

# EXPReS Progress Meeting

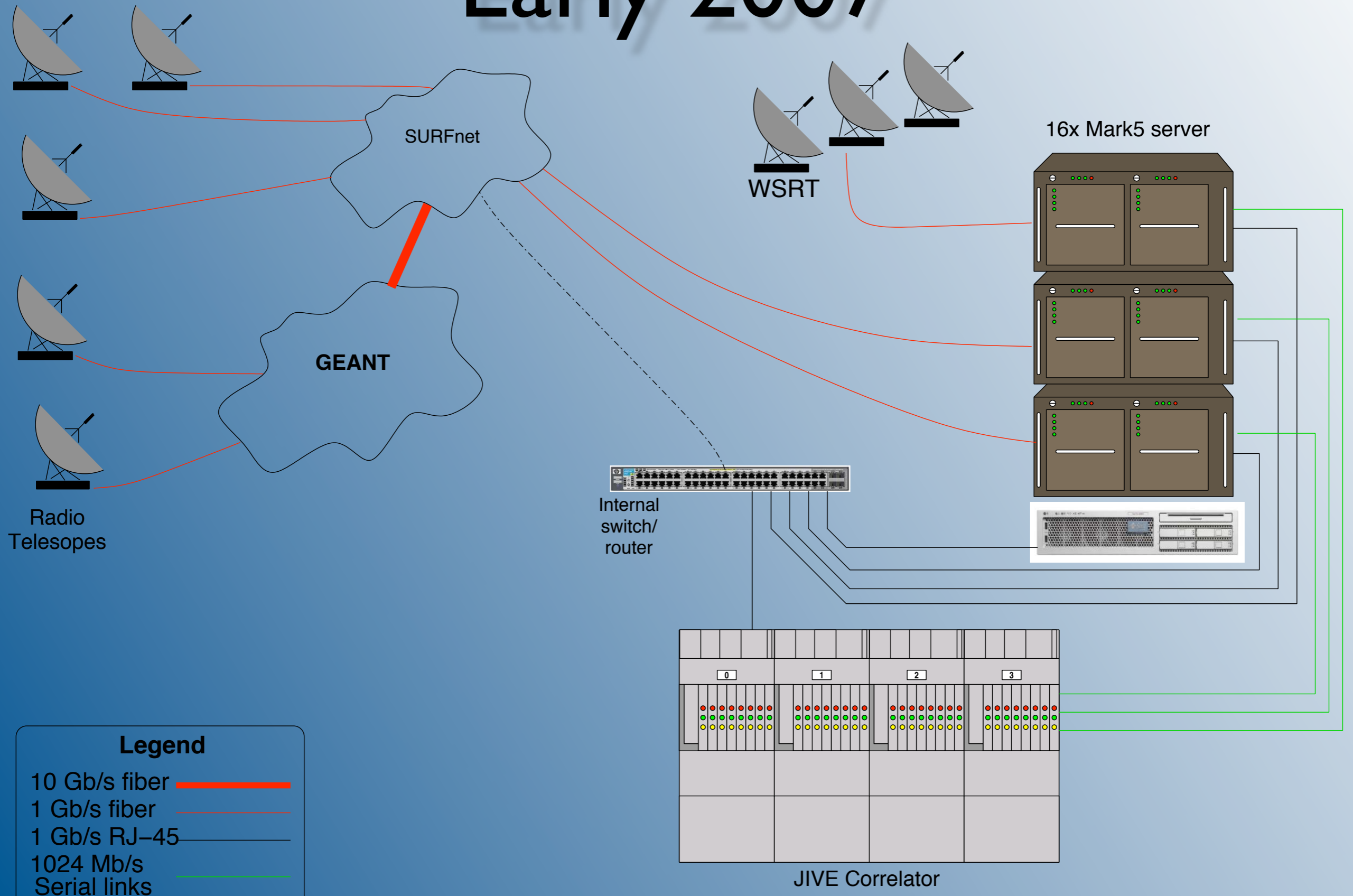
Paul Boven



# Early 2007

- ★ 6x 1 Gb/s to Amsterdam (SURFnet)
- ★ 1x 1 Gb/s to WSRT
- ★ 2 lightpaths Amsterdam - UK
- ★ Netherlight IP-space
- ★ All switching/routing in Amsterdam (SURFnet)
- ★ MkV: 1x 1.3GHz P3
- ★ 256 Mb/s operations

