
Pan-European research networking beyond GEANT-2

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Are the research networks, Research Infrastructures?

- Where do we come from ?
- Where do we go now ?
- About the future ?



Where do we come from?

- Since early 90's, it has been long and difficult to have in place a Pan-European Research network infrastructure
- Earlier versions (EuropaNET, TEN34, TEN155) mostly accompanied the development of Internet (IP + WEB + mail) within academic communities



Where do we come from?

- From TEN155, VPN-type services were made available
- From GEANT, the service portfolio was enhanced (QoS, Multicast, IPv6, etc...)
- From then, the network has also been supporting network research (FPx projects)



Where do we come from?

- GEANT did contribute to improve sciences performances:
 - 3500+ Universities and research centers
 - Astronomy (VLBI), Grid (EGEE), HPC (DEISA) etc...
- Enhanced public-private cooperation for telecoms R&D (CISCO, ALCATEL, JUNIPER, etc...)



Where do we go now with GEANT-2 ?

- GEANT appears now as an unlimited bandwidth network to standard users (EU-EU, EU-US, EU-JP)
- However, a lot of work is still needed to answer requirements of non-standard users
 - Technology (hw and sw)
 - Global connectivity worldwide
 - Policy and organisation



About the future ?

- A Pan-European dark fiber footprint for end to end connectivity
 - GEANT extending within NRENs to reach end-users
 - GEANT being superseded by the aggregation of NRENs with cross-border links
- How to fund this permanent infrastructure and to keep it at the highest level of performances?



About the future ?

- Technical challenges:
 - Bring fibre to remote instruments
 - Software developments for massive data transfers over very long distances
 - Solve the RTT/latency issues for real time network applications
 - Make most of network management and monitoring transparent to users and application driven



About the future ?

- Organisational paths:
 - End to End services are a real multidomain issue which requires extended cooperations
 - Maintain at the European level the advantage of a coherent architecture as GEANT+NRENs
 - Avoid the construct of competing network infrastructures and organisations to dilute funding and waste management resources to put them together --> eInfrastructure



About the future ?

- Expand high level services to the wide user base, other challenges:
 - Mobility and ubiquity
 - Digital libraries
 - Generalised networks for sensors, antenna, etc... will raise other difficulties for storage, processing and computing
- Networks progress will require parallel development of data handling capabilities



About the future ?

- Answer to the question:
 - Yes, Research networks are a Research Infrastructure, by themselves AND as needed complement to all other RIs.



The end

