



**India-CMS grid
computing center at
TIFR**

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T2 resources

T2 EPR Credit points earned in 2015 – 14.4

Installed capacity in 2015

Site Name	VO	Pledge Type	Resources	% of required resource in CMS
T2_IN_TIFR	CMS	CPU (HEPSPEC06)	6150	1%
		Disk (TB)	970	3%

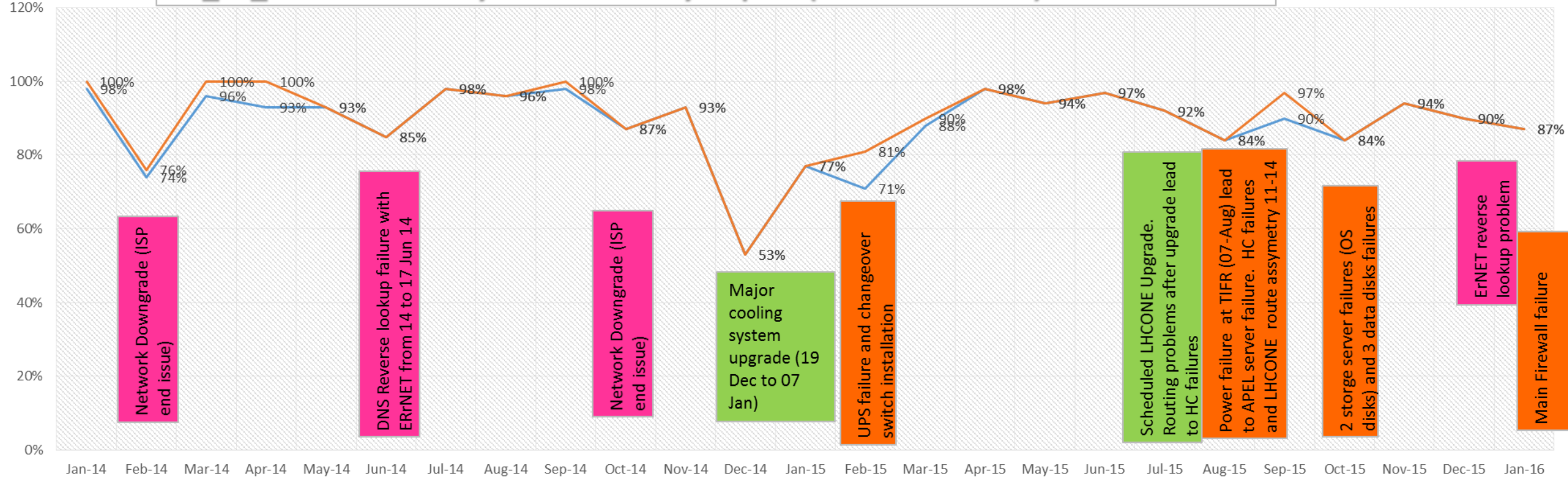
- TIFR hosts a Grid Tier2 centre for CMS experiment
- 1 of the 50 T2 centres world-wide,
- T2 is a global resource hundreds of active users at a time
- Active since 2008 (earning credit for the contribution made to CMS computing efforts)
- Contribution of India to CMS

