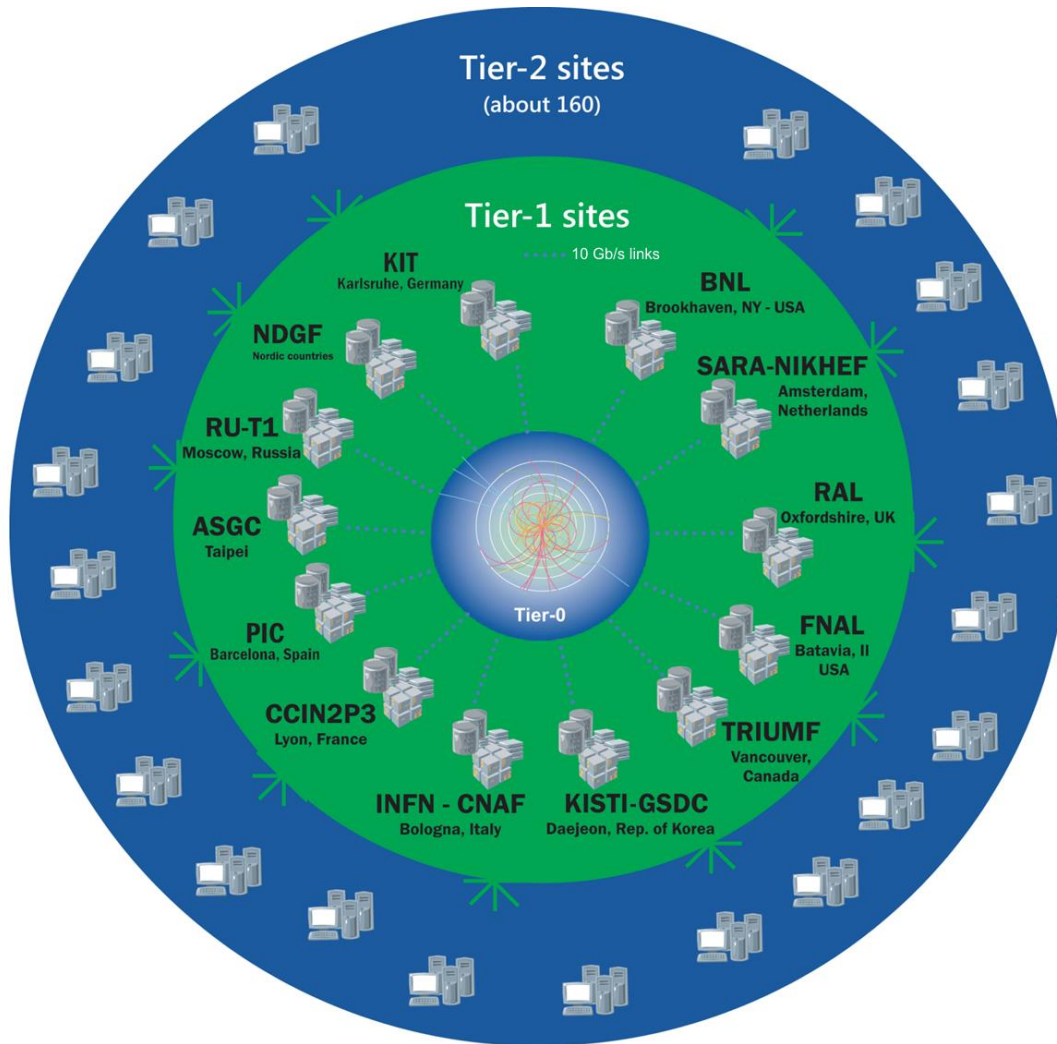
WLCG beginning - 2002 year

<http://home.cern/about/computing>

- Approximately 600 million times per second, particles collide within the Large Hadron Collider (LHC) $\sim 30\text{PB}$ per year.
- Solution - The Worldwide LHC Computing Grid (WLCG) – a distributed computing infrastructure arranged in tiers – gives a community of over 8000 physicists near real-time access to LHC data.

