



US CMS Tier1 Facility Network at Fermilab

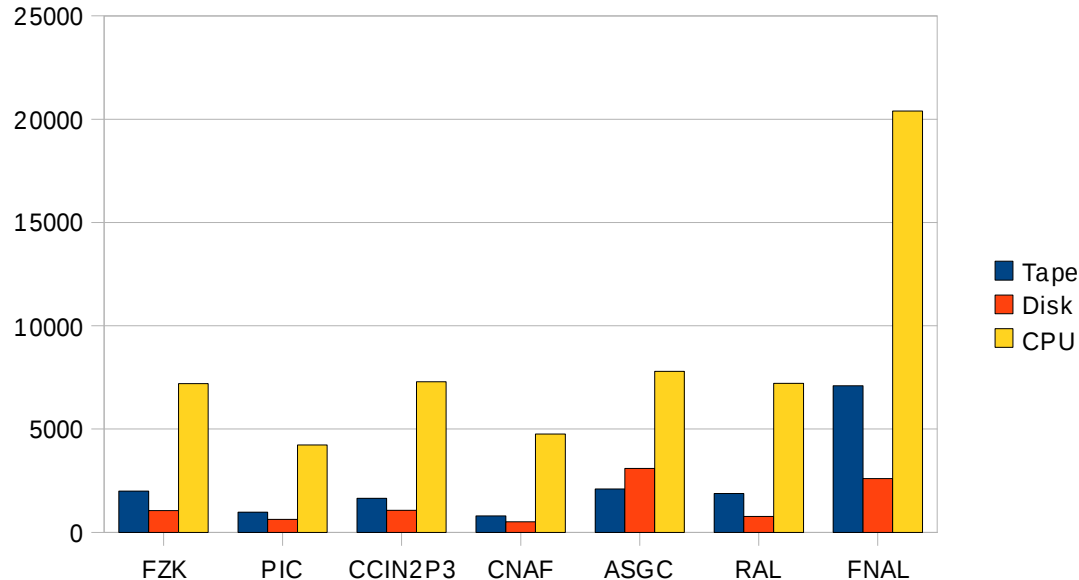
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Fermilab, Computing Division***