Pledge Resources for 2016

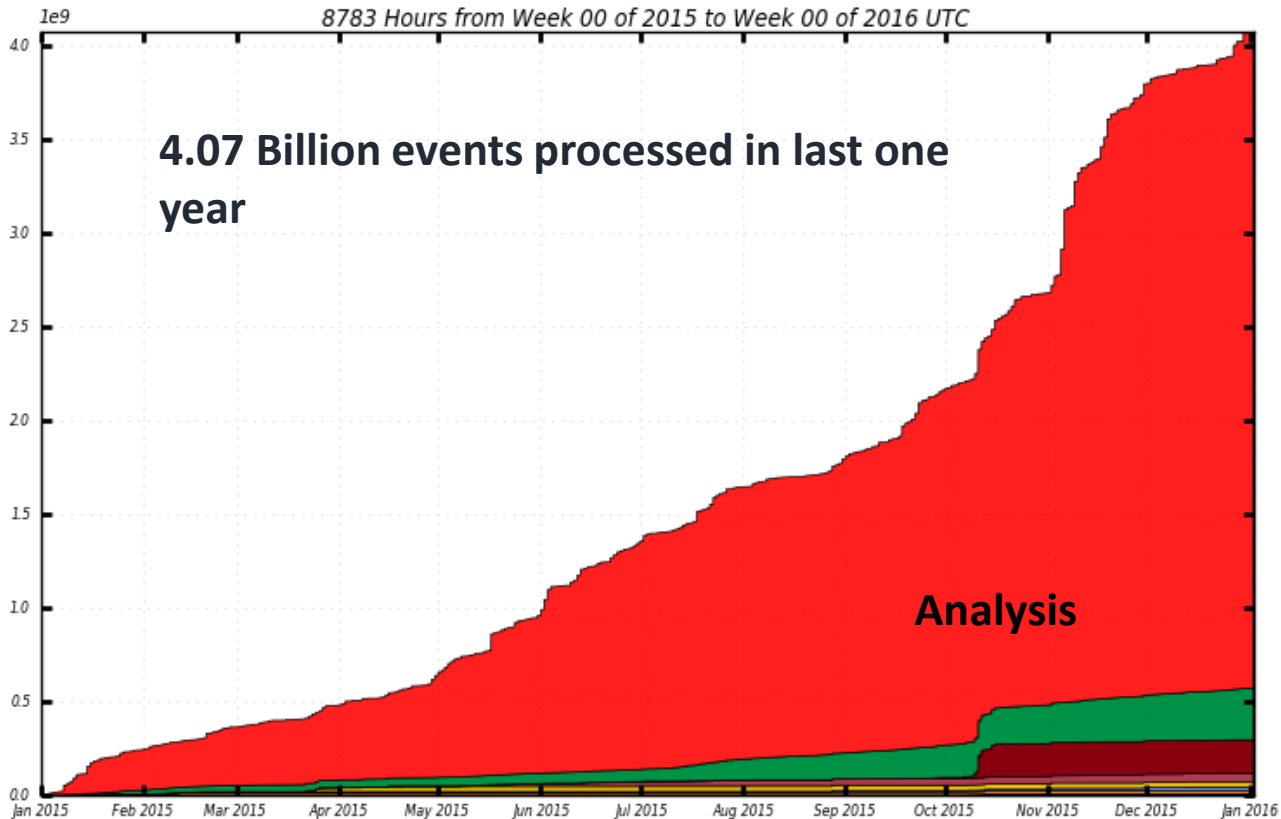
Site Name	VO	Pledge Type	Resource	% of required resource in CMS
T2_IN_TIFR	CMS	CPU (HEPSPEC06)	12,288	2%
		Disk (TB)	1,980	5%

- Dedicated T3 setup for Indian users
- scaled upto 100 TB storage and 100 job slots.
- Supporting ~70 Indian users with resources and analysis
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T2_IN_TIFR Availability and Reliability Report (Jan-14 to Jan16)



	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16
Availability	98%	74%	96%	93%	93%	85%	98%	96%	98%	87%	93%	53%	77%	71%	88%	98%	94%	97%	92%	84%	90%	84%	94%	90%	87%
Reliability	100%	76%	100%	100%	93%	85%	98%	96%	100%	87%	93%	53%	77%	81%	90%	98%	94%	97%	92%	84%	97%	84%	94%	90%	87%

