Dynacore Networking pilots

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For the DYNACORE (REMOT++) collaboration.
• The group
• REMOT/DYNACORE project
• Services and Requirements
• Pilots
• The management domains
• Possible architecture
• GIGAcluster
• Acknowledgments
• Located in Minnaert Building 3th floor
  – 1 Professor
  – 3 staff
  – 1 secr
  – ± 6 on projects
  – ± 10 stud
  – 3 stag
  – 2 industry
- **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)
• Networking
  – Focus on applications for Physics
  – QoS networks for computing, collaboratories and telelearning
  – Distributed systems topics:
    » Modeling
    » Optimization
    » Simulation
    » Emulation
• 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
• **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**
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
- 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
• **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
• 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

POLICY

LDAP

ECASH

management

SSR

End user

Remote service
• 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

SUN

1 Gb/s eth

SSR L4 switch

L2 switch

Workstations/Pc's

ATM

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

QUESTIONS?