WLCG structure

<http://wlcg-public.web.cern.ch/tier-centres>



Tier-0 – the CERN Data Centre, in Geneva and the Wigner Research Centre for Physics in Budapest with two dedicated 100 Gbit/s data links. 20% of the total compute capacity. Store raw data (first copy), first pass reconstruction.

Tier-1 – 13 Computer centers in different countries. Store replica of raw data and reconstructed data from T1 and T2. Large-scale reprocessing data.

Tier-2 – about 160 centers on all world – typically universities and other scientific institutes. Store reconstructed data and reprocessing data.

Russia in WLCG

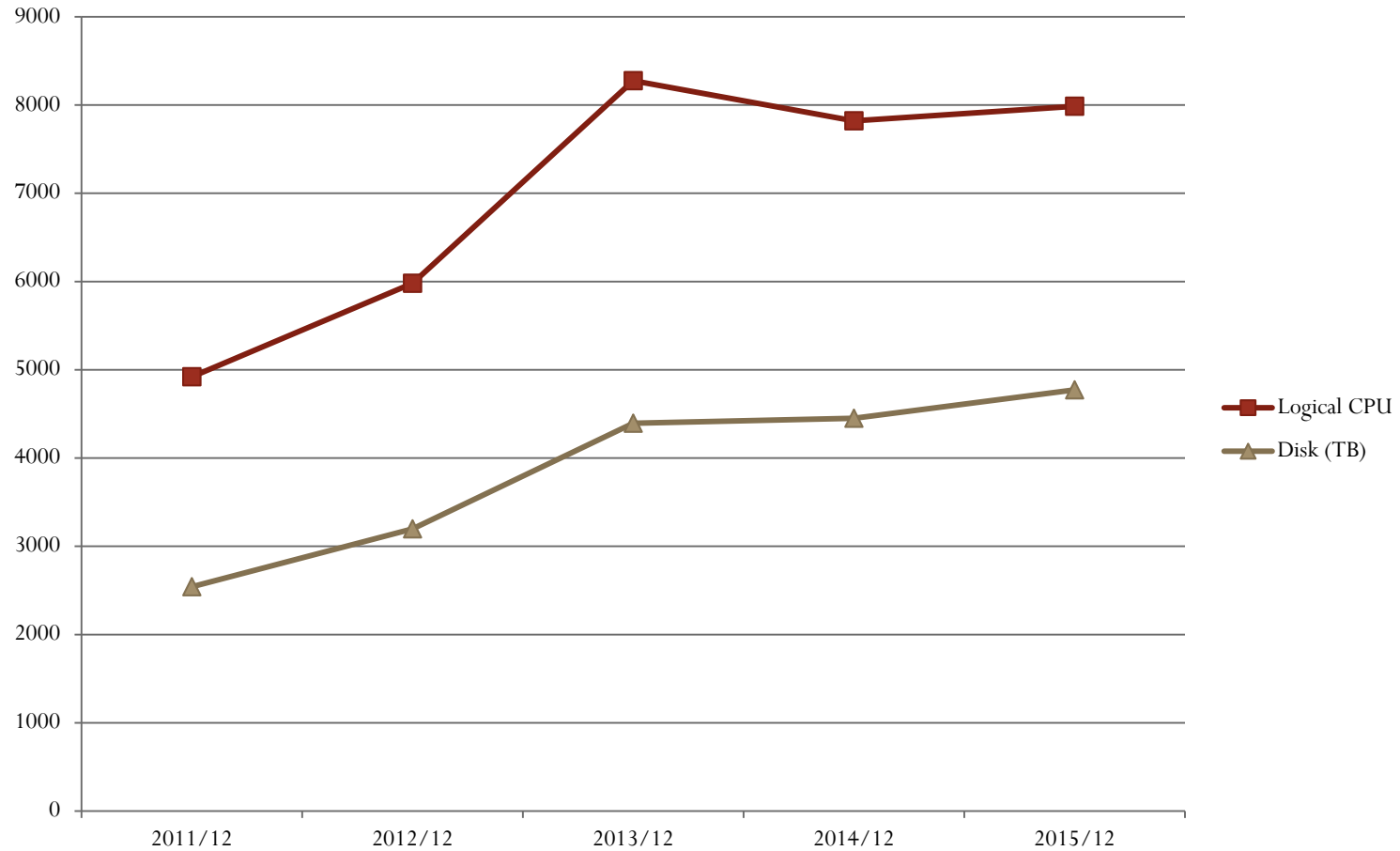
- 2003 – to create RDIG (Russian Data Intensive GRID) , participation in EGEE(Enabling Grids for E-sciensE): KI, ITEP, IHEP, JINR, PNPI, SIMP MSU, IMPB RAS, KIAM RAS,
- 2007-2010 – EGEE-II – resources for Russian sites.
- 2012 – Tier-1 in JINR (cms) and KIAE (atlas,alice,lhcb)