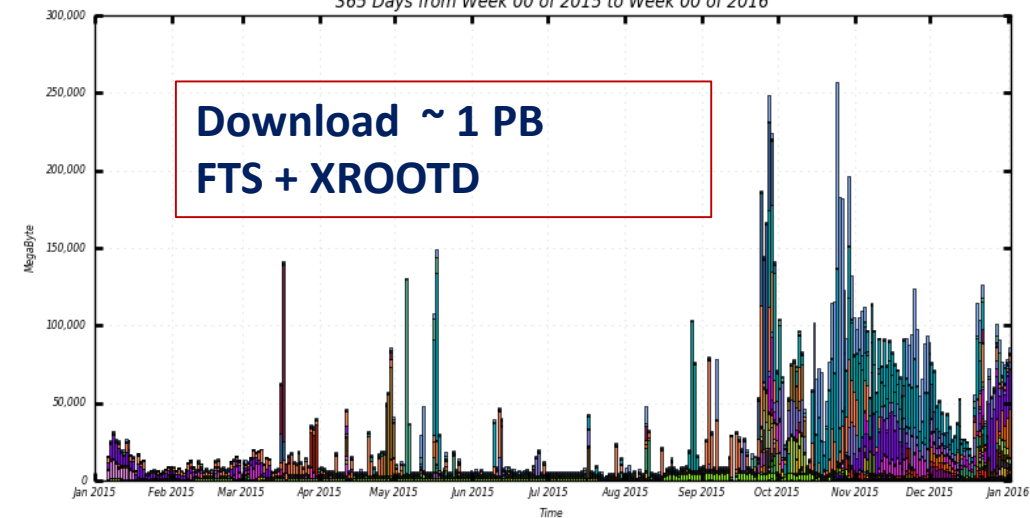
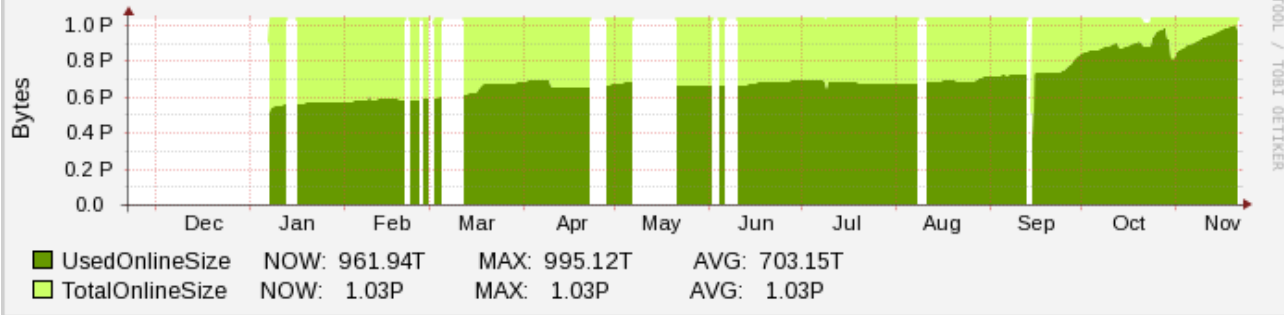


- analysis (3,504,551,554)
- hctest (274,103,816)
- production (178,275,379)
- hcxrootd (44,902,680)
- unknown (28,242,481)
- analysisitest (21,097,780)
- test (16,659,955)
- reprocessing (5,628,647)

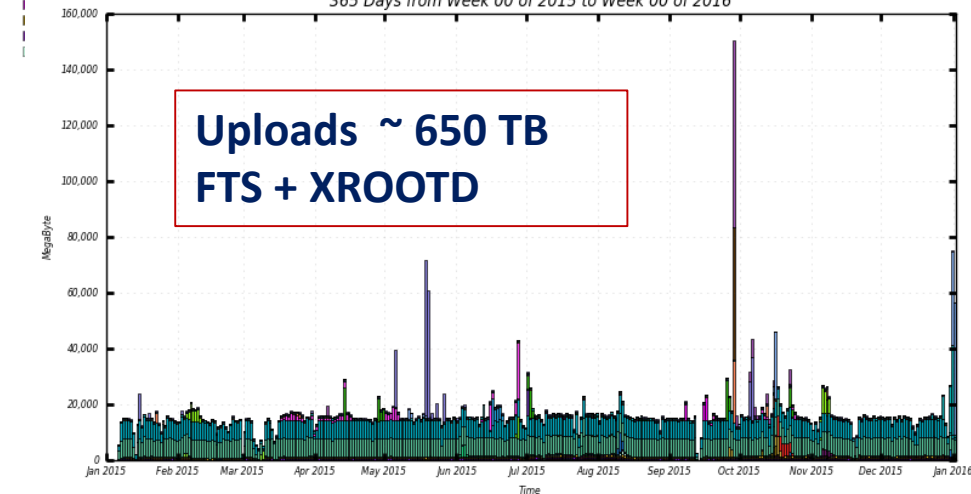
Total: 4,073,462,292 , Average Rate: 128.82 /s

Storage utilization

Online Storage Space (Site: INDIACMS-TIFR)



