e-VLBI: Dynamic circuits for radio astronomy

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A typical e-VLBI run

- 8 - 12 telescopes
- 1024 Mb/s per telescope (Near future: 4Gb/s)
- 8 - 12 hours
- 30 - 65 TB
• NEXPReS is a three-year project aimed at further developing e-VLBI services of the European VLBI Network (EVN), with the goal of incorporating e-VLBI into every astronomical observation conducted by the EVN.

• 15 Astronomical Institutes and NRENs participating:
  JIVE, ASTRON, SURFnet, Nordunet, DANTE, PSNC (pl), TUM (de), INAF (it), MPG (de), UMAN (uk), OSO (se), VENT (lt), FG-IGN (es), AALTO (fi), CSIRO (au)

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WP6: High Bandwidth on Demand

Task 1: Integration of e-VLBI with Bandwidth-on-Demand (JIVE, SURFnet, NORDUnet, OSO, CSIRO)

Task 2: On-demand access for large archives (ASTRON (LOFAR), SURFnet)

Task 3: Testing and validation of on-demand circuits (UMAN, JIVE)

Task 4: Multi Gbps on demand for e-VLBI (4Gb/s, 10Gb/s) (JIVE, SURFnet, NORDUnet, OSO)
Dynamic 10Gb/s in NEXPReS WP6

OSO

SUNET
Stockholm

NORDUnet
Copenhagen

JIVE

JBO

UMAN

GÉANT
Dynamic Core

Dynamic 10Gb/s in NEXPReS WP6

PSNC

Torun

fPoP
Hamburg

SURFnet
Amsterdam
Experience with NSI so far

• Standard is still in development

• There is no ‘NSI-cloud’ yet
  • Every new connection has to be provisioned
  • Lots of work for ‘first user’

• Layer 2 service: think about your IP assignments and routing
  • Limited number of ‘labels’ (VLAN tags)

• Not a production service yet
  • Testbeds have limited bandwidth
  • Extra connections in/out of testbeds
  • Often no bandwidth enforcement

• Different versions of NSI standard and software
  • AutoBahn, OpenDRAC, OpeNSA, NEXPReS client

• Very good support from NRENs, GÉANT
NSI ‘wishlist’

- Authentication/Authorization

- Pathfinding, topology discovery and exchange
  - Real-time topology (incl capacity)? Per user (screened)?
  - Path building - chain / tree? Explicit Routing Object?

- Aggregation
  - DIY aggregation in NEXPReS client

- Monitoring
  - Fault tolerance, maintenance, automatic/manual re-routing?

- Status of NSI clients? Full citizens?

- Bandwidth! Reach!
Questions?