SPbSU in WLCG

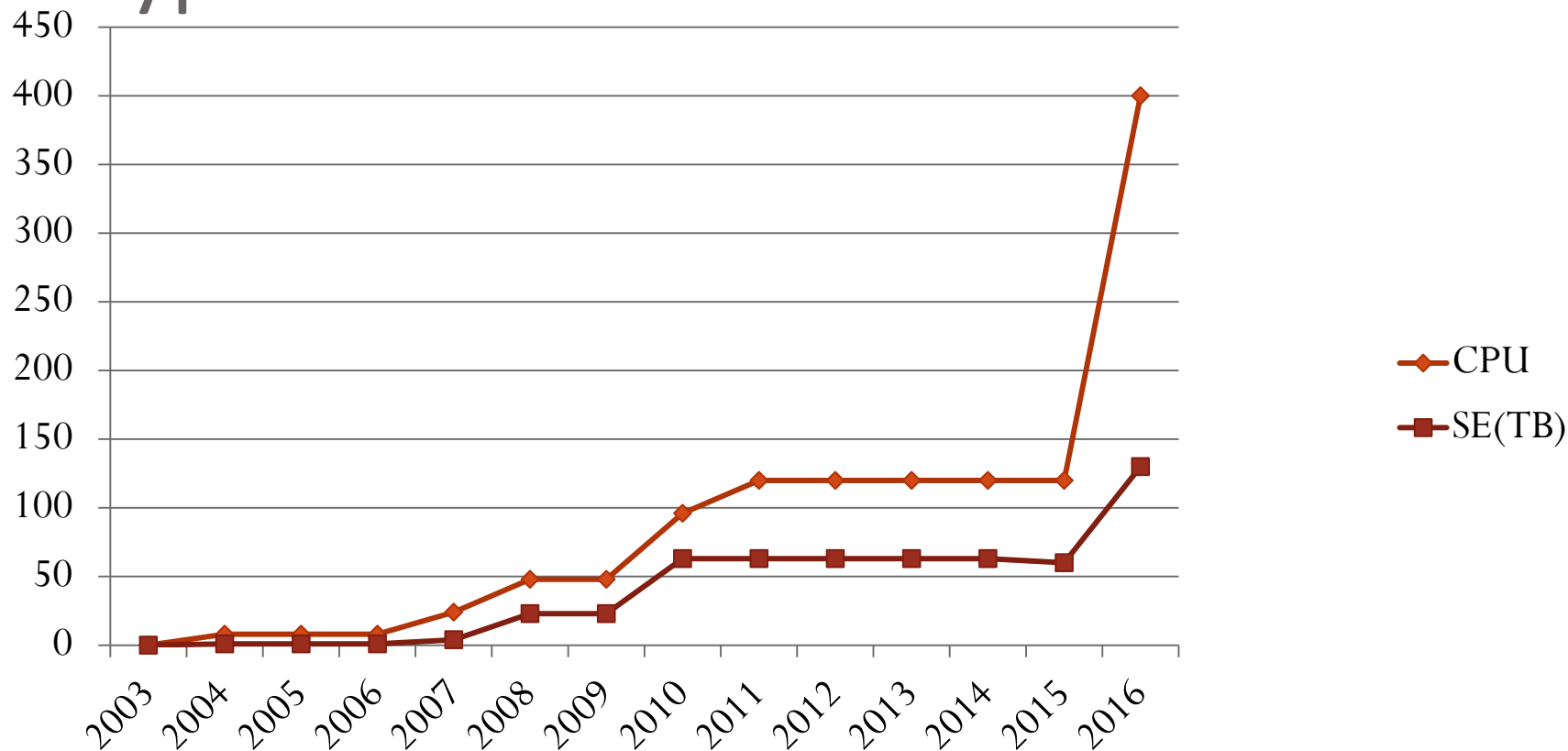
- 2002 – 1-st grid experiments (EDG, GLOBUS)
- 2003 – installation AliEn (Alice Environment) with Pablo Saiz.
- 2004 – installation LCG with ALICE support by Latchezar Betev help
- 2007 – include to RDIG, get resource from RDIG
- 2008 – technical coordination of Alice Russian grid sites
- 2013 – coordination of Alice Russian grid sites
- 2013-2016 – development cloud infrastructure ALICE and WLCG

