



Víctor Castelo Gutiérrez

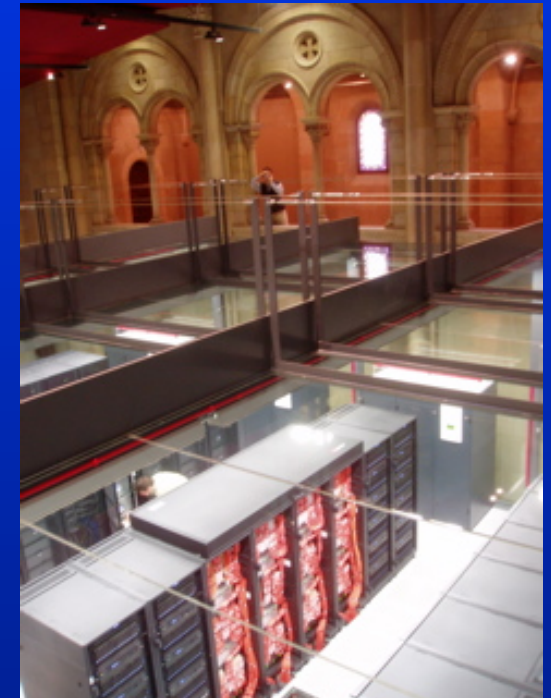


e-Infraestructuras en Europa

e-Infraestructuras en Europa

Víctor Castelo Gutiérrez

Secretaría General Adjunta de Informática
Consejo Superior de Investigaciones
Científicas (CSIC)
Ministerio de Ciencia e Innovación (MICINN)



Agenda

- Las redes cambiando el modelo
- e-Ciencia, e-Infraestructuras
- Infraestructuras científicas
- Foros e iniciativas europeas de coordinación e-Infraestructuras
- Aplicaciones e-Ciencia
- Evolución de la infraestructura Grid
- Supercomputación
- Datos científicos
- Hacia nuevas redes
- Conclusiones, Referencias

Cambiando la concepción del mundo

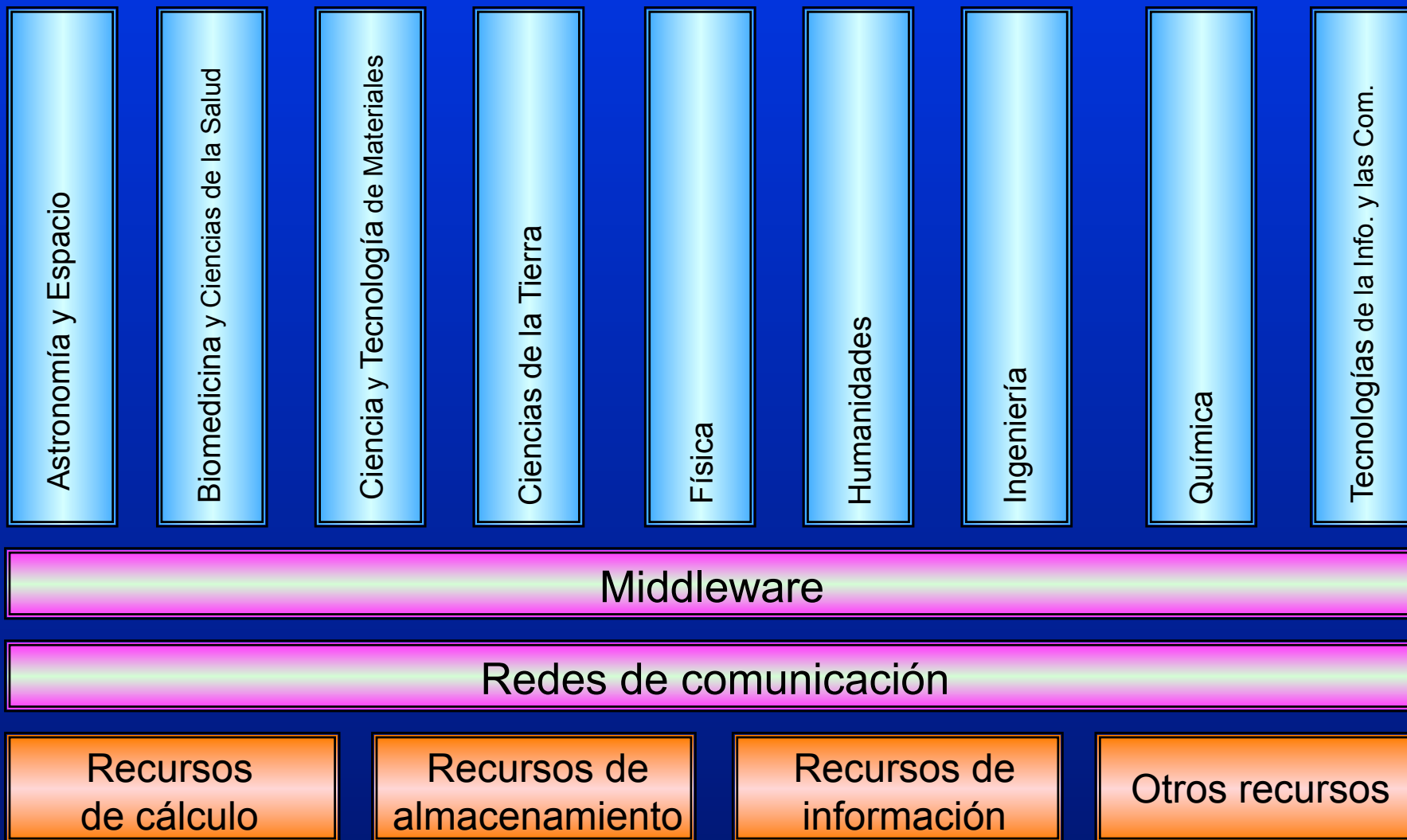


e-Ciencia

- Conjunto de actividades científicas, desarrolladas mediante el uso de recursos distribuidos accesibles a través de Internet
- Más efectiva cuando se asocia a una colaboración global (en vez de nivel individual)

[Libro blanco e-CIENCIA en España 2004](#)

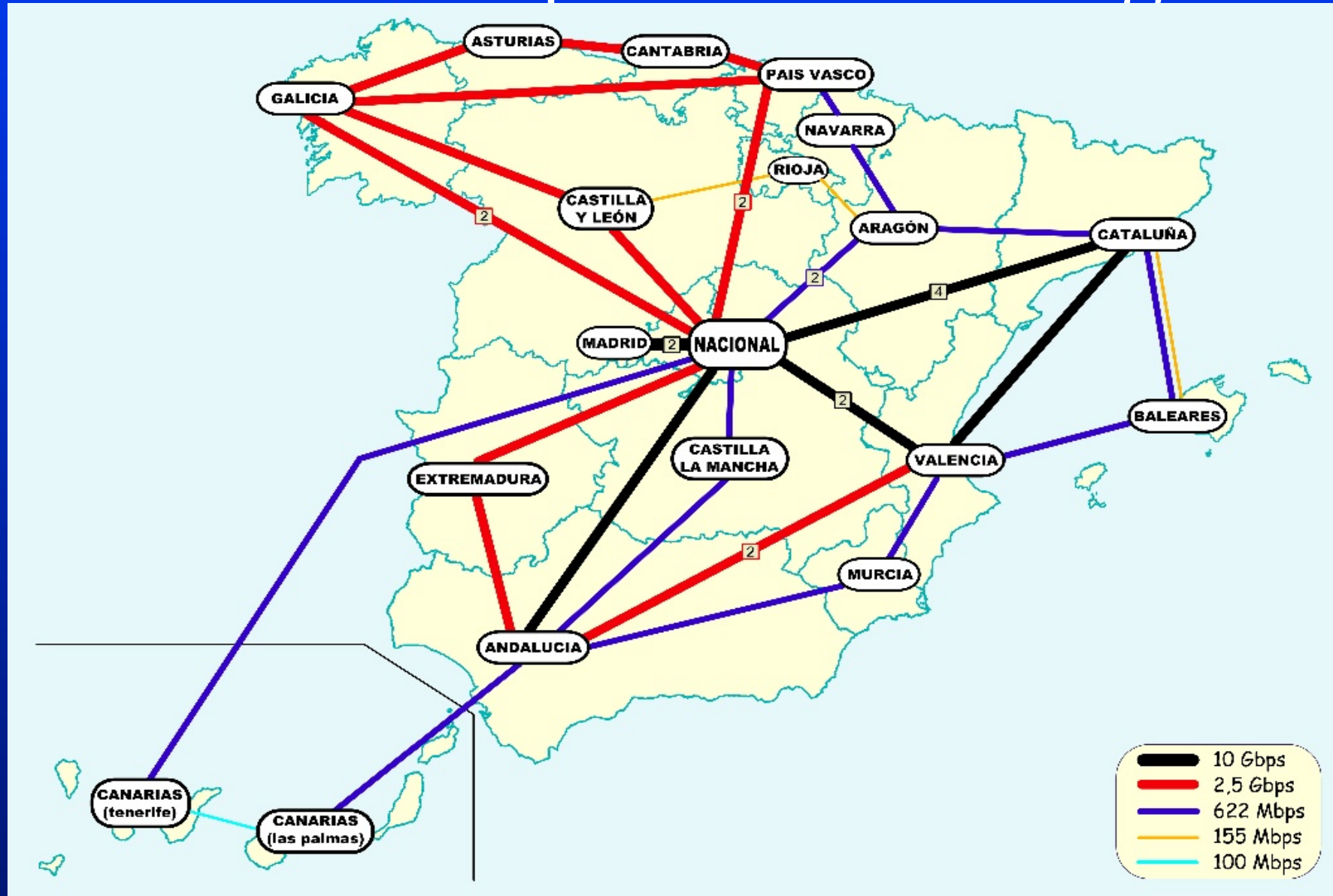
Taxonomía de la e-Ciencia



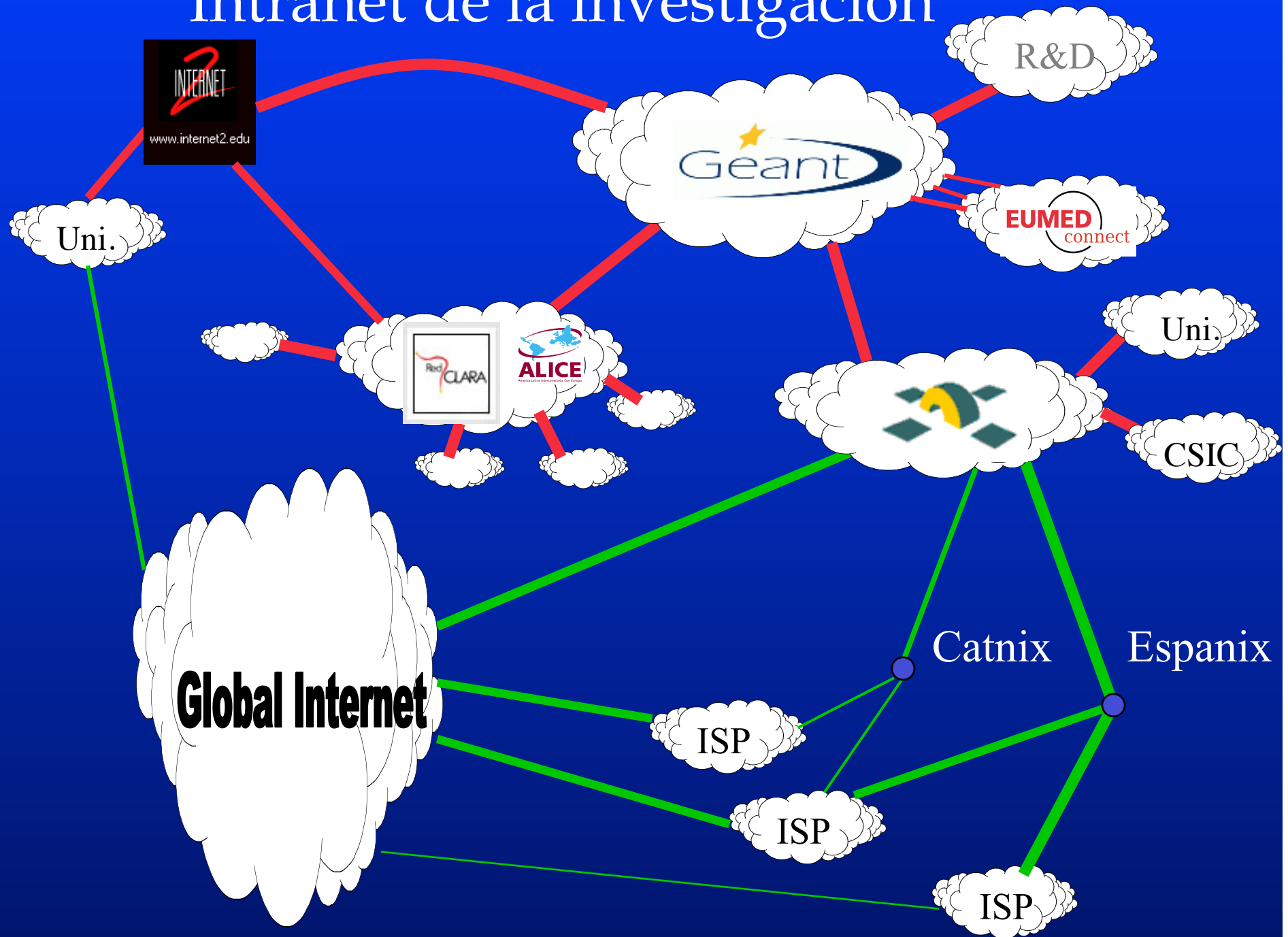
e-Ciencia: Nuevas oportunidades

- Generación de nuevo conocimiento
- Se cambia la forma de investigar
- Aparece ciencia generada por el recurso en sí mismo
- Generación de ciencia en la frontera de dos ciencias
- Creación de centros virtuales pluridisciplinarios

