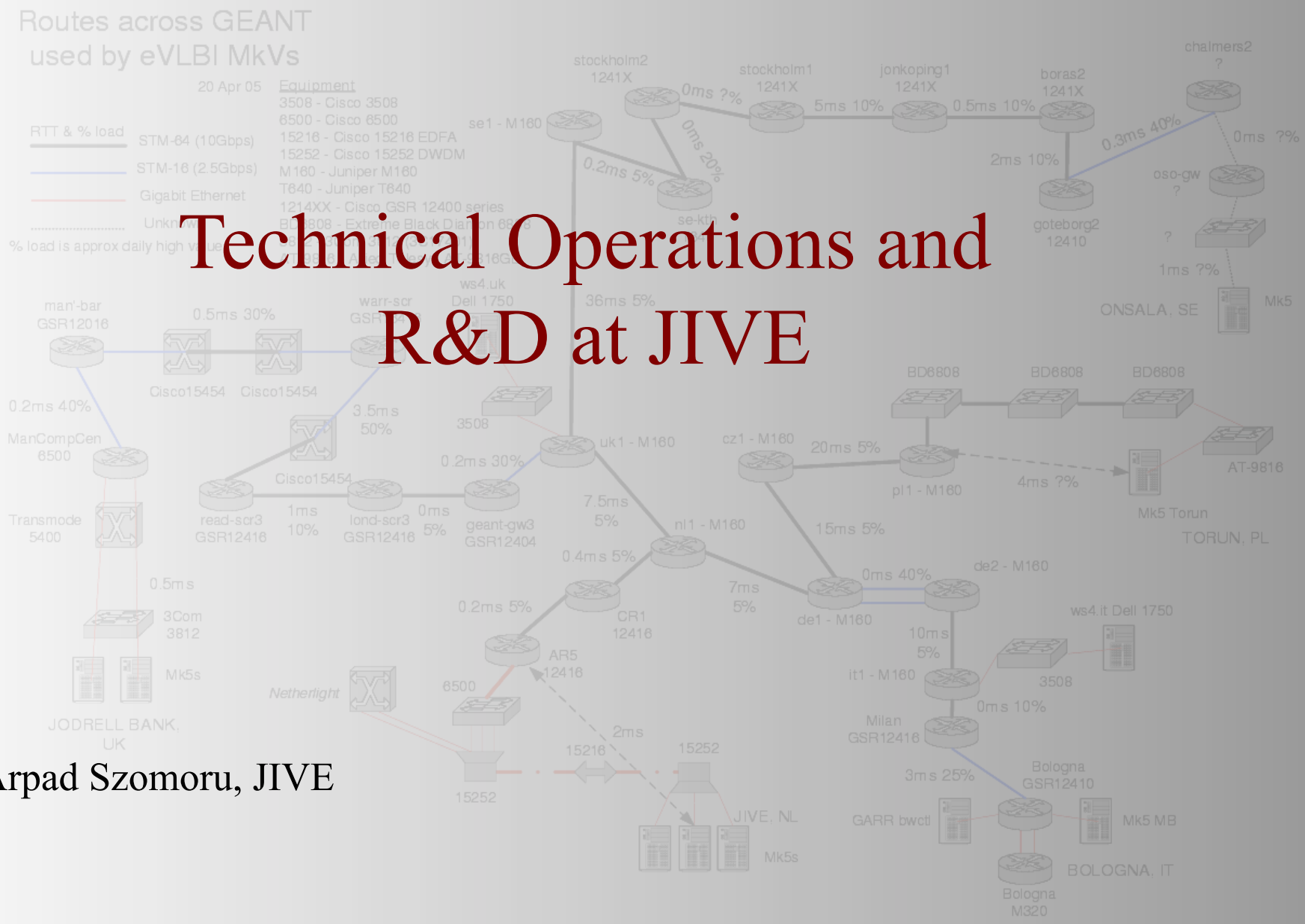


Technical Operations and R&D at JIVE

Arpad Szomoru, JIVE

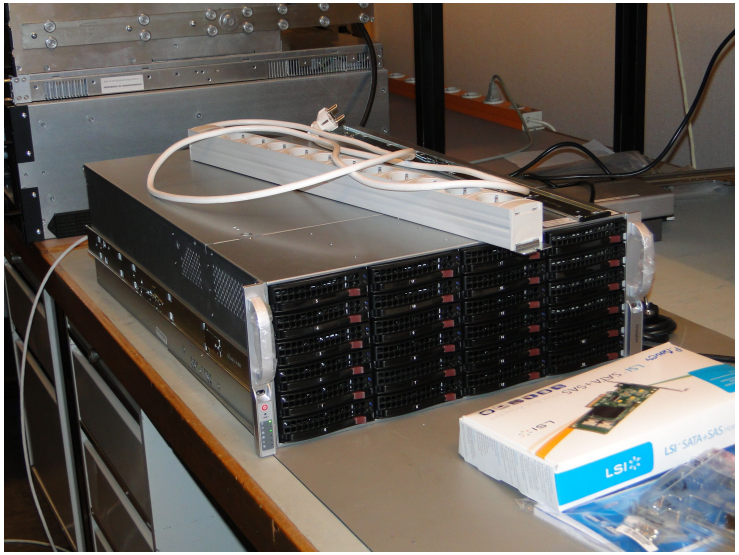
Mark5, SUs, MarkIV correlator

- Not much really changed since January

- Mark5, general
  - 10G cards/cables being exchanged (soon)
  - Decision on Sdk 9 *still* needed
- Mark5B/C
  - 2 units permanently converted to B, more as needed
  - 1 extra unit currently B+, 2 C units in place
  - 5 more C units (not hooked up yet) (soon!)
- SU
  - Full complement of functional
    - Although one caused problems recently
- MkIV Correlator
  - Has been holding up reasonably well
    - But is feeling its age
  - Spate of power supply failures
  - Probably related to power downs/ups

Mark5B/B+, Jive5AB, PCInt

- Native Mark5B, e-based:
  - Being tested in the wild, last week actually
  - Problem still lack of B-enabled stations
  - Which is rapidly changing because of roll-out of dBBCs
- Jive5AB control code re-written (yet again)
  - Stable production version available
  - Multi-threading sorted
  - Splitting of data streams enabled (for distributed correlation
- PCInt replaced
  - Powerful computing platform
  - Large disk raid
  - Works to Dr. Bob's satisfaction (!!)

