Fermilab Data Communications and Networking

Network Monitoring at Fermilab

CMS Computing Meeting

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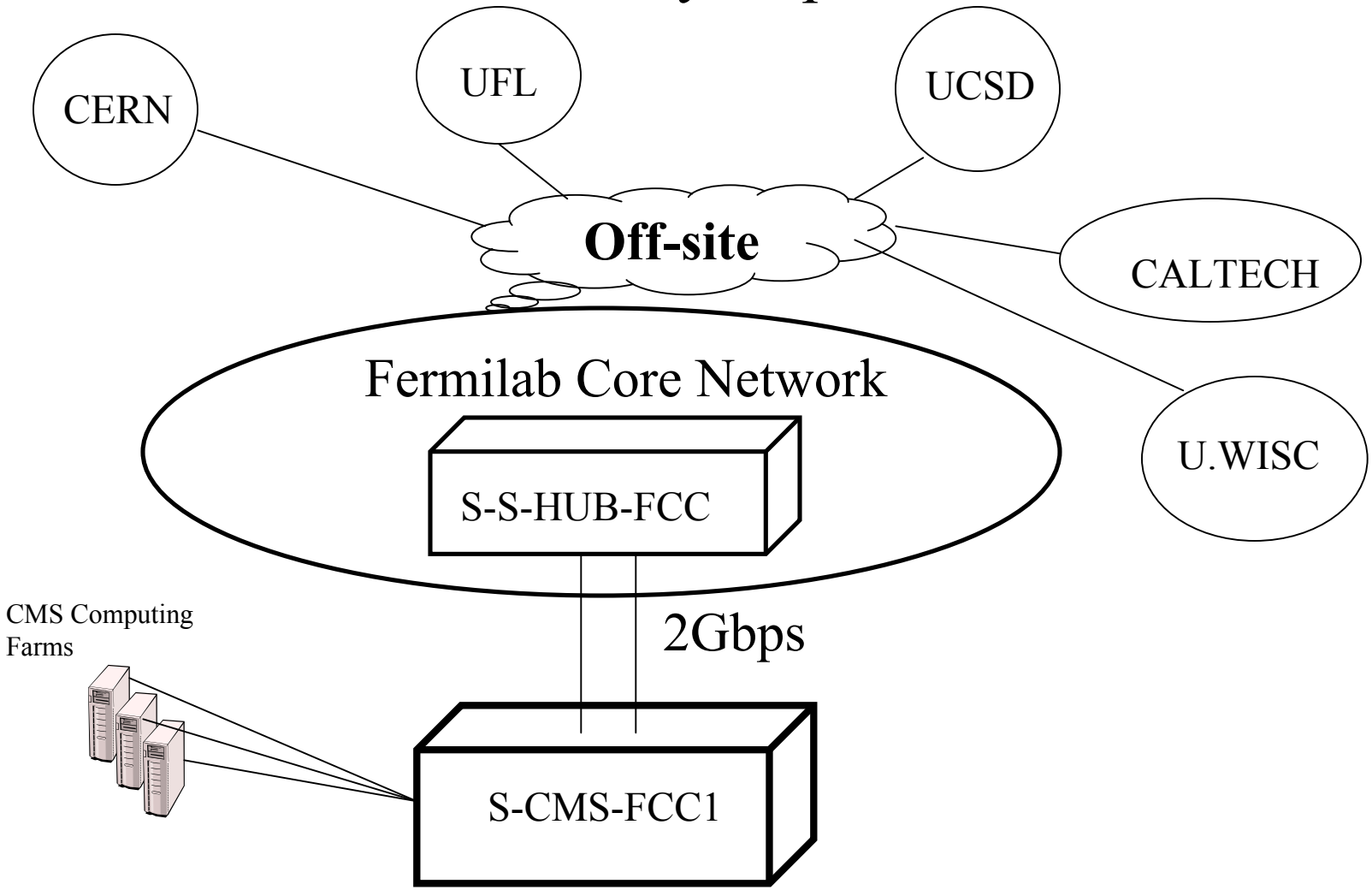
DCN/CCF Fermilab, March 2003

Outline of the talk:

- What do we monitor for CMS
- Switch port statistics
- External connectivity (pinger)
- topN - top 20 hosts, scanners, pairs
- Local groups, external sites traffic (netflow based)
- CMS traffic
- Summary