RedIRIS: red española de investigación

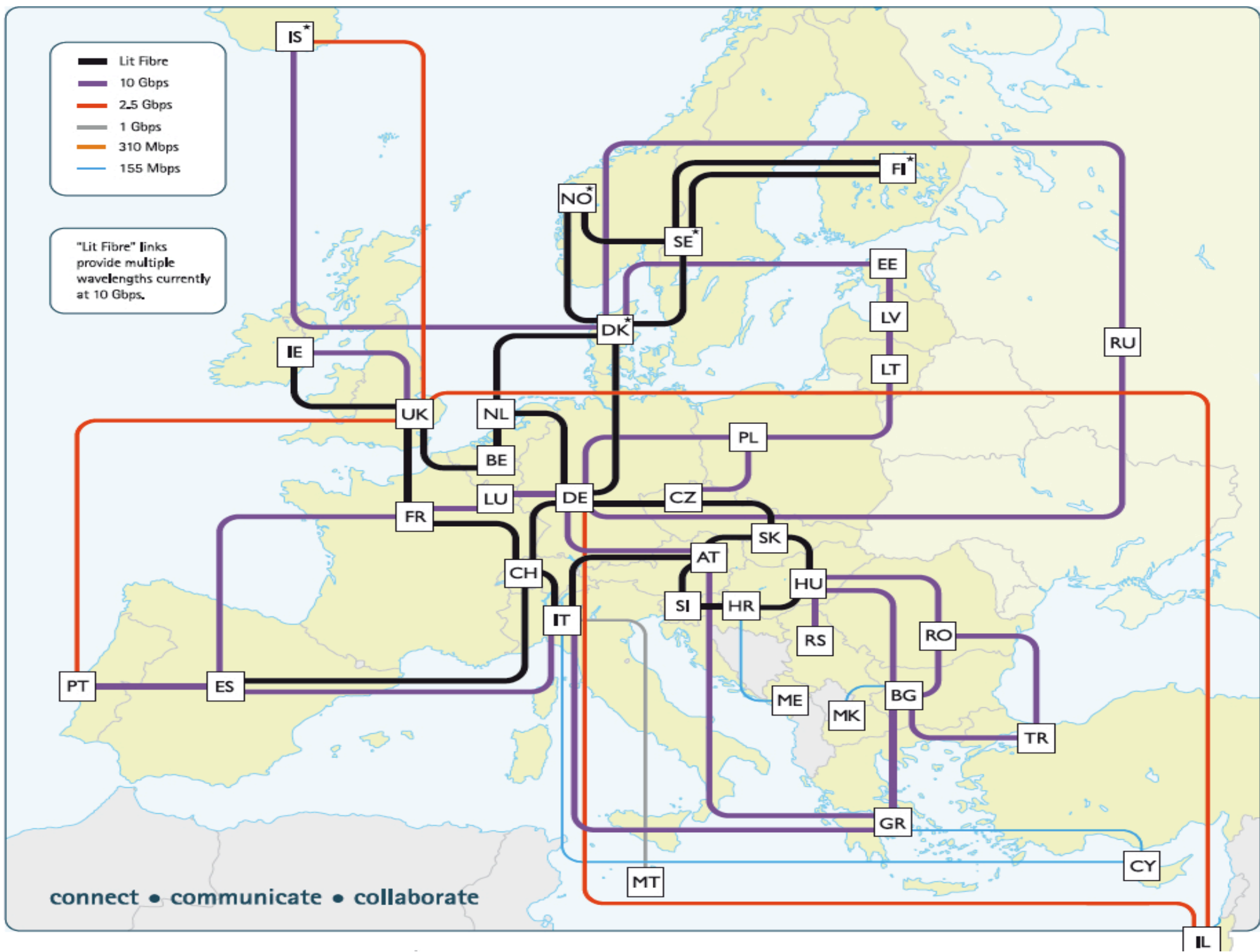


Intranet de la investigación










- Lit Fibre
- 10 Gbps
- 2.5 Gbps
- 1 Gbps
- 310 Mbps
- 155 Mbps

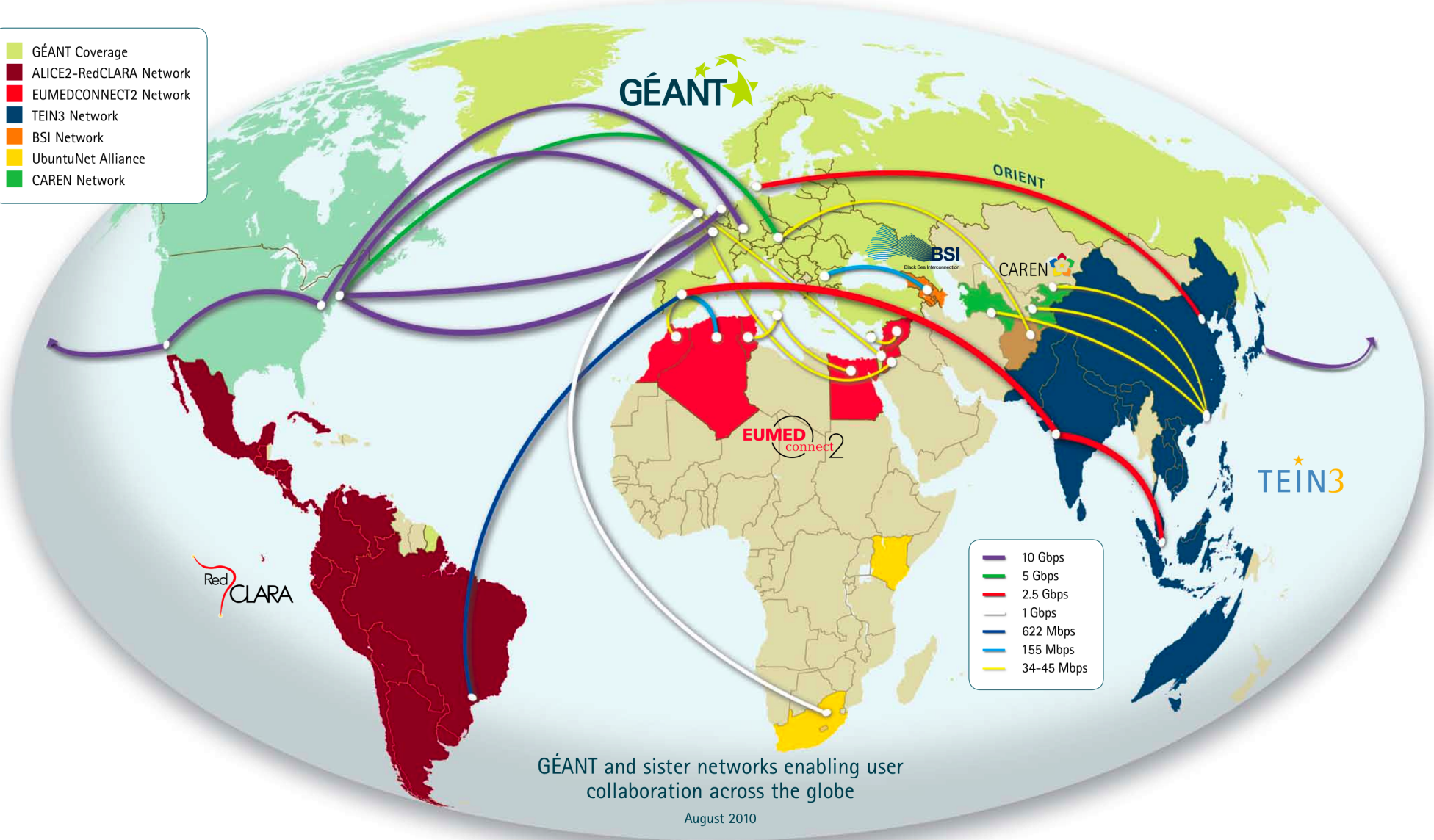
"Lit Fibre" links provide multiple wavelengths currently at 10 Gbps.



connect • communicate • collaborate

GÉANT At the Heart of Global Research Networking

-  GÉANT Coverage
-  ALICE2-RedCLARA Network
-  EUMEDCONNECT2 Network
-  TEIN3 Network
-  BSI Network
-  UbuntuNet Alliance
-  CAREN Network



e-Infraestructuras

- e-Infraestructuras según el e-IRG: *"The term e-Infrastructure refers to this new research environment in which all researchers - whether working in the context of their home institutions or in national or multinational scientific initiatives - have shared access to unique or distributed scientific facilities (including data, instruments, computing and communications), regardless of their type and location in the world."*
- Toda una serie de sistemas para potenciar la Ciencia: e-Infraestructuras para la e-Ciencia
 - » Infraestructuras comunes
 - » Coordinación de esfuerzos con sistemas interconectados a nivel Global

e-Infraestructuras de todo tipo

- NRENs: National Research and Education Networks, conectadas en GEANT y a nivel Global
- Computación distribuida
 - » High Performance Computing
 - » Grid
 - » Desktop computing
- Repositorios de datos
- e-Infraestructuras dedicadas (control y observación remota, visualización, etc)

MAPA DE INSTALACIONES CIENTÍFICAS Y TÉCNICAS SINGULARES



Buque de Investigación Oceanográfica Hespérides



Reserva Científica de Doñana



Gran Telescopio CANARIAS



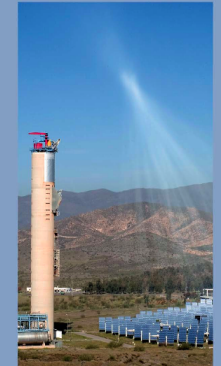
Canal de Experiencias Hidrodinámicas de El Pardo