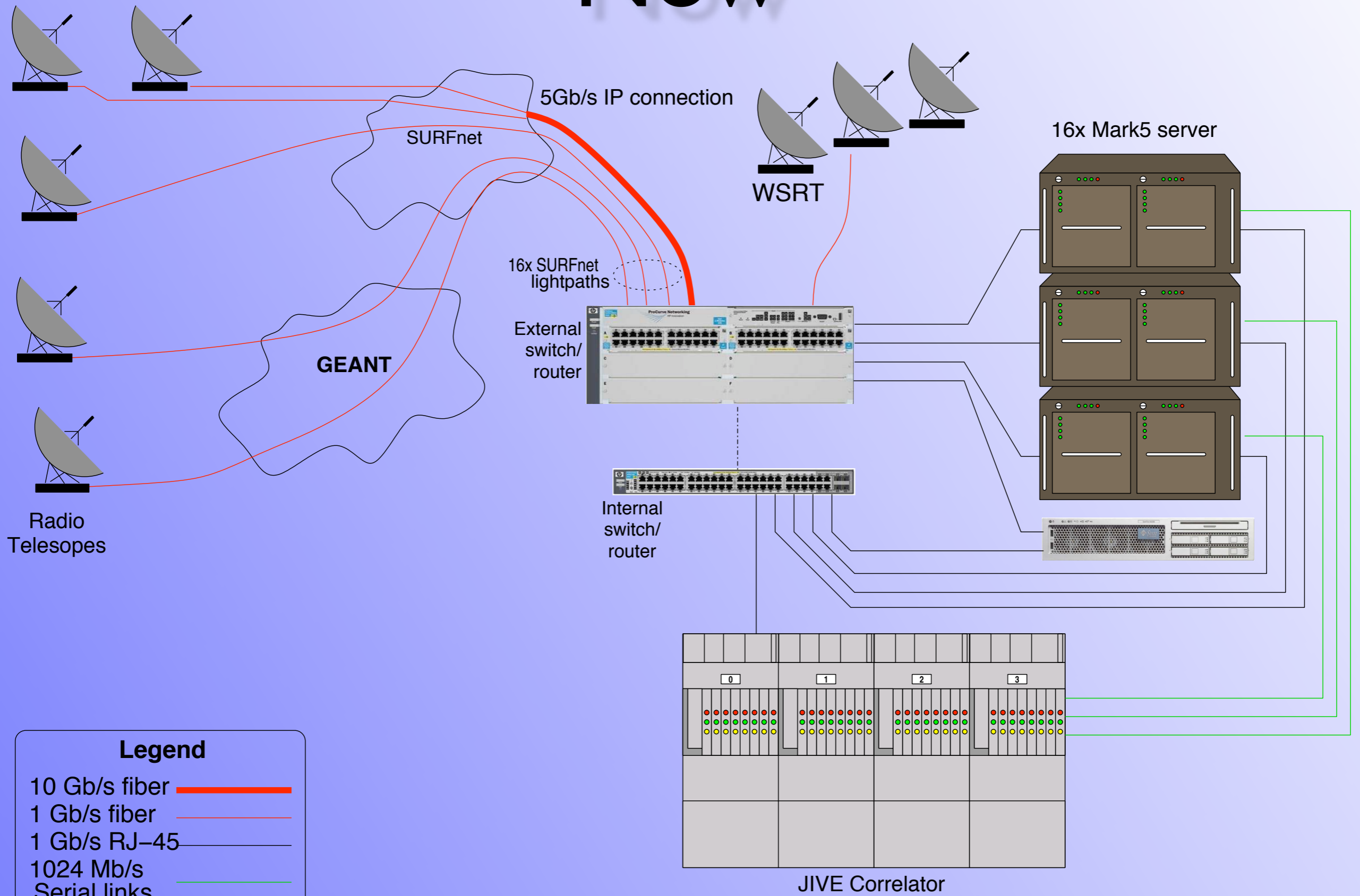
# Early 2007








## Legend

- 10 Gb/s fiber ———
- 1 Gb/s fiber ———
- 1 Gb/s RJ-45 ———
- 1024 Mb/s Serial links ———

# Now



**Legend**

- 10 Gb/s fiber 
- 1 Gb/s fiber 
- 1 Gb/s RJ-45 
- 1024 Mb/s 
- Serial links 

# Now

- ★ 5Gb/s routed to SURFnet
