

Virtual performances. How Performing Arts use the network

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NRENS EXPERIENCE

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What is a Research and Education Networks?

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- **Provide capabilities beyond commercial ISPs**
 - A question of purpose
 - ✦ Dedicated bandwidth, direct control and low congestion enable exploitation of new/demanding applications
 - ✦ High bandwidth both in upstream and downstream allows the users to producing contents and services as well as using them
 - Platform for providing key Research and Education collaboration-supporting infrastructure
 - ✦ Authentication and authorization
 - ✦ Shared use of computation and storage facilities – i.e., the Grid
 - Potential to mitigate constraints in non-competitive marketplaces
- **Aggregate demand of a key user community**
 - Different demand patterns than residential, business users
- **Collaboration among the Research and Education Community**
 - Where much more can be achieved together than separately

The role of Research and Education Networks?

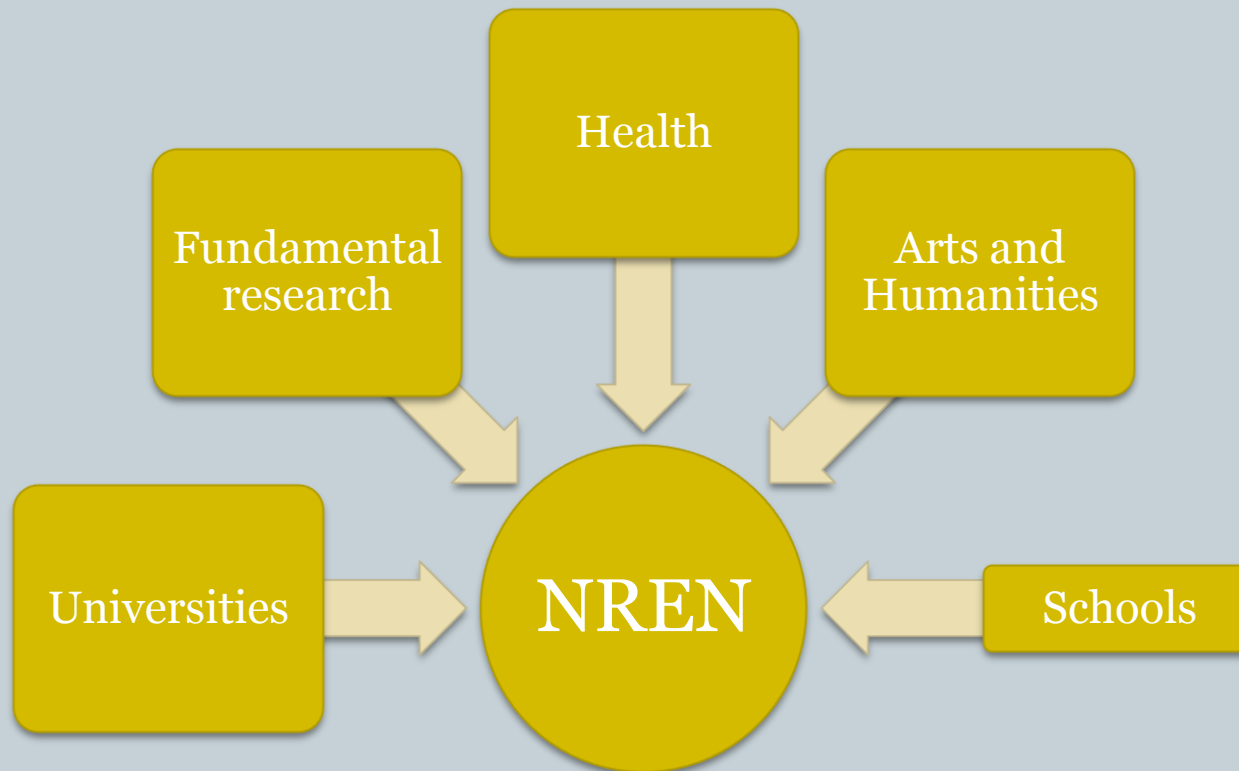
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- **The role and importance of National Research and Education Networks:**
 - non-commercial and dedicated to serve research and education
 - offer large network capacity and various advanced services not available generally
 - research networks and their user communities form important environments that become sources of innovation
 - Networks of networks (NRENs interconnecting): participation in international, world-leading broadband developments with particular applications to leading-edge education and research
 - outreach, technology implementation and support for application development in various ways

