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IPv6 Priorities for Action at EU Level

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Presentation Outline

- ❑ **The Political Background on IPv6**
- ❑ **The IPv6 Task Force**
- ❑ **Actions to be taken at EU level**
 - EU member States
 - Industry
 - European Commission
- ❑ **The Second Phase of the IPv6 Task Force**

The Importance of IPv6

... We have to look at other means to stimulate the emergence of Mobile Internet.

We have to see that a new Internet Protocol – IPv6 – will be rolled out swiftly.

We have to stimulate European content production.

We have to see that sufficient research funding is available for future wireless technologies, as is foreseen in the Commission's proposal for the 6th Framework programme for Research.

... Mr. Liikanen's Appearance before EP Plenary, 1st March 2001

The Political Background

- **The Lisbon European Council (March 2000) set the objective for Europe to become the most competitive and dynamic knowledge-based economy in the world.**
- **The "eEurope 2002" Action Plan (June 2000) defined the necessary measures to accomplish the objective of**
“An Information Society for All”
- **and identified the main objectives:**
 - a cheaper, faster and secure Internet;
 - investing in people and skills and stimulating the use of the Internet.

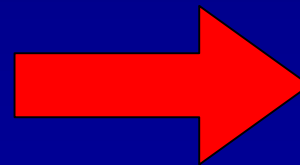
The Political Background (Cont.)

□ The eEurope Action Plan specifically addressed the next generation Internet, including

– mobile Internet, and emphasised the need for a vastly increased Internet IP address space (as offered by IPv6)

– The emergence of

- **peer-to-peer**
- **broadband access**
- **machine-to-machine**
- **etc.**



**rapid evolution
towards IPv6.**

The Political Background (Cont.)

- **The 3G Communication from EC (March 2001) also stressed that IPv4 is considered to hinder the full deployment of 3G services in the long run.**
 - IPv6 overcomes the address space shortage and enables additional features.
 - It will considerably boost the scope for novel 3G-application development.
 - Any delay in the transition to all-IPv6 networks risks hindering the deployment of these advanced 3G service features at a later stage.

The Political Background (Cont.)

- **The eGovernment declaration agreed by Ministers from 28 European countries (November 2001), invites the EC to make the necessary RTD investments in the next generations of infrastructures and open systems,**
 - Including a fast but coherent transition to broadband access and the next Internet Protocol.

The IPv6 Task Force

- **In response to the conclusions of the Stockholm Summit, the Commission launched the IPv6 Task Force in April 2001, led by the Industry**
 - The objective was to develop a comprehensive action plan by end 2001, aiming at ensuring the timely availability of IPv6 and to encourage its worldwide deployment.
- **This Task Force has now completed its work and issued a series of reports and recommendations (<http://www.ipv6tf.org/>)**
 - Invited the EC to submit a communication on IPv6 to the European Council (last March in Barcelona, Spain).



ENGLISH



SPANISH

Next Generation

IPV6 TASK FORCE



INFO DOCS

CONTRIBUTIONS

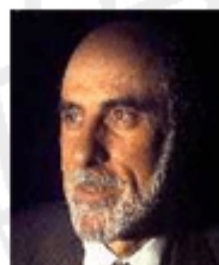
MEETINGS

PRESS ROOM

LINKS

T.F. MEMBERS

MEMBERS ONLY



Dr. Vint Cerf

*Honorary Chair,
IPv6 Forum*

"Founder of the Internet"

"The value of IPv6 can be realized only if the deployment effort is broadly based on a global scale. Part of the IPv6 Task Force effort needs to be devoted to fostering IPv6 understanding where ever the Internet has gone, and beyond that to places where it can go with the help of the much-expanded IPv6 address space.

I encourage your initiative and support your efforts to create a receptive environment for the development, delivery and use of IPv6 in the global Internet".

"Our objective is to ensure that Europe's competitiveness in wireless technology is not jeopardised by the lack of a clear road map towards IPv6," European Enterprise Commissioner Erkki Liikanen said in his opening speech to the IPv6 Task Force.



Erkki Liikanen
EU Commissioner

The IPv6 Task Force (Cont.)

- **Chairman: Latif Ladid**, Ericsson Telebit & Pres. IPv6 Forum
- **Working Groups:**
 - Internet Infrastructure
 - Chair: Petri Mahonen, Univ of OULU
 - Mobile Wireless
 - Chair: Bosco Fernandes, Siemens
 - Next Generation Applications
 - Chair: Gert Van Den Broek, Philips
 - Trials framework
 - Chair: André Zehl, D-Telekom

Action Drivers for IPv6

- ❑ **For new Internet enabled services to be deployed in a timely manner, it is of key importance to structure, consolidate and integrate European efforts on IPv6.**
- ❑ **A concerted effort is required in order to strengthen the Europe overall competitiveness in this strategically important area of development.**
- ❑ **By rapidly adopting IPv6, the European industry at large, including all Internet related players (fixed and wireless), has a unique chance to investigate and pioneer the future.**
 - They can acquire a competitive edge which can be explored and exported.

Recommendations of the IPv6 Task Force

- **A series of recommendations pertaining to the implementation of IPv6 by all relevant ICT sectors in Europe was proposed to the:**
 - EU member States
 - Industry
 - European Commission.

EU Member states are called upon to:

- 1. Increase their support towards IPv6 in the networks and services associated with the public sector**
- 2. Establish and launch educational programmes on IPv6**
- 3. Promote the adoption of IPv6 through awareness campaigns**
- 4. Continue to stimulate the wide spread use of Internet across Europe and encourage the transition towards IPv6**
- 5. Strengthen the financial support towards NRENs.**
- 6. Provide the required incentives towards the development and testing of native IPv6 products, tools, services and applications in the new economy sectors.**

EU Member states are called upon to:

7. Take appropriate measures (such as the establishment of a National or Regional IPv6 Council) to carry out:

- The assessment, at national or regional level, of current developments and degree of take-up of IPv6.
- Formulation of guidelines and dissemination of best practises relating to the efficient transition towards IPv6.
- The development of measures aiming at the alignment of IPv6 transition schedules favouring a cohesive IPv6 take-up.
- Encouraging the active participation of technology experts in the work of European and International standards and specification bodies tasked with IPv6 matters.