- ★ 1x 1Gb/s to WSRT
- ★ 8x 1Gb/s lightpaths into JIVE:  
2x Jb, Mc, Tr, 3x ATNF, Sheshan
- ★ Own IP-space (class C)
- ★ Central Switch/Router
- ★ MkV: 2x 3.2GHz Xeon
- ★ 512 Mb/s operations

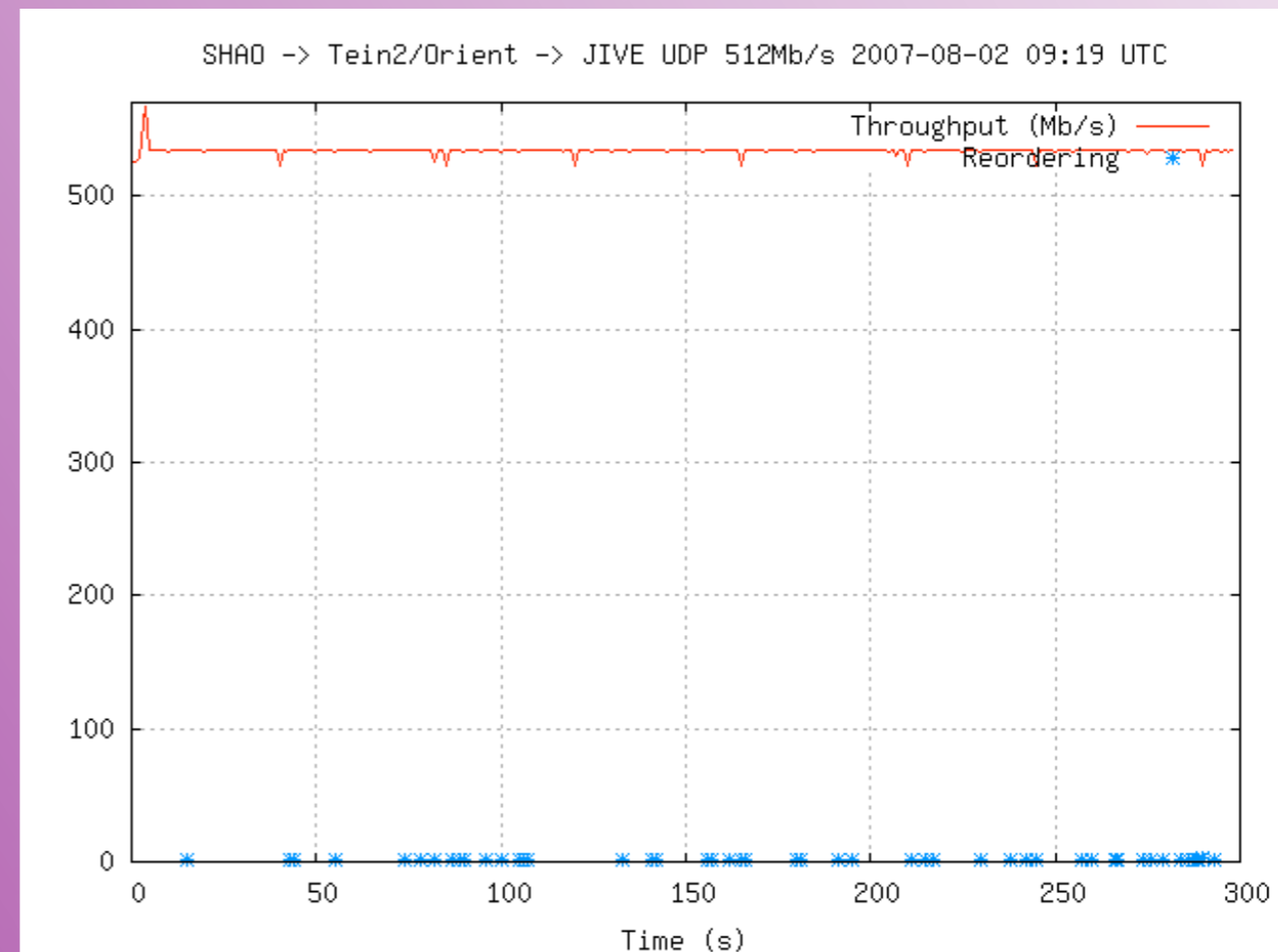
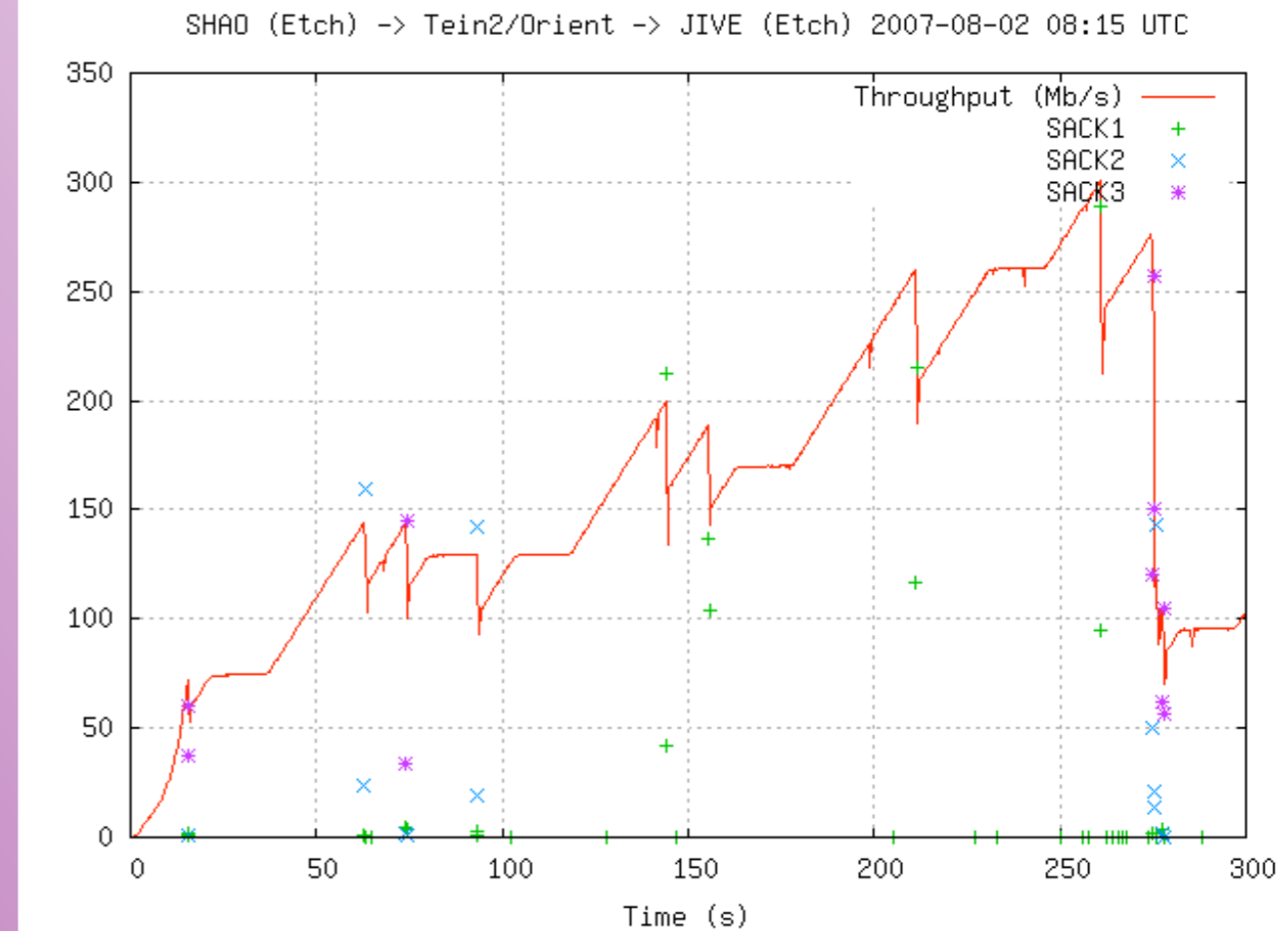
# Network overview