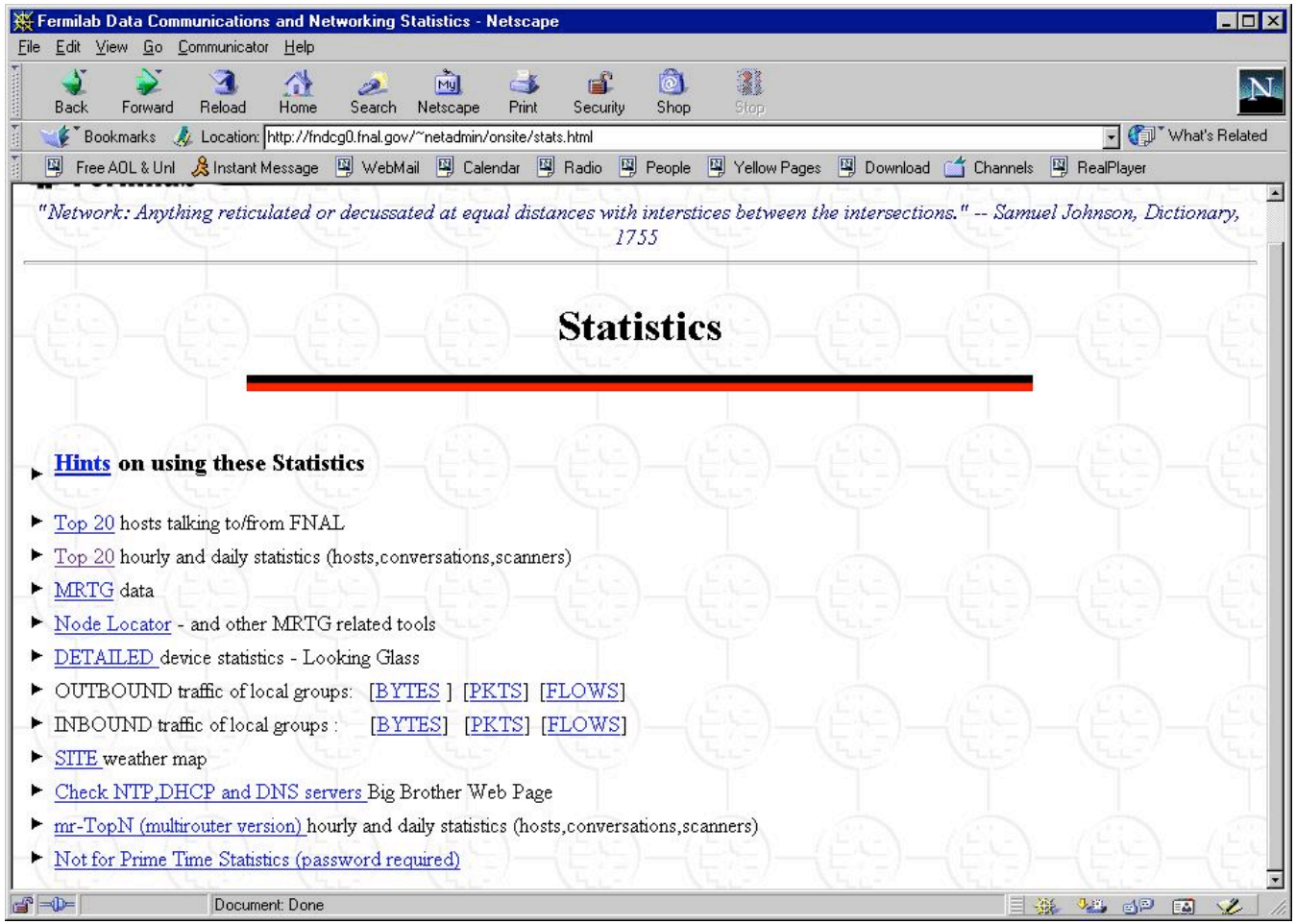
Connectivity map



Start Point for Network Statistics

HTTP://www-dcg.fnal.gov

Requires userid/password to access from Offsite

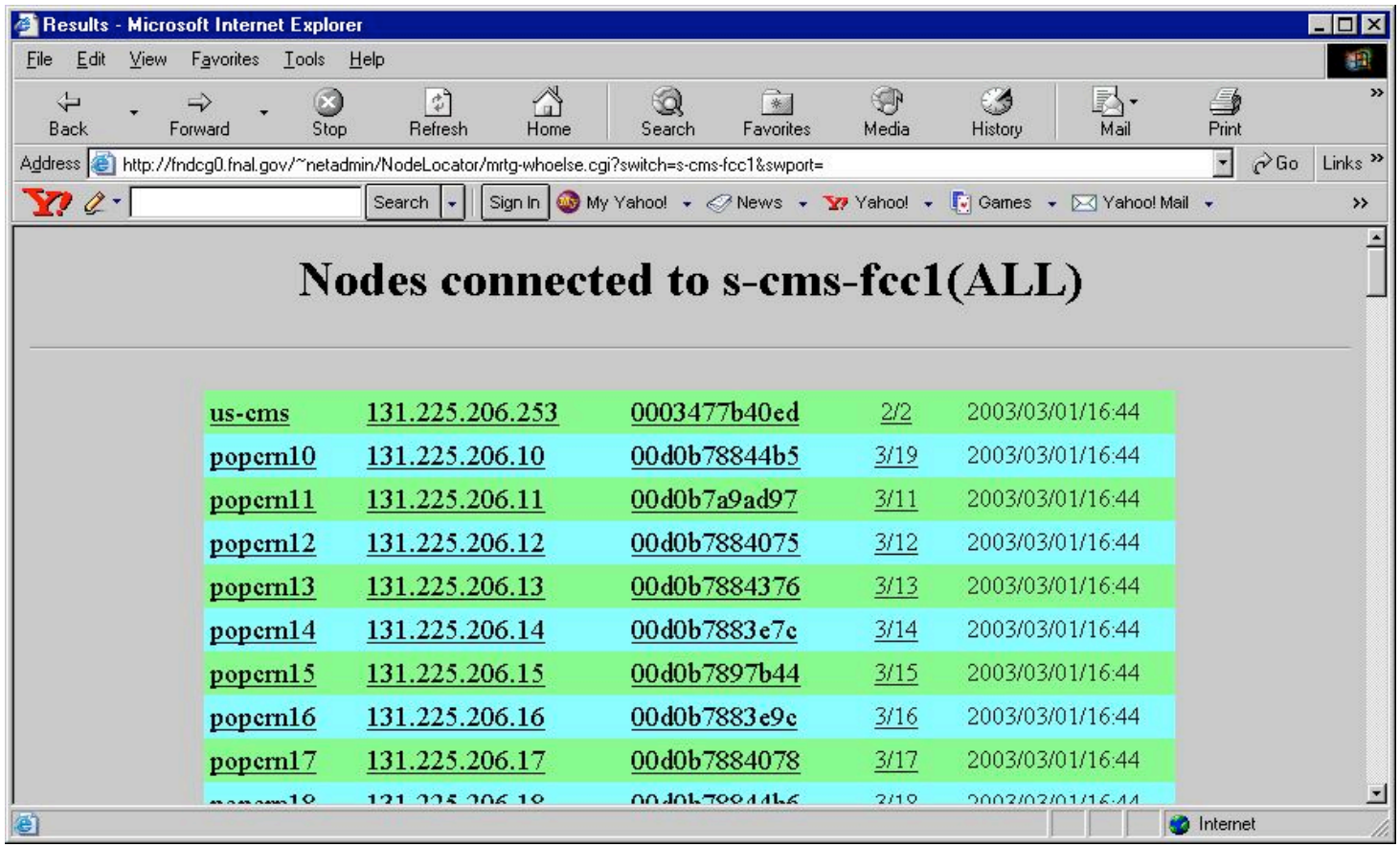


Monitoring of local traffic

HTTP://www-dcg.fnal.gov/

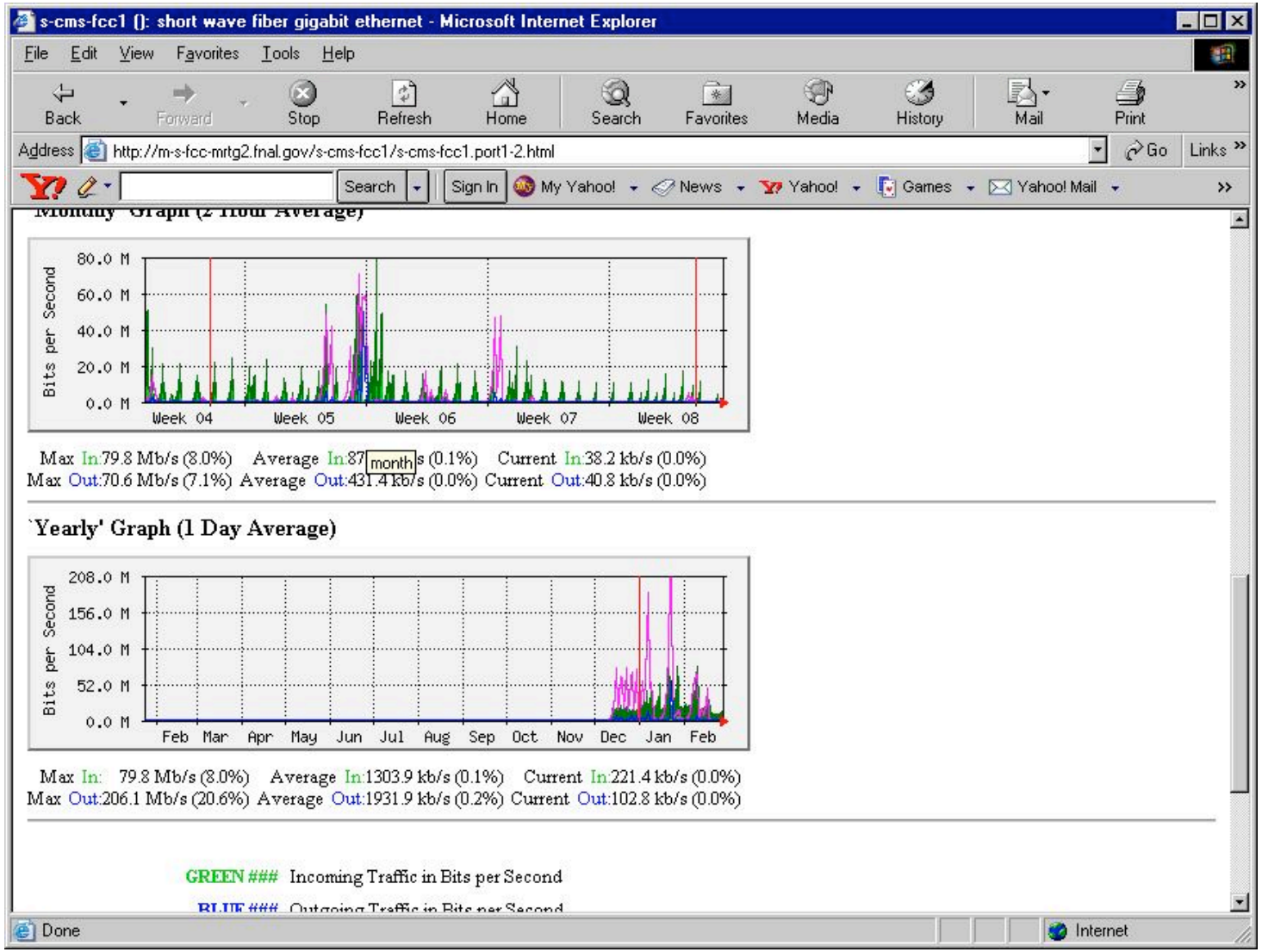
Statisics -> Node Locator or MRTG data

Uplinks to the core are ports **1/1** and **1/2**



us-cms	131.225.206.253	0003477b40ed	2/2	2003/03/01/16:44
popcrn10	131.225.206.10	00d0b78844b5	3/19	2003/03/01/16:44
popcrn11	131.225.206.11	00d0b7a9ad97	3/11	2003/03/01/16:44
popcrn12	131.225.206.12	00d0b7884075	3/12	2003/03/01/16:44
popcrn13	131.225.206.13	00d0b7884376	3/13	2003/03/01/16:44