- T1_IT_CNAF_Disk
- T1_UK_RAL_Disk
- T1_ES_PIC_Disk
- T1_FR_CCIN2P3_Disk
- T1_US_FNAL_Buffer
- T2_US_FNAL_Disk
- T2_IT_Pisa
- T0_CH_CERN_Export
- T1_FR_CCIN2P3_Buffer
- T1_IT_CNAF_Buffer
- T2_FR_GRIF_LLRL
- T1_DE_KIT_Disk
- T2_ES_JFCA
- T1_ES_PIC_Buffer
- T1_RU_JINR_Disk



- T2_US_Nebraska
- T2_CH_CERN_Export
- T1_IT_CNAF_Disk
- T2_DE_DESY
- T1_US_FNAL_Buffer
- T1_US_FNAL_Disk
- T2_AT_Vienna
- T1_ES_PIC_Buffer
- T2_BE_IJHE
- T0_CH_CERN_Disk
- T2_US_Vanderbilt
- T1_ES_PIC_Disk
- T2_BR_URERJ
- T1_UK_RAL_Disk
- T1_RU_JINR_Buffer
- T2_FR_IPHC
- T2_US_UCSD
- T1_UK_RAL_Disk
- T2_CH_CERN
- T2_IT_Legnaro
- T2_UA_KIPT
- T2_DE_RWTH
- T1_DE_KIT_Buffer
- T1_IT_CNAF_Buffer
- T1_FR_CCIN2P3_Buffer
- T1_FR_CCIN2P3_Disk
- T3_US_FNALLPC
- T2_CH_CSCS
- T2_GR_Ioannina
- T2_EE_Estonia
- T2_BE_UCL
- T2_CN_Beijing
- T2_BR_SPRACE
- T2_PL_Swierk
- T1_UK_RAL_Buffer
- T3_IN_VBU

Maximum: 150,235 , Minimum: 0.00 , Average: 16,855 , Current: 56,518

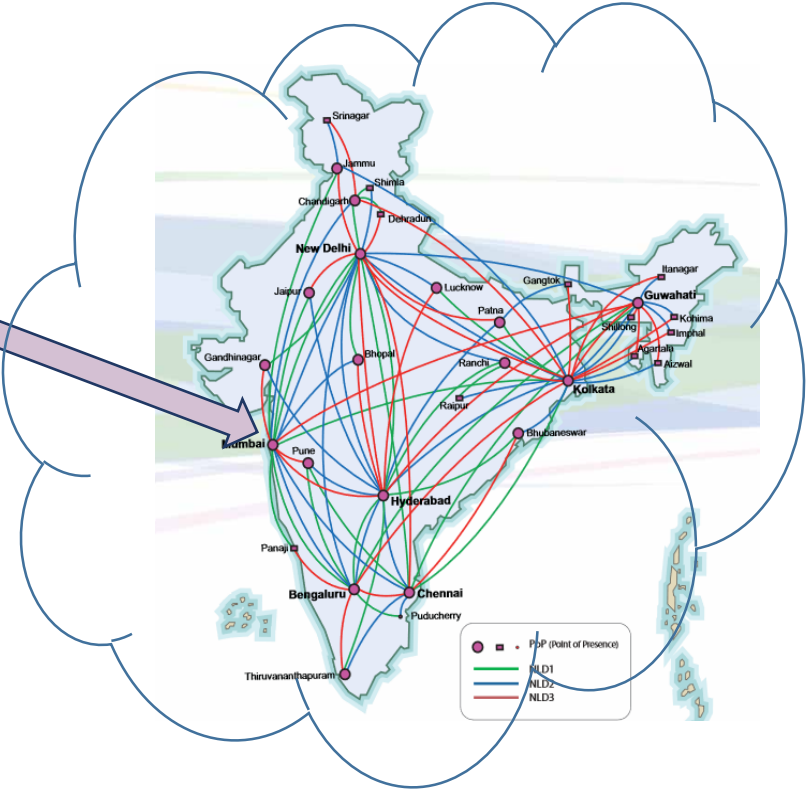
Network

Fully operational LHCONe peering.