Sheshan	512Mb/s + 622Mb/s	180ms / 354ms
ATNF (3x)	3x 1Gb/s	343ms
Arecibo	100Mb/s	154ms
TIGO	95Mb/s	150ms
Medicina	1Gb/s LP	29.7ms
Onsala	1Gb/s	34.2ms
Torun	1Gb/s LP	34.9ms
Jodrell Bank	2x 1Gb/s LP	18.6ms
WSRT	1Gb/s Dark Fiber	0.57ms



# TCP Research

- ★ Mirror port
- ★ tcpgrok.c
- ★ eVLBI: RTT up to 354ms
- ★ Window Size
- ★ SACK
- ★ High speed stacks
- ★ Mk5 only 2.4 kernel
- ★ Conclusion: UDP



# HP5412zi

- ★ Modular Layer 2/3 switch/router
- ★ 12 Module slots, 40Gb/s (bidi) per slot

- ★ 4x 10Gb/s

- ★ 24x SFP

- ★ 24x RJ-45

- ★ Cat-6A





# The trouble with HP...

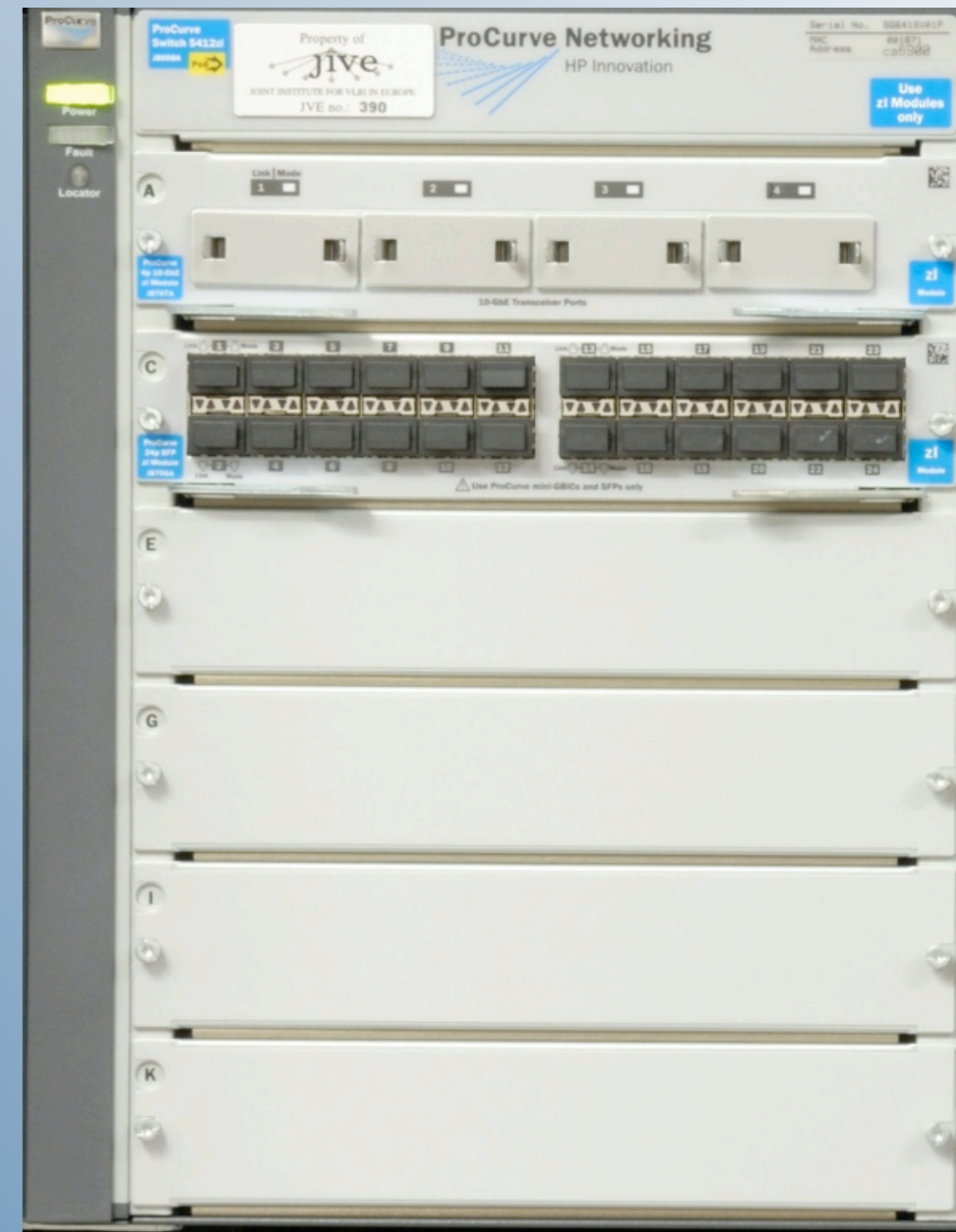
- ★ Found 5 unknown bugs in just 6 months

(jumbo support broken, flooding, wrong VLAN tags on monitor port, SNMP counter bugs, forwarding table)

