# Dynacore Networking pilots

L. Gommans*, W. Lourens, C.T.A.M. de Laat, E. van der Meer and B.U. Nideröst

Faculty of Physics and Astronomy Utrecht

*Cabletron

M. Korten, G. Kemmerling

Forschungs Zentrum Jülich

For the DYNACORE (REMOT++) collaboration.

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- REMOT/DYNACORE project
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- Acknowledgments

- **Located in Minnaert Building 3th floor**
  - 1 Professor
  - 3 staff
  - 1 secr
  - ± 6 on projects
  - ± 10 stud
  - 3 stag
  - 2 industry

# Research subjects - 1, 2

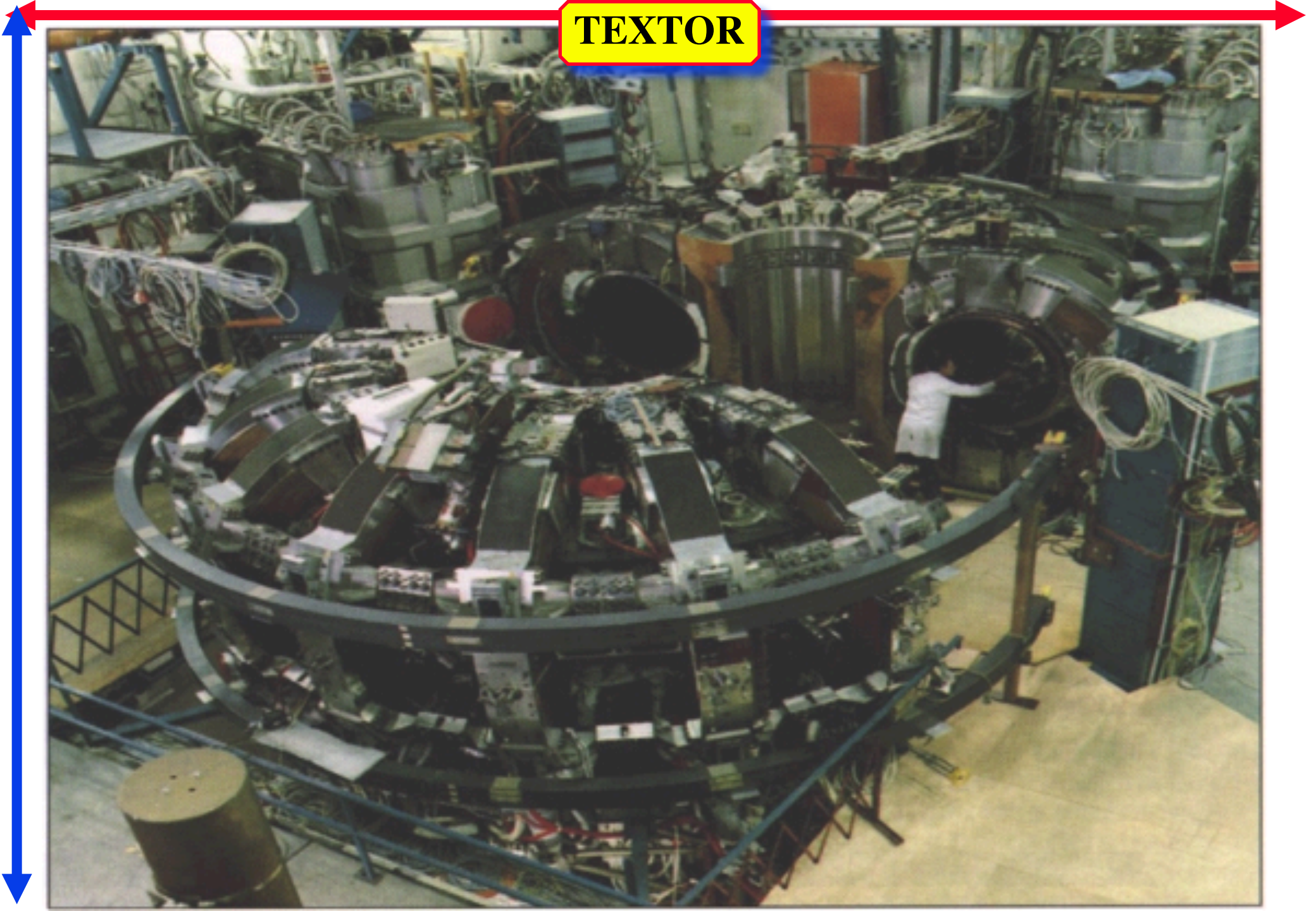
- **Computational Physics**
  - Ocean and weather modeling
  - Solid State physics
  - Supercomputing massive parallel system
  - Code distribution and optimization
- **Computer based learning systems**
  - SENS project
  - Computer and network based college
  - WEB based (Java, HTML,Db, Groupware)