popcrn14	131.225.206.14	00d0b7883e7c	3/14	2003/03/01/16:44
popcrn15	131.225.206.15	00d0b7897b44	3/15	2003/03/01/16:44
popcrn16	131.225.206.16	00d0b7883e9c	3/16	2003/03/01/16:44
popcrn17	131.225.206.17	00d0b7884078	3/17	2003/03/01/16:44

MRTG Data for s-cms-fcc1- port 1/1



External Connectivity

HTTP://PINGER.FNAL.GOV

We are hep.net

Generate Network Performance Graphs - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media History Mail Print

Address http://pinger.fnal.gov/cgi-bin/graph_pings_gd.pl?src_regexp=hep.net&dest_regexp=*caltec* Go Links

Search Sign In My Yahoo! News Yahoo! Games Yahoo! Mail

Generate Network Performance Graphs

You can cut down the list of choices shown in the scroll-list below by entering strings that must be matched before it will show up in the list. You can use * to match any string. For example *hep.net will match any node ending in hep.net.

Source Contains: hep.net **Destination Contains** *caltec* Match It

Links:

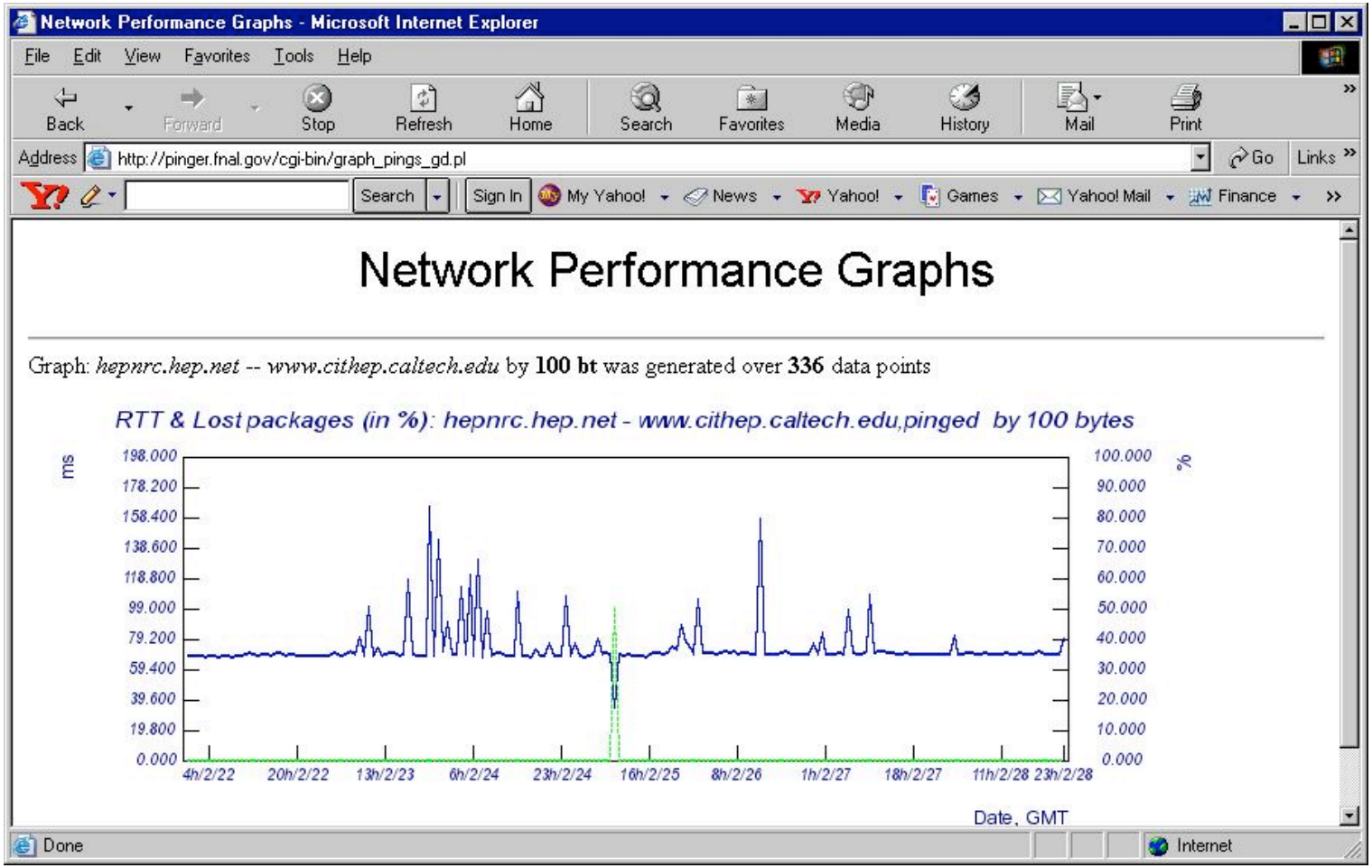
hepnrc.hep.net -> hep505.cithep.caltech.edu (100 byte packets)
hepnrc.hep.net -> hep505.cithep.caltech.edu (1000 byte packets)
hepnrc.hep.net -> www.cithep.caltech.edu (100 byte packets)
hepnrc.hep.net -> www.cithep.caltech.edu (1000 byte packets)
hepnrc.hep.nethepnrc.hep.net -> hep505.cithep.caltech.edu (100 byte packets)