- ★ 3 confirmed by HP, none fixed

- ★ Workarounds found and in place

- ★ 10Gbase-T delayed at least  
8 months

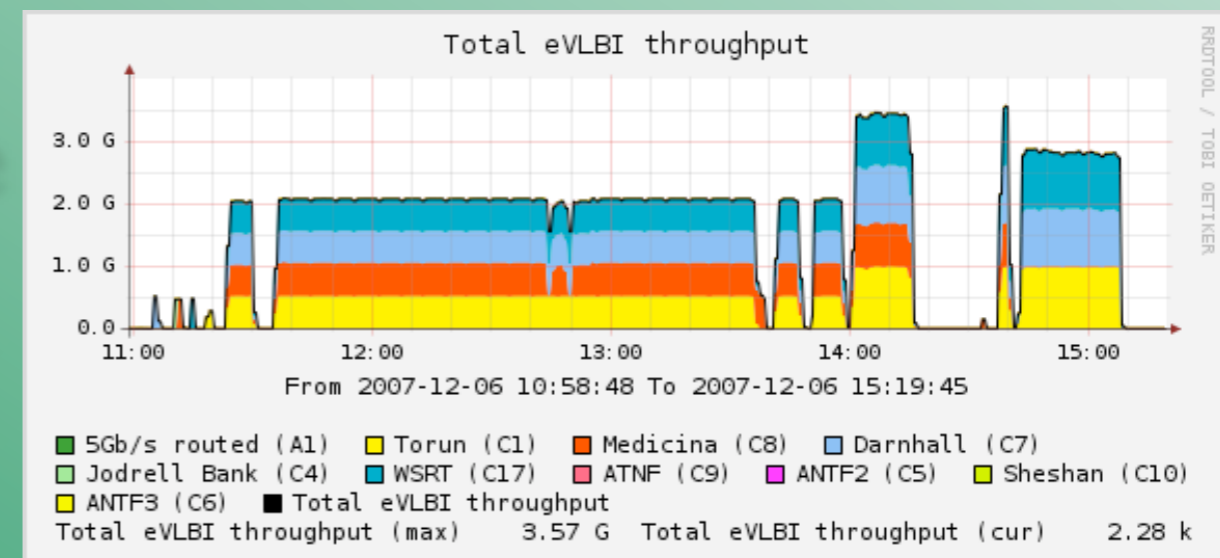
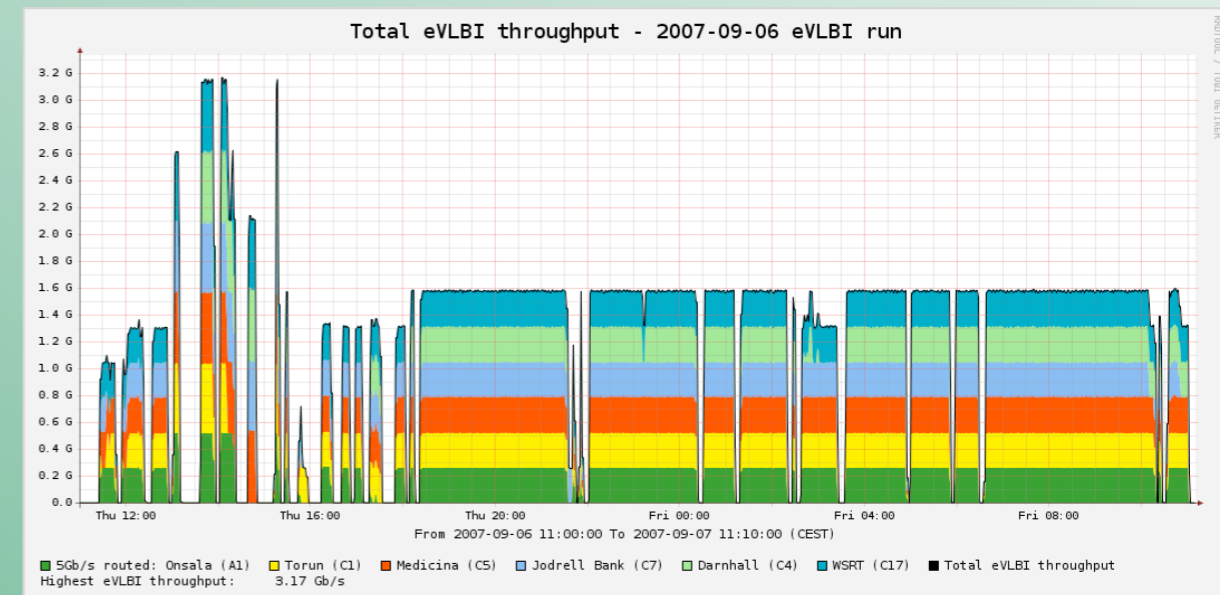




# Cacti

<http://graphs.jive.nl>

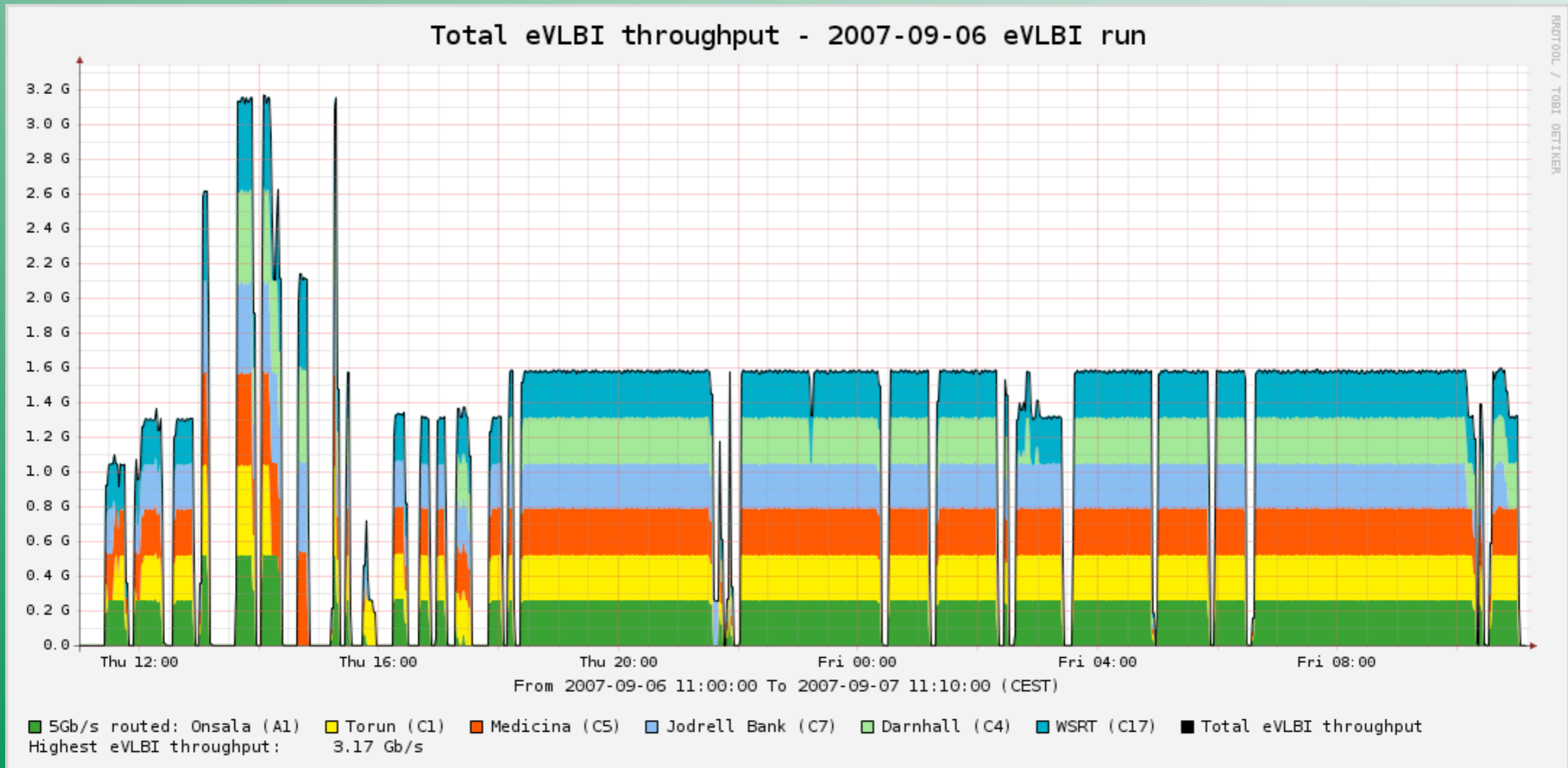
- ★ Cacti is an open-source network management tool
- ★ Records SNMP counters
- ★ Public access website
- ★ Records once every minute
- ★ 64 bit counters
- ★ Secure SNMPv3