Centro Astronómico de Yeves



Sala Blanca del Centro Nacional de Microelectrónica



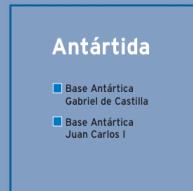
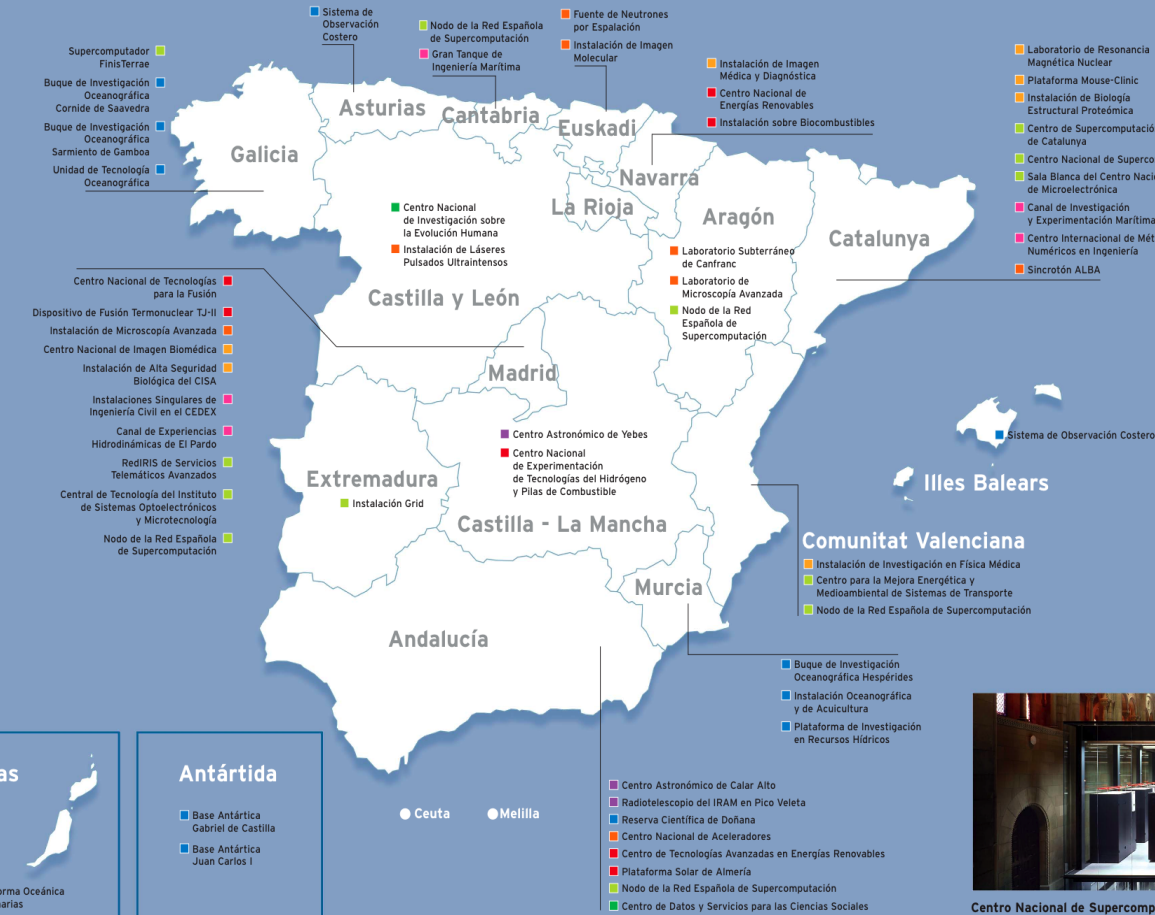
Plataforma Solar de Almería



Instalación de Ingeniería Civil del CEDEX



Centro Nacional de Supercomputación



Áreas de Investigación

GOBIERNO DE ESPAÑA | MINISTERIO DE EDUCACIÓN Y CIENCIA

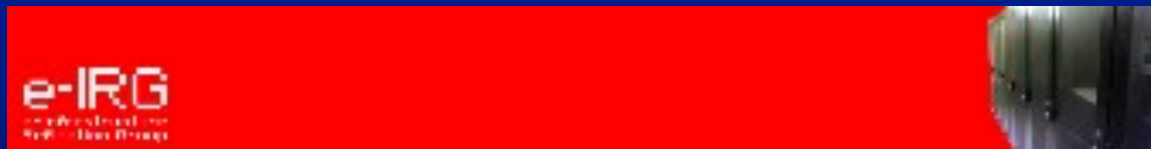
Astronomía e Investigación Espacial | Ciencias del Mar, de la Vida y de la Tierra | Ciencias Socioeconómicas y Humanidades | Tecnologías de la Información y las Comunicaciones | Ciencias de la Salud y Biotecnología | Física de Partículas y Microscopía | Energía | Ingeniería



Foros europeos



- ESFRI: European Strategy Forum on Research Infrastructures (RI) **General**
 - » **RoadMap (revisable)**
- e-IRG (eInfrastructure Reflection Group) **eInfraestructuras**
 - » **RoadMap (visión de futuro, actualizado regularmente, 6m)**
 - » **White papers (algo más coyuntural del momento 6m)**
 - » **TaskForces**



e-IRG

- Identificar todos los elementos de la e-Ciencia, en todos sus aspectos, desde las infraestructuras a la comunicación con los usuarios.
- Realizar recomendaciones a todos los niveles de cara a crear un marco europeo de recursos electrónicos distribuido, eficiente y sostenible.

e-InfraNet

- e-InfraNet: ERA-NET para la coordinación de políticas y programas a alto nivel (ministerios implicados)
 - » Convocatorias conjuntas
 - » Áreas focales: Cloud, Green, Openess
- Workshops dedicados:
 - » Cloud Computing (ya realizado)
 - » Green Computing (ya realizado)
 - » Openness (27-28 Octubre 2011)



e-IPF (e-Infrastructures Policy Forum)

- Promovido por la EC (muy en relación con e-InfraNet)
- Compartir las visiones y políticas sobre e-Infraestructuras
- Representantes de alto nivel
- No duplicar trabajos de otros foros
- Grupos de trabajo

Ibergrid

Coordinación de e-Ciencia ES-PT. Acceso común a recursos y cooperación. Cooperación con Iberoamérica

- Redes
- Supercomputación
- Grid
- Repositorios de datos
- Movilidad
- Proyectos conjuntos

Conferencia anual

EEF (European e-Infrastructures Forum)

- Proveedores de e-Infraestructuras:
 - » GEANT, Terena
 - » DEISA, PRACE
 - » EGI
- » Entre sus actividades: encuesta de necesidades de proyectos ESFRI

Green TIC

- Importante punto a tener en cuenta en las e-Infraestructuras
 - » Disminuyendo la emisión de CO2 (energías renovables)
 - » Menor consumo
 - » Aumentando la eficiencia
 - » Permitiendo la escalabilidad (Exascale)

Diseminación



- Mediante las diferentes e-Infraestructuras y proyectos
- Proyecto Grid Talk → eScience Talk
 - » Boletín semanal
 - iSGTW
 - » Agenda de eventos



RedCLARA



- Conectando Latinoamérica mediante redes avanzadas y proporcionando el medio de colaboración para la investigación, la innovación y la educación

Proyectos-Infraestructuras

Importante realimentación

AugerAcces



Evalso



Infraestructuras conectando

Chile - Argentina - Brasil

Observatorio Pierre Auger

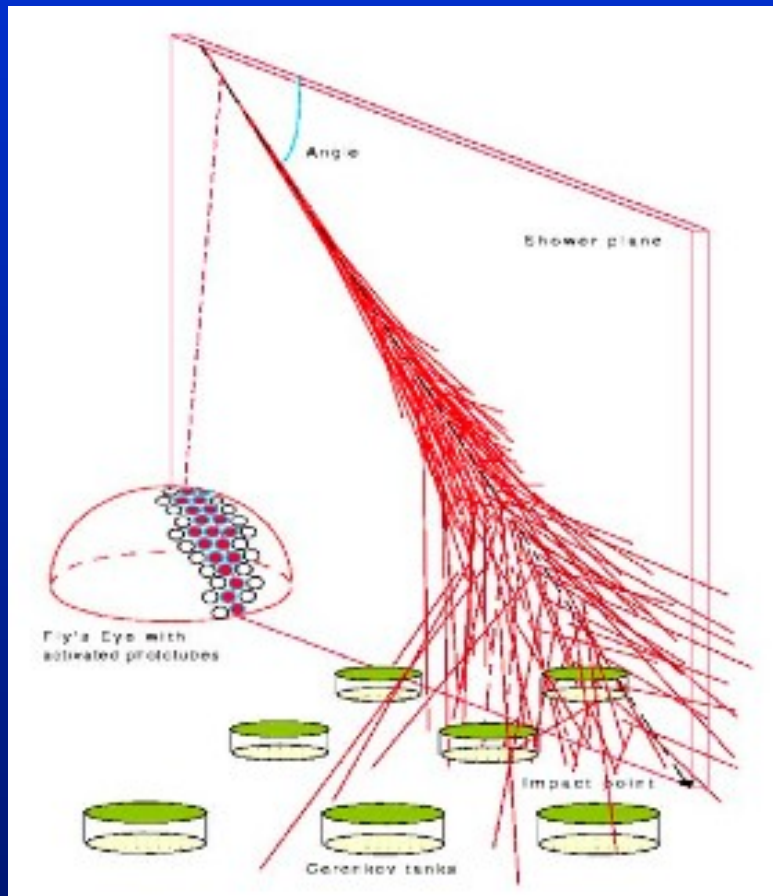
- Proyecto AugerAccess
 - » Detección de rayos cósmicos de ultra energía
 - » 300 km cuadrados
 - » Conexión a InnovaRed- RedClara
 - » Control remoto y monitorización
 - » Base de datos dinámica

The logo for Auger Access, featuring the words "Auger Access" in a stylized, metallic, 3D font. The letters are gold-colored with a dark, shadowed base, giving them a three-dimensional appearance. The background is a textured, light blue-grey surface.

AugerAccess: localización



AugerAccess: detectores



EVALSO

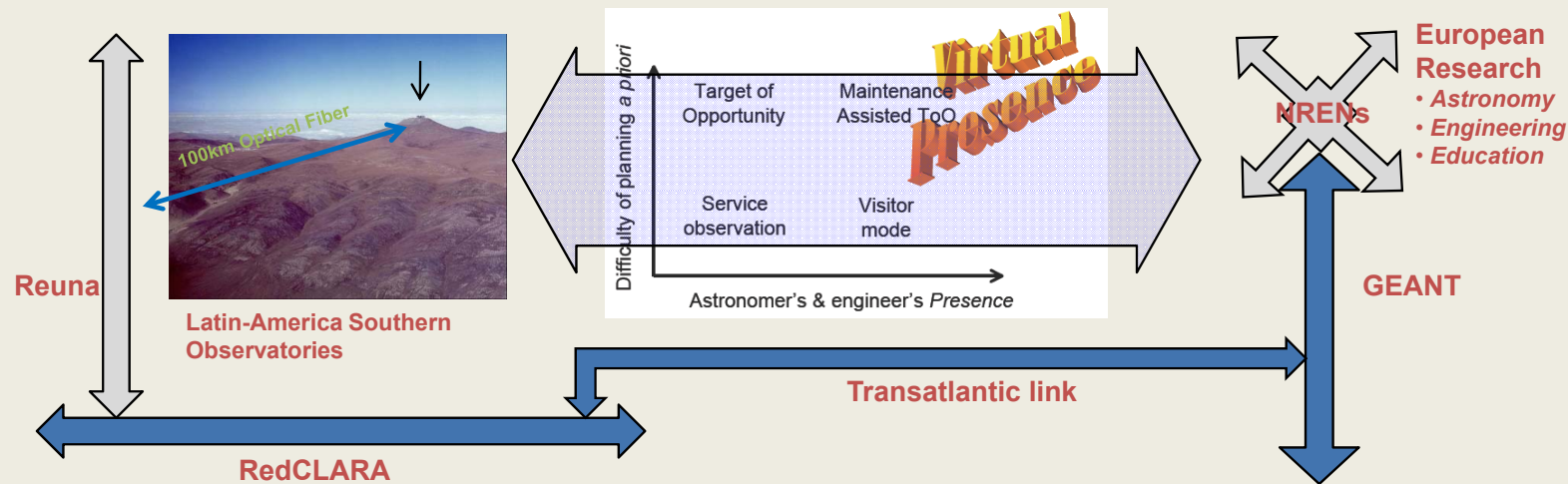


Enabling Virtual Access to Latin-America Southern Observatories



.... aims to create a physical infrastructure (and the tools to exploit it) to efficiently connect the ESO Paranal and the Cerro Armazones Observatories to Europe.