# Research Subjects - 3

- Networking
  - Focus on applications for Physics
  - QoS networks for computing, collaboratories and telelearning
  - Distributed systems topics:
    - Modeling
    - Optimization
    - Simulation
    - Emulation

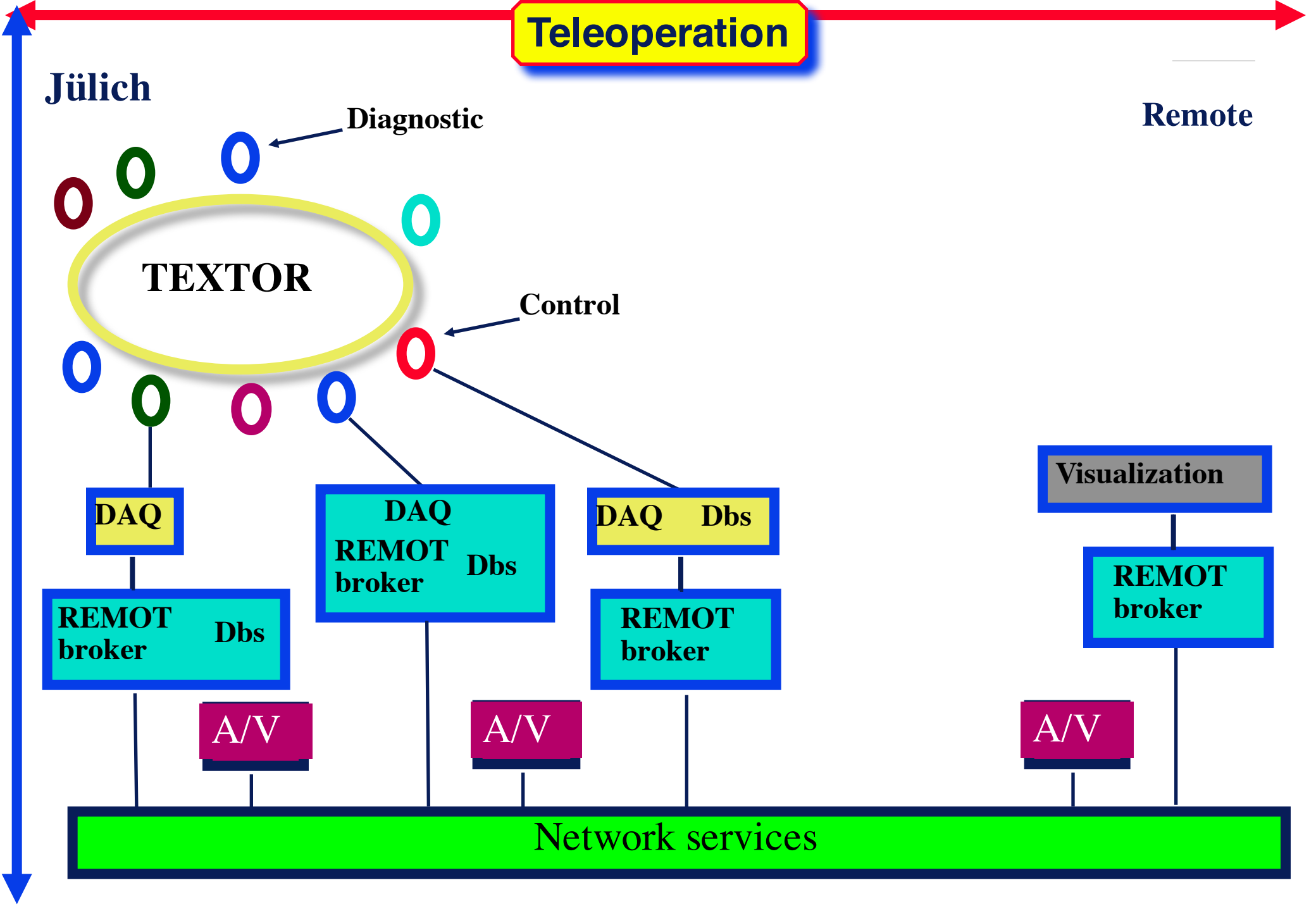
# Research Subjects - 4

- **EU project REMOT / DYNACORE**
  - Collaboratories, virtual control rooms
  - Support science at the home institutes
  - Groupware, Videoconference tools point to point and point to multipoint
  - Corba services, distributed object db
  - www.phys.uu.nl/~dynacore


TEXTOR

# Operation

- Experiment cycle
  - load settings in the diagnostics
  - negotiations with TEC operator on properties of next pulse
  - freeze all diagnostic and machine parameter
  - load capacitors
  - PLASMA pulse
  - data readout
  - look at data of your own diagnostic
  - correlate with data of other diagnostics
  - draw conclusions for settings on next pulse
- Cycle takes about 5 - 10 minutes
- Load capacitors, pulse, data readout take 3 minutes
- Data size currently: 10 - 100 MByte / pulse depending on active diagnostics

