

European and international IPv6 Collaborative activities

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Types of IPv6-Related Projects

- **National R& D**
 - **Some testbeds, some research**
- **National Research Networks**
 - **Most have activity-often linked to Internet-2**
- **European Commission (EC) R & D**
 - **e.g. Mobile, active network, Virtual Reality**
- **European Research Networks**
 - **Mainly on TEN-155 and GEANT**

European vs International

- **Some National projects encourage US participation; less East Asian so far**
 - **Important reason is lack of physical links**
- **EC projects are mainly European**
 - **Often includes US-owned Labs in Europe**
 - **But international links now encouraged**
 - **Will mention several with North American and East Asian links**

European NRN Pilots

- Many National universities part of 6BONE
- Some NRNs have actual IPv6/IPv4 sponsored Projects
 - France, Germany, Netherlands, Nordic, UK
 -
- NL has native IPv6 services
 - Has taken leading stance in Europe
- Germany, UK .. Have IPv6/ATM pilots
 - but many are phasing out IPv6!

European-wide IPv6 Pilots

- **DANTE runs MBS Pilot on TEN-155**
 - **Has IPv6/ATM Pilot under TF-TANT, MBS stays until October 2001**
- **New project is GEANT**
 - **Will not have ATM MBS, considering still what to do for IPv6**

- Many NRNs have given one site some co-ordinating functions
 - e.g. Resource Centres at Lancaster U
 - Co-ordinating function for both UKERNA and GEANT Southampton U
- Many allow IPv6/IPv4 internationally
 - Encourage, but no European co-ordination, of work with Internet-2
 - Some funded Europe-US, e.g. Bermuda

EC Support for IPv6 Projects



- **Proposals are one year before projects start**
- **Pre-1999, no products and little support**
 - **Some defence-related projects, not EC**
- **1999-> 2000, F4 Projects, research stacks**
 - **Encouraged projects to show IPv6 feasibility of their activities - very few projects**
- **2000 -> 2002, products starting less routers**
 - **Network & mobile projects, several short-term**
- **2001 -> 2003, products now coming**
 - **Many projects, concertation now needed also**

Location of IST IPv6 Projects

- **There is no real definitive list**
 - **Given two in preparing this talk**
- **Some in F5 Action IV - key technologies**
 - **Distributed Systems and Service Provision**
 - **Large-scale simulation and visualisation**
 - **Mobile and personal communications**
- **Some in F5 Research Networks**



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IST IPv6 F- IV Support



- 1999 - 2000 some F-IV projects moved applications onto IPv6, e.g.
 - COIAS - multimedia/satellite
 - MECCANO - mm conferencing
 - RAT/SDR Applications in MS Research Stack!
- 1999 - 2001 TEN-155 supports MBS
 - Has IPv6 TF-TANT Working Group
 - Supports IPv6/ATM
 - Has specific IPv6/ATM Project

F5 Projects - 00 -> 01

- Some projects small or no testbed
 - **6INIT**, 296 pm, 1/00 - 3/01, problems in piloting IPv6 applications, transitions
 - **BRAIN**, 542 pm, 1/00 - 3/01, seamless access for high speed mobile users
 - **ANDROID**, 824 pm, 5/00 - 4/02, management of active services, transitioning to IPv6

F5 Projects - 00 -> 01 Contd



- **Some longer projects, 00/01 -> 12/02**
 - **DRIVE**, 725 pm, 4/00 - 3/02, organising inter-working of many mobile communication technologies, common signalling, aim at transport
 - **SUITED**, 913 pm, integrated satellite and terrestrial wireless, mobile and QoS aware
 - **WINE GLASS**, 482 pm, terrestrial wireless, QoS in core and QoS-aware applications, UMTS core, emulated UTRAN, WLAN
 - **WINE**, 535 pm, QoS - aware, wireless technology-neutral, Bluetooth, Hiperlan, WLAN



NGN Projects starting in 2001



- Several Projects, longer term, with testbed potential. Now need serious concertation. Have new missions. Examples are:
 - **6Winit**, 550 pm + foreign, 1/01 - 12/02 pilot applications, specially clinical, needing QoS, security, mobile, with GPRS and UMTS. Has Canadian, Japanese, Korean and US partners
 - **Moby Dick**, 815 pm + foreign, 1/01-12/03, QoS & AAA Architecture, UMTS, WLAN & ENET; includes testbed and micro-mobility

NGN Initiative

- **NGNI, 192 pm, 1/01 - 12/02, provide co-ordination, planning and roadmaps & dissemination for whole NGN area - particularly IPv6**
- **Will provide liaison with all relevant fora, information on relevant IST activities, and international facilitation**

Collaboration Needs & Trends

The UCL logo, which is a stylized drawing of a building with a dome, with the letters 'UCL' underneath.

