IPv6 ed architetture p2p per i tele-laboratori e la cooperazione

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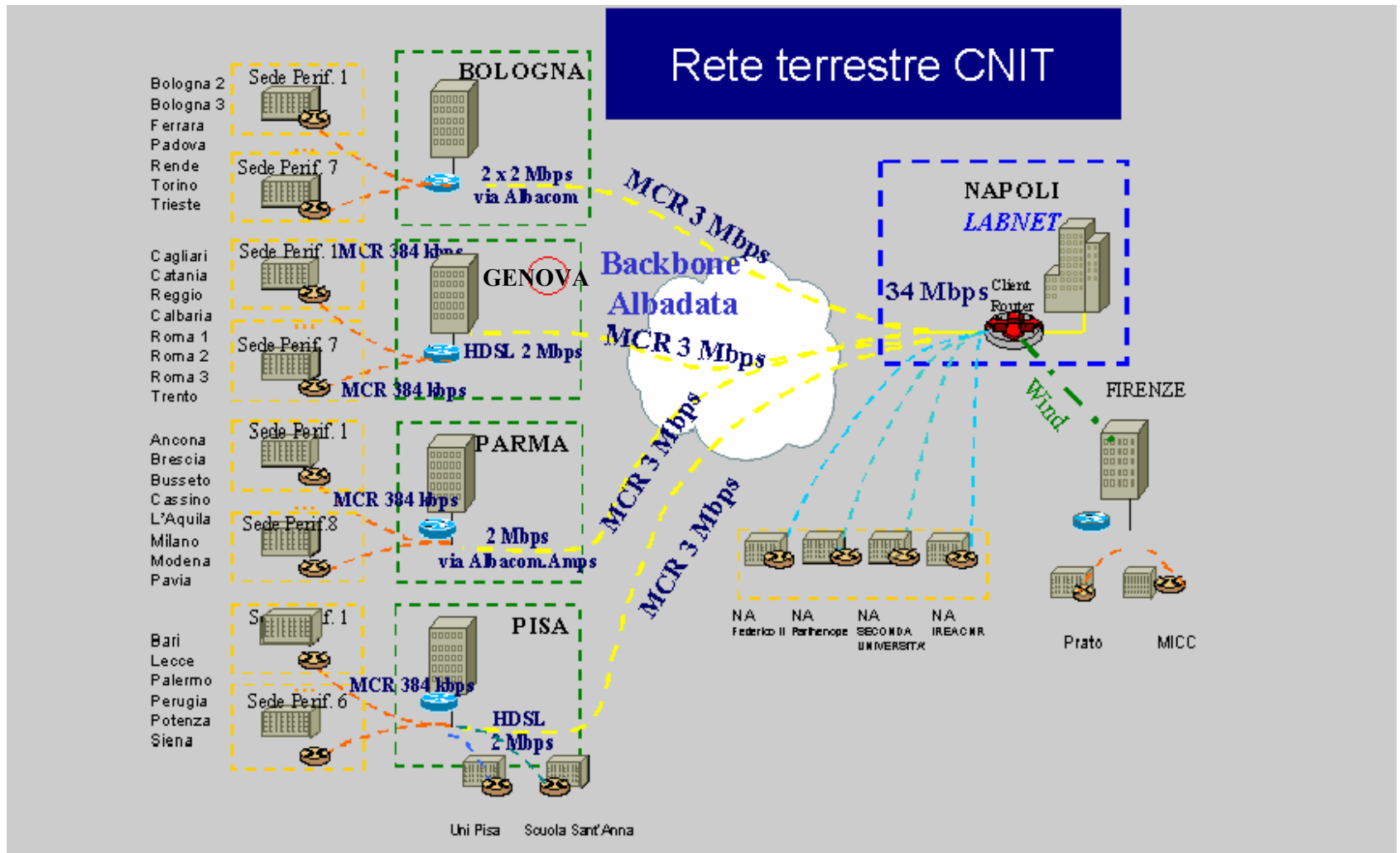
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What is CNIT?