**Winter 2010 ESCC/Internet2 Joint Techs
Salt Lake City, Utah, January 31 – February 4, 2010**

Tier1 Facilities for CMS Experiment



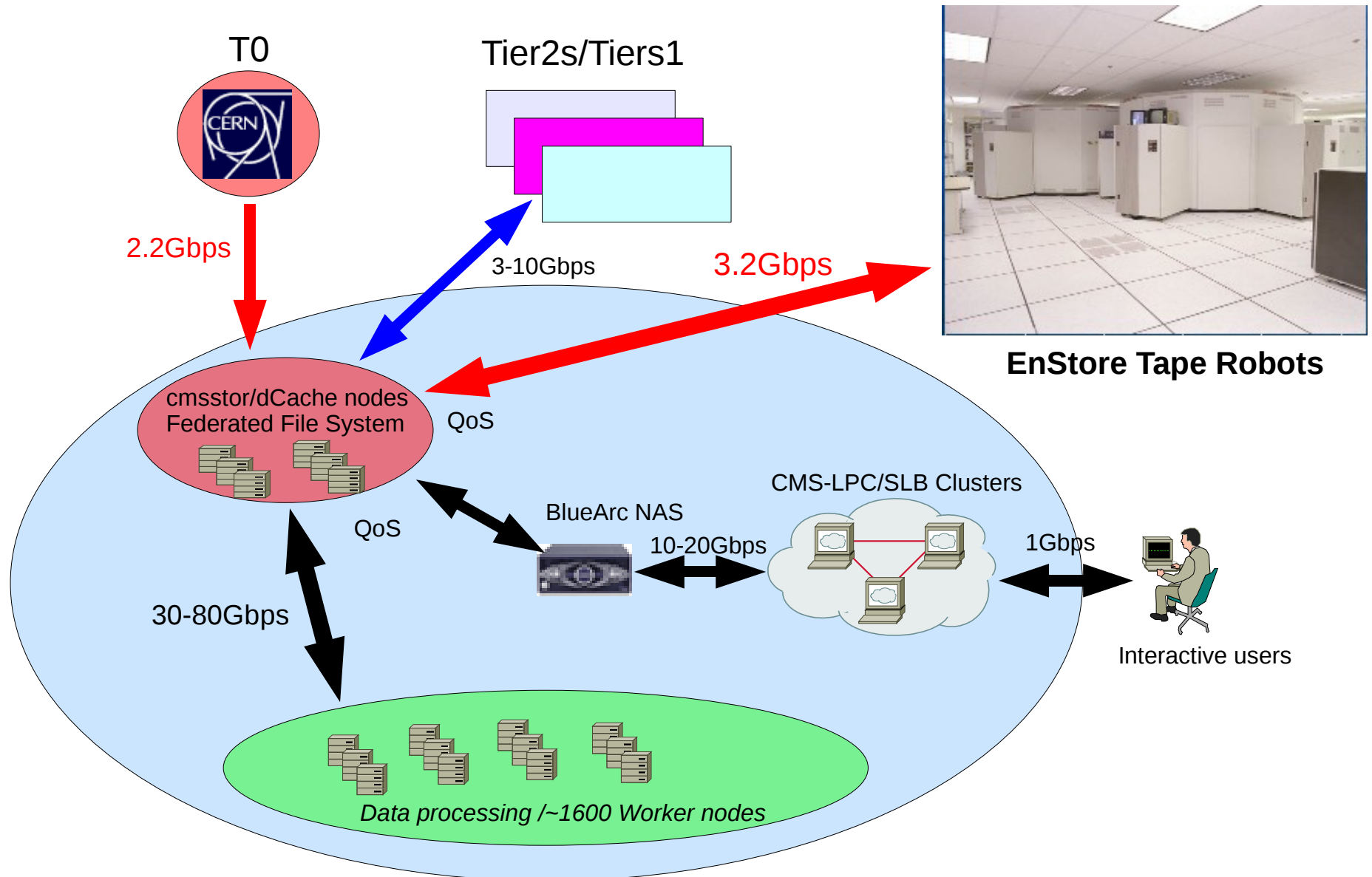
US CMS Tier1 is one of 7 Tier1 centers