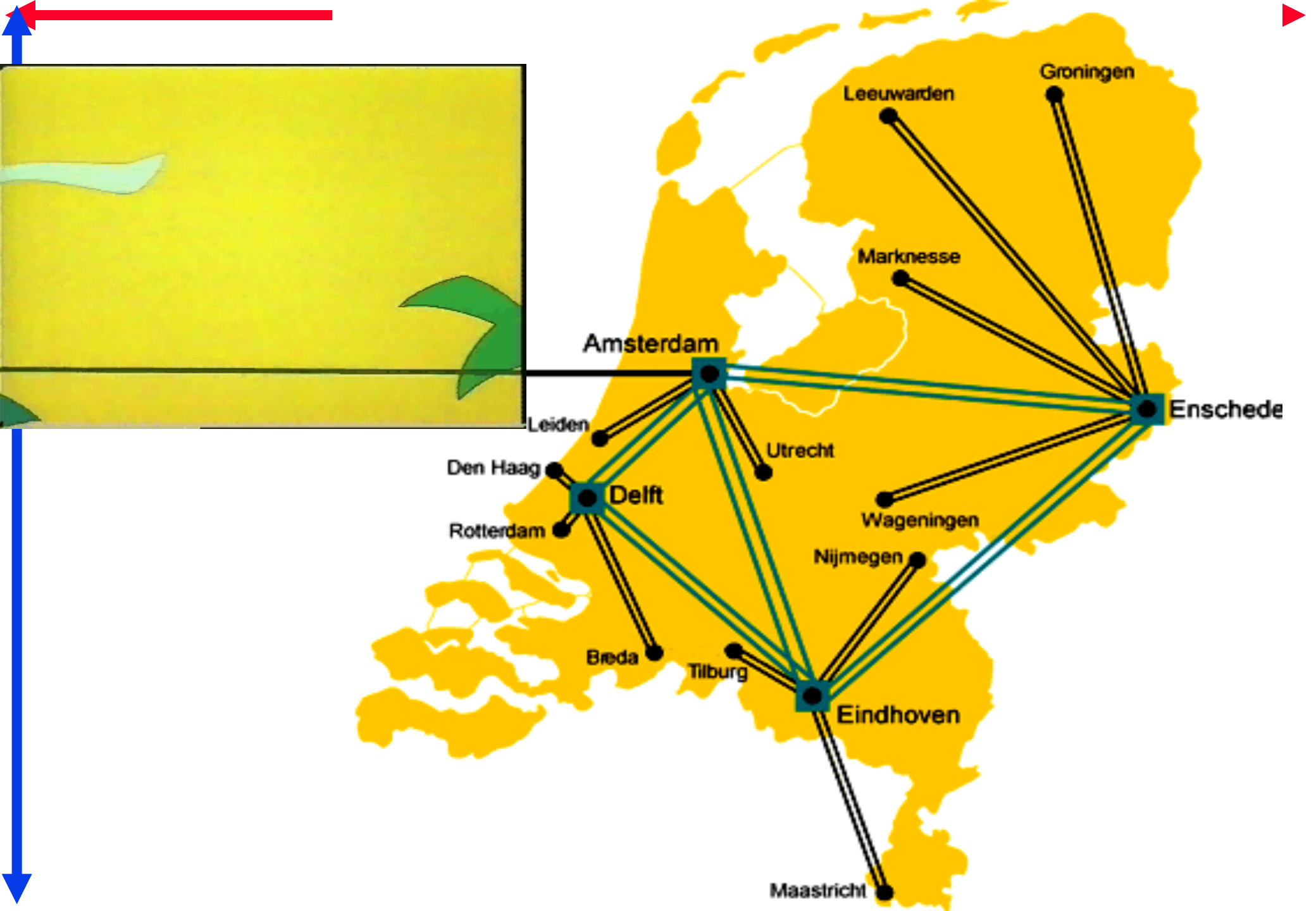

Teleoperation
Jülich
Remote
Diagnostic
TEXTOR
Control
DAQ
REMOT broker
Dbs
DAQ
REMOT broker
Dbs
DAQ
Dbs
REMOT broker
Visualization
REMOT broker
A/V
A/V
A/V
Network services

# Network requirements

- **Real Time**
  - time is limited between shots and decisions have to be made
- **Scalable**
  - there are about 20 diagnostics from several institutes
- **Multicast**
  - there are many one to one, one to many and many to many conferences going on
- **Solutions**
  - IP based QoS
  - ISDN
  - IpV6, RSVP, DiffServ/IntServ
  - Mbone
  - Netmeeting
- **Total Bandwidth Estimate: ≈ 20 Mbit/s**

# SURFnet

- Network backbone for University's
- 4 cluster leaders, ~ 14 POP’s
- 155 Mbit/s to USA
- Services <-> research
- TF-Ten - Quantum project
- SURFnet 4 -> move to 155 Mbit/s ATM
- GIGAport
  - 80 Gbit backbone
  - 20 Gbit POPs
  - 2 Mbit to every SURFnet user @ home


Groningen
Leeuwarden
Marknesse
Amsterdam
Enschede
Leiden
Utrecht
Den Haag
Delft
Wageningen
Rotterdam
Nijmegen
Breda
Tilburg
Eindhoven
Maastricht