RDIG T-2 resources

<https://wlcg-rebus.cern.ch/apps/topology/federation/253>



Ресурсы СПбГУ

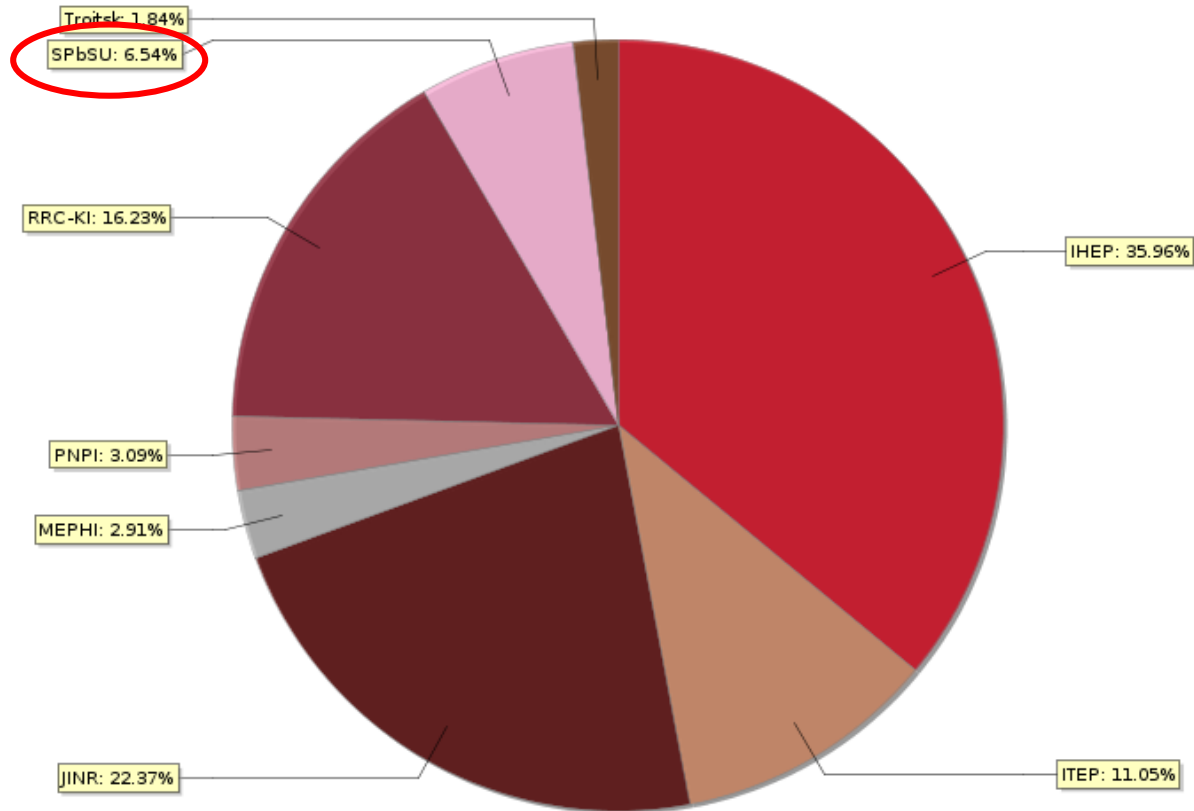


- 2004 – 4 Pentium 600 (2 core, 1GB RAM), 1TB SE
- 2007-2010 – Supermicro servers from EGEE-RDIG
- 2011 – Virtual machines from CC SPbSU
- 2016 – resources from SPbSU