From:
Month: Feb
Day: 22
Year: 2003

To:
Month: Feb
Day: 28

Done Internet

Fermilab -Caltech graphs



TopN - top 20 outbound/inbound hosts

Pairs2Table - Netscape

File Edit View Go Communicator Help

Back Forward Reload Home Search Netscape Print Security Shop Stop

Bookmarks Location: http://fndcg0.fnal.gov/~netadmin/pairs2table.cgi?file=/usr/local/apache/htdocs/topN/Daily/2003_02_28/Pairs_2003_02_28 What's Related

Free AOL & Unl Instant Message WebMail Calendar Radio People Yellow Pages Download Channels RealPlayer

=== 03/01/03 03:07 Top 20 daily conversations with OnSite and OffSite source from 02/28/03 ===

Total outgoing traffic: 810715 (MB) 669269206 pkts
Total incoming traffic: 203311 (MB) 462094763 pkts
Total flows: 9609329

TopN OutBound Data Streams

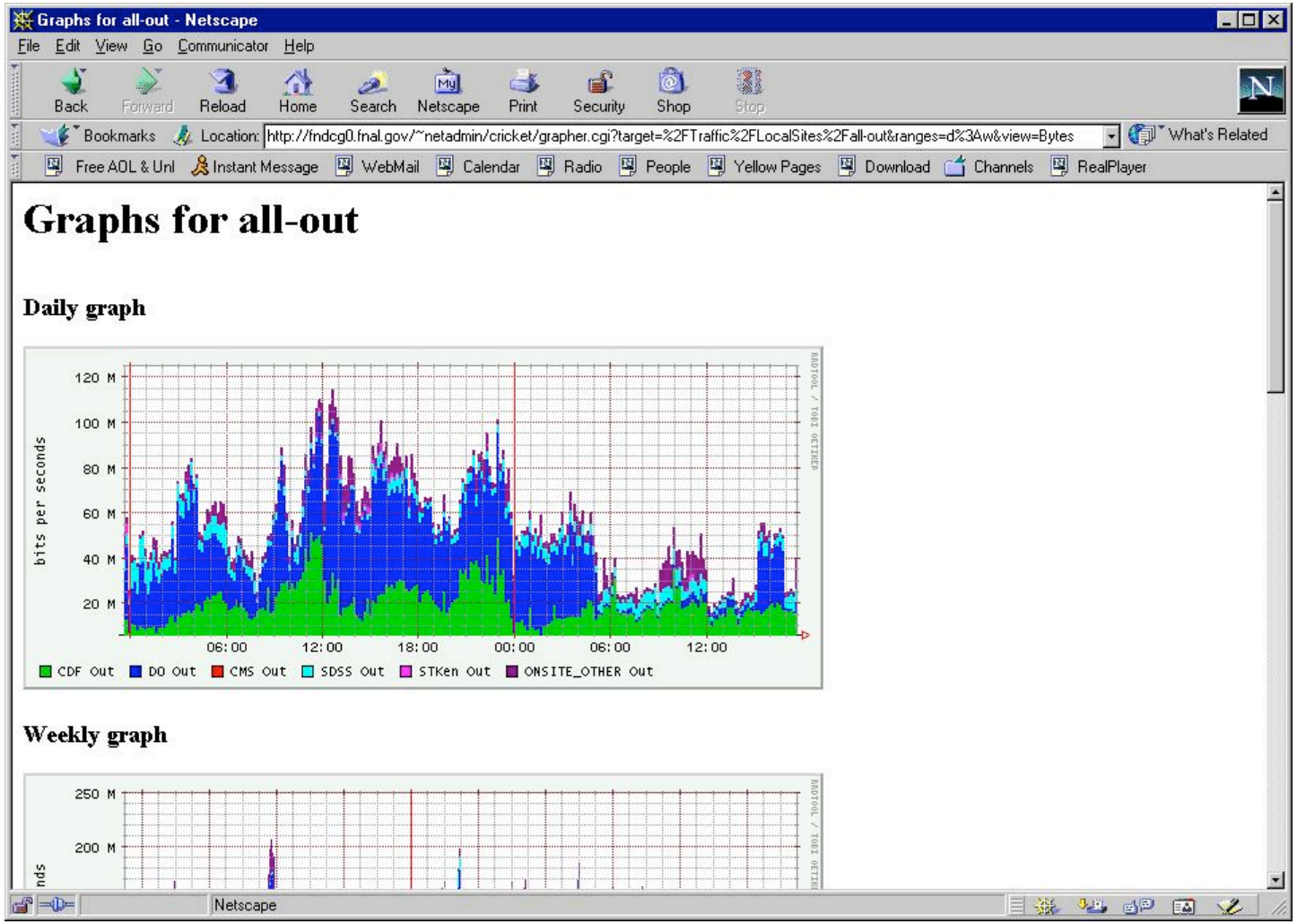
Source	Destination	Traffic (MB)	Packets
d0mino.fnal.gov	dokkum.hef.kun.nl	292498	204575143
d0mino.fnal.gov	ccsvsn02.in2p3.fr	47741	34278680
fcdfsgi2.fnal.gov	202.13.200.42	42830	29941590
fcdfsgi2.fnal.gov	sara.saske.sk	34536	24149200
d0mino.fnal.gov	golias.farm.particle.cz	32053	22409303
fcdfdata016.fnal.gov	cdf.fzk.de	30002	22157837
fcdfsgi2.fnal.gov	sgb.tsukuba.jp.hep.net	26570	18724336
fcdfsgi2.fnal.gov	cdf.phys.ufl.edu	19725	15228101
sdssdp6.fnal.gov	gs80.sk.nao.ac.jp	17172	12224330
sdssdp2.fnal.gov	photo4.astro.Princeton.EDU	15000	11061225
fcdfdata029.fnal.gov	pcdf4.pd.infn.it	13423	9384375
sdssdp2.fnal.gov	photo5.astro.Princeton.EDU	11862	8756803
fcdfdata056.fnal.gov	cdf19.uchicago.edu	11696	8257898
fcdfdata029.fnal.gov	heplcdf2.harvard.edu	11275	7947962