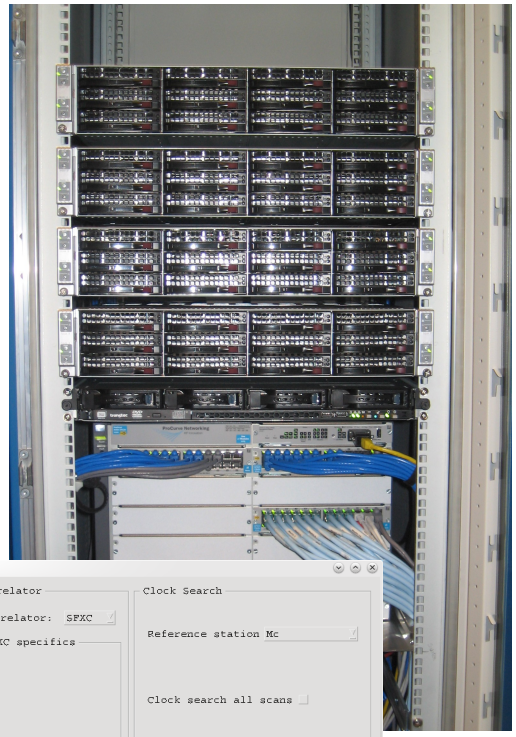


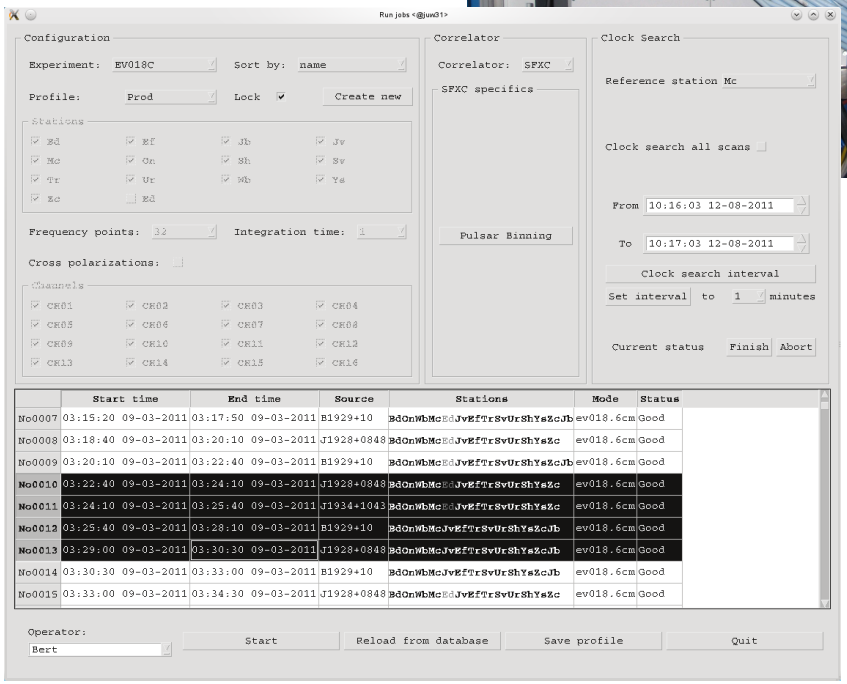
e-status

- Full 1024 Mbps used operationally, from most stations
  - e from dBBC working fine from Ef
- No more Merlincast (ever….?)
- Channel dropping available when needed
- Sh still limited to 256 Mbps
  - Congestion within China
  - No improvement in sight
- Ar at 512 Mbps, Hh at a full 1024 Mbps
- KVN tests show 512 Mbps possible (via GLIF)
  - Formatter test next
- EVN-ASKAP e-test within next few months
  - Needs real-time capability of SFXC software correlator
  - Which was tested last week
- Plans to distribute clock via fibre to Dwingeloo telescope
  - Part of large Dutch (STW) proposal

SFXC Correlator

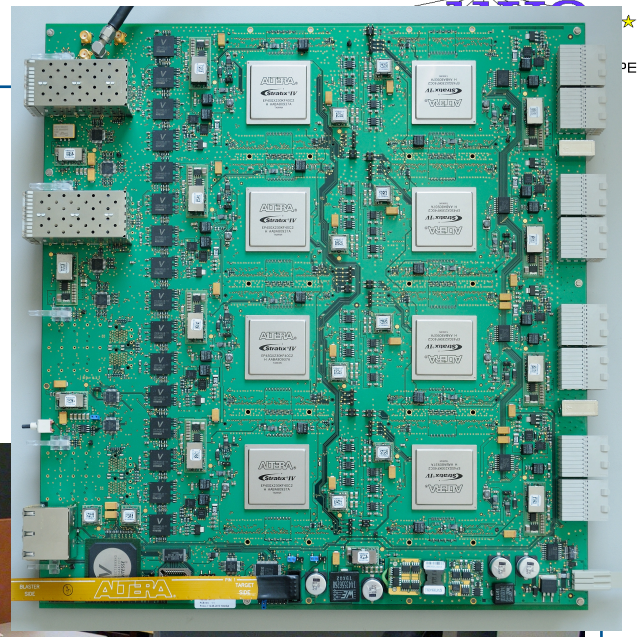
- Software correlator operational:
  - 16 cluster nodes
  - each 2 quad core CPUs: 128 cores
  - 1 head node, quad core
  - Direct 1GE/2GE to Mark5s
  - 40 Gbps Infiniband between nodes
- Pulsar experiments, multiple phase centers, increased use (and demand)
- New hardware delivered
  - Will be installed as part of general overhaul
  - e-VLBI works with simulated data
- Now has “real” interface
- Run by operators





UniBoard

- Production run concluded
  - Boards distributed among partners
  - Not much activity yet
    - Vacations….
- Digital receiver design in good shape
  - Developed at INAF/Bordeaux
- VLBI correlator
  - Good progress (after recent regress)
  - Timing checks out for front and backnodes
  - First auto-correlation soon
  - Delay model implemented, not yet included
  - First fringes before end of year?
- At Astron:
  - backplane, beamformer for Apertif system
  - all-dipole Lofar correlator
- Next production run in planning phase
- Architecture considered for SKA



NEXPReS: EXPReS follow-up

JOINT INSTITUTE FOR VLBI IN EUROPE

- Service Activity 1 (Arpad Szomoru): Cloud correlation:
  - flexible buffering at stations and correlator
  - automated network-dependent correlation
  - continuous quality monitoring and remotely controlled operations

- Service Activity 2 (Paul Boven): High bandwidth on demand:
  - integrate e-VLBI with existing BoD
  - investigate on-demand access for large archives
  - establish international multi-Gbps on-demand services
  - position EVN to take full advantage of emerging 100 Gbps technology