SPbSU and RDIG T-2 in ALICE last year

<http://alimonitor.cern.ch/display>

Total wall time kSI2K hours for ALICE jobs

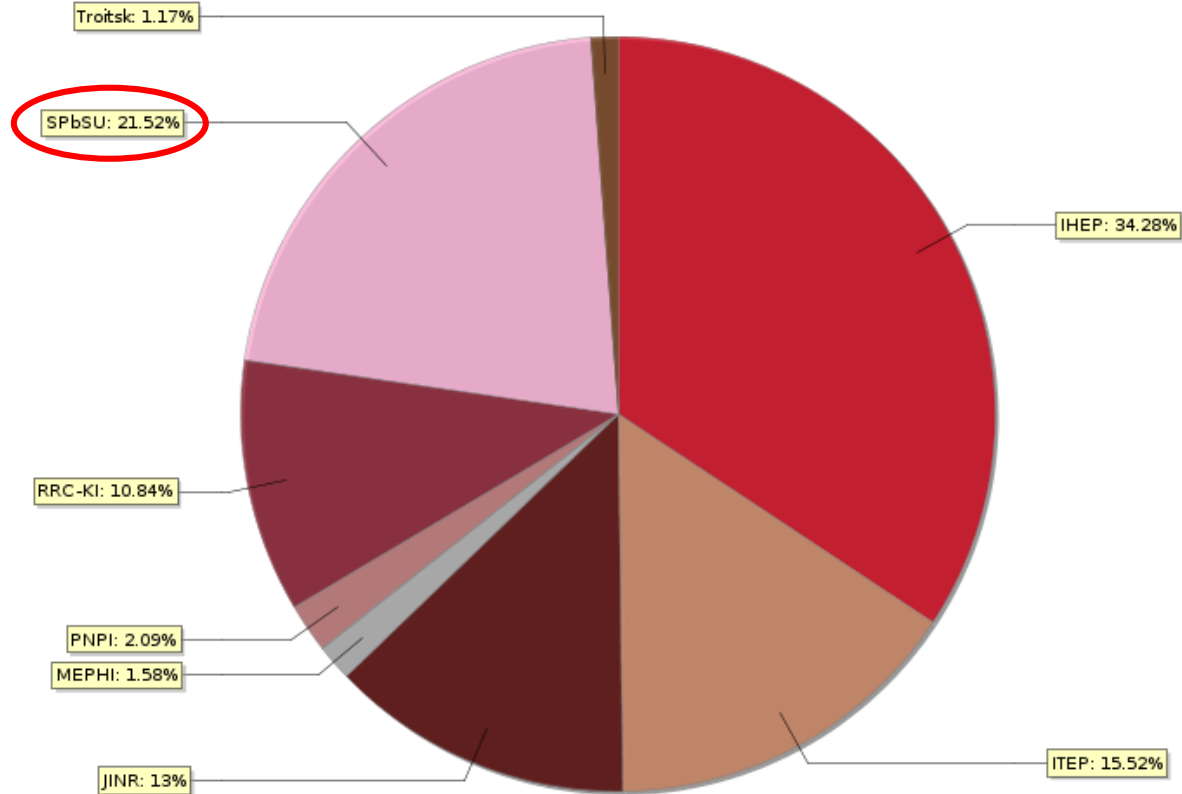


● IHEP ● ITEP ● JINR ● MEPHI ● PNPI ● RRC-KI ● SPbSU ● Troitsk

SPbSU and RDIG T-2 in ALICE last 2 days

<http://alimonitor.cern.ch/display>

Total wall time kSI2K hours for ALICE jobs



● IHEP ● ITEP ● JINR ● MEPHI ● PNPI ● RRC-KI ● SPbSU ● Troitsk

Network for T-1 – T-2 sites

<https://twiki.cern.ch/twiki/bin/view/LHCONE/LhcOneVRF>



<http://lhcone.web.cern.ch>

<u>Site</u>	<u>AS number</u>	<u>Announce v4</u>	<u>Announce v6</u>	<u>Access VRF</u>	<u>Access Point</u>	<u>Bandwidth</u>	<u>Active</u>	<u>AUP ack</u>
JINR	2875	159.93.228.0/22 (T1) 159.93.39.0/24 (T2) 159.93.224.0/22 (T2)	noc@jinrspa.mnot.ru	RU-VRF	M9, Moscow (RU)	2x10G	Y	Y
RRC-KI	59624	144.206.224.0/24 (T1) 144.206.236.0/24 (T1) 144.206.237.0/24 (T2)	noc@computing.spamnot.kiae.ru	RU-VRF	M9, Moscow (RU)	2x10G	Y	Y