The infrastructure will use the international infrastructures created in the last years with the EC support (RedCLARA, GEANT) to provide European Research a competitive edge having faster access to the collected data and use the facilities in an ever more efficient way



Control remoto

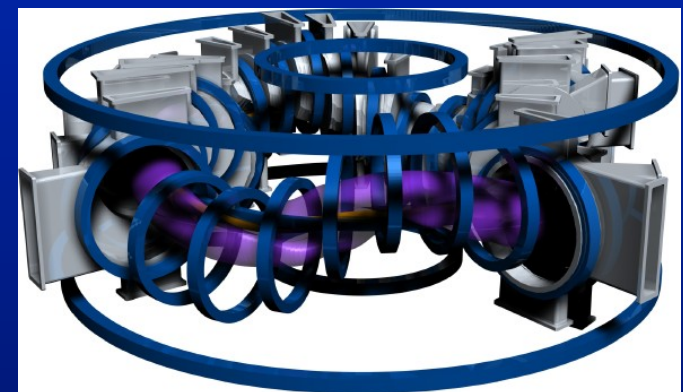
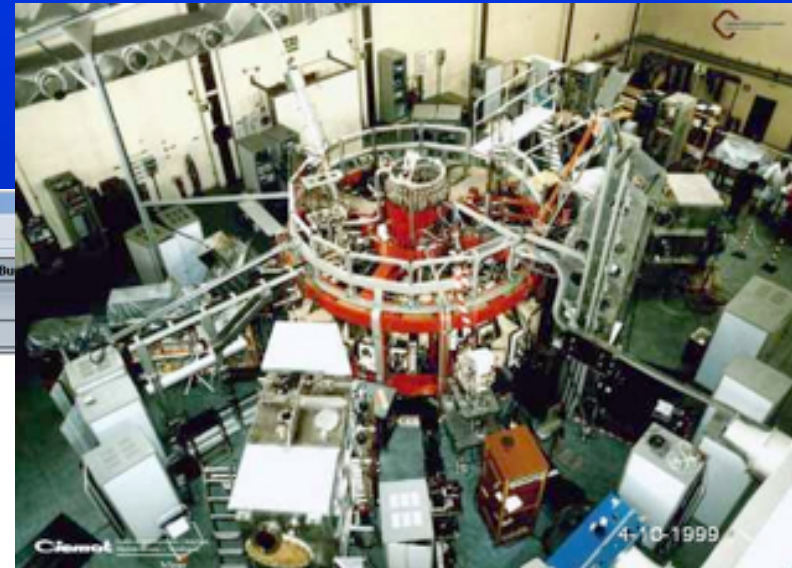
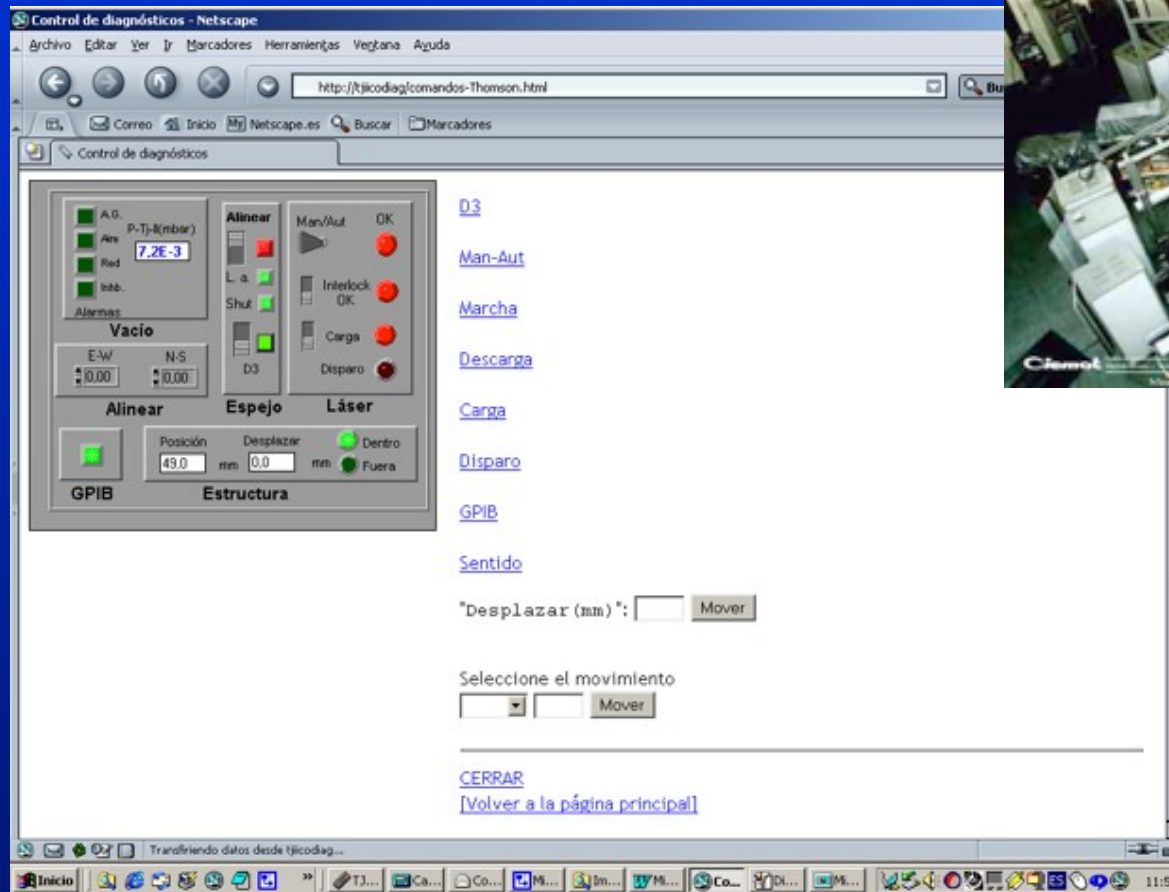
The screenshot displays the 'Microscope control' software interface. The main window shows a grayscale SEM image of a sample with a complex, circular pattern. A mouse cursor is positioned over the image. The interface includes a menu bar with options: Image!, Magn., Beam, Scan, Detectors, Filter, In/Out, Stage, and Settings. Below the menu is a toolbar with various icons for image manipulation and control. On the right side, there are several control panels:

- Vacuum:** Contains 'Pump' and 'Vent' buttons, and a 'Vac OK' indicator.
- Beam:** Shows '10.0 kV' and '65 μ A' in yellow boxes, and a 'Spotsize' slider set to 5.0.
- Video:** Shows 'Contrast' at 18.6 and 'Brightness' at 42.9, with corresponding sliders and 'ACB' and 'Save' buttons.
- Stage:** Contains a dropdown menu, and input fields for X (1972.8 μ mR), Y (-2048.9 μ mT), and Z (8.527 mm), along with 'Go to' and 'Abs'/'Rel' radio buttons.

At the bottom of the image, a status bar displays the following information:

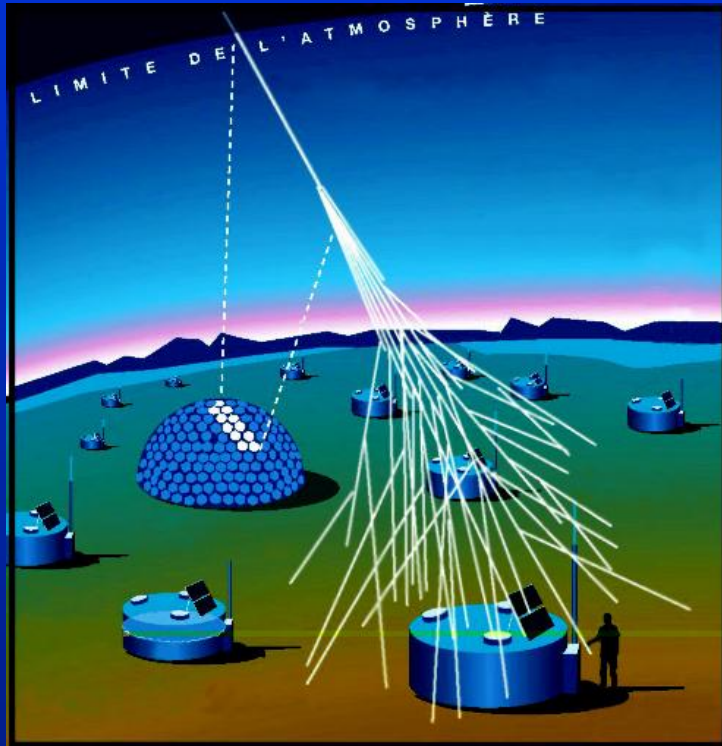
Acc.V 10.0 kV Spot 5.0 Magn 100x Det SE WD 10.0 |-----| 200 μ m The Teaching SEM, MS&E, U of MI

Acceso remoto al dispositivo de fusión TJII (Ciemat), usando PAPI

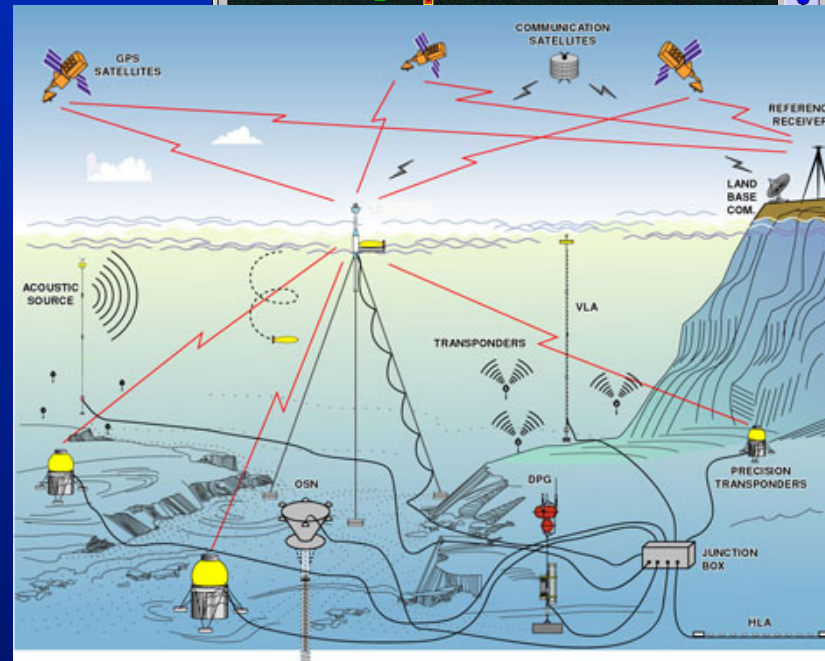
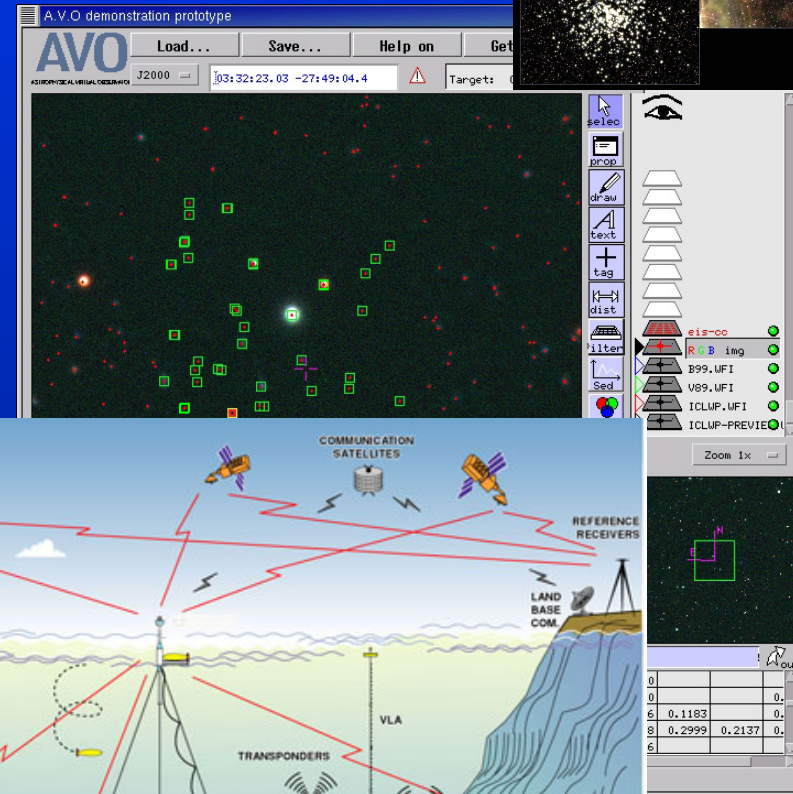


Sensores

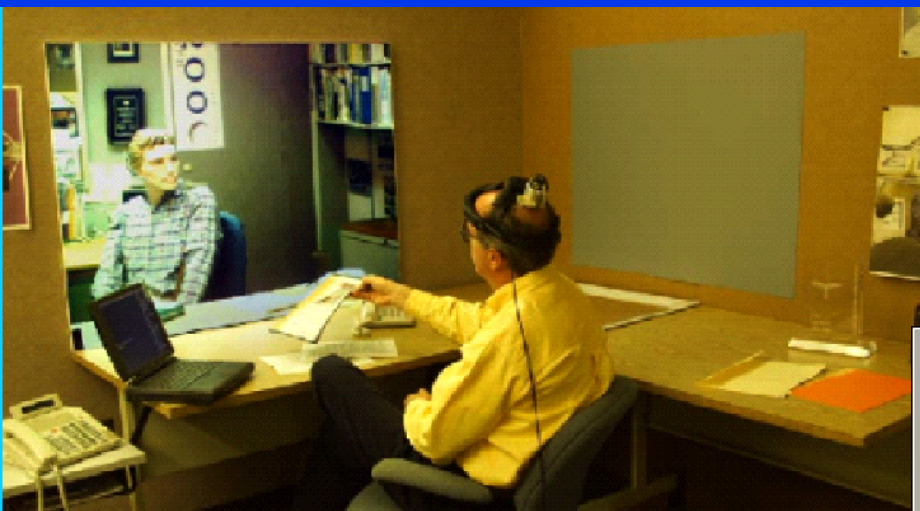
- Información distribuida



O. Pierre Auger



Telepresencia





Colaboración en grupo



<http://www.accessgrid.org/>

The screenshot shows a virtual meeting interface. On the left, there is a list of participants with their names and status. In the center, a grid of video windows shows various participants. On the right, a presentation slide titled "LDIF Structure" is displayed. The slide contains the following text:

LDIF Structure

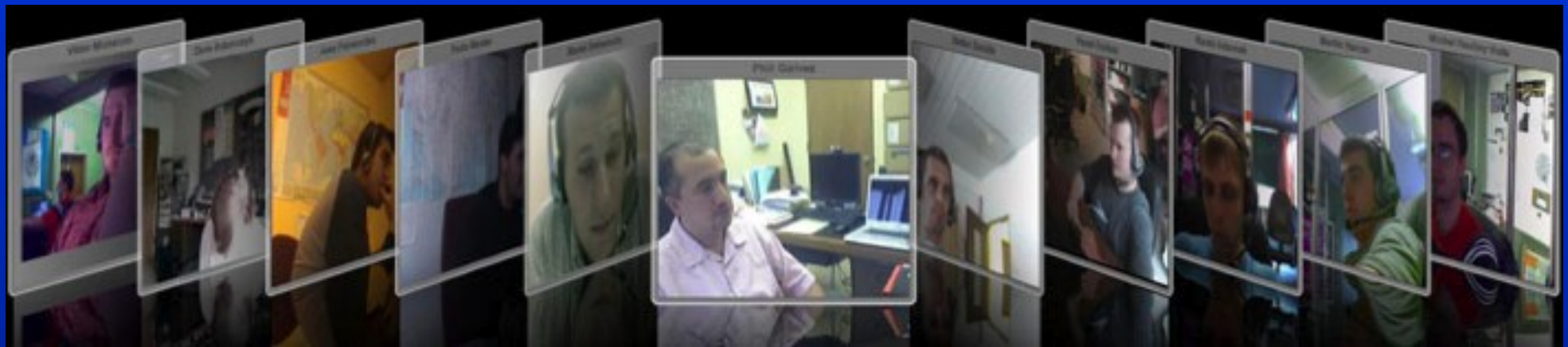
- LDIF identifies "objects" via a "Distinguished Name" and an "objectclass"
- Objects are stored in a Directory Information Tree(DIT), and a DN represents a path in the tree, just as filesystem directories do
- Example:
 - O=UNM, OU=HPC, OR=Employee, CN=Chris Jordan

At the bottom of the slide, the name "CHRISTOPHER JORDAN" and the affiliation "HPC@UNM" are listed.

Colaboración: EVO (Enabling Virtual Organizations)



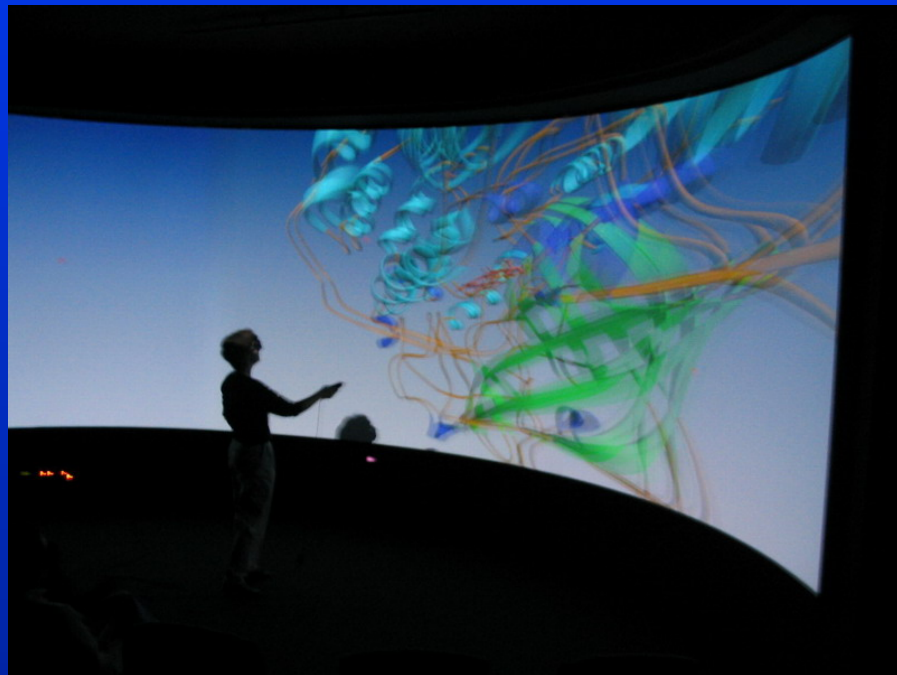
<http://evo.caltech.edu>



Evolución del VRVS



Realidad virtual compartida

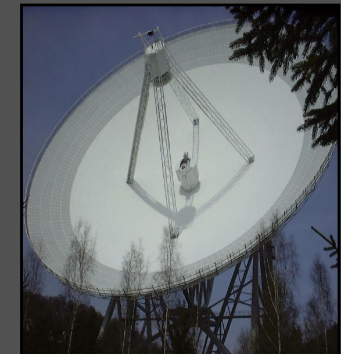
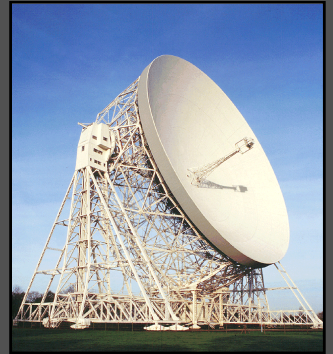
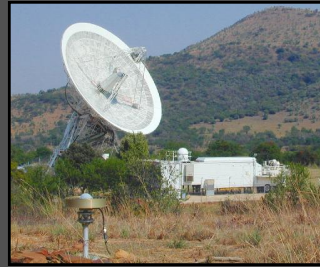
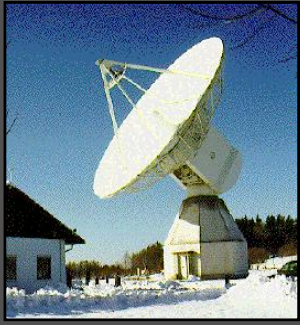


UNAM (México)

jive

JIVE INSTITUTE FOR VLBI IN EUROPE

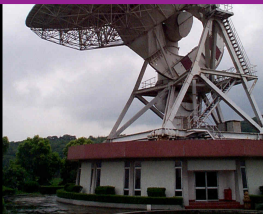
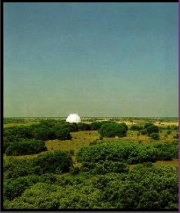
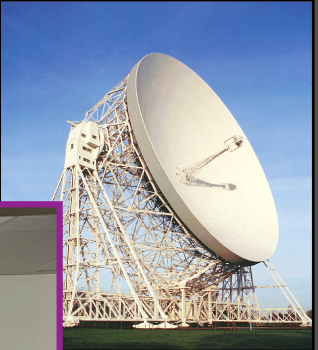






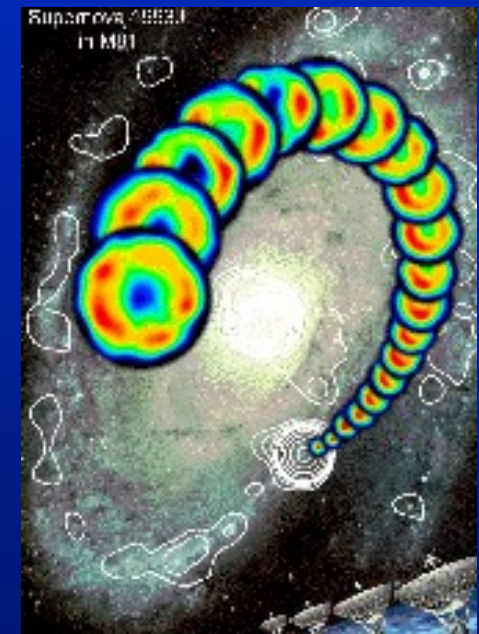
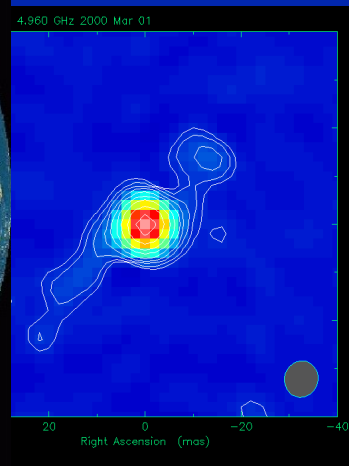
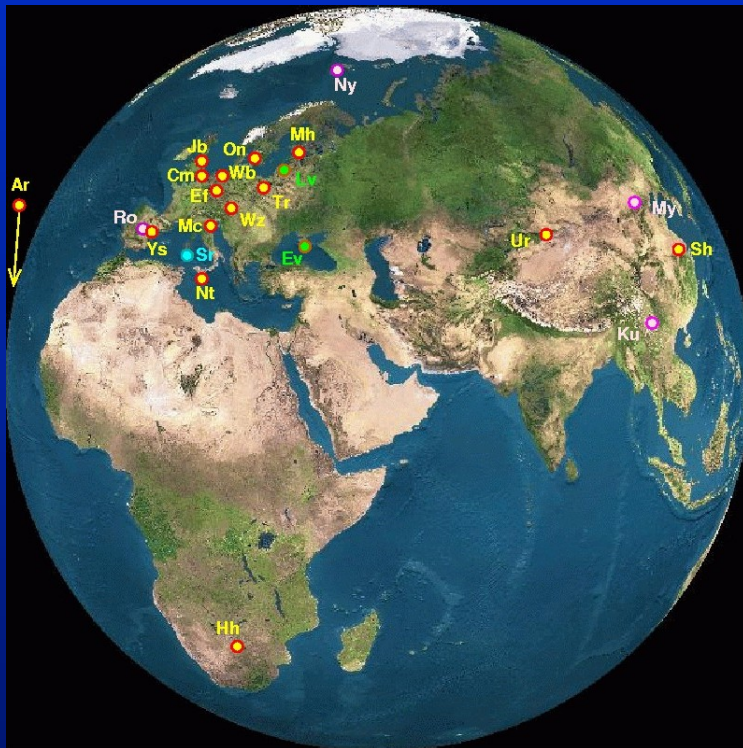
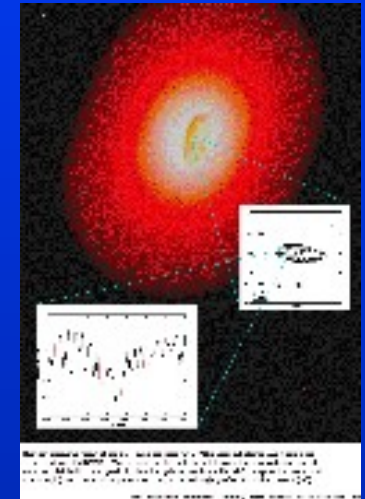
jive
JOINT INSTITUTE FOR VLBI IN EUROPE