- Consortium of 34 Italian Universities Private-type legal entity
- Founded in 1995
- Headquarters are in Parma
- 2 National Labs
  - Photonic Networks (in Pisa)
  - Multimedia Communications (in Naples)
- Mission: to promote applied research in TLC
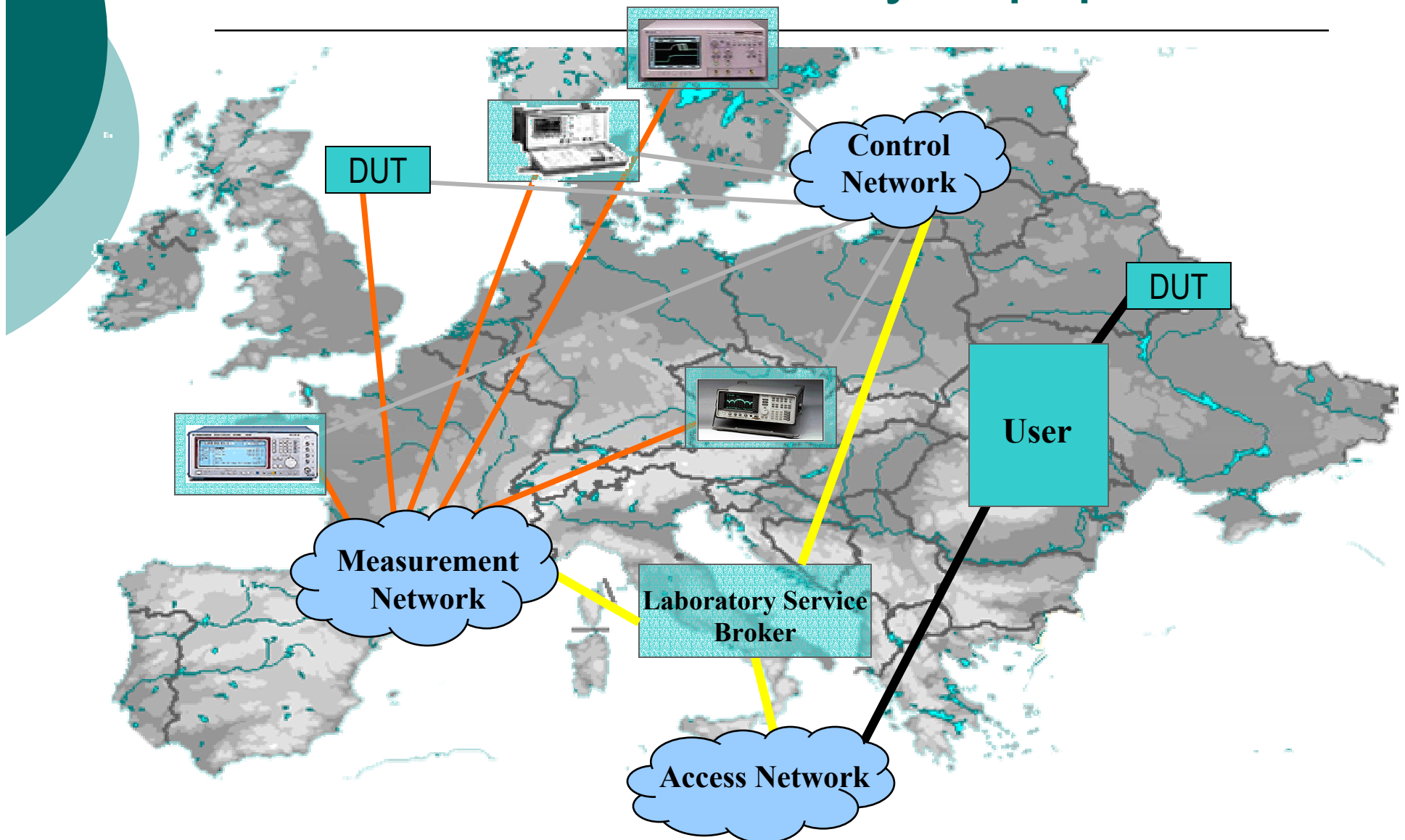
The CNIT Network

The CNIT Network

The network is being complemented with a satellite part:

- Ka band
- Skyplexnet over regenerative payload HB6
- up to 2 Mbit/s
- MF-TDMA uplink with Bandwidth-on-Demand capability
- DVB-RCS-like and DVB-IP
- 24 earth stations in first deployment
- gateway to Ku band
- TCP/IP over satellite

Networked Laboratory Equipment

Application Fields

- The real/virtual instrumentation and the "Devices Under Test" are distributed over the various Labs involved in the experiment.
- Applications:
  - Telecommunication systems measurement & testing
  - Telecommunication networks measurements & testing
  - Other application fields in engineering and physics
- **We are investigating and we suggest to move unbalanced frameworks toward a cooperative fashion**

…and IPv6

- Cooperative environments need end-to-end transparency.
- IPv6 has IPSec natively:
  - VPNs "overlayed" on the "global network"
- IPv6 QoS support is appealing
- IPv6 allows to do "peering" from many devices in a simpler way:
  - Sensor Networks and GRID

Instruments as Shared Resource in a GRID: the Device Farm
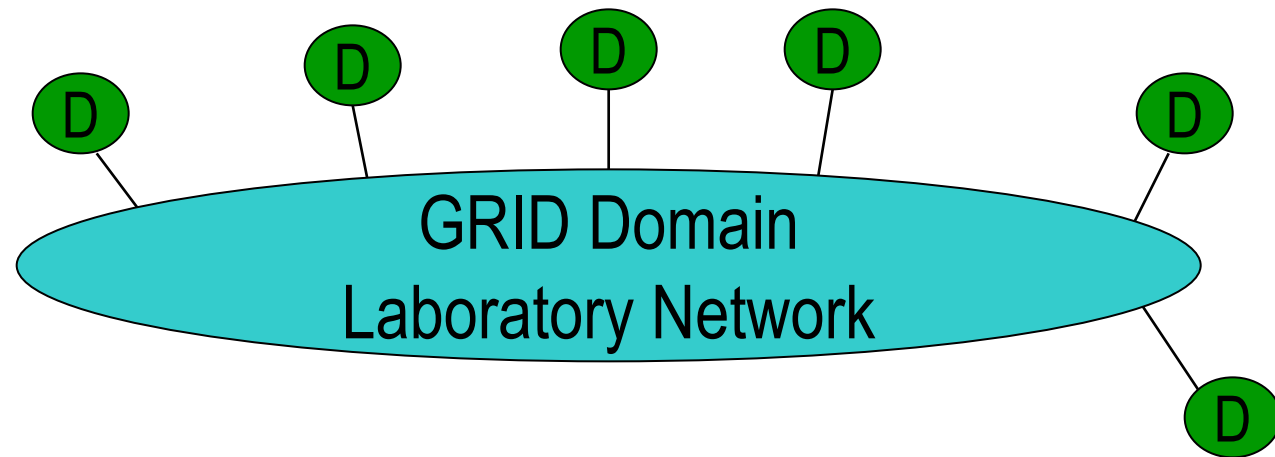
- ○ Each Instrument may consist of:
  - a physical device
  - a software emulated device
- ○ Devices will be accessed directly and data from sensors might be routed directly to remote GRID nodes.

p2p and Cooperation

- The p2p communication paradigm is becoming popular and adopted:
  - IM
  - Seti@Home
  - File Sharing
  - File Storage (e.g., Freenet)
  - Content Delivery (e.g., Bit Torrent)
- NAT is NOT the problem

Transparency

- There are several workarounds for NAT:
  - Rendezvous points (JXTA)
  - Mediation points (WinMX)
  - Pushed peer caches (JXTA)
- The developer pays the reduction of transparency and the overall architecture tends to be *n-tier* rather than p2p!

Why IPv6?

- IPv6 restores transparency
- Allows to better organize overlay-based technologies
- Better support for mobility:
  - Mobility applications
  - 3G
  - Mobile devices interacting with:
    - GRID facilities
    - Remote Laboratories

Conclusions

- Investigate:
  - new paradigms
  - forecast new traffic patterns
  - Interconnection of cooperating facilities
  - GRID as a resource aggregator emphasizing the importance of the network
  - The p2p paradigm as a way to cooperate and sharing resources.