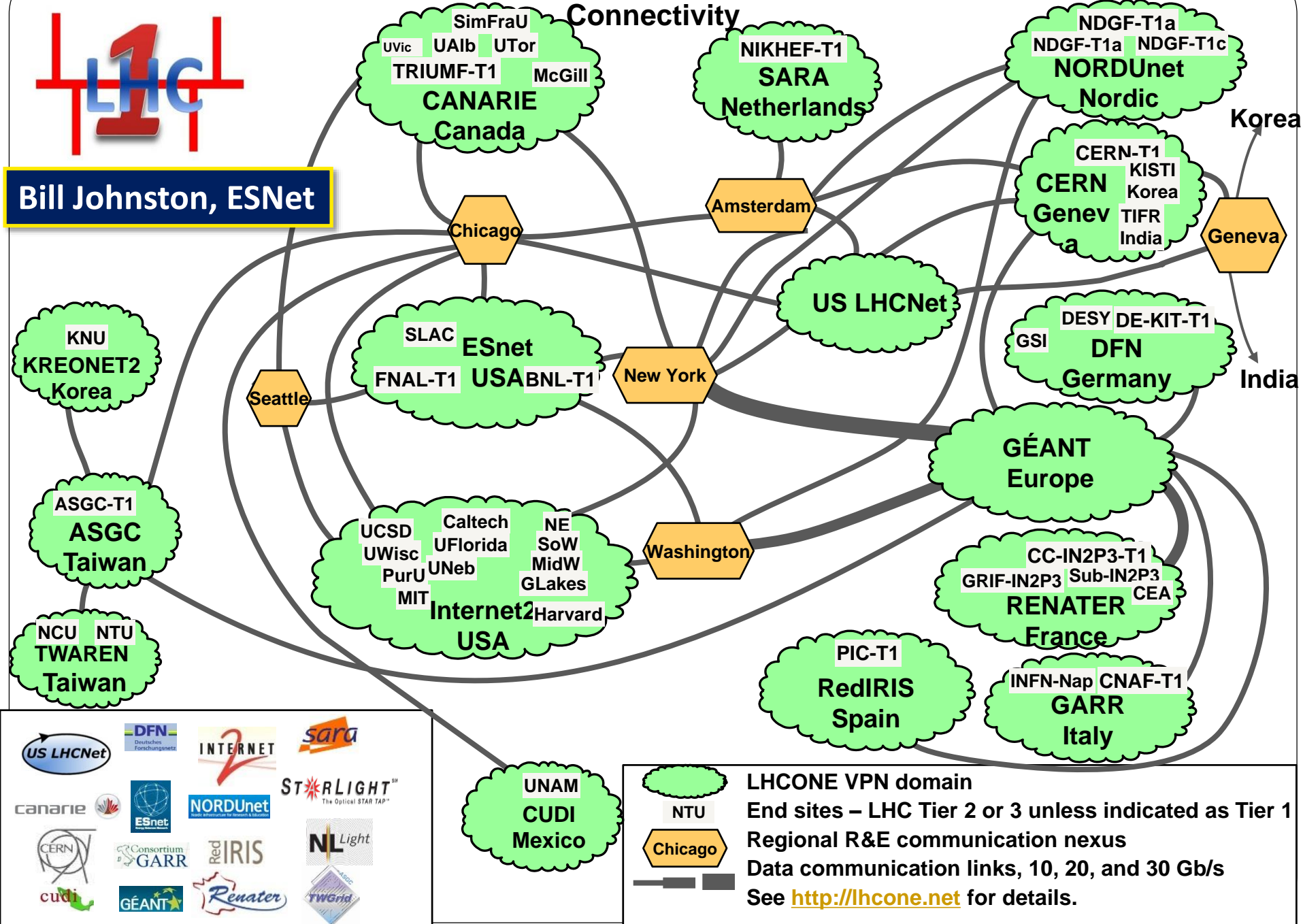
<u>Name</u>	<u>AS</u>	<u>NOC</u>	<u>Peering</u>	<u>Transit from</u>	<u>Status</u>
RU-VRF (RU)	57484	noc@computing.spamnot.kiae.ru	CERNlight, NORDUnet, ESnet, Internet2		Active

LHCONE: A global infrastructure for the LHC Tier1 Data Center – Tier 2 Analysis Center



Connectivity

Bill Johnston, ESNet



Cloud experiments in SPbSU

- SPbSU+BITP – prototype of cloud site for Tier-3
 - “Integration of XRootD into the cloud infrastructure for ALICE data analysis”, M.Kompaniets ,O. Shadura, P.Svirin,V.Yurchenko, A.Zarochentsev, Journal of Physics:Conference Series, 2015.
 - “Scalable cloud without dedicated storage”, D.Batkovich,M.Kompaniets , A.Zarochentsev, Journal of Physics:Conference Series, 2015.
 - “LHC experiment’s job submission on cloud sites within EGI Federated Cloud”, M.Kompaniets ,O. Shadura, P.Svirin,V.Yurchenko, A.Zarochentsev, ACAT 2016
- KIAE+SPbSU+PNPI (+JINR +SINP MSU+ ITEP) – Federative Storage
 - “Evaluating Federated Data Infrastructure in Russian Academic Cloud for LHC experiments and Data Intensive Science”, D.Krasnopevtsev,P.Hrisov,A.Klimentov,A.Kiryanov,A.Zarochentsev , ACAT 2016