(c) E.P.B. 2006



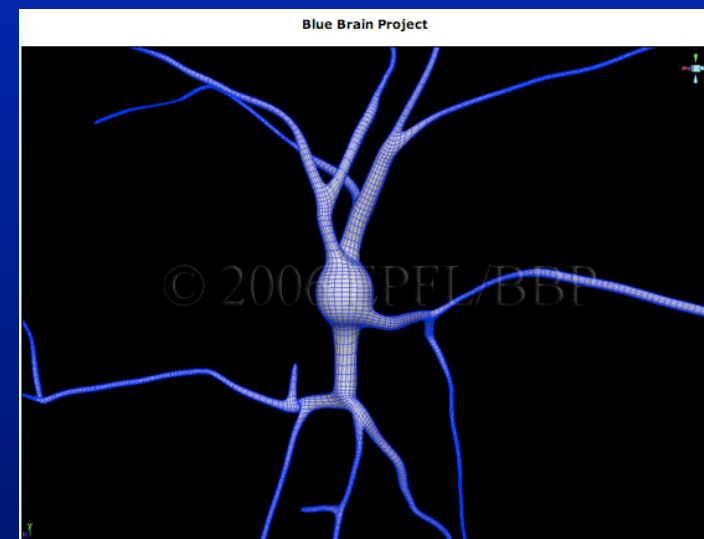
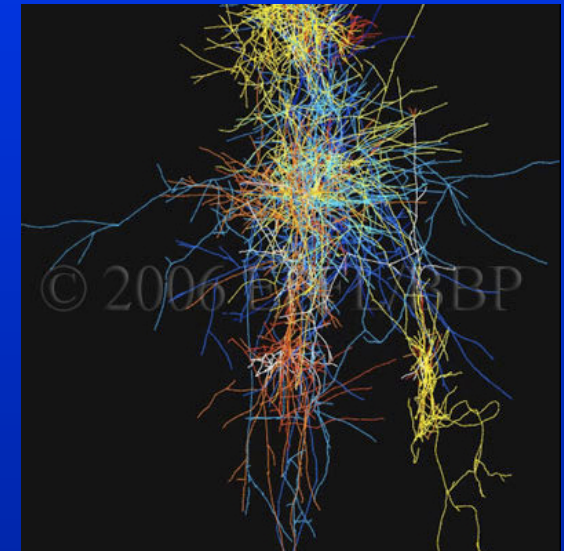
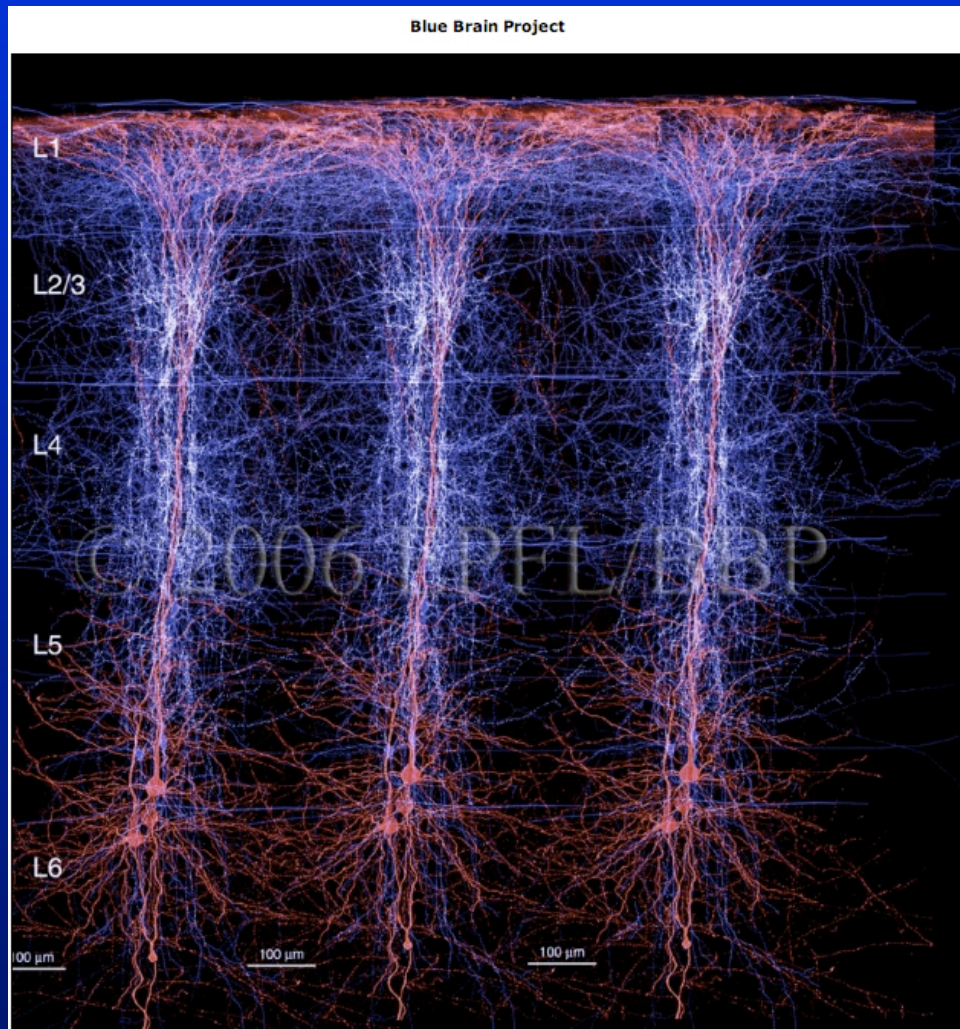
Transmisiones masivas: eVLBI

- Very Long Baseline Interferometry
- Velocidades de 2×10^8 GE
- Numerosos centros en Europa



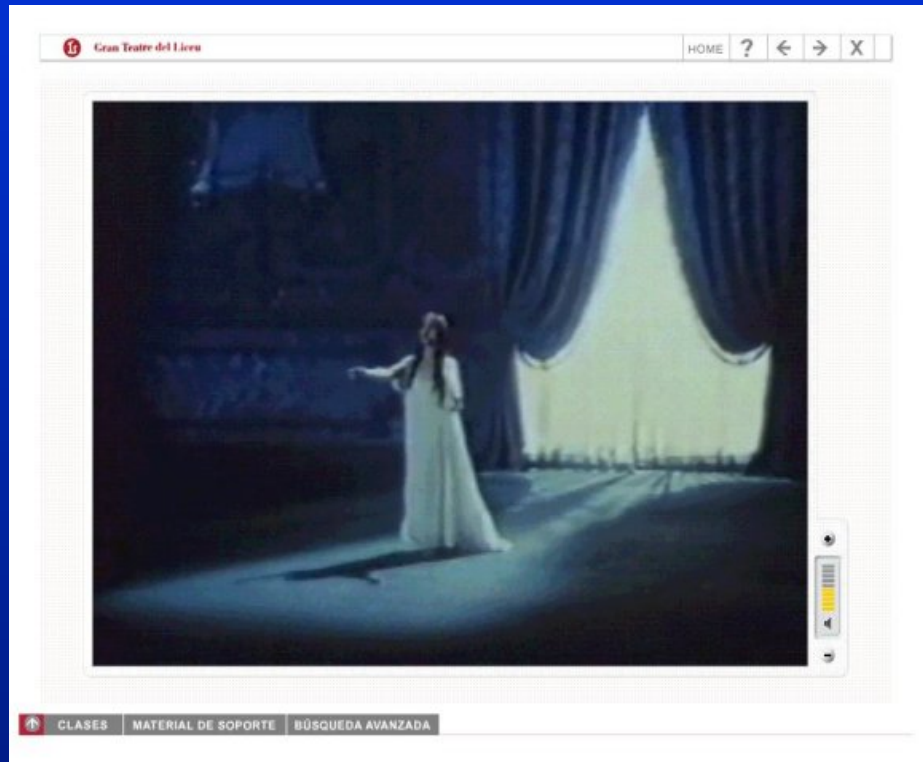
Modelización: Blue Brain Project

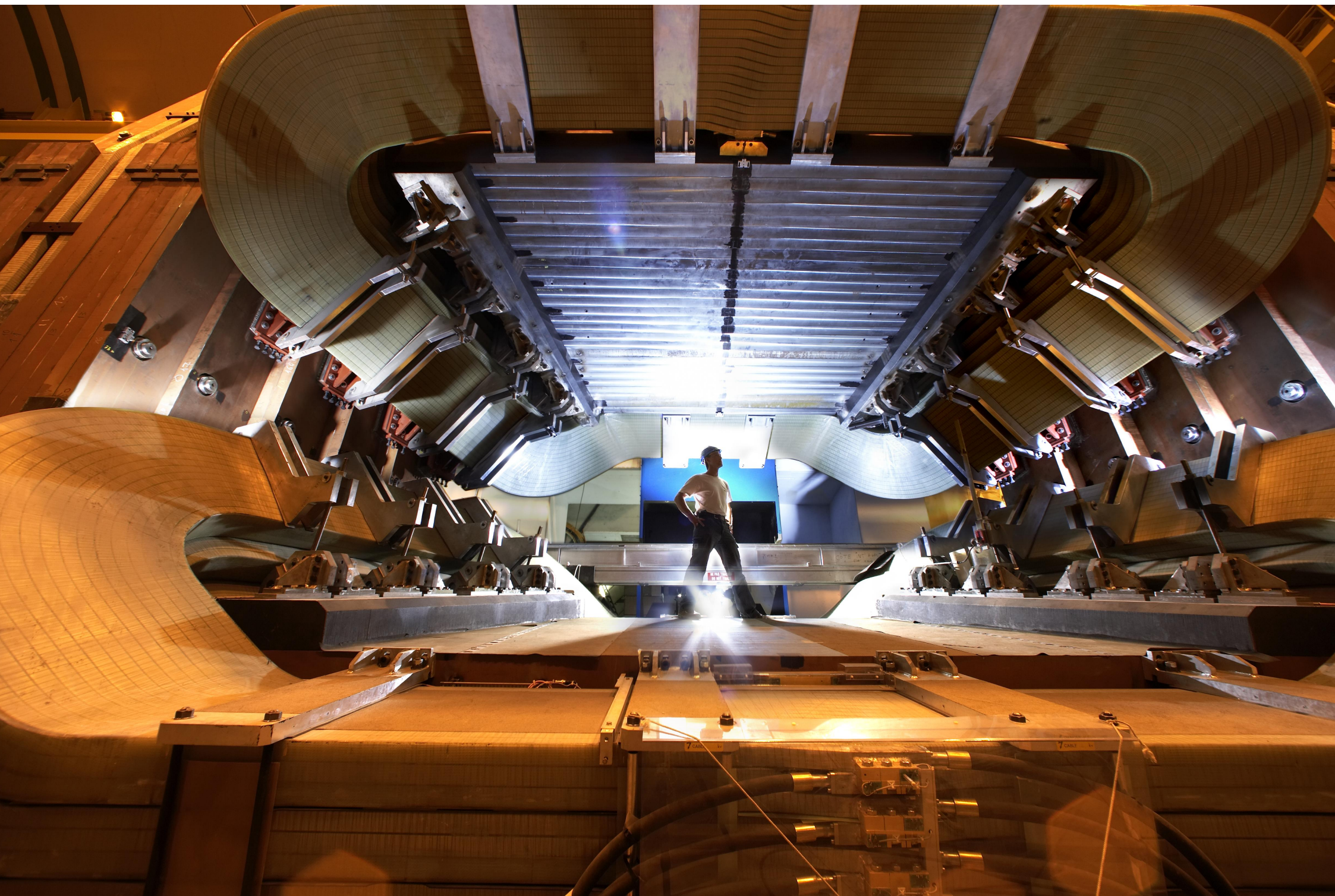
Ingeniería inversa del cerebro



Transmisiones en directo: Proyecto Opera Oberta

- Transmisión multicast de óperas en directo, desde el Liceo de Barcelona, en alta calidad. Flujos ≥ 10 Mbps