The Industry is called upon to:

- 1. Fully participate in the R&D activities, namely in FP6.**
- 2. Actively contribute to standards and specifications bodies.**
- 3. Develop key guidelines for the rapid integration of IPv6 infrastructures and interoperability of IPv6 services and applications, especially in the context of 3G mobile comm.**
- 4. Support and fully participate in interoperability events organised notably by ETSI.**
- 5. Establishment of a European wide, vendor independent, training and education programme on IPv6**
- 6. Consider the need to integrate IPv6 in their strategic plans and take early steps to obtain adequate IPv6 address allocations.**

Complementary Actions by the EC:

1. Increase and refocus EU support to RTD in the context of the 6th Framework Programme in the following areas:

- IPv6 broadband fixed and wireless network infrastructures, and their interoperability aspects,
- Development of IPv6 tools, devices and network elements,
- Large scale testing of IPv6 based services and applications, across heterogeneous, fixed and wireless, access platforms,
- IPv6 enabled advanced infrastructures for Research
- IPv6 awareness, training and education,
- Production of a European Code Base for IPv6
- Launching a socio-economic and market study.

Complementary Actions by the EC:

2. Renew the mandate of the “IPv6 Task Force” with an enlarged participation of all economic and industrial sectors likely to be impacted by IPv6, to:

- Ensure a working liaison with standards and Internet governance bodies such as ISOC, IETF, ICANN, RIPE NCC, 3GPP, ETSI, IPv6 Forum, Eurescom, ETNO, UMTS Forum and GSM Europe,
- Provide a regularly updated review and plan action on the development and future perspectives of IPv6 in order to coordinate European efforts on IPv6,
- Establish collaboration arrangements and working relationships with similar initiatives being launched in other world regions.

Second Phase of IPv6 Task Force

□ Objectives

- To continue the successful work of the first phase with an enlarged participation
- To monitor how the recommendations will be implemented
- To discover and fill gaps and provide strategic guidance to the market place
- To promote the IPv6 deployment in different business sectors, including the educational and user awareness
- To concert efforts with local and other international initiatives

□ Supporting project:

- IPv6 Task Force Steering Committee (under negotiation)

R & D on IPv6

- All aspects of IPv6 and notably its R&D dimensions are addressed by a multitude of organisations.
- The EC has been instrumental in providing the necessary funding for the R&D of IPv6 related issues.
- A large number of IPv6 projects totalling some 75 M€ of community funding is currently operational under the 5FP.
 - This includes two large scale IPv6 trials (6NET and Euro6IX)
 - These trials are fully complementary to the efforts deployed at national level in the context NRENs and other European initiatives such as GEANT.

R & D on IPv6 (Cont.)

- **The importance to continue the R&D effort on IPv6 was stressed by the EC in its preparatory work for the 6FP,**
 - It will provide further opportunities to the research community and ensure the development of innovative tools, services and applications.
- **The first Call for proposals is expected to be published by the end of 2002.**

Further info can be found on EU Activities

<http://www.cordis.lu/ist/ka4/mobile/index.htm>

CORDIS: IST: KA4: Mobile: Home page - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit

Address <http://www.cordis.lu/ist/ka4/mobile/index.htm> Links

Google Search Web Search Site Page Info Up Highlight

ACTIVITIES

- Home page
- News and events**
- Newsletter subscription
- Projects**
- Concertation and Cluster
- Statistics**

BACKGROUND

- Past events
- Regulatory and legislative documents
- Library
- Mission of Unit E4
- Areas of current work
- ACTS Mobile (4FP)

LINKS

- Fora, Associations,

IST MOBILE SUMMIT 2002 - 16-21 June 2002, Thess

Welcome to

The site of the R&D initiatives on "Mobile and personal communications and systems including satellite based systems and services"

Reconfigurable Radio

Wireless IP Society

4th Generation

S-UMTS, Satellite Broadband, DVB-S, DAB, OVB-T, Satellite/HAPS, GSM, GPRS/EDGE, MBS 60, MBS 40, UMTS, UMTS ++, WFA, MWS, xMDS, WLAN, Bluetooth, DECT, IR, Body LANs, Personal Area Networks, Indoor, Local Area Networks, Broadcasting, Cellular, Quasi-Cellular, Wireless Local Loop