- **Moving towards availability of international network testbeds**
 - **Partly provided under GEANT-like initiatives with joint funding**
 - **Builds on needs in specific project or program with international partners at first**
- **Drivers often major applications, e.g.**
 - **LHC for High Energy Physics**
 - **Distributed High Performance Computing**
 - **Grid Project**

Examples of Current European International Partnerships

- **6INIT - IPv6 pilot, Canada**
- **FAIN - Active Networks, Japan, US**
- **6WINIT - Wireless testbed, Canada, Japan, Korea and US**
- **LHC - worldwide**

Global Wide Area Application

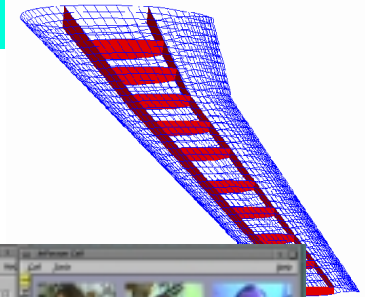
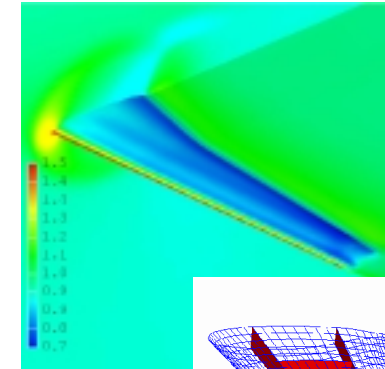


Cooperation: JAERI and Univ. of Stuttgart



- **Common fields of interest:**

- **Grid computing**
- **Collaborative working**
- **Simulation of Fluid-Structure interaction**

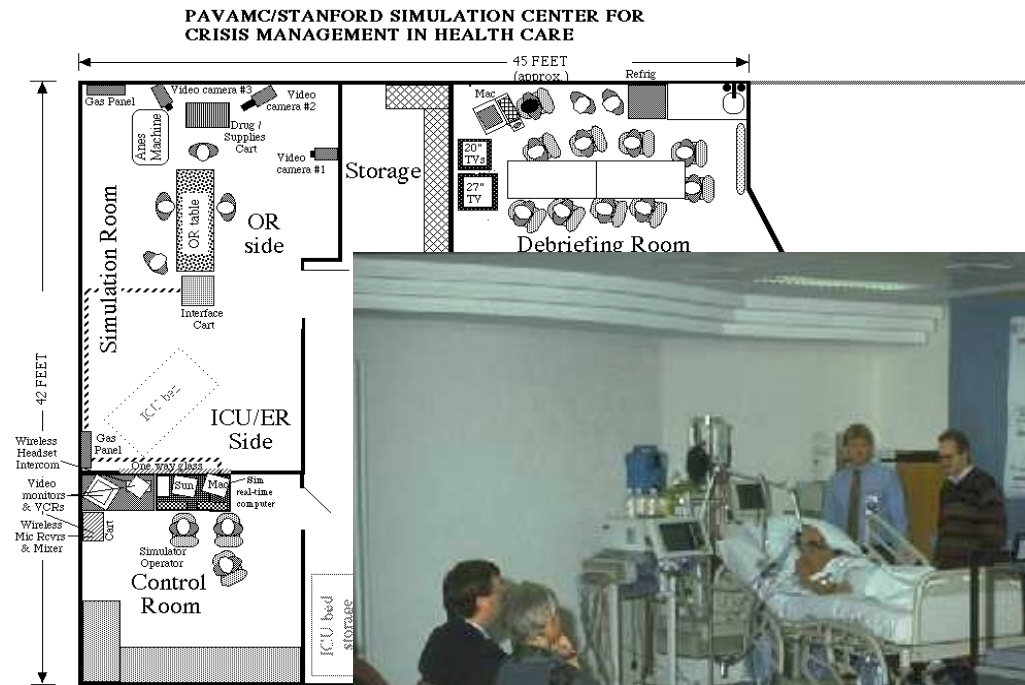
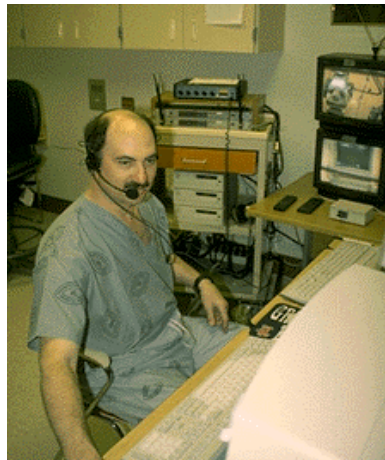


- **Cooperation:**

- **Exchange of staff**
- **Common use of tools**
- **Common use of systems**
- **Distributed test-bed**



Stanford Application Local Scenario



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Services to be Provided



- **Move existing services over to IPv6**
 - **Conferencing, media distribution, DB access**
 - **NRNs and GEANT must realise priority**
 - **Large suppliers will help finance**
 - **Must be possible to use services routinely**
- **Make high quality services available with predictable QoS, security, mobility**
 - **Some selling still needed to programmes**
 - **Carrier needs of management experience, and Government interest in facilitation may be key**
- **Major political initiatives needed - but may be forthcoming**