TopN InBound Data Streams

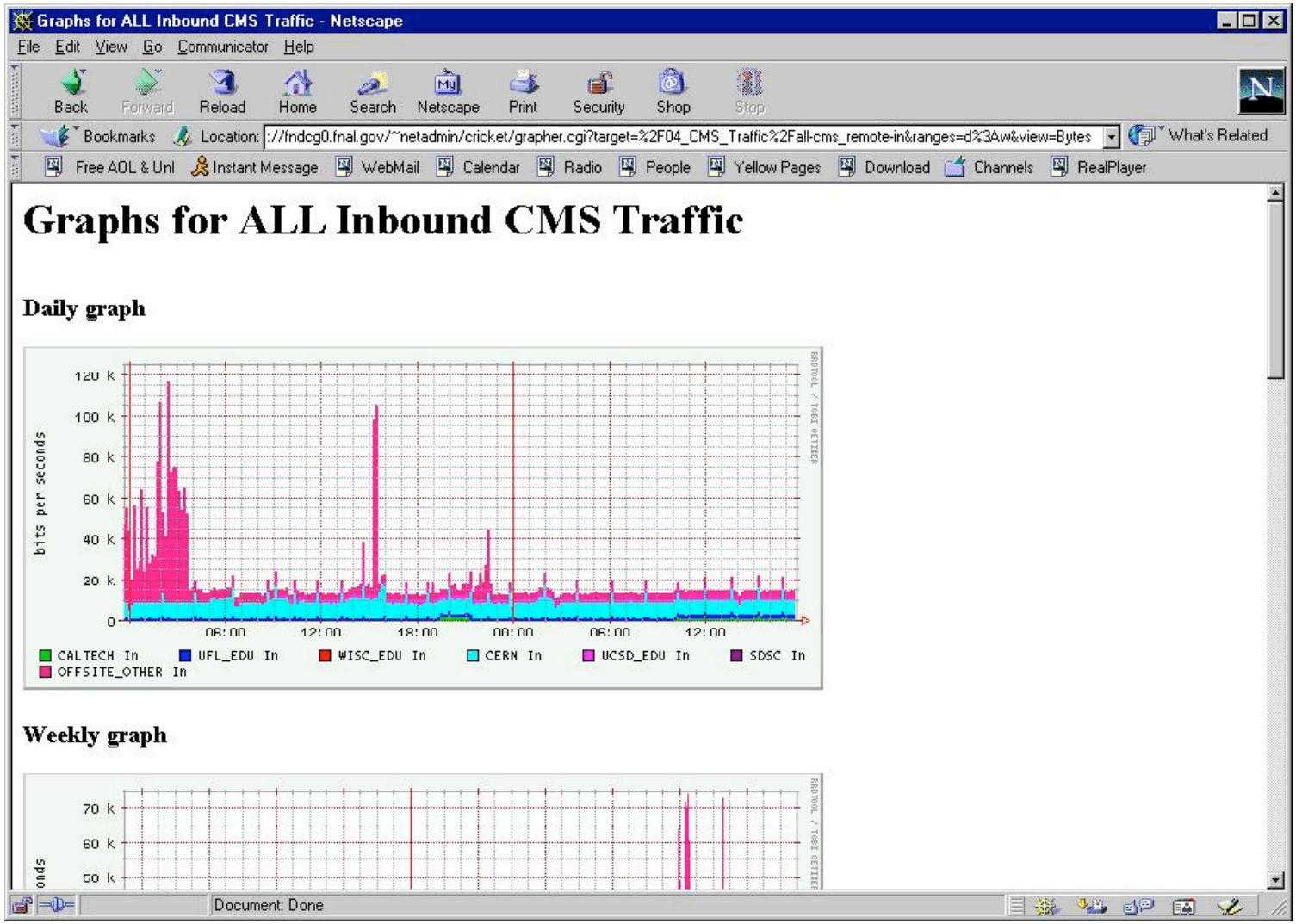
Source	Destination	Traffic (MB)	Packets
beowulf-server-tor-c3-gsr-if.one	fcdfdata031.fnal.gov	48838	34563014
turmoil.ncsa.uiuc.edu	qcdhome.fnal.gov	19786	13832508
fal000phys03.lancs.ac.uk	d0mino.fnal.gov	11622	8360809
ccd0.in2p3.fr	d0mino.fnal.gov	11287	7897692
schuur.nikhef.nl	d0mino.fnal.gov	8504	5995017
dmzmon0.deemz.net	pinger-dev.fnal.gov	8137	7432320
hexfm1.rutgers.edu	rutpc7.fnal.gov	7552	5581535