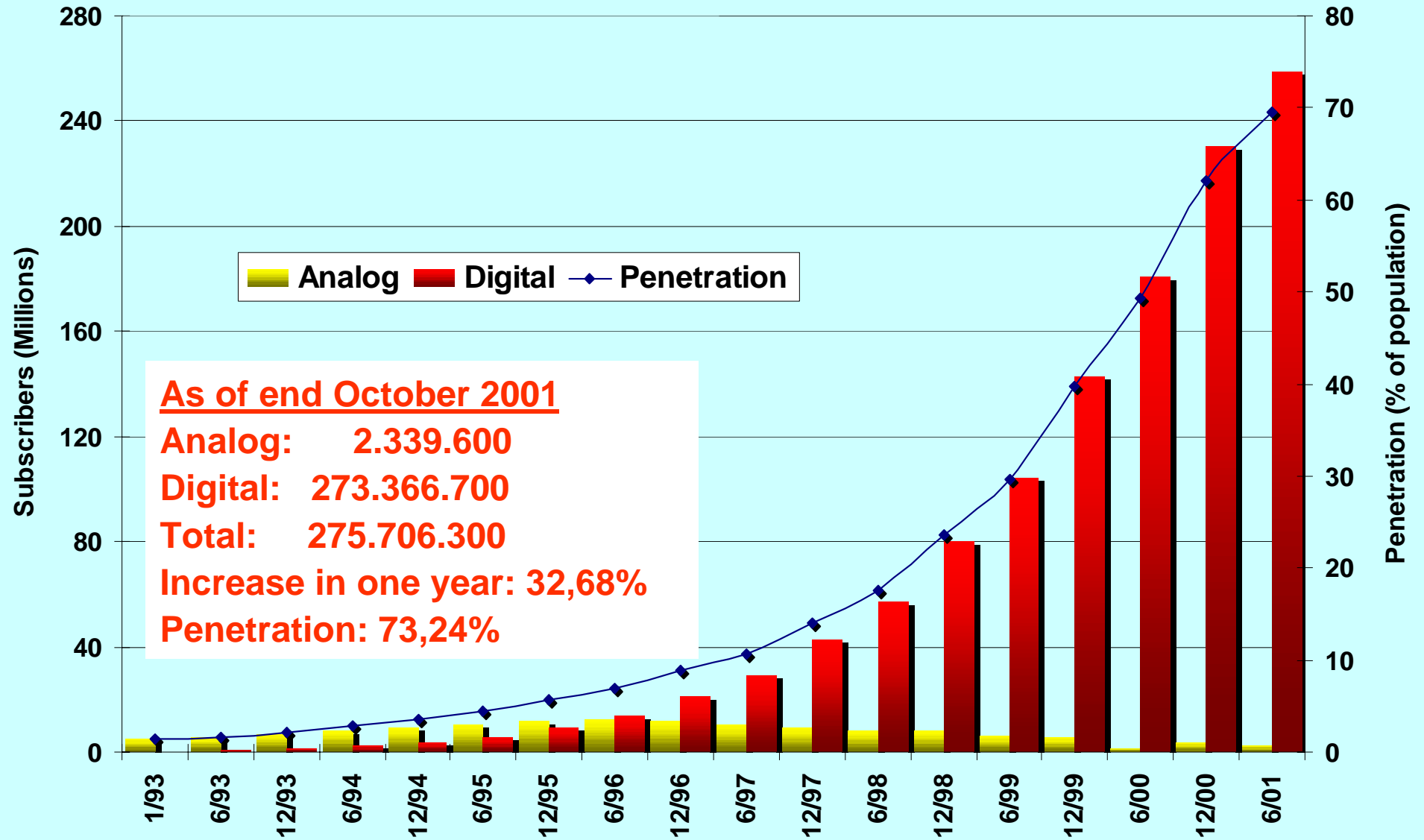
<http://www.iti.gr/summit2002> Internet

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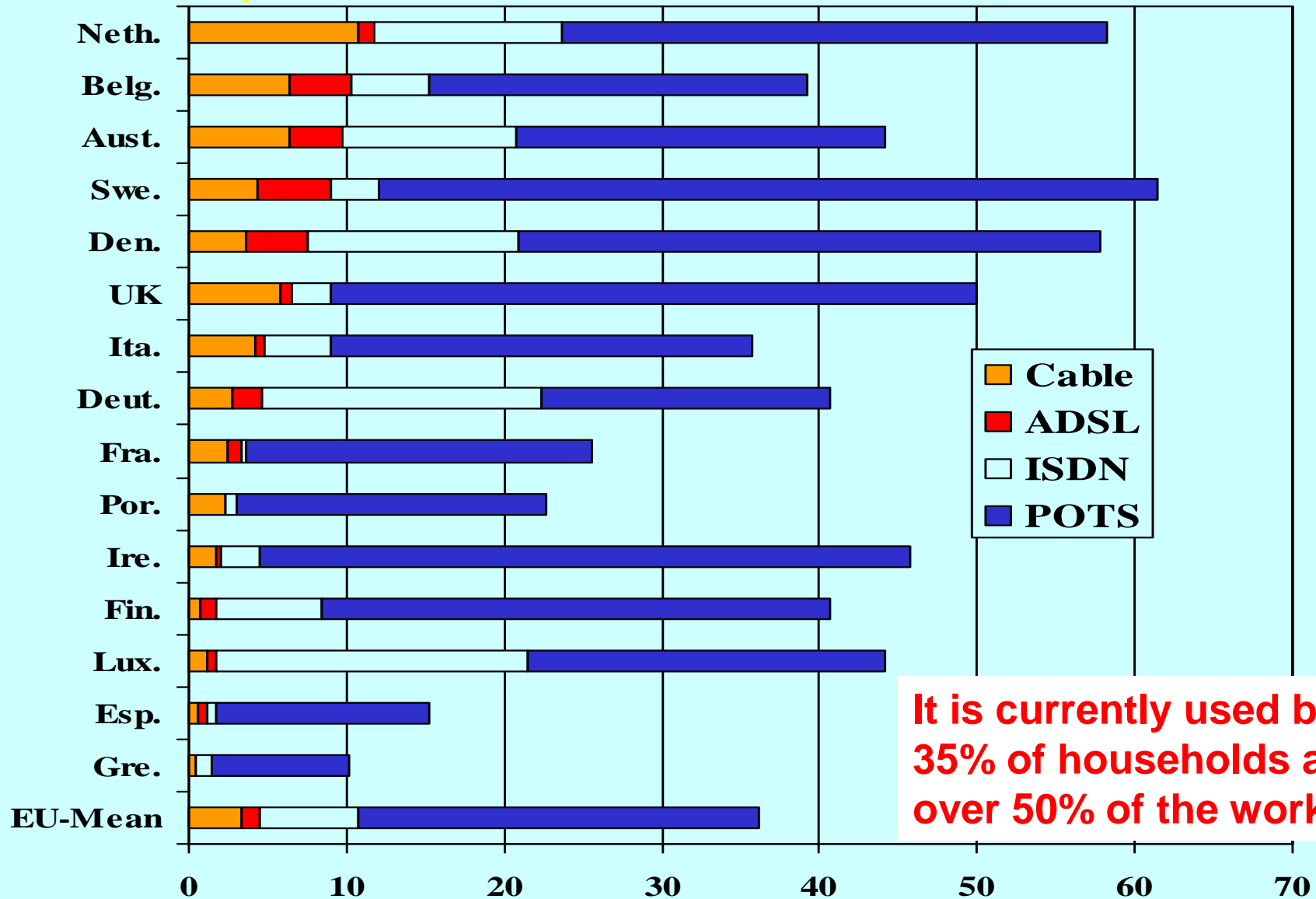
Internet and wireless Convergence

Cellular Subscribers (EU)

(June 2001)



Internet Penetration in Europe (June 2001)



It is currently used by over 35% of households and by over 50% of the workforce.