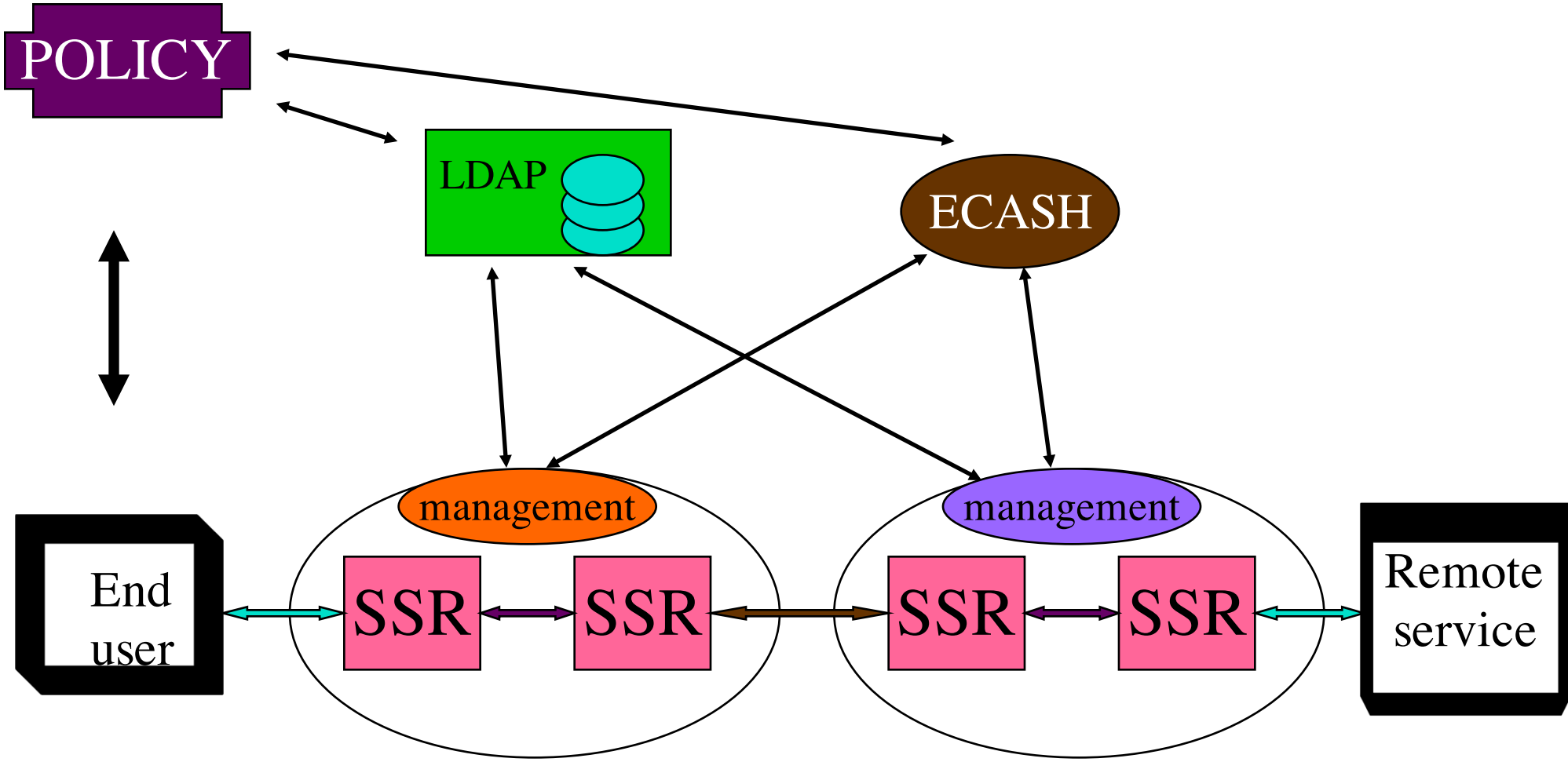
# Pilots

- **SURFnet4 - TF-Ten**
  - ATM - LANE for DAQ systems
  - ATM - SVC in backbone
  - ATM multicast in the backbone
  - ATM - ABR traffic, policing and management
  - Videoconference/GroupWare survey
  - DAS, coupling compute clusters over WAN with QoS
  - Simulator for computer aided learning
  - Wireless LAN for computer aided learning
  - IPv6
  - RSVP
- **SURFnet5 - TF-TANT**
  - Policy control
  - Diff-serv

# The management domains

- Physics-UU to IPP-FZJ => 7 kingdoms
  - Physics dept
  - ACCU, Campus network
  - SURFnet, NRN-Netherlands
  - Dante - ten 155
  - WINS/DFN, NRN-Germany
  - FZJ-ZAM, Campus network
  - FZJ-IPP, Institute of Plasma Physics