Modelo Proyecto EGEE

- Comunidades científicas

High Energy Physics

Astrophysics

Computational Chemistry

Fusion

Life Sciences

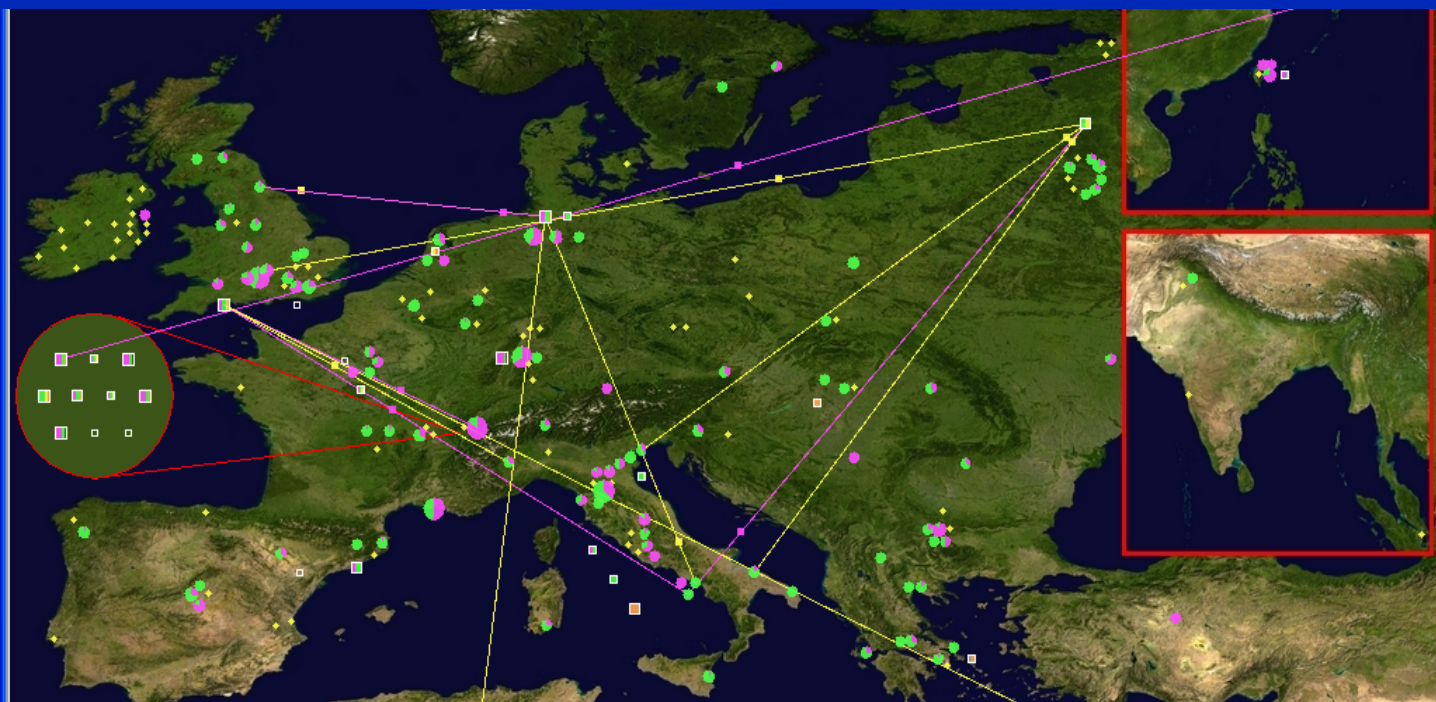
Biomedics

Earth Sciences

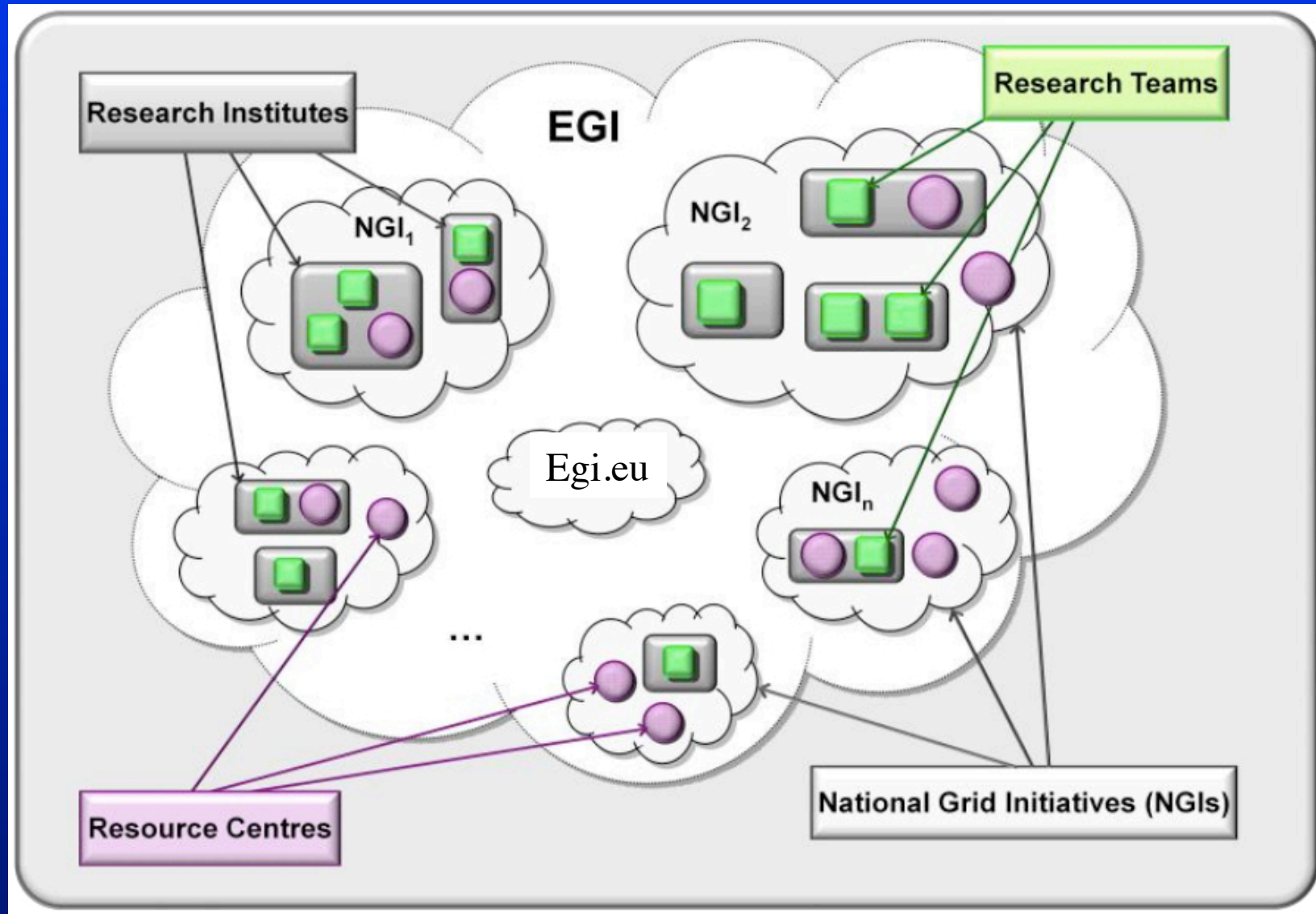
Finance

Geophysics

Multimedia...



European Grid Initiative: EGI



EGI & EGI.eu

❑ EGI = European Grid Infrastructure

- Set of resources owned by the resource providers (NGIs, EIROs, external countries)
- Used by over 13,000 scientists

❑ EGI.eu = European Grid Initiative Foundation

- Based in Amsterdam
- Director is Steven Newhouse
 - 25 people working at the Amsterdam site
- Governed by an Executive Board
- Overseen by a larger Council with representatives from 33 NGIs (countries) & / EIROs (research communities)
- Celebrated our first birthday on 8th February!

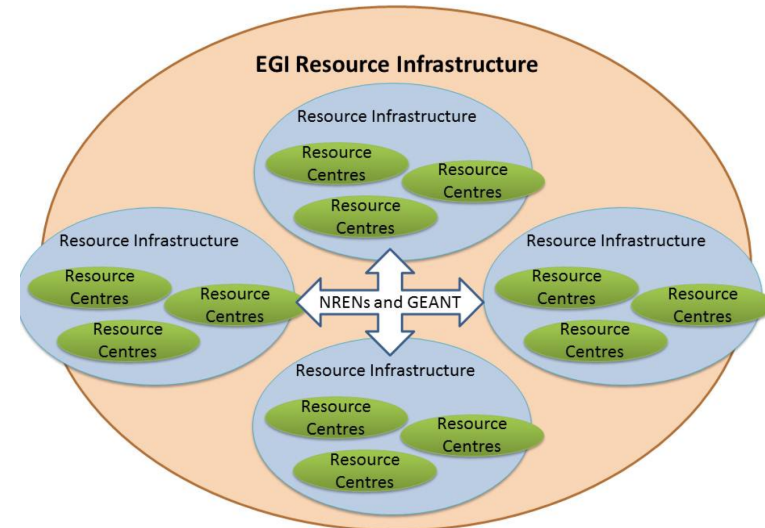
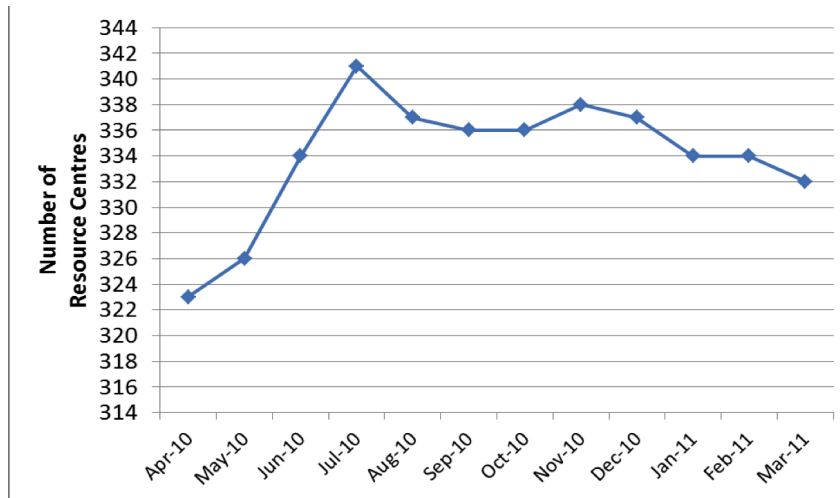


EGI.eu

- EGI.eu = Stichting European Grid Initiative
 - » Overseen by the EGI Council
 - 33 NGIs (countries) & / EIROs (research communities)
 - » Governed by an Executive Board
 - » 21 members of staff
 - » Science Park, Amsterdam
 - » First birthday on 8th February!
- Community Coordination
 - » Operations & Technology
 - » User Communities
 - » Policy & Dissemination



Computing Infrastructure in EGI



There are 331 “sites” contributing computing resources to EGI located at 58 countries in the 5 continents (40 of them in Europe)

	April 2010 (end of EGEE-III)	March 2011	Increase
Logical CPUs	192,000	207,203	8 %
Million SI2K	335	495	48 %

EGI-InSPIRE

Integrated Sustainable Pan-European Infrastructure for Researchers in Europe

- A 4 year project with €25M EC contribution
 - » Project cost €72M
 - » Total Effort ~€330M
 - » Effort: 9261PMs

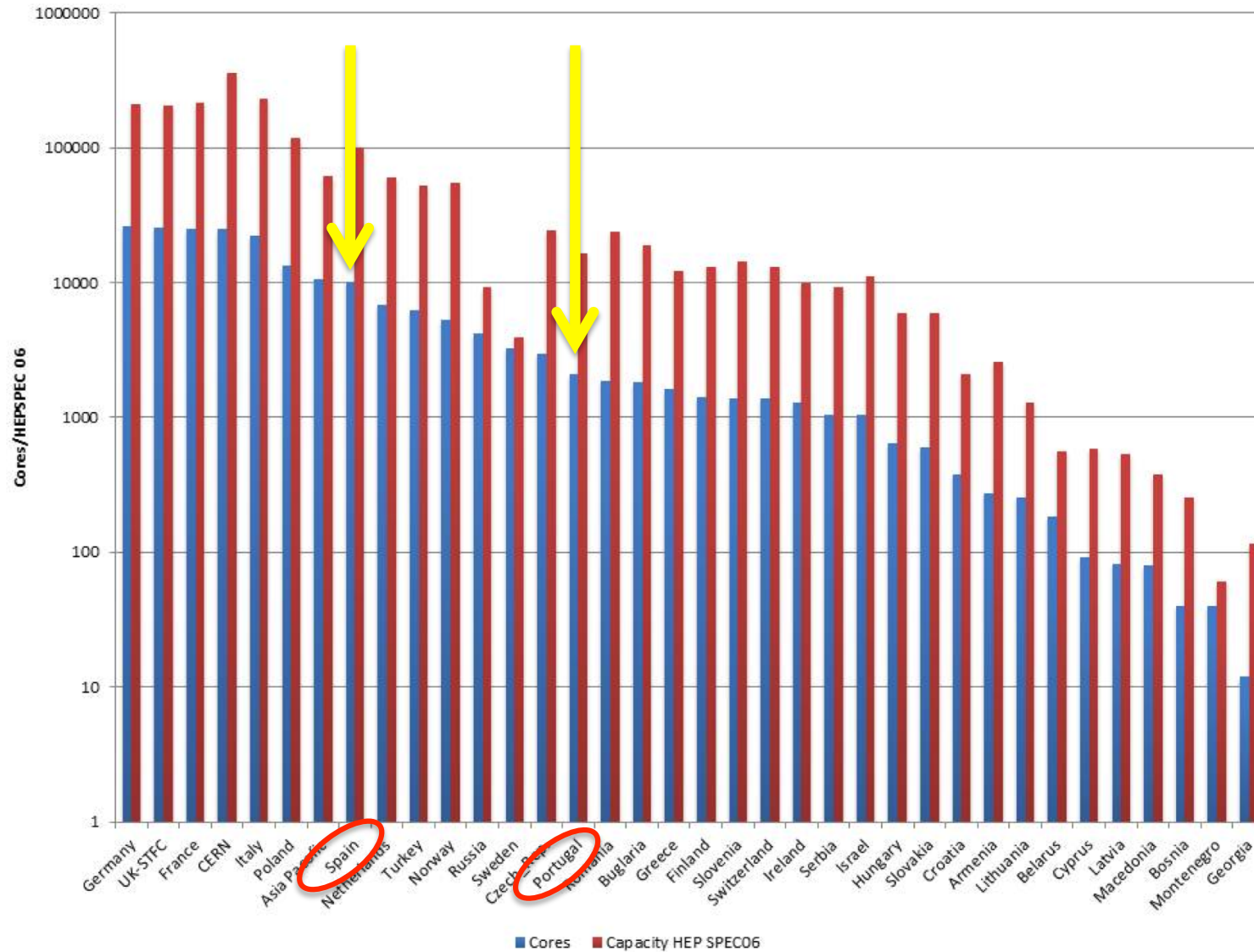
Project Partners (50)
EGI.eu, 38 NGIs, 2 EIROs
Asia Pacific (9 partners)