Internet and wireless Convergence

- **The anticipated convergence of Internet and wireless communications is a unique opportunity for Europe to capitalise on its technology know-how and successfully make the leap to the wireless Internet world.**
- **Accessing and using the Internet via a mobile communicator/phone or computer or a TV set-top box, is expected to become commonplace in the coming years,**
 - creation of novel applications and services
 - new business opportunities can be built to the benefit to all actors in the new Internet economy.

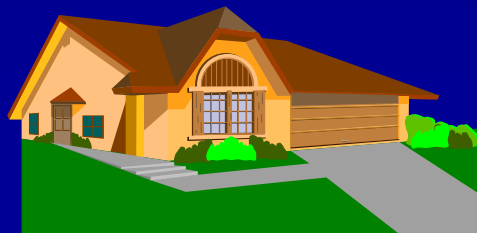
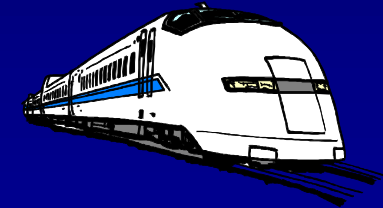
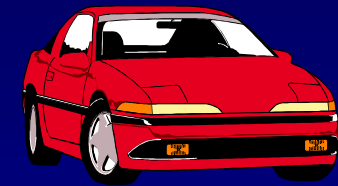
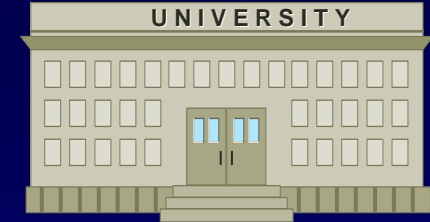
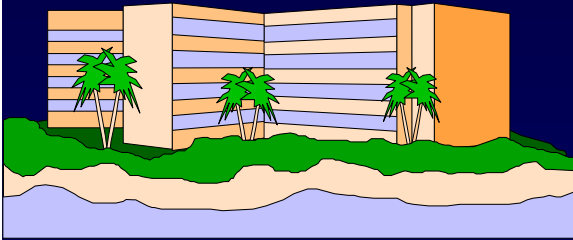
The IPv4 Address Scarcity

- ❑ **There is a serious risk that global IPv4 addresses become critically scarce by 2005.**
- ❑ **IPv4 addresses may never be completely exhausted, but their availability for large-scale requirements (such as those of mobile operators) is becoming a problem.**
 - Scarcity implies an undesirable cost to those wanting IP addresses.
- ❑ **In the initial phase of GPRS/UMTS with a few millions of terminals, IPv4 appears to be a reasonable solution, but to offer a scalable service that will cater for over a billion terminals, IPv6 is an imperative.**

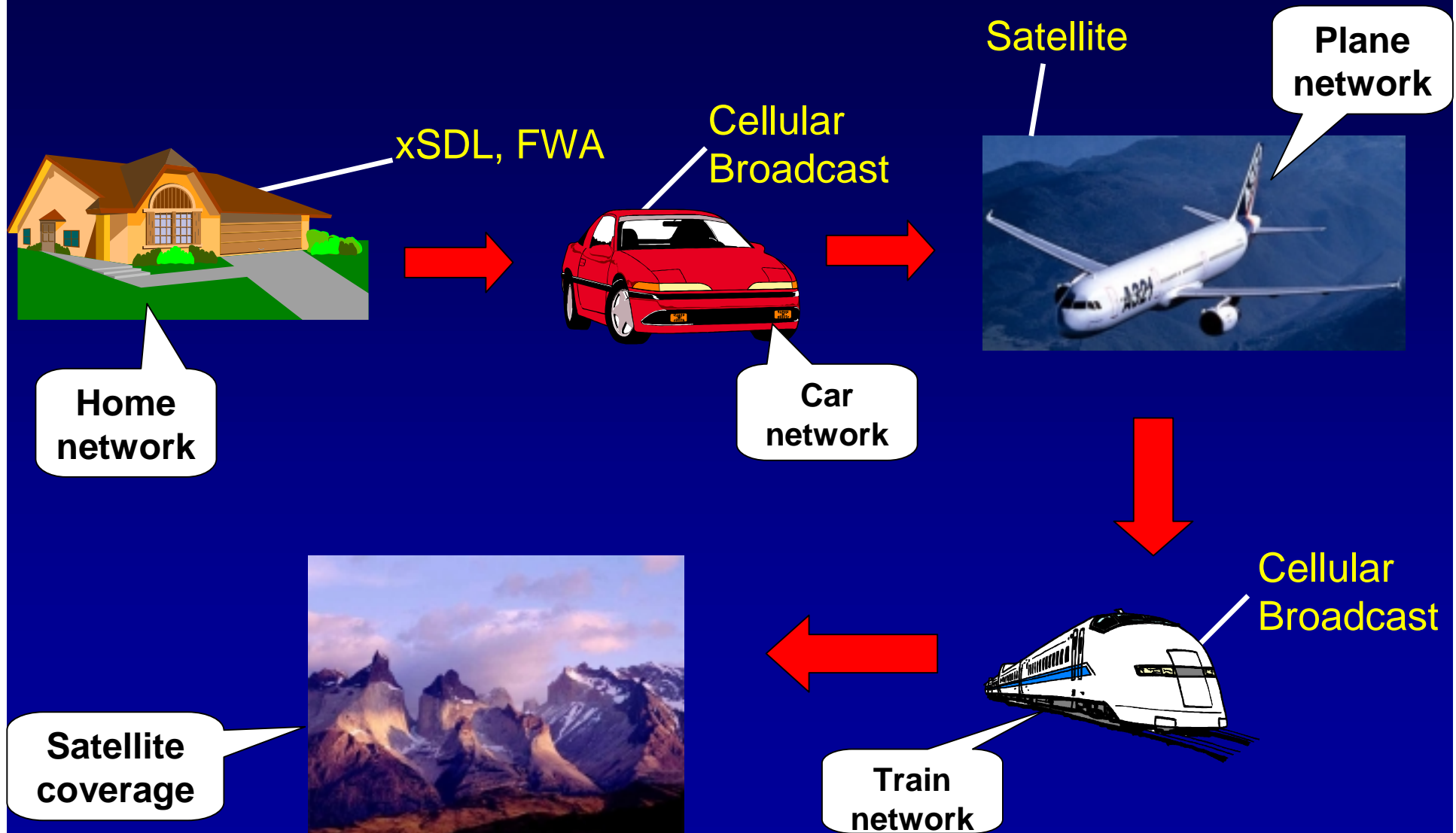
The IPv4 Address Scarcity (Cont.)