Communities create community

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*Different users communities
can collaborate using the same e-infrastructure*



Supporting user communities

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- Research and Education increasingly dependent on global access to resources, collaborators, data, scientific instruments.
 - dedicated global infrastructure: impractical or unfeasible for each country to work on their own
 - accessing, collecting, analysing, visualising and sharing data
 - access to national and international resources
 - access to scientific instruments with specific geo-location needs (e.g., optical and radio telescopes)
 - e-Teaching and e-Learning
 - and many others...



The role of NRENs for digital cultural content

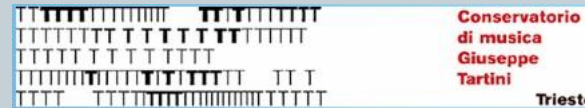
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- Thanks to their unique position, and indispensable functions, NRENs can play a key role in supporting digital cultural content:
 - **Improving connectivity** relating to access to high-quality digital data (images, documents, video, music, etc) for researchers
 - **Linking to the international community**, also supporting current and new collaborations with partners in other regions
 - Building Bridges between all e-Infrastructure layers, **from Network up to end users**, to develop common solutions

Arts & Humanities are NRENs community

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- on European NRENs
 - EU Universities (Departments of Arts, Literature, History) , Music Conservatories and Arts Academies, Theaters, Museums, Libraries, Archives, etc.



ORQUESTRA DE PORTÀTILS DE L'ESMUC

GARR community

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- GARR is the Italian NREN
- GARR users are all the academic and research institutes in Italy
- **Shareholders:**
 - Italian Universities (Fondazione CRUI)
 - INFN - The National Institute of Nuclear Physics
 - CNR - The National Research Council
 - ENEA - The Italian National Agency for New Technologies, Energy and Sustainable Economic Development.
- **Stakeholders:**
 - ASI - The Italian Space Agency
 - INGV – The National Institute of Geophysics and Volcanology
 - INAF – The National Institute of Astrophysics
 - Scientific Institutes for Research, Hospitalization and Health care
 - **Music Conservatories, Academies of Art and Performing Arts institutes**
 - **National libraries, National Archives and other documentation centers**
 - **Other cultural and scientific institutes in Italy (national and international operating in Italy)**
- <http://www.garr.it/eng/>

And what do they do?

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- **Education**
 - Master Classes
 - Training
- **Live Performance Events**
 - Drama, Dancing
 - Concerts, Art Installations
- **Laboratories**
 - Explore new challenges and chances
 - Collaborations
- **Digital memories**
 - Data Sharing and Mining
 - Deploy new concepts in “exhibitions”

Education: Music and Drama

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In collaboration with New World Symphony
 A master class and examination
 with maestro Luigi Alberto Bianchi
 between Rome and Miami

During GARR Conference 2007
 An exhibition performed by
 three different actors groups located
 in different sites



Music, but not only music...

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- GARR Conference 2005
- Pisa – Miami Viola Lesson

Let's have a look ...



A new idea of theater! A new vision of stage!

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- Third University of Rome / Vite3
- A live performance with actors in different locations

Let's have a look ...