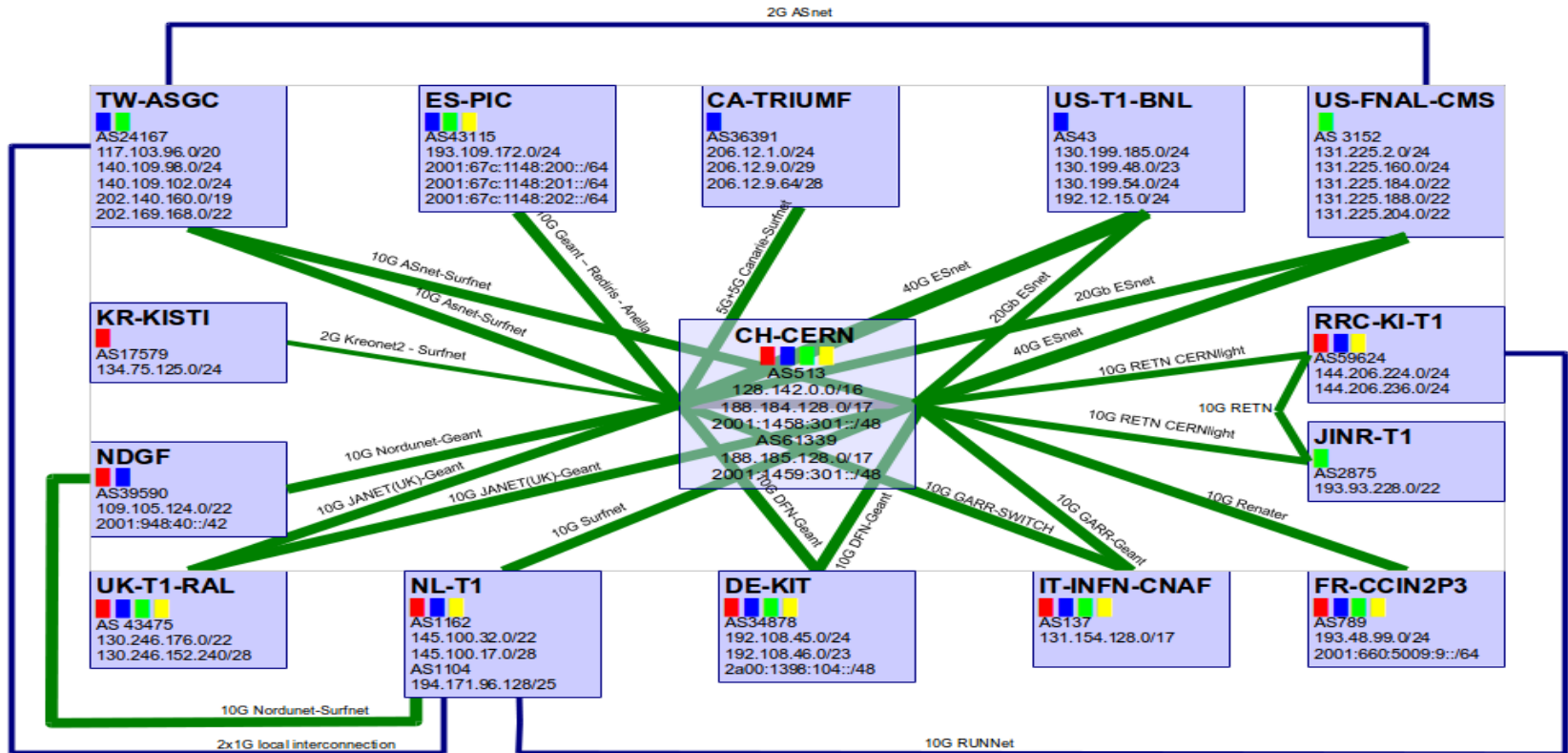
Questions

backup

Network

<http://lhcopn.web.cern.ch/lhcopn/>

LHCOPN



	T0-T1 and T1-T1 traffic		= Alice		= Atlas
	T1-T1 traffic only		= CMS		= LHCb
	Not deployed yet				
	(thick) >=10Gbps				
	(thin) <10Gbps				

p2p prefix: 192.16.166.0/24 - 2001:1458:302::/48
 edoardo.martelli@cern.ch 20 150515

Network

<http://lhcone.web.cern.ch/>

LHCONE: A global infrastructure for the High Energy Physics (LHC and Belle II) data management