- ❑ **Without sufficient global IP address space, applications are forced to work with turn-around mechanisms (NATs) that provide local site addressing**
- ❑ **The need for always-on environments to be globally contactable precludes NAT-style IP address conversion,**
- ❑ **IPv6 should remove the requirement for NAT usage because global addresses will be widely available.**
 - IPv6 reintroduces end-to-end security and communication that are not always readily available through a NAT-based network.

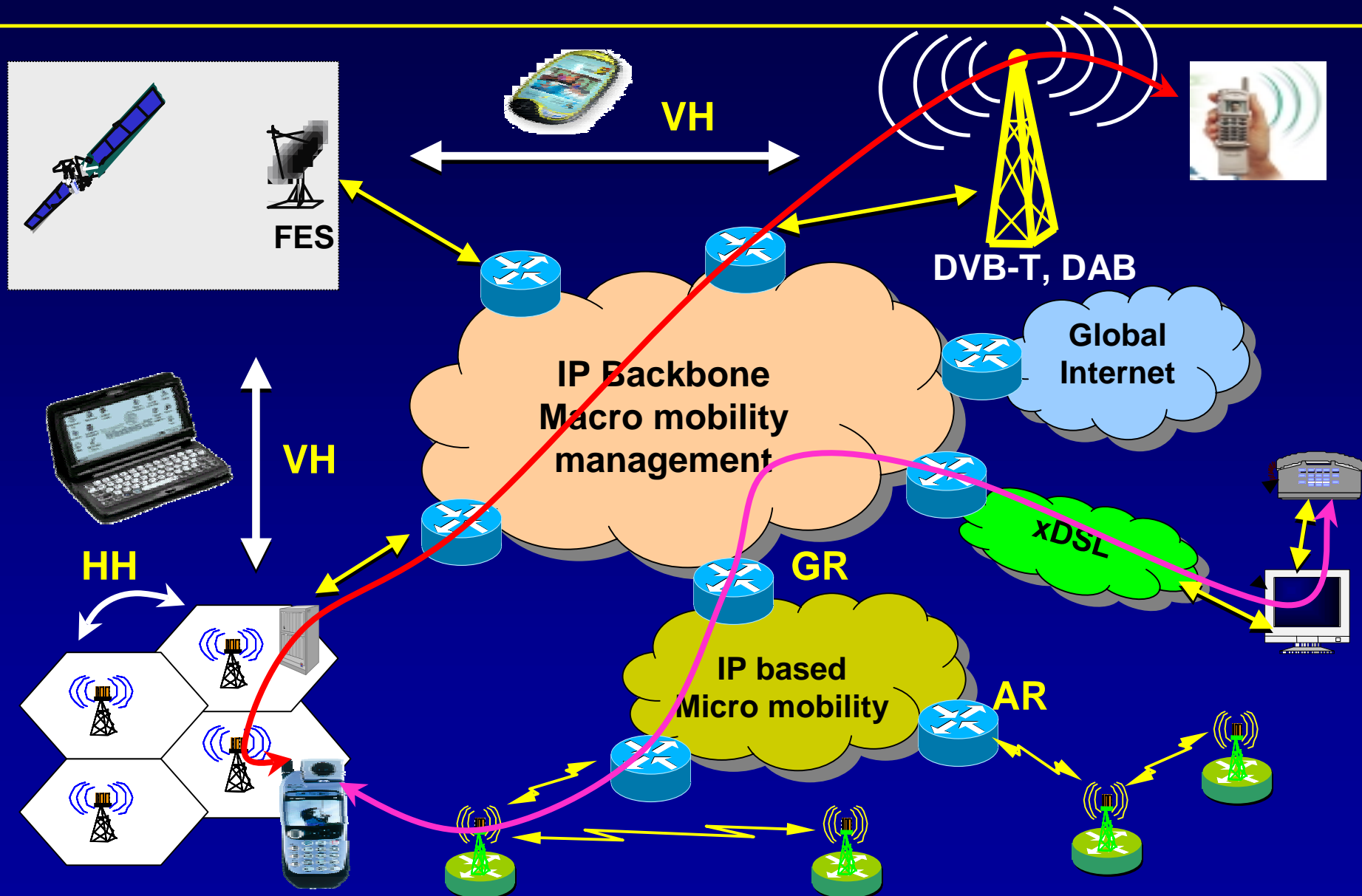
Pervasive Connection Anytime Anywhere



A trip to the mountain with a Multi-Mode Terminal



Architecture



There is no substitute for IPv6

❑ **Enough Addresses**

- From private addresses to global addresses in every terminal and device.