Same instruments for the whole community

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- HD streaming in 34 Universities rooms for Health community
- High Definition can be useful also for other branch of learning
- Lectio Magistralis Prof. Roland Martin, expert in Multiple Sclerosis

Prof. Roland Martin lesson

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The Role of CD4+ T Cells in Multiple Sclerosis
- and Marco Vergelli's Contribution to Understanding It

Roland Martin

Department of Clinical Neuroimmunology and Multiple Sclerosis Research, Neurology Clinic, UniversitätsSpital Zürich,
University of Zürich, Switzerland

DVTS

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- DVTS is a system that transmits DV streams from IEEE1394 over IP
 - Latency: Good enough for conversation
 - Quality:
 - ✦ Audio: 48kHz/16 bit uncompressed
 - ✦ Video: Standard definition, DV25 compression
 - Bandwidth: 30 Mbps



From GARR User community

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- **LOLA project**
 - LOLA (LOW LATency audio visual streaming system) is a project coordinated by Music Conservatory of Trieste.
 - Interactive music performance at the same time among musicians located in two different sites.
 - Critical network set-up and monitoring.
 - Virtual Concert workshop between Trieste and Paris



LoLa Project – Virtual exhibition Trieste-Paris

LOLA – LOw LATency A/V system

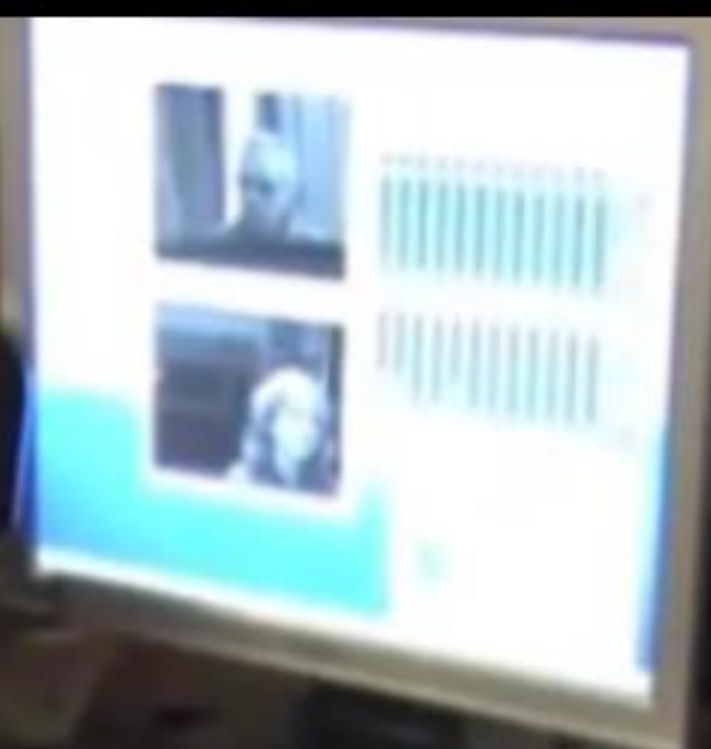
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- First tests on a 1 GigaEthernet end-to-end circuit
- 92Mbps to 460Mbps, Jitter<4ms
 - audio 44K 24bit stereo
 - video 60 frames per second b/w or color, 680*480
- 20ms audio/video codec roundtrip latency
- ~1ms GE network latency per 100Km

- Long distance test between Paris and Trieste
- it runs on “routed” networks!



Handwritten notes on a piece of paper, possibly a list or a set of instructions, placed on a dark surface.



Collaboration with TERENA for European Performing Arts Production Workshop

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- March 2003 -- New World Symphony and Internet2 host first annual Performance Production workshop
- May 2005 -- GARR and New World Symphony host demonstration at GARR annual user conference
- July 2009 – First European Performing Arts Production Workshop in Trieste, with GARR
- November 2010 – Second European Workshop in Paris, IRCAM/COMEDIA hosts with RENATER
- June 2011 – Third European Workshop in Barcelona, Grand Teatre del Liceu will host with CESCO and RedIris
 - ✦ <http://www.terena.org/activities/network-arts/barcelona/>

Thank you!

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