dokkum.hef.kun.nl	d0mino.fnal.gov	5598	107580183
cdfb.rl.ac.uk	nliv08.fnal.gov	5593	4030260
dhcp-c-148-166.eng.ohio-state.ed	csddev.fnal.gov	2407	2010911
hepfm007.uta.edu	d0mino.fnal.gov	2241	1573836
enisei.itep.ru	ncdf108.fnal.gov	2135	1528917
d0farm.hecr.tifr.res.in	d0mino.fnal.gov	1855	1298818
updates.redhat.com	lrep.fnal.gov	1780	1250550

Document: Done

Traffic of Local Groups and Remote Sites



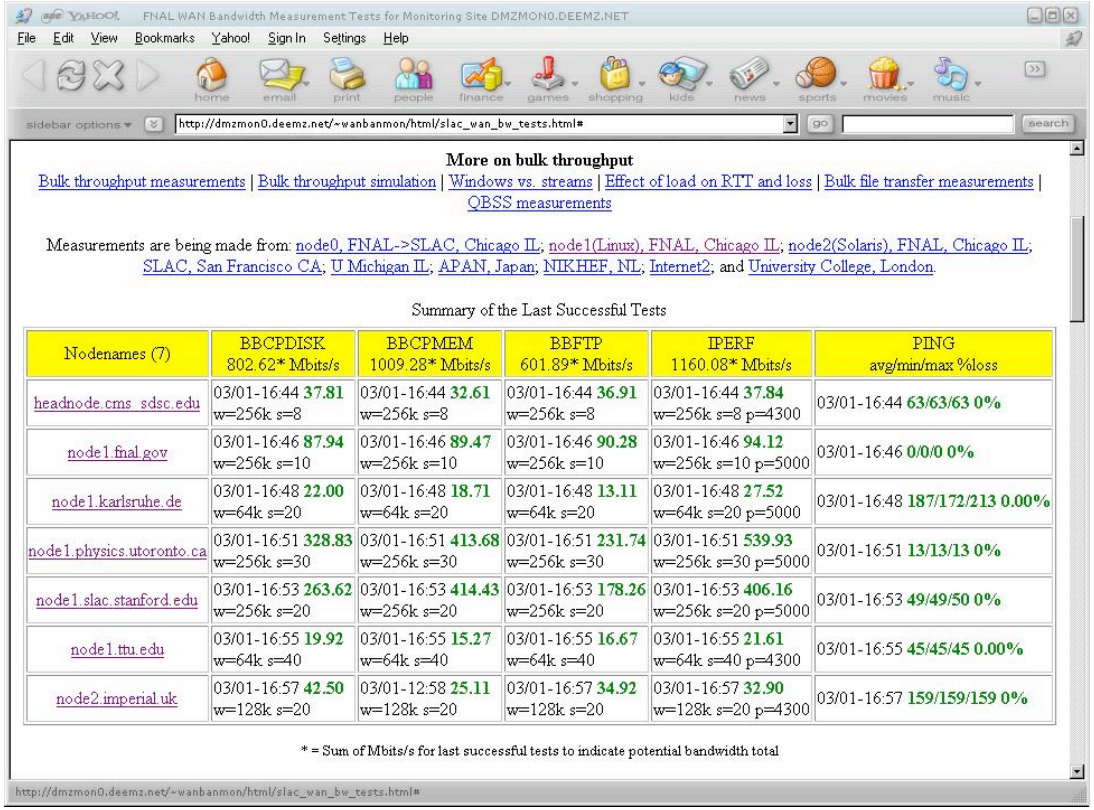
Breakdown of CMS traffic to/from Remote sites