❑ **Address Autoconfiguration (plug and play)**

❑ **Increased Network Efficiency**

- Can reduce network load up to 50%
- Route Optimization could double Internet-wide performance!

❑ **Increased Functionality**

- New services, new business opportunities, lower costs, higher performance, more robustness, from a one way road (dead end) to a two way highway.

❑ **Competition enhanced**

A larger IP address space is needed

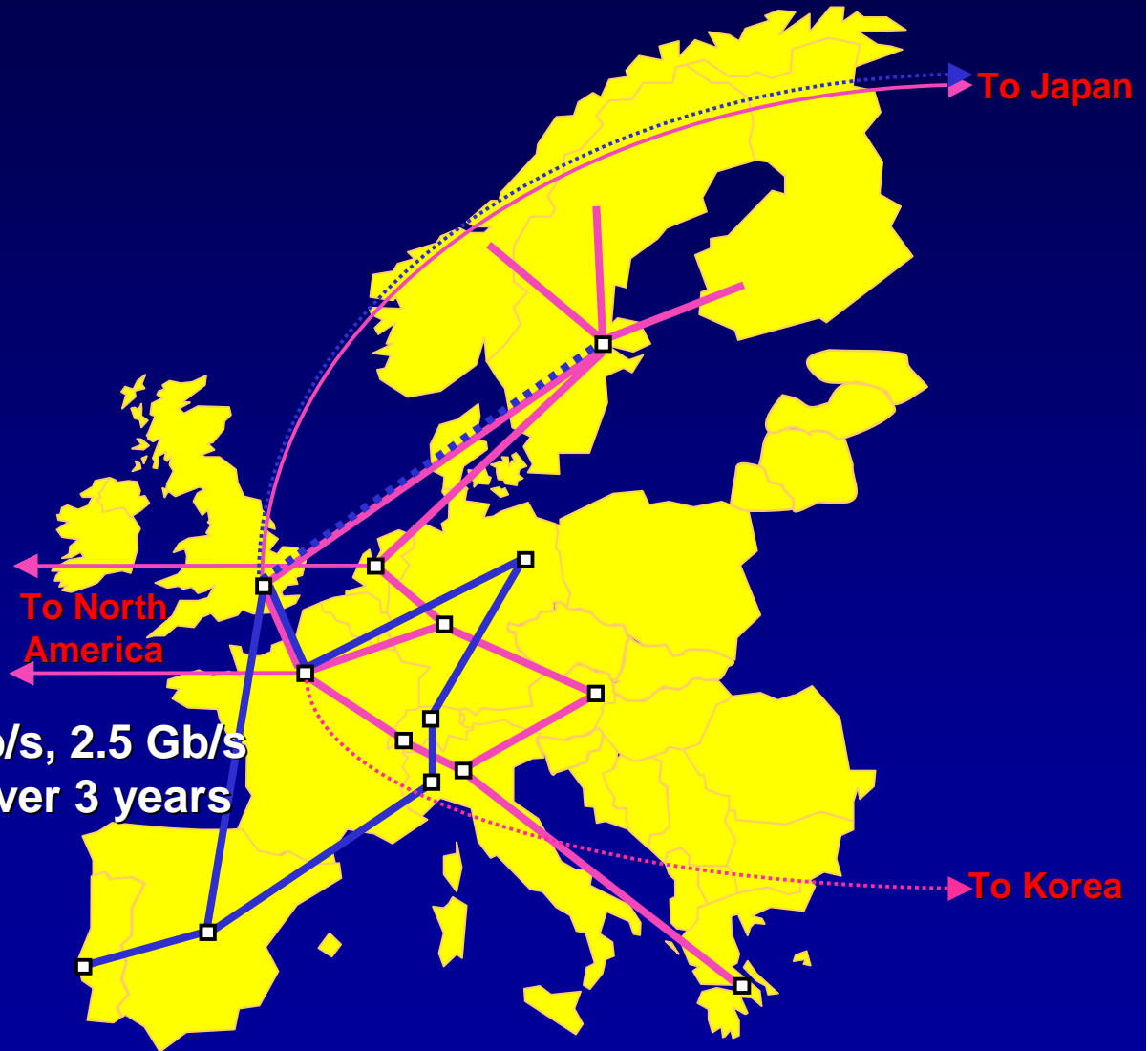
- **Overall Internet traffic is growing very fast**
 - ~320 million users in 2000, ~480 million as of Oct 2001
- **The number of cellular users is growing**
 - ~ 650 million mobile phone users in 2000, over ~ 1 billion by 2003
- **The number of cars to be equipped with sensors, actuators, GPs, Yellow page services is growing**
 - ~1 Billion cars in 2010, 15% should get GPS and Yellow Page services
- **The number of “always-on” Internet appliances for Home users will reach billions**
- **Emerging population/geopolitical & Address space**
 - China, India, Japan, Korea needs global IP addresses
 - How to move to e-Economy without Global Internet access?