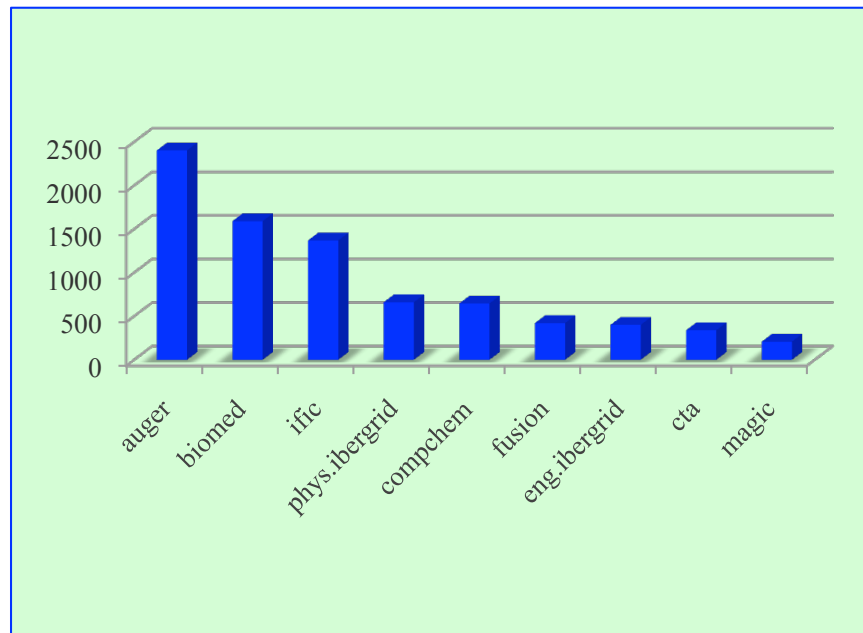
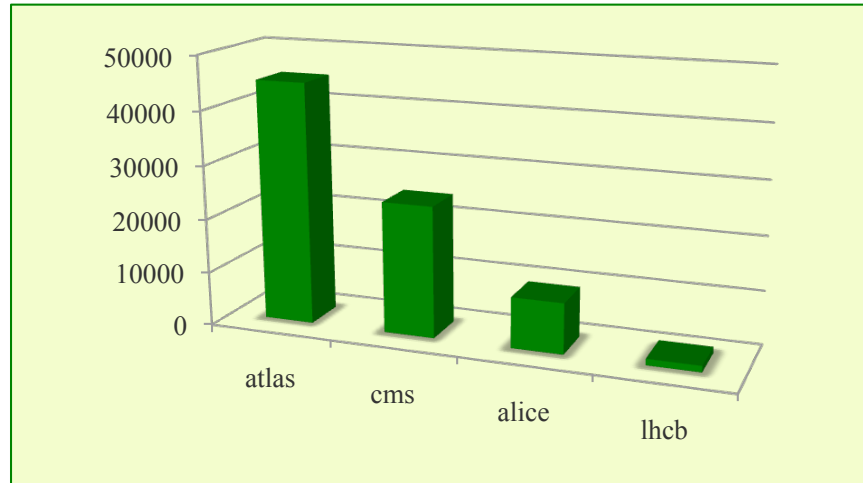
ES-NGI: National Grid Initiative

- Plataforma de recursos computacionales promovida desde el MICINN. Coordinación del IFCA (Unican-CSIC)
- Centros de Recursos: BIFI, CESGA, CETA-CIEMAT, CIEMAT, CIN2, ESA-ESAC, GRYCAP, IAA, IFCA, IFIC, IFISC, PIC, RedIRIS, UNICAN, UNIOVI
- Integración de la infraestructura nacional con la infraestructura pan-Europea en el marco de EGI.eu
- Soporte computacional a los proyectos de ámbito internacional de los grupos de investigación españoles que requieran de la tecnología Grid, en el marco de EGI.eu
- Coordinarse con el resto de actividades de la Red Española de e-Ciencia
- Asesoramiento al MICINN, a petición de éste, en su ámbito de actuación, así como participar en las iniciativas que el MICINN determine, a nivel nacional o internacional

IBERGRID Infrastructure in EGI - Cores



On what is the infrastructure in Ibergrid being used ?



Over the last 12 months a total of 89 millions of CPU hours have been used (normalized to KSI)

- **A massive data analysis** by the researchers of the worldwide collaborations **of the 4 experiments of the LHC**
 - Will increase with this year as more data come out
- **The activity of international VOs**
 - Auger, Biomed, CompChem, Fusion, CTA and Magic
- **The activity of Ibergrid VOs**
 - Physics & Engineering (phys, ific. eng)

Technology innovation

- ❑ Will come from outside EGI
 - Moving research technologies into production
- ❑ Partnership with technology projects
 - EMI (European Middleware Initiative)
 - IGE (Initiative for Globus in Europe)
 - EDGI (European Desktop Grid Initiative)
 - StratusLab
 - VenusC



GISELA



Grid Initiatives for e-Science virtual communities in Europe and Latin America



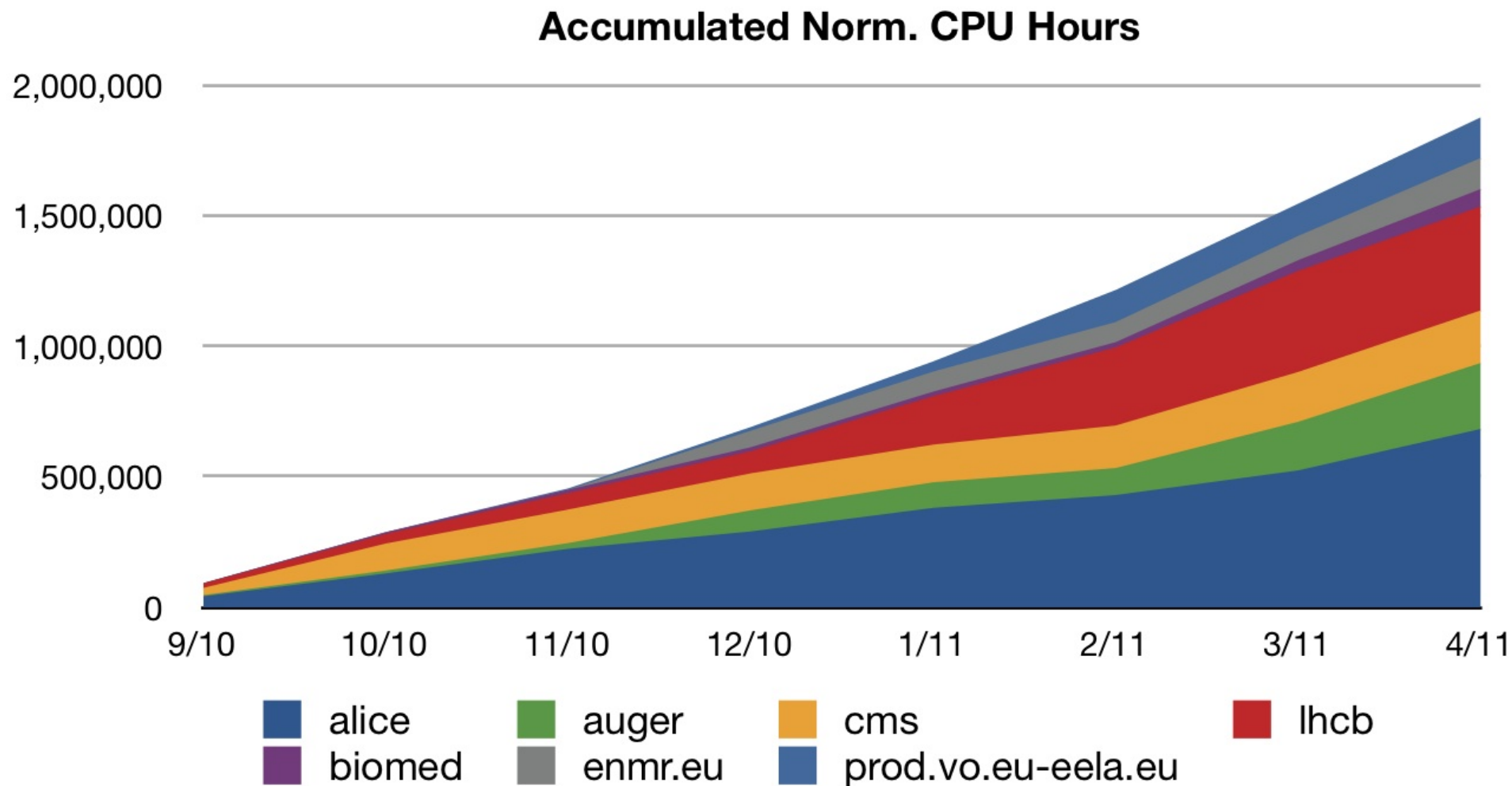
- Establecimiento de una e-Infraestructura sostenible basada en el desarrollo de EELA2
- Apoyo a Virtual Research Communities (VRC): pequeñas VRC de EELA2+ Ciencias de la Tierra, de la Vida, HEP, etc.

15 Countries (11 in Latin America)
 19 Partners (14 in Latin America)
 12 Third Parties (11 in Latin America)



The GISELA spirit is not anymore to consider Institutions, but rather representatives of JRU / NGI, with the advantage to “accept” de facto all JRU / NGI members.

- Accumulated load per VO (gLite only)



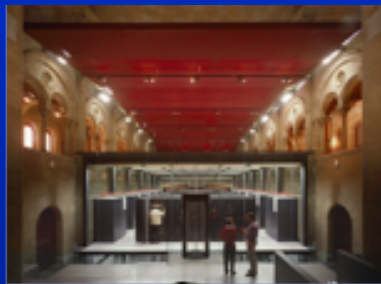
La velocidad de la luz

- 300.000 km/s
- A una distancia de 1.000 km
- ----->
- $T: 1.000/300.000 = 0,0033$ segundos
- Comparémoslo con un ciclo de reloj de una CPU actual o la velocidad de Myrinet.



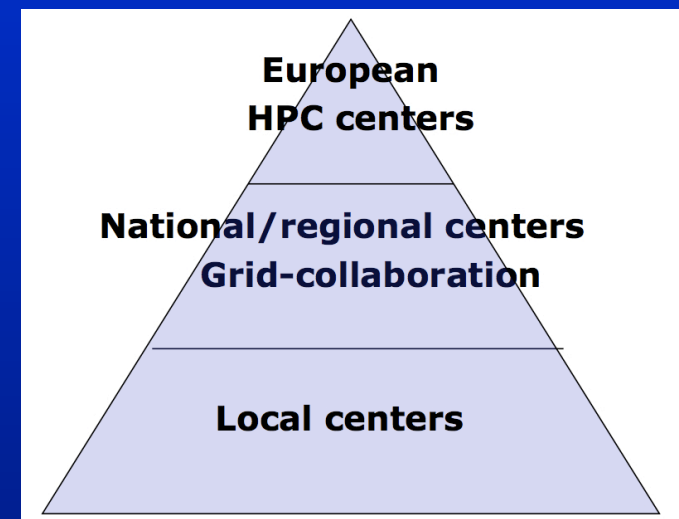
Niveles de supercomputación

RES, Red Española de Supercomputación