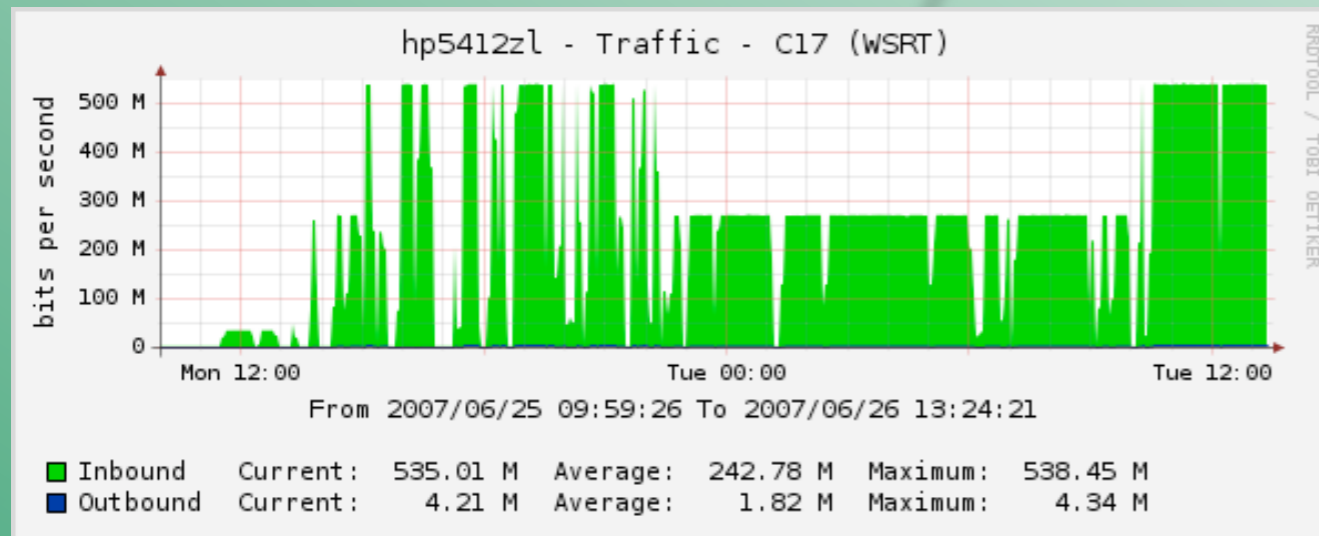


# Cacti

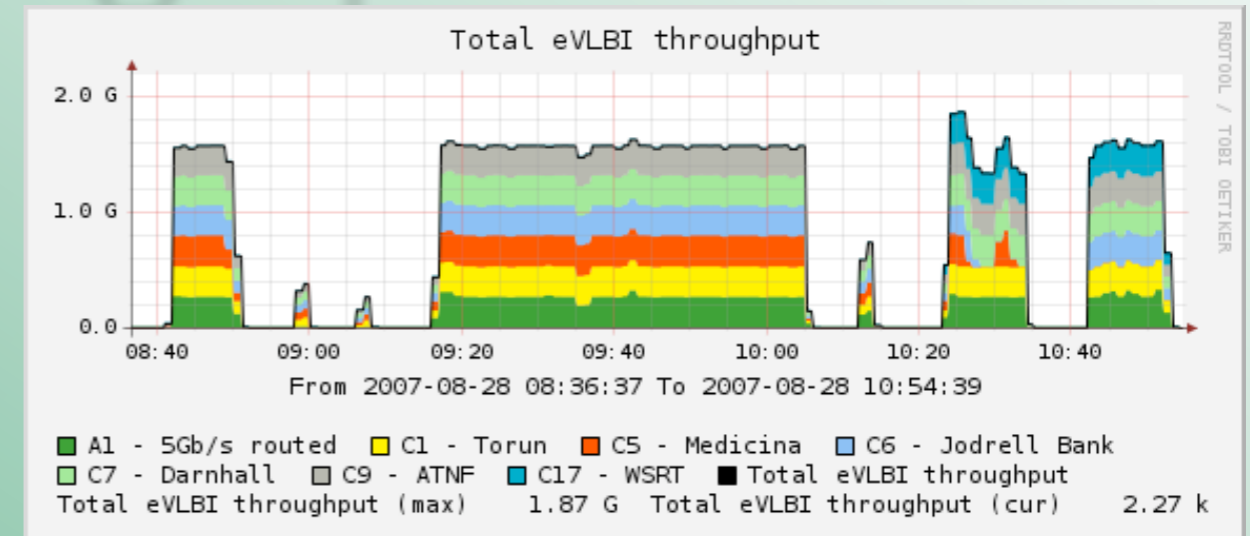
<http://graphs.jive.nl>



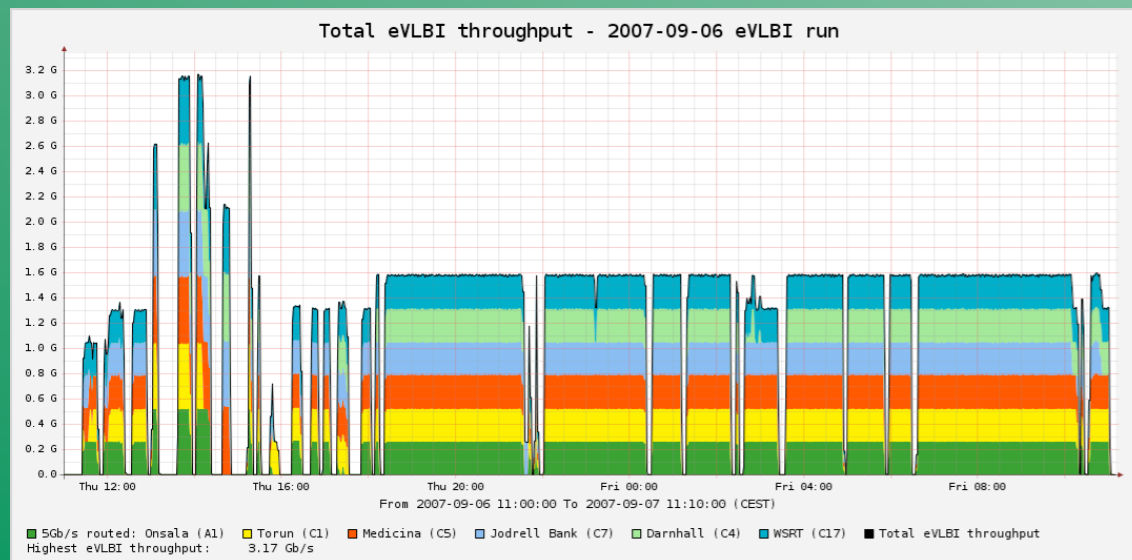
# A year in graphs



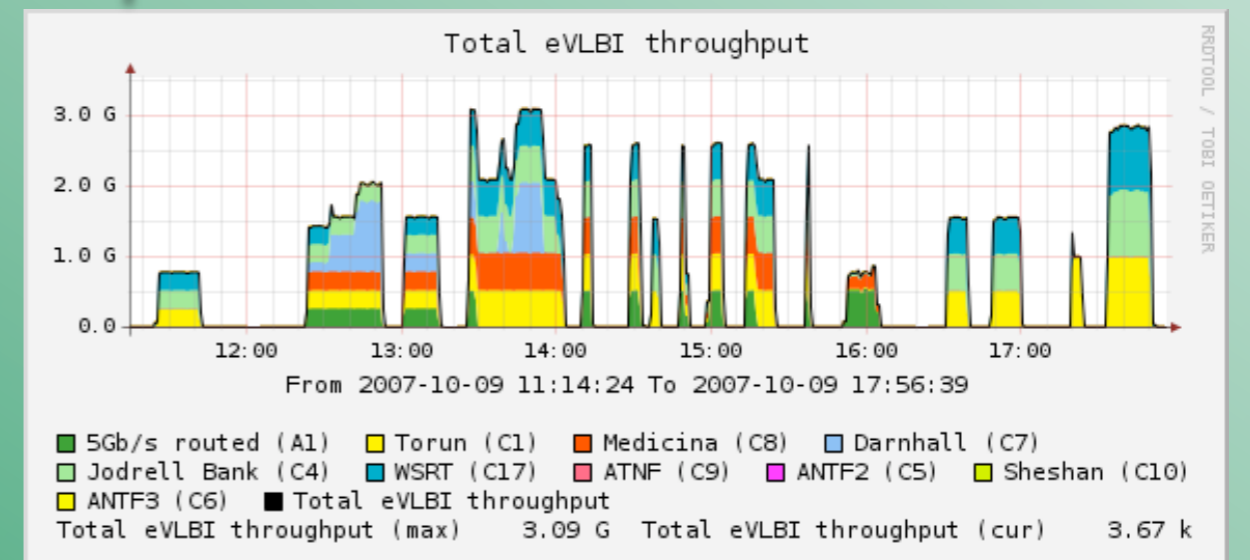
2007-06-25: 6x 256Mb/s  
Calibrators near binaries