10G Dedicated
P2P to CERN

India-LHC L3 VPN on NKN



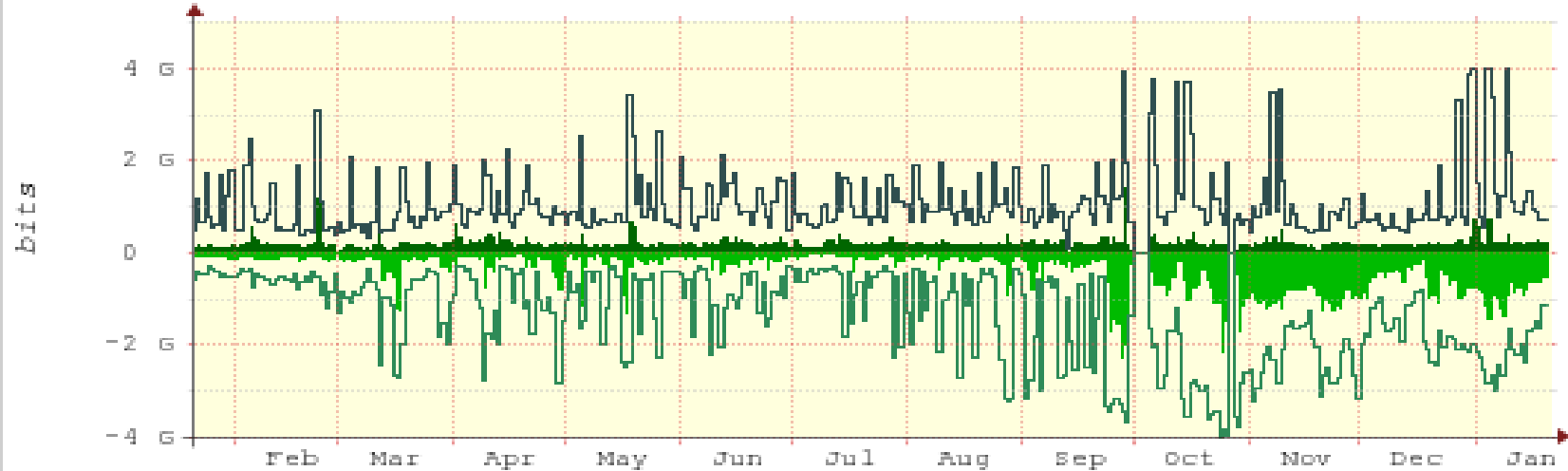
Collaborating Indian Institutes connected on NKN

- TIFR, Mumbai WLCG Site
- VECC, Kolkata WLCG Site
- BARC, Mumbai
- Delhi University, New Delhi
- SINP, Kolkata
- Punjab University, Chandigarh
- IIT Mumbai, Mumbai
- IIT, Chennai)
- RRCAT, Indore
- IIT, Bhubaneswar
- IPR, Ahmedabad
- NISER, Bhubneshwar
- IOP, Bhubneshwar
- Vishva-Bharti University (Santiniketan, WB)
- IISER, Pune

- TIFR-CERN bandwidth is 10 Gbps
- TIFR-NKN bandwidth upgraded to 10 Gbps.
- Successfully consolidated Indian WLCG network.

TIFR<->LHCONE traffic last one year

TIFR Total Traffic



	Avg	Max	last	Peak:
from TIFR	217.09M	1.40G	214.72M	4.01G
to TIFR	396.84M	2.25G	552.41M	3.98G

Last update: Wed Jan 20 2016 19:11:24

CERN

Network Link Upgraded to 10G
Dedicated from 3rd Feb 2016

10G



	Avg	Max	last	Peak:
from TIFR	329.27M	1.09G	214.40M	8.83G
to TIFR	591.02M	1.71G	1.38G	3.58G

Last update: Wed Apr 06 2016 20:04:31

CERN



Composite view of health of LHC peers from PerfSONAR at TIFR

- With the evolution of the CMS computing model, there are upgrades at all the levels.. Data access and data placement, submission infrastructure...etc
- Health of the network has become even more crucial
- The only way to keep multi-domain, international scale networks error-free is to test and monitor continuously end-to-end to detect soft errors and facilitate their isolation and correction
- Continuous upgrades Hardware .. Software ...and supporting infrastructure
- More involvement in CMS central computing.. Software development and testing...

Thank you