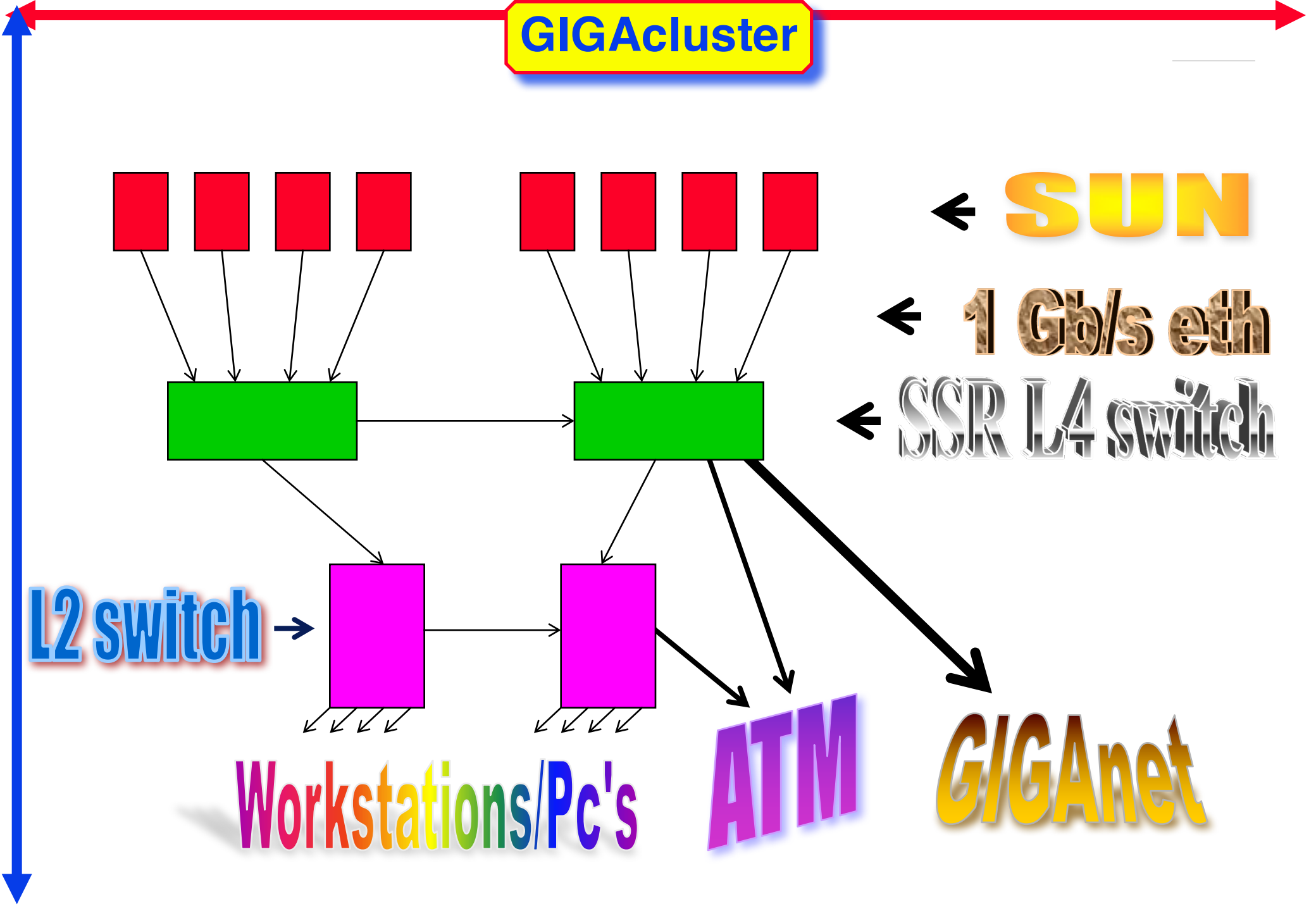
# Possible architecture



Dynacore specific

- All sides a l4 switch
  - Encryption
    - » Specialized hardware for extranet
  - Prioritization (TOS, Diffserv, WFQ)
    - » Level 4 flow labels
    - » Label = source/destination ip+port+tos
    - » Extra bits for metering, shaping, token bucket
    - » Packet marking, avoid application changes

# GIGAcluster



# GIGAcluster applications

- REMOT/DYNACORE, collaboratory
- Objectivity, distributes db's
- Corba, object and message passing
- Qbone, Quality of Service on WAN
- MCU's, scalable video distribution
- SURFnet 5, GIGAbit producer/sink
- DAS - Distributed Cluster Computing
- LLT (LFAP, CAC, COPS, IPSEC, …)

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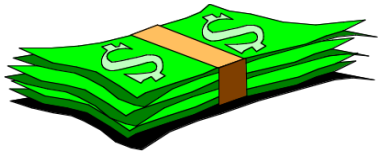

**http://www.phys.uu.nl/~delaat**
**http://www.phys.uu.nl/~wwwfi**
**http://www.phys.uu.nl/~wwwfi/gigacluster**
**http://www.phys.uu.nl/~wwwfi/das**
**http://www.phys.uu.nl/~dynacore**

# QUESTIONS ?