IPv6 Large scale trials in preparation

6NET



Native IPv6 at: 34 Mb/s, 155 Mb/s, 2.5 Gb/s
2400 person months of work over 3 years
32 MEuro total cost



The GEANT backbone

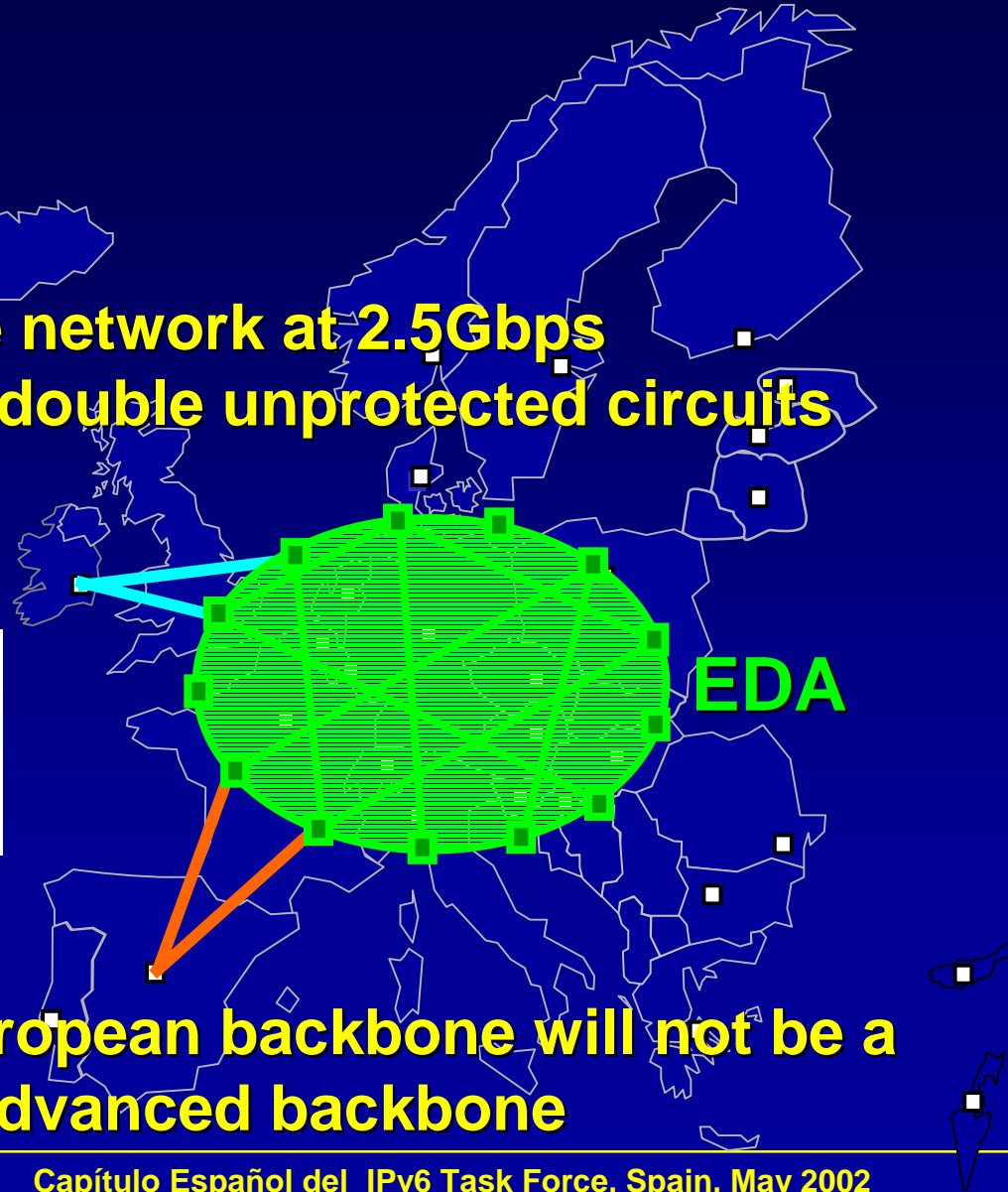
10 Gbps in 8 PoP

2.5 Gbps in 7 PoP

...