- Joint Research Activity 1 (Mark Kettenis): Computing in a shared infrastructure
  - Use existing network and computing resources within EVN for distributed correlation
  - real-time stream processing
  - develop generic Grid alternatives

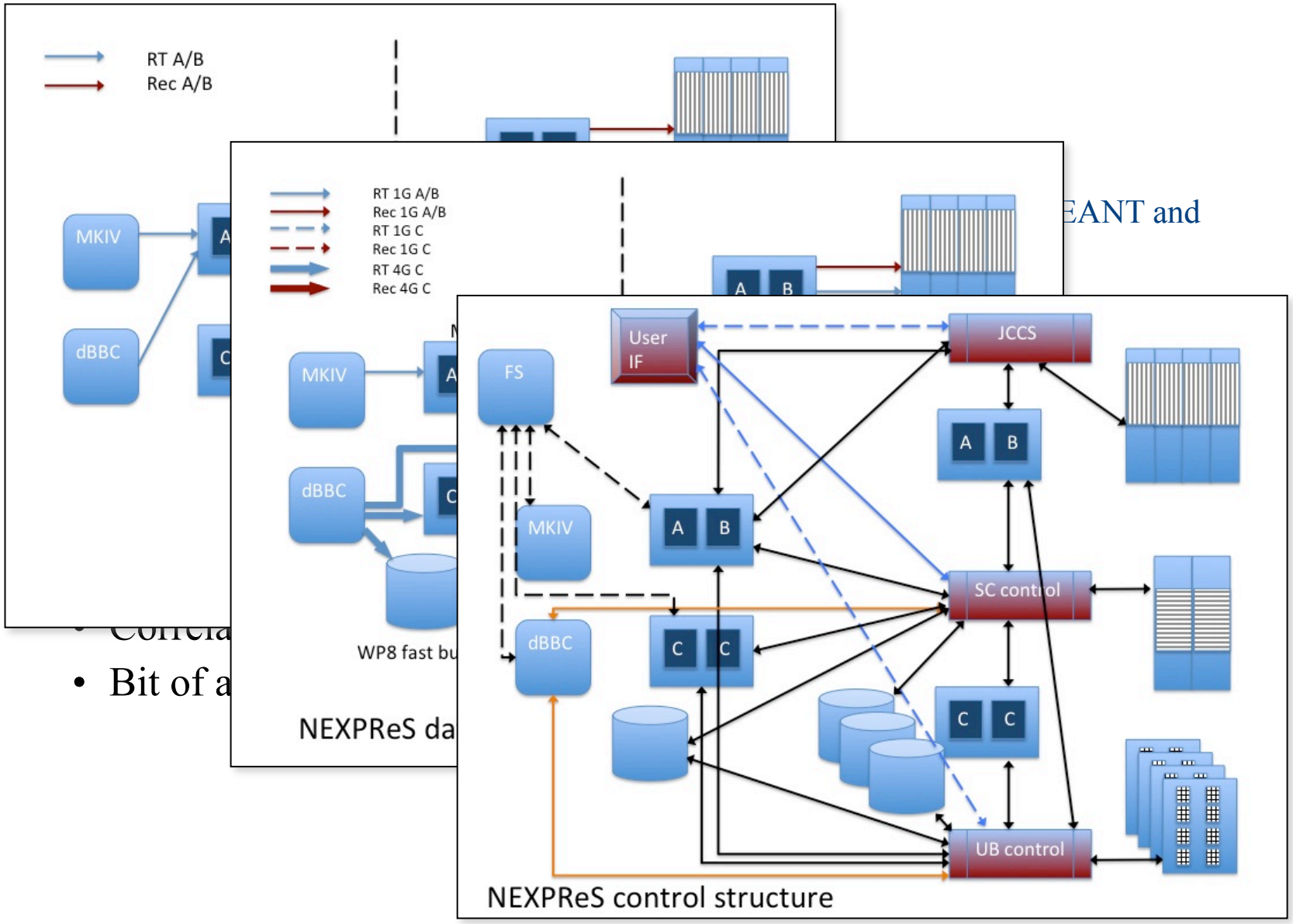
- JRA2 (Ari Mujunen): High-bandwidth, high-capacity networked storage:
  - Develop multi-Gbps storage elements with simultaneous I/O streaming
  - investigate use of such elements as LTAs
  - investigate allocation methods

NEXPReS: considerations, motivation

- Growth of bandwidth, sensitivity, size of EVN
  - 2 Gbps, 4 Gbps, more?
- Growth of network capacity
  - 100 Gbps on the way