2007-08-28: 6x 256Mb/s  
Apan Demo

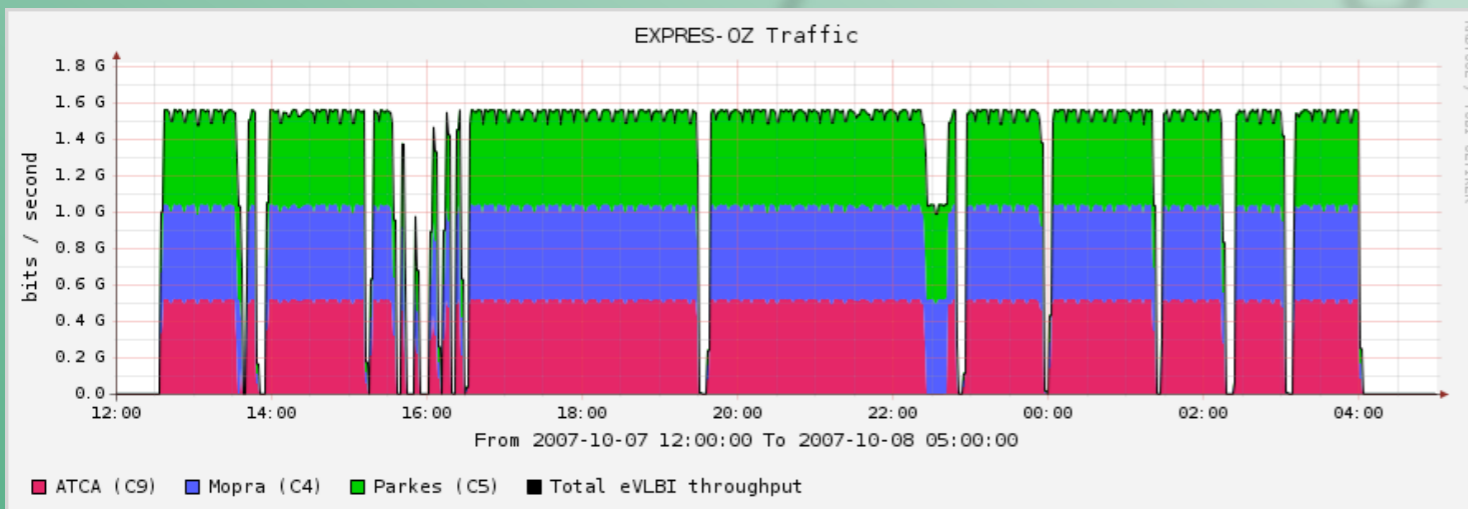


2007-09-06: 6x 256Mb/s  
SN2007gr

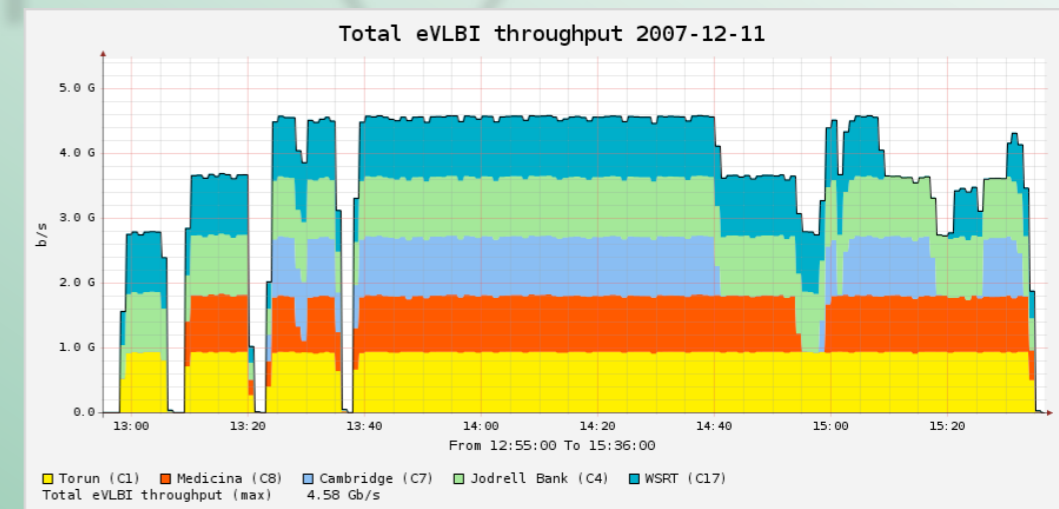


2007-10-09 3x 1Gb/s  
Test session

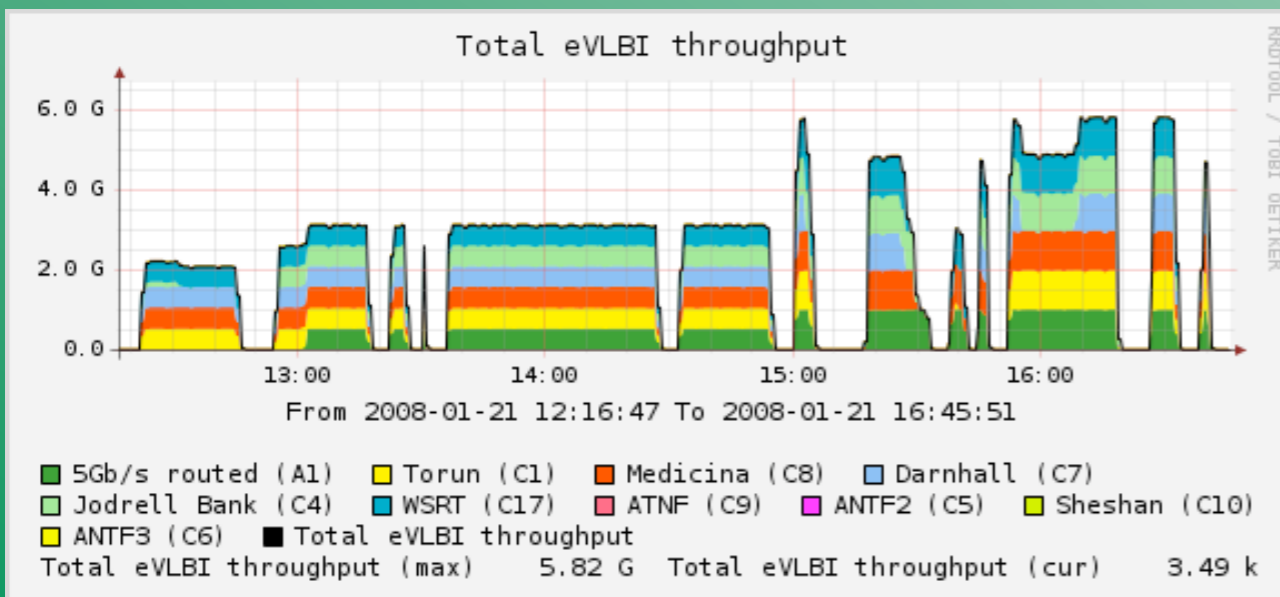
# A year in graphs (2)