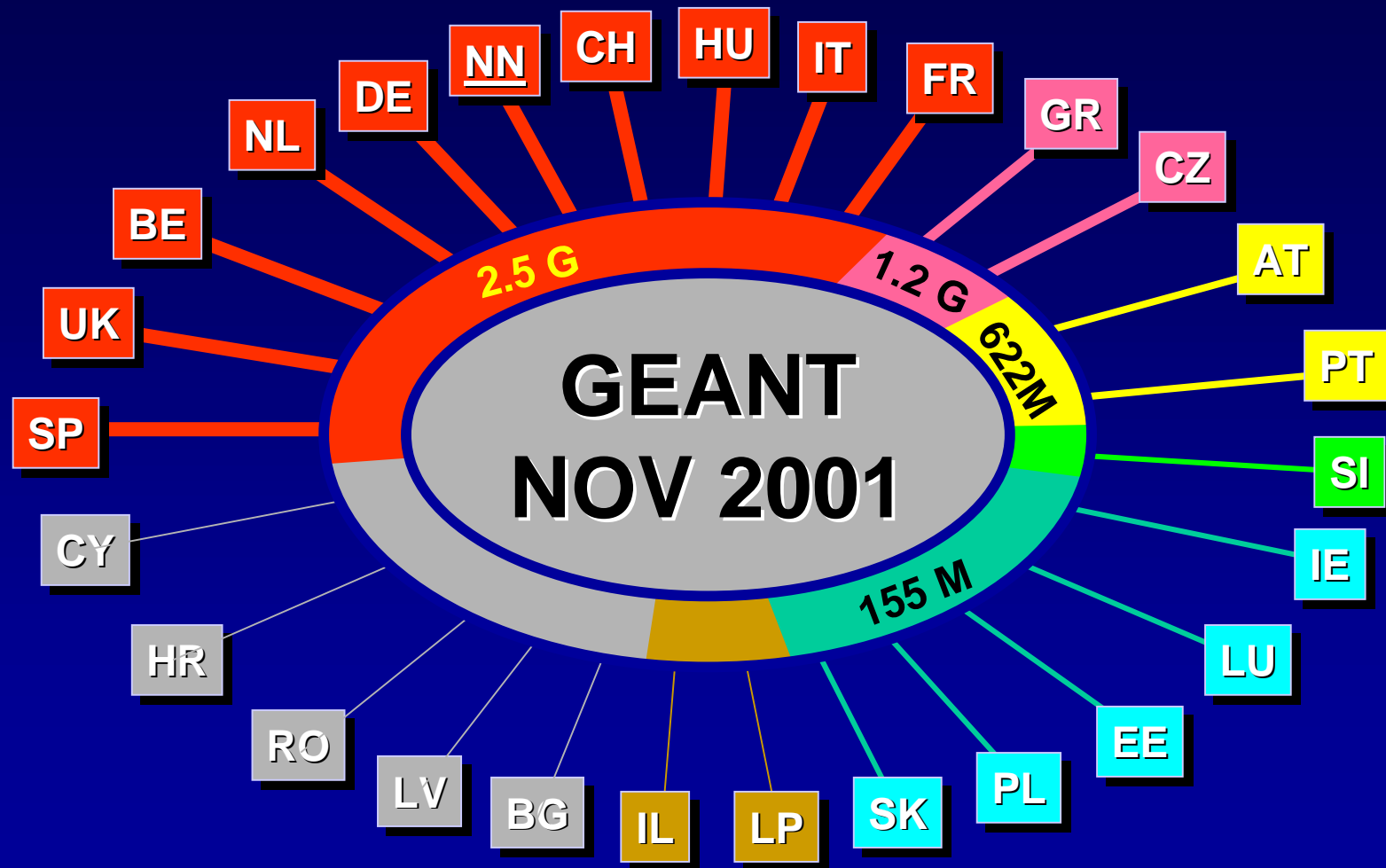
Access to the core network at 2.5Gbps

Typical access by double unprotected circuits




For the first time European backbone will not be a bottleneck... most advanced backbone

Access Capacities



Wireless IPv6 - a sample

Moby Dick - Mobility and Differentiated Services in a Future IP Network



MOBY DICK


"Such exaltation of thought, while it let a drift the spirit, and gave it licence in strange airs, ..."
- 'Seven Pillars of Wisdom' -
Thomas Edward Lawrence,
better known as Lawrence of Arabia

Project duration: 36 months
Key Action: IST 2000 - IV 5.2: "Terrestrial Wireless Systems and Networks"
Clusters: Wireless IP, Mobile services and applications
Project Number: IST-2000-25394

Main Objectives:

- To facilitate the development of seamless access to existing and emerging IP-based applications
- To propose an architecture for wireless Internet access by developing new mechanisms for seamless hand-over, QoS control after and during hand-over, 3 & 3.5 and 4G systems

BRAIN: Broadband Radio Access for IP based Networks IST-1999-10050





Main Page
Partners
Description of work
Publications
Links
Workshop

BRAIN is a research and technology development (RTD) project sponsored by the European Commission under the [Information Technologies Programme \(IST\)](#), which is one of the thematic programmes of the [Fifth RTD Framework Programme \(1998-2002\)](#)

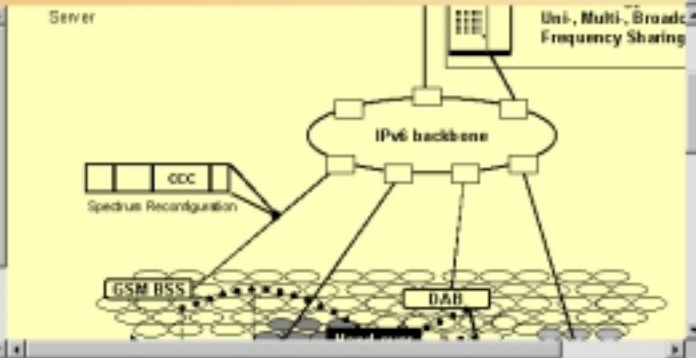
Driven by the increasing demand for mobile and cordless broadband services in hot spot areas like airports, campus, and conference centres, the BRAIN project will provide a true broadband multimedia IP-based radio technology. As a complement to GSM and UMTS, BRAIN will support several high data rate users via one base station, e.g., provide 2 Mbps for 10 users such that the total data rate will be around 20 Mbps per RF channel. In addition, BRAIN will offer the integration of end-to-end services over IP and evolve IP towards mobility. Furthermore, it will enable the interworking of private, corporate, and public networks. It will also support a wide range of services (point-to-point, point-to-multi-point, symmetric, and asymmetric) and allow roaming as well as inter-

DRIVE Dynamic Radio for IP-Services in Vehicular Environments
IST-1999-12515



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Server
Uni, Multi, Broadc. Frequency Sharing
IPv6 backbone
CCC
Spectrum Reconfiguration
GSM BSS
DAB

WINE GLASS

Wireless IP Network as a Generic platform for Location Aware Service Support



Main Objectives
Technical Approach
Partners

This Project aims to contribute to the technical innovation by exploiting the potential of IP-based wireless mobile multimedia networking with UMTS and WLANs. The objective of the Project is to exploit enhanced and/or new IP-based techniques to support mobility and soft-guaranteed QoS in a wireless Internet architecture based on UMTS and incorporating WLANs, and to explore their

IPv6 R&D in IST (a sample)

- ❑ 6INIT - Introduction of IPv6 services in Europe
- ❑ 6WINIT- Wireless counterpart
- ❑ WINE - Wireless Internet Networks
- ❑ LONG - Laboratories over Next Generation Networks
- ❑ GCAP - Global Communication Architecture and Protocols
- ❑ NETGATE - Advanced Network Adapter for the new Generation of mobile and IP based Networks
- ❑ AQUILA - Adaptive resource control for QoS Using an IP-based Layered Architecture
- ❑ SEQUIN - End-to-end approach to quality of Service
- ❑ DRIVE - Cellular/broadcast inter-working at IP level
- ❑ WINE GLASS - IP in support of mobility for UMTS-WLAN's
- ❑ MOBY DICK - Evaluation of IPv6-based micro-mobility on Wnets
- ❑ BRAIN - Seamless handover between heterogeneous Wnets
- ❑ MIND - Mobile IP based Network Developments
- ❑ SUITED - IPv6 over the EuroSkyways satellite
- ❑ GEOCAST - Multicast Over Geostationary EHF Satellites