IEPM-BW

http://dmzmon0.deemz.net/~wanbanmon/html/slac_wan_bw_tests.html

http://www-iepm.slac.stanford.edu/bw/



FNAL WAN Bandwidth Measurement Tests for Monitoring Site DMZMON0.DEEMZ.NET

File Edit View Bookmarks Yahoo! Sign In Settings Help

http://dmzmon0.deemz.net/~wanbanmon/html/slac_wan_bw_tests.html#

More on bulk throughput

Bulk throughput measurements | Bulk throughput simulation | Windows vs. streams | Effect of load on RTT and loss | Bulk file transfer measurements | QBSS measurements

Measurements are being made from: node0, FNAL->SLAC, Chicago IL; node1(Linux), FNAL, Chicago IL; node2(Solaris), FNAL, Chicago IL; SLAC, San Francisco CA; U Michigan IL; APAN, Japan; NIKHEF, NL; Internet2; and University College, London.

Summary of the Last Successful Tests

Nodenames (7)	BBCPDISK 802.62* Mbits/s	BBCPMEM 1009.28* Mbits/s	BBFTP 601.89* Mbits/s	IPERF 1160.08* Mbits/s	PING avg/min/max %loss
headnode.cms_sdsc.edu	03/01-16:44 **37.81** w=256k s=8	03/01-16:44 **32.61** w=256k s=8	03/01-16:44 **36.91** w=256k s=8	03/01-16:44 **37.84** w=256k s=8 p=4300	03/01-16:44 **63/63/63 0%**
node1.fnal.gov	03/01-16:46 **87.94** w=256k s=10	03/01-16:46 **89.47** w=256k s=10	03/01-16:46 **90.28** w=256k s=10	03/01-16:46 **94.12** w=256k s=10 p=5000	03/01-16:46 **0/0/0 0%**
node1.karlsruhe.de	03/01-16:48 **22.00** w=64k s=20	03/01-16:48 **18.71** w=64k s=20	03/01-16:48 **13.11** w=64k s=20	03/01-16:48 **27.52** w=64k s=20 p=5000	03/01-16:48 **187/172/213 0.00%**
node1.physics.utoronto.ca	03/01-16:51 **328.83** w=256k s=30	03/01-16:51 **413.68** w=256k s=30	03/01-16:51 **231.74** w=256k s=30	03/01-16:51 **539.93** w=256k s=30 p=5000	03/01-16:51 **13/13/13 0%**
node1.slac.stanford.edu	03/01-16:53 **263.62** w=256k s=20	03/01-16:53 **414.43** w=256k s=20	03/01-16:53 **178.26** w=256k s=20	03/01-16:53 **406.16** w=256k s=20 p=5000	03/01-16:53 **49/49/50 0%**
node1.ttu.edu	03/01-16:55 **19.92** w=64k s=40	03/01-16:55 **15.27** w=64k s=40	03/01-16:55 **16.67** w=64k s=40	03/01-16:55 **21.61** w=64k s=40 p=4300	03/01-16:55 **45/45/45 0.00%**
node2.imperial.uk	03/01-16:57 **42.50** w=128k s=20	03/01-12:58 **25.11** w=128k s=20	03/01-16:57 **34.92** w=128k s=20	03/01-16:57 **32.90** w=128k s=20 p=4300	03/01-16:57 **159/159/159 0%**

* = Sum of Mbits/s for last successful tests to indicate potential bandwidth total

http://dmzmon0.deemz.net/~wanbanmon/html/slac_wan_bw_tests.html#

Summary:

- Start point http://www-dcg.fnal.gov
- Node Locator & MRTG - local traffic & troubleshooting
- topN - top 20 inbound/outbound talkers
- pinger - RTT & packet loss
- Local groups and remote sites traffic (netflow based)
- Breakdown of CMS traffic
- IEPM-BW - active performance measurements