New Projects Expected

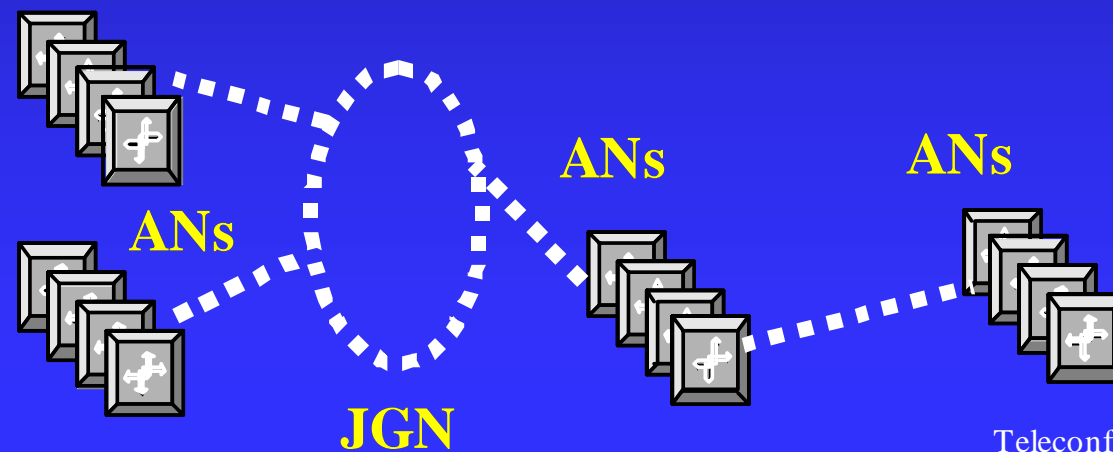
- In the context of such links, new proposals can be expected
- Two proposals which are extensions of the current FAIN IST initiative, relevant to planned EC initiatives, and proposed by Galis (UCL) are indicated below:



Large Scale Active Networks Test Bed Project (No1)

Objectives:

- Large scale test beds (100- 150 nodes)
- Interoperability & IPV6
- Performance comparison
- Evaluate advantages / limitations of active networks and services

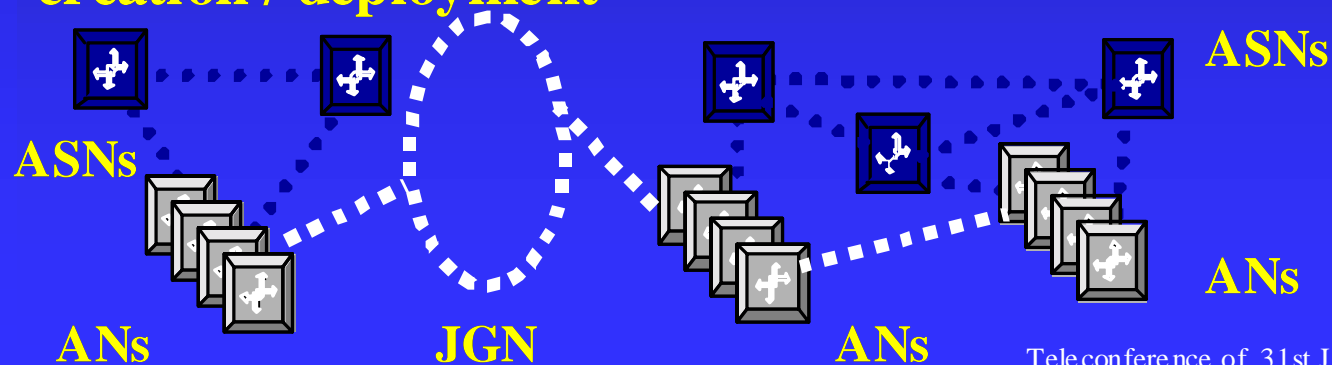


Teleconference of 31st January 2001

Active Mobile Service Creation and Deployment Project (No2)

Objectives:

- Definition of Network Service Level APIs & Active Service Nodes(ASNs)
- Active Service Middleware components for Mobile/Wireless extension
- Interoperability & IPV6
- Evaluate advantages / limitations of active services creation / deployment



Tele conference of 31st January 2001

Conclusions

- **This type of joint session is a foretaste**
 - **but it must be the norm not special**
 - **with IPv4 facilities constant QoS difficult**
- **Resource requirements must be scaleable**
 - **so that many conferences can be provided standardly without special set-up or damage to other collaborative services**
- **This link is an important milestone**
 - **Many projects will benefit**

Acknowledgements

- **Many provided information, e.g.**
 - **de Silva, Campolargo, Drabvic (EC)**
 - **Many 6WINIT/ANDROID partners also on the projects mentioned**
- **All who made the link possible**
 - **CRL and all the many who collaborated technically and at short notice**