- Change of business model/appearance of business model
- Need to map one development on the other
  - And find an economic way of doing it..
  - And preserve/augment the development and achievements of e-VLBI
- Increase available bandwidth
- Reserve and use bandwidth only when needed

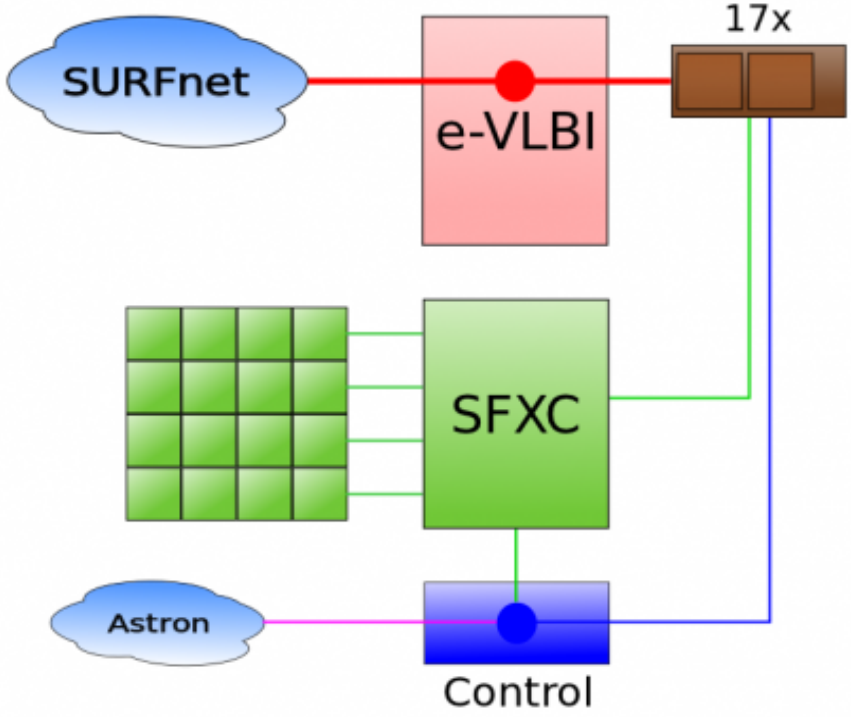
NEXPReS in practice



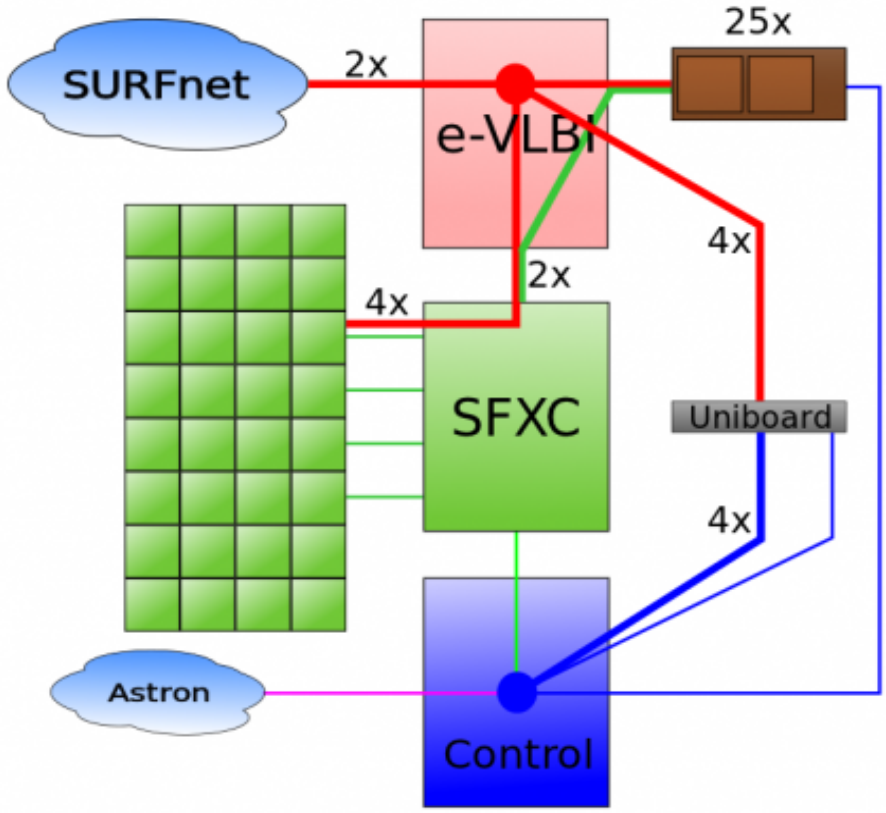
- Correla
- Bit of a

EANT and

Complete local network overhaul

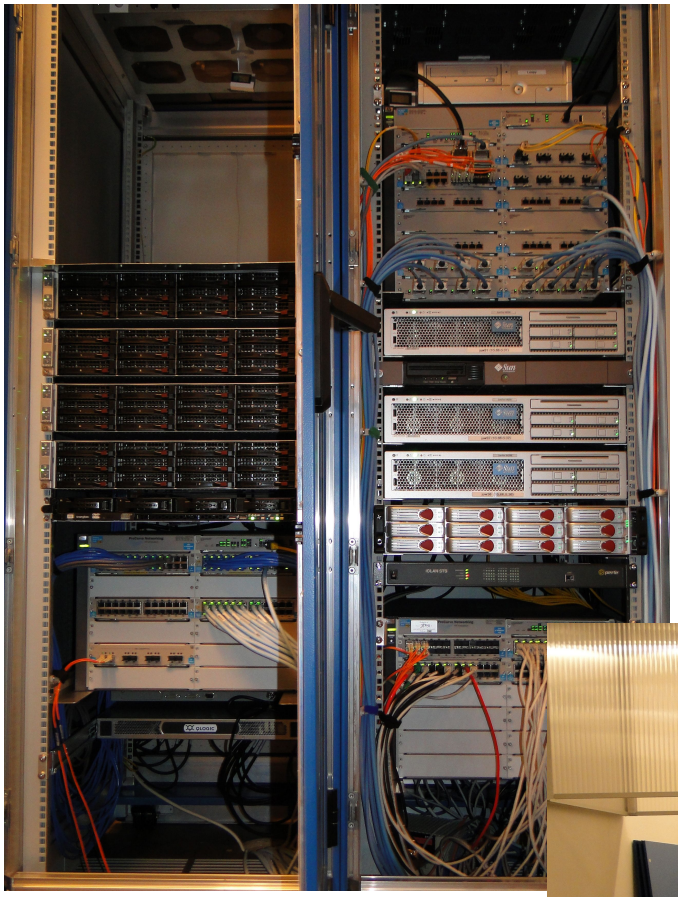


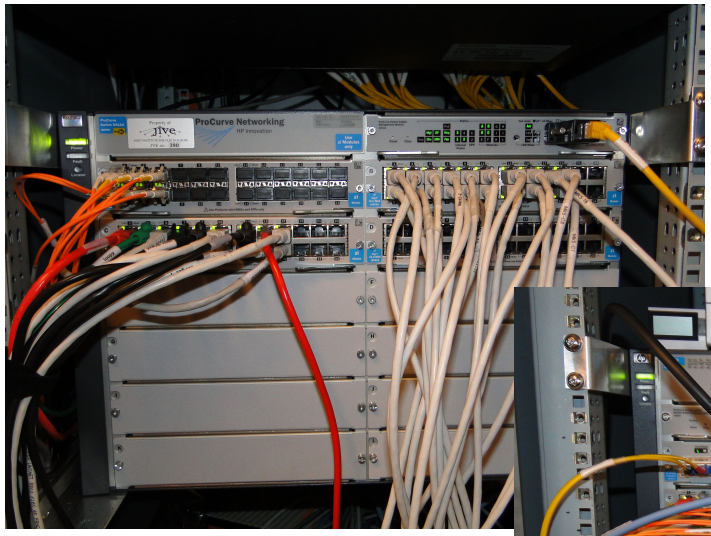
Current JIVE e-VLBI network



JIVE e-VLBI network after upgrade

Lot of (new) hardware moving around





NEXPReS status

- Cloud correlation:
  - TUM and MPG making good progress
  - Effort at JIVE up to full speed
  - First tool for system monitoring/alerting
- High bandwidth on demand
  - Definition phase over, standard has been decided upon
    - Somewhat slow process
  - Preparations for setting up first dynamic lightpath Onsala-JIVE
  - First interface using SOAP
- Computing in a shared infrastructure
  - Progressing well
  - New features added to SFXC
- High-bandwidth, high-capacity networked storage
  - Personnel in place
  - Hardware platform selected