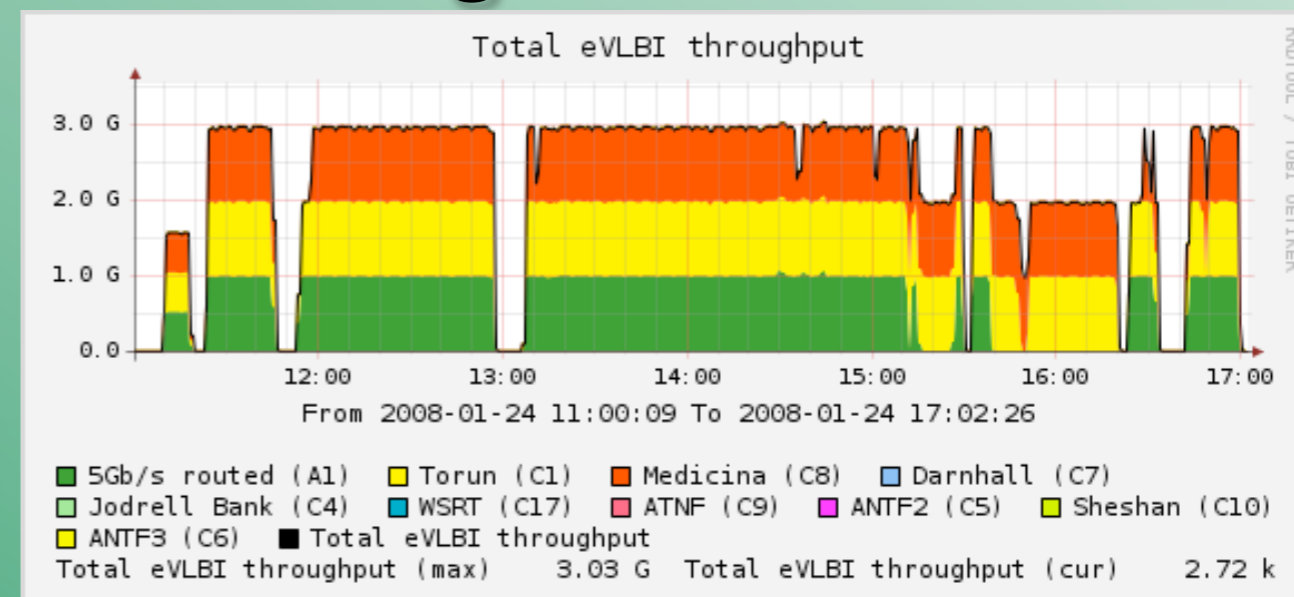
2007-10-07: 3x 512Mb/s ATNF  
SNI 987a



2007-12-11: 5x 917Mb/s  
Fringes on all baselines



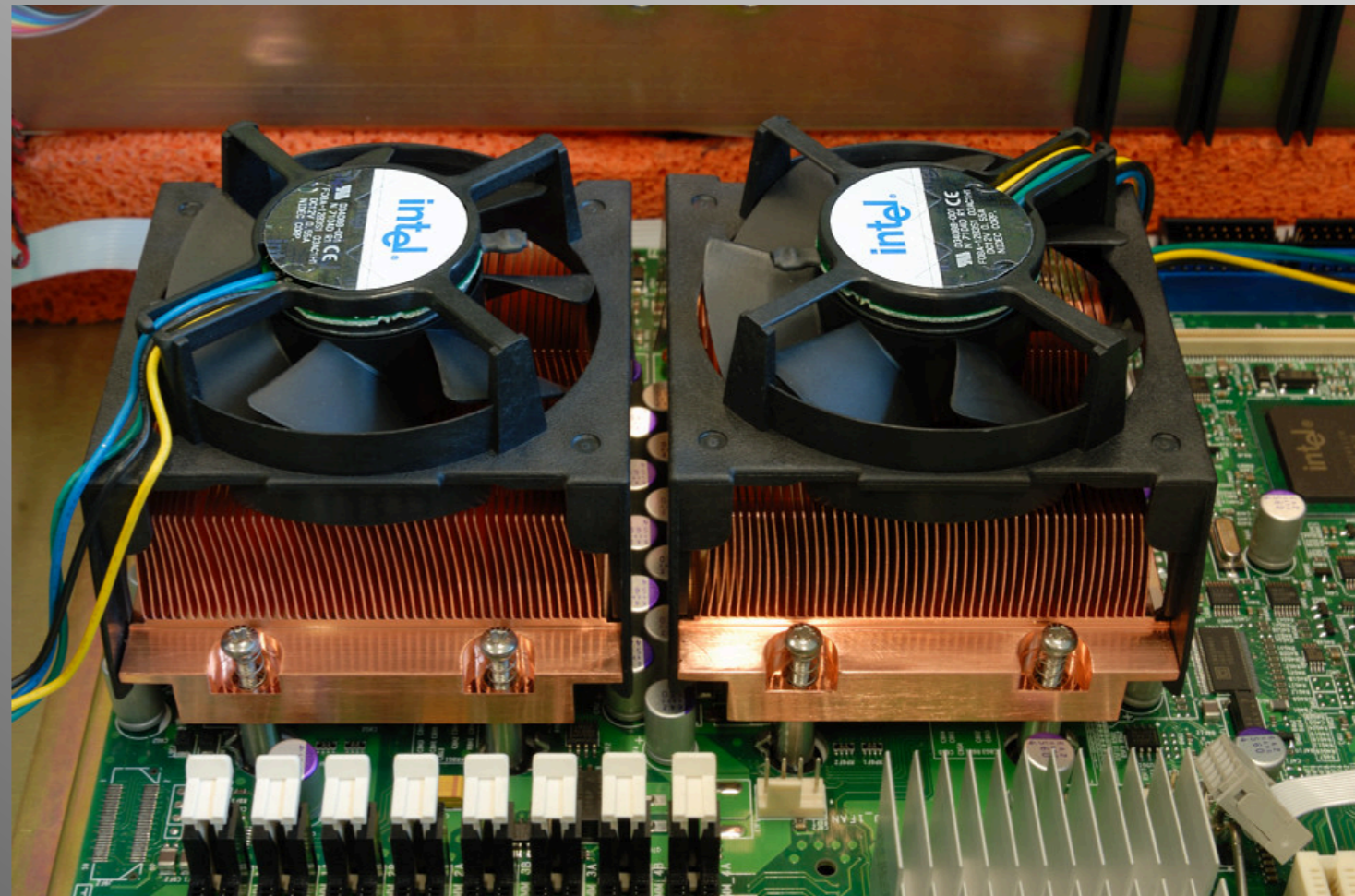
2008-01-21: 6x 970Mb/s  
(1:22 packet drop rate)



2008-01-24: 3x 970Mb/s  
(1:22 with all headers)

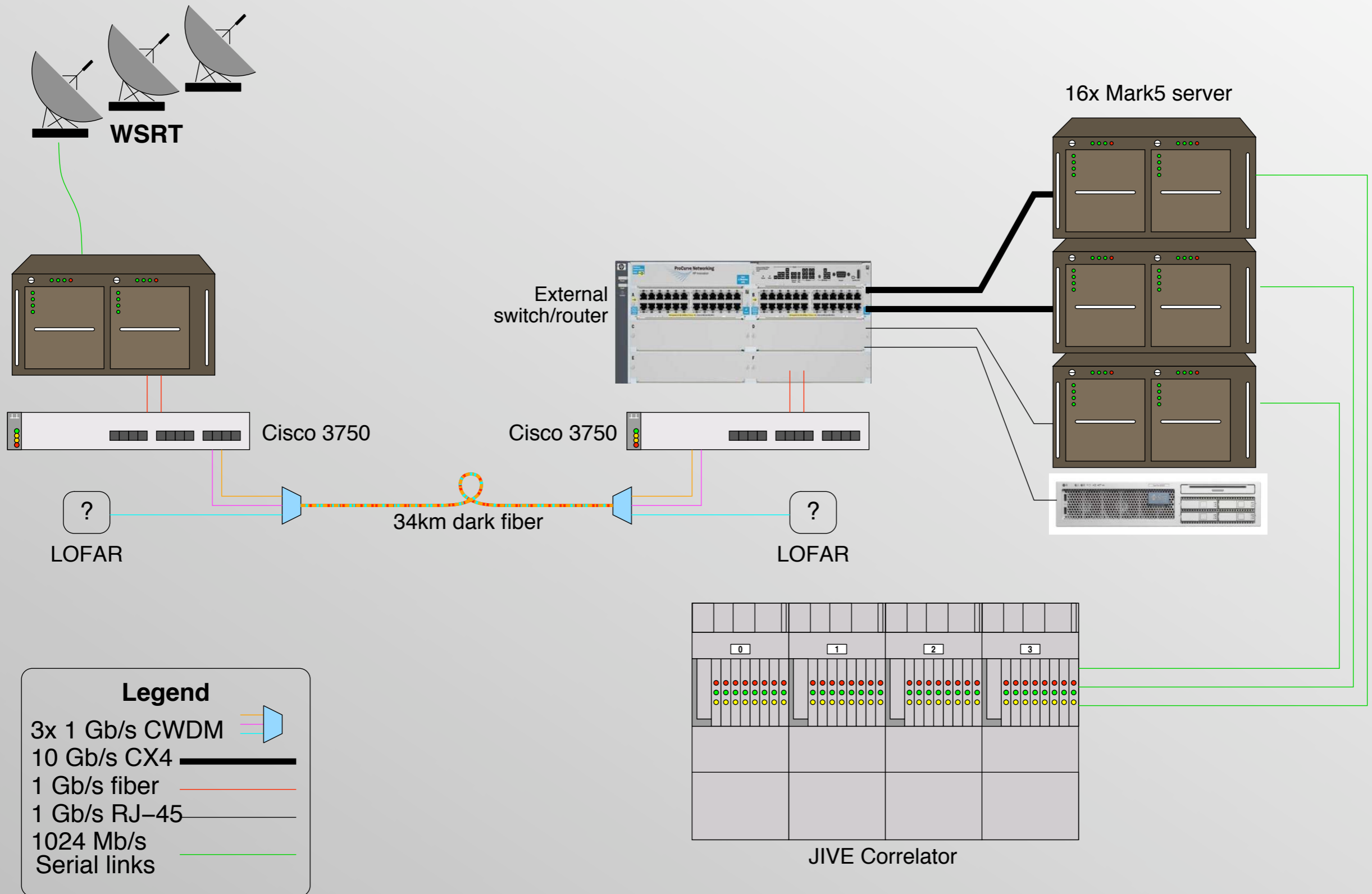
# Other projects

- ★ Upgrade of the internal JIVE network
- ★ Upgrades of all the Mark5:
  - 2x 3.2GHz Xeon, 2GB, 650W PSU (still RedHat)
- ★ 1 Gb/s and 1024Mb/s (1030Mb/s) e-VLBI
- ★ Tests with Debian Sarge
- ★ Security of the e-VLBI network



# 1024 Mb/s

e-VLBI at 1024Mb/s from WSRT to JIVE



# Coming soon:

- ★ More telescopes: Effelsberg, Yebes, Ventospils, ... ?
- ★ Dropping tracks/channels instead of packets  
(either in FPGA or on CPU)
- ★ True 1024Mb/s operations
- ★ 10Gb/s ethernet inside JIVE
- ★ Mark5B







Questions?