for CMS experiment, a biggest one.



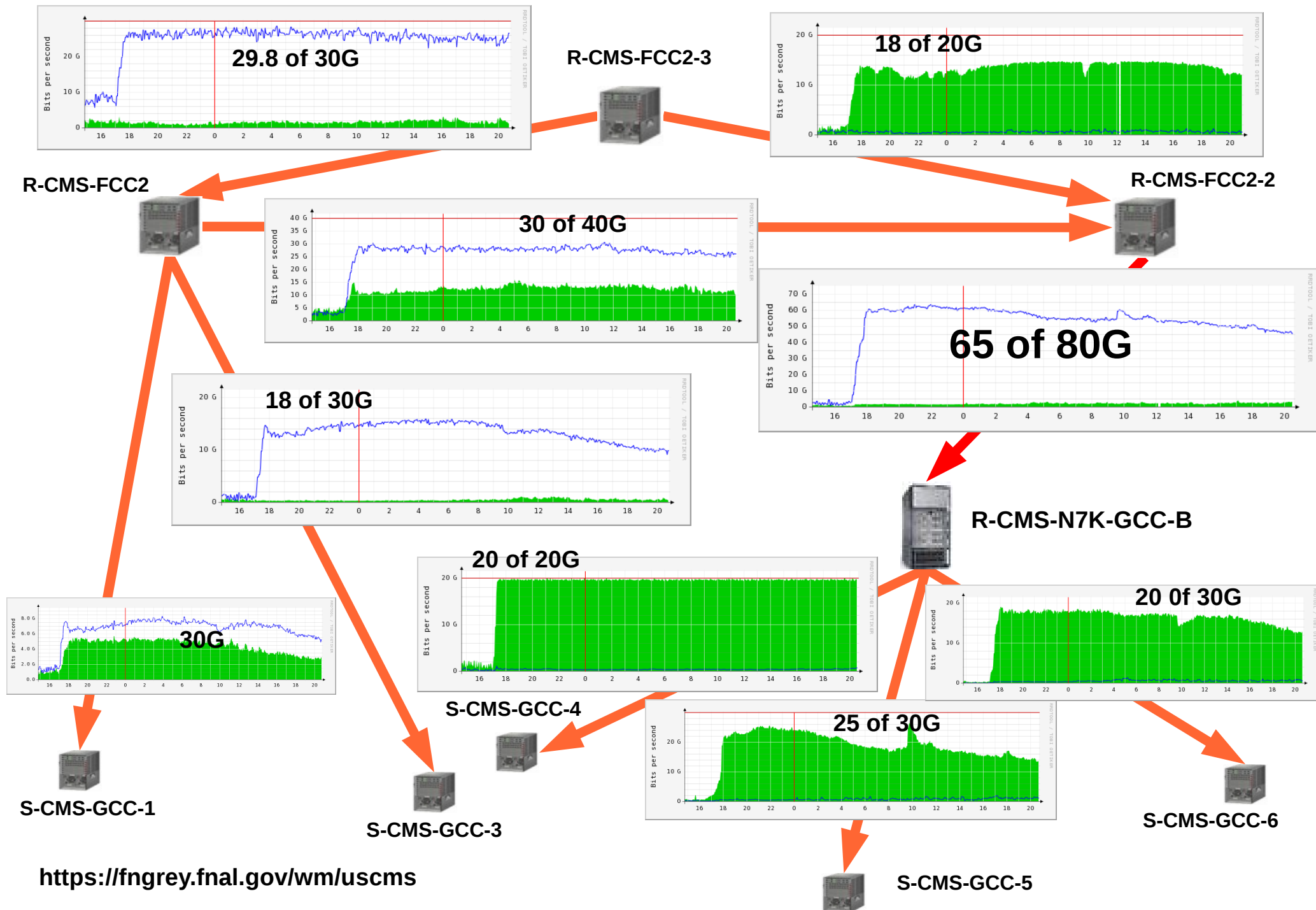
3 buildings		
Worker Nodes	1600	1x1GE
CMSStore with 2x1GE	200	2x1GE
Servers	150	1x1GE
2 x Nexus 7000	512 x 10GE	
8 x C6509	2448 x1GE	

		Tape(TB)	Disk(TB)	CPU(kHS06)
Tier0	Switzerland	10000	2200	44000
FZK	Germany	2000	1060	7200
PIC	Spain	974	630	4232
CCIN2P3	France	1650	1067	7296
CNAF	Italy	804	516	4760
ASGC	Taiwan	2100	3100	7800
RAL	UK	1887	774	7208
FNAL	US	7100	2600	20400

A model of USCMS-T1 Network data traffic



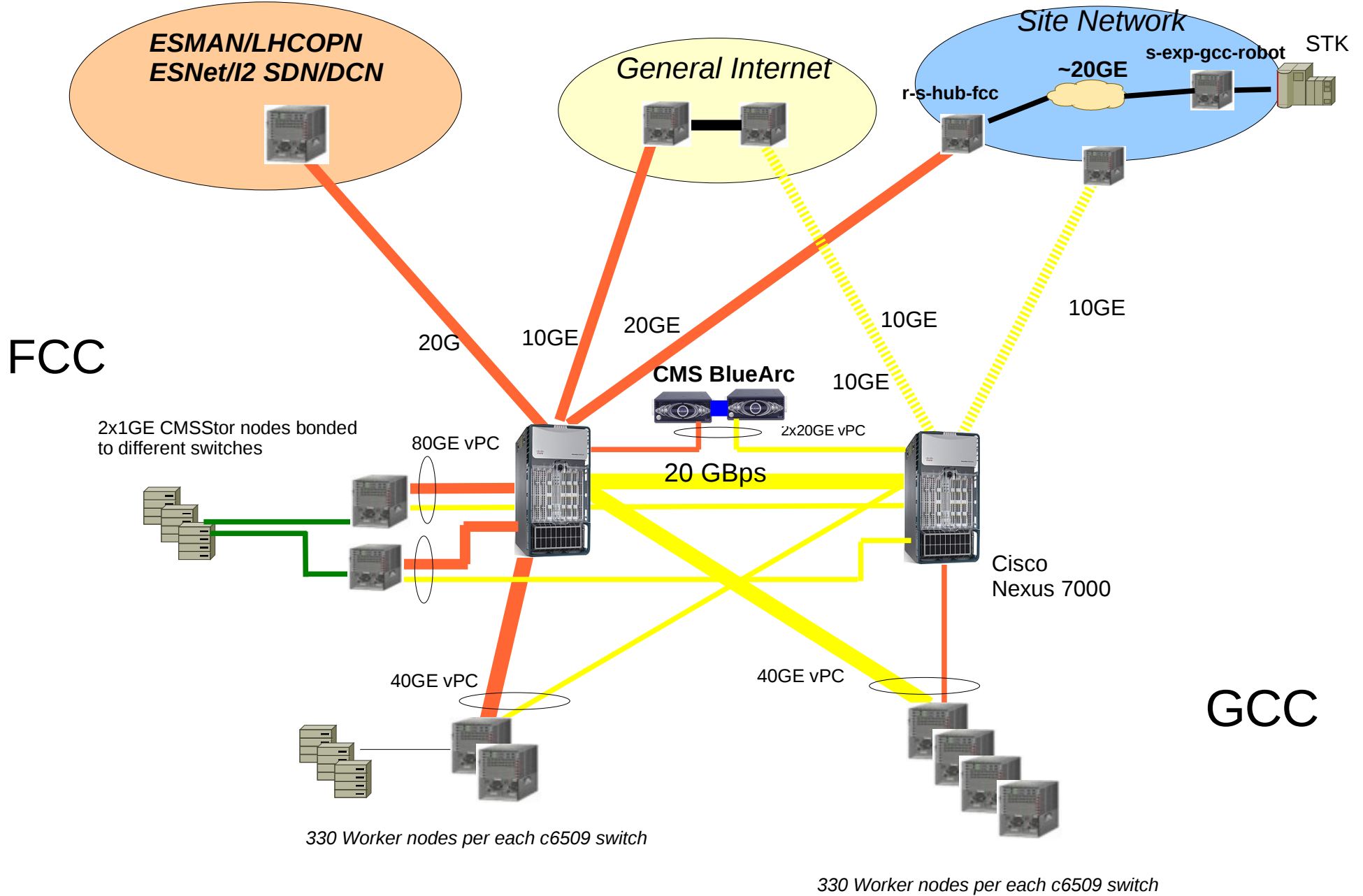
USCMS Tier1: Data Analysis Traffic 02/05 – 02/06/09



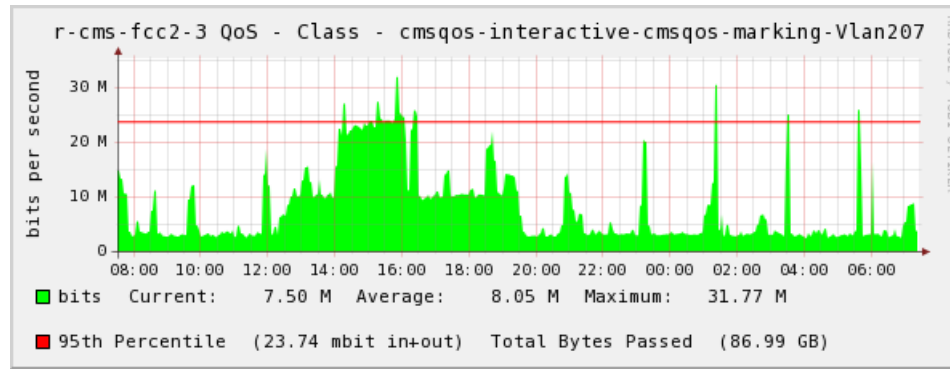
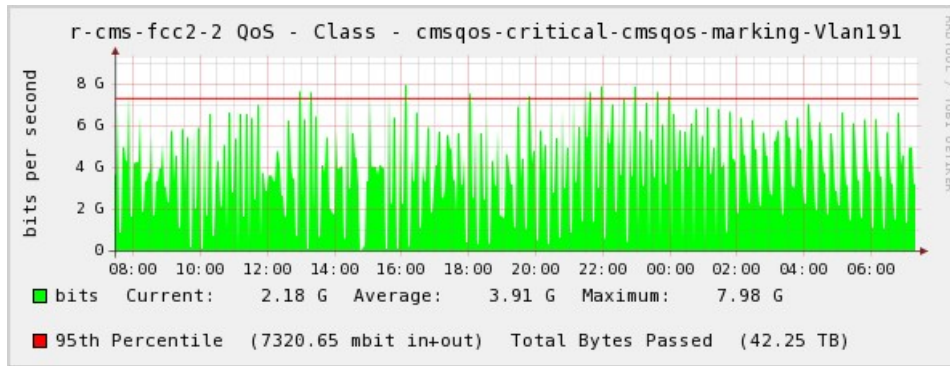
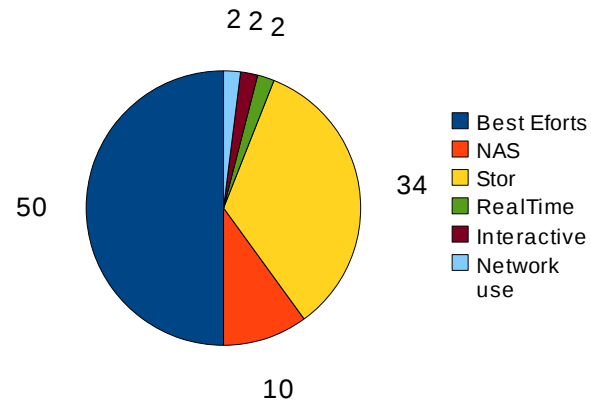


US CMS Tier1 Network

January 2010 SAB



Allocation of LAN Bandwidth per CMS Traffic Classes



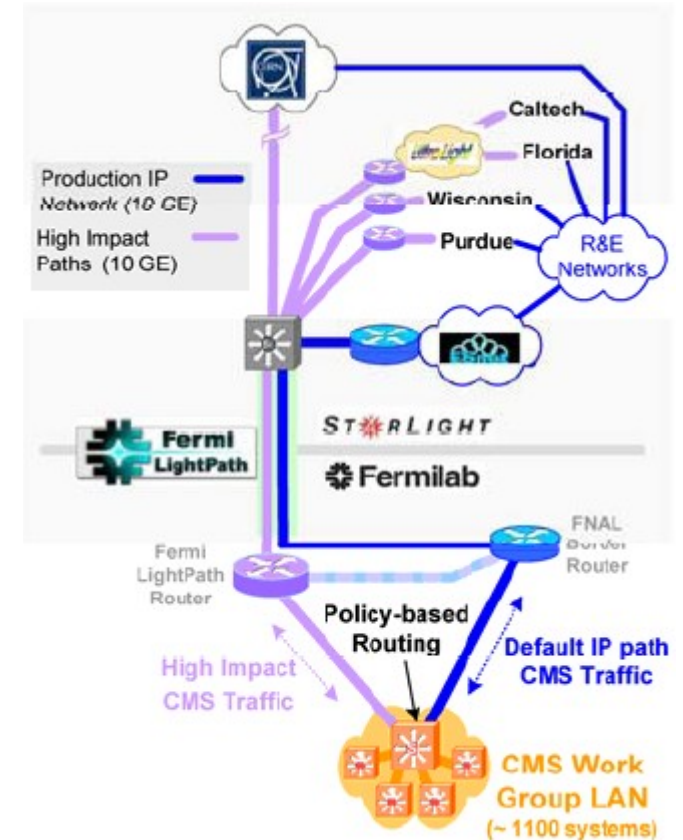
	BW%	80GE	40GE
Network Use	2	1.6Gbps	0.8Gbps
Interactive, LPC	2	1.6Gbps	0.8Gbps
Real-Time, Monitoring, DB Transactions	2	1.6Gbps	0.8Gbps
Critical (Store Nodes, EnStore Traffic)	34	27.2Gbps	13.6Gbps
NAS	10	8Gbps	4Gbps
Best Efforts	50	40Gbps	20Gbps



End-to-End Circuits

USCMS-T1 has a long history of using USLHCNet, ESNet/SDN and Internet2 DCN circuits

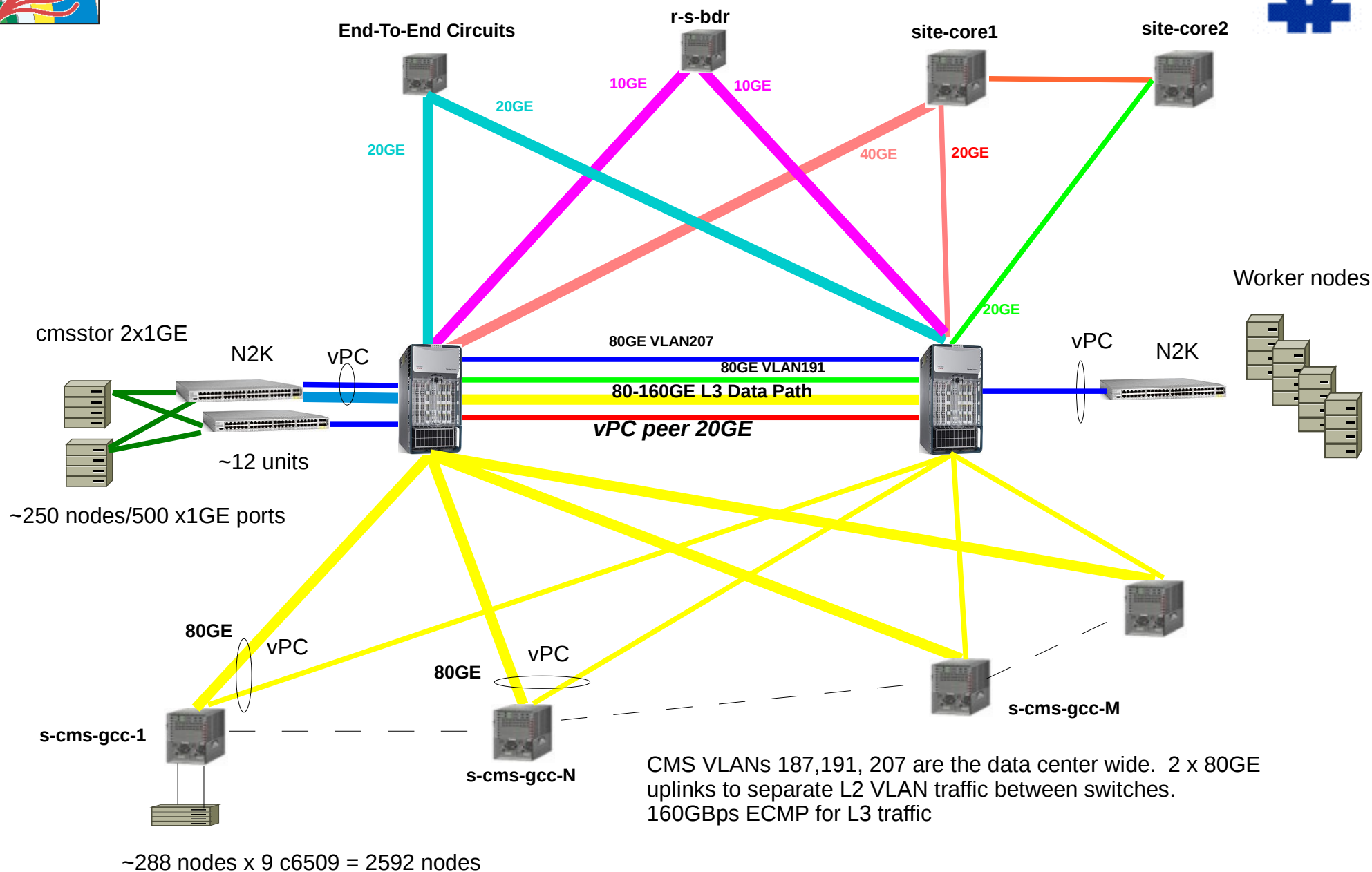
Circuit	Country	Affiliation	BW
LHCOPN	Switzerland	T0	8.5G
LHCOPN Secondary	Switzerland	T0	8.5G
LHCOPN Backup	Switzerland	T0	3.5G
DE-KIT	Germany	T1	1G
IN2P3	France	T1	2x1G
ASNet/ASGC	Taiwan	T1	2.5G
CALTECH	USA	T2	10G
Purdue	USA	T2	10G
UWISC	USA	T2	10G
UFL	USA	T2	10G
UNL	USA	T2	10G
MIT	USA	T2	10G
UCSD	USA	T2	10G
TIFR	India	T2	1G
UTK	USA	T3	1G
McGill	Canada	CDF/D0	1G
Cesnet, Prague	Czech	D0	1G



SLA monitor, IOS Track objects to automatically fail over traffic if circuit is down



USCMS Tier1 Network in FY10-11



CMS LAN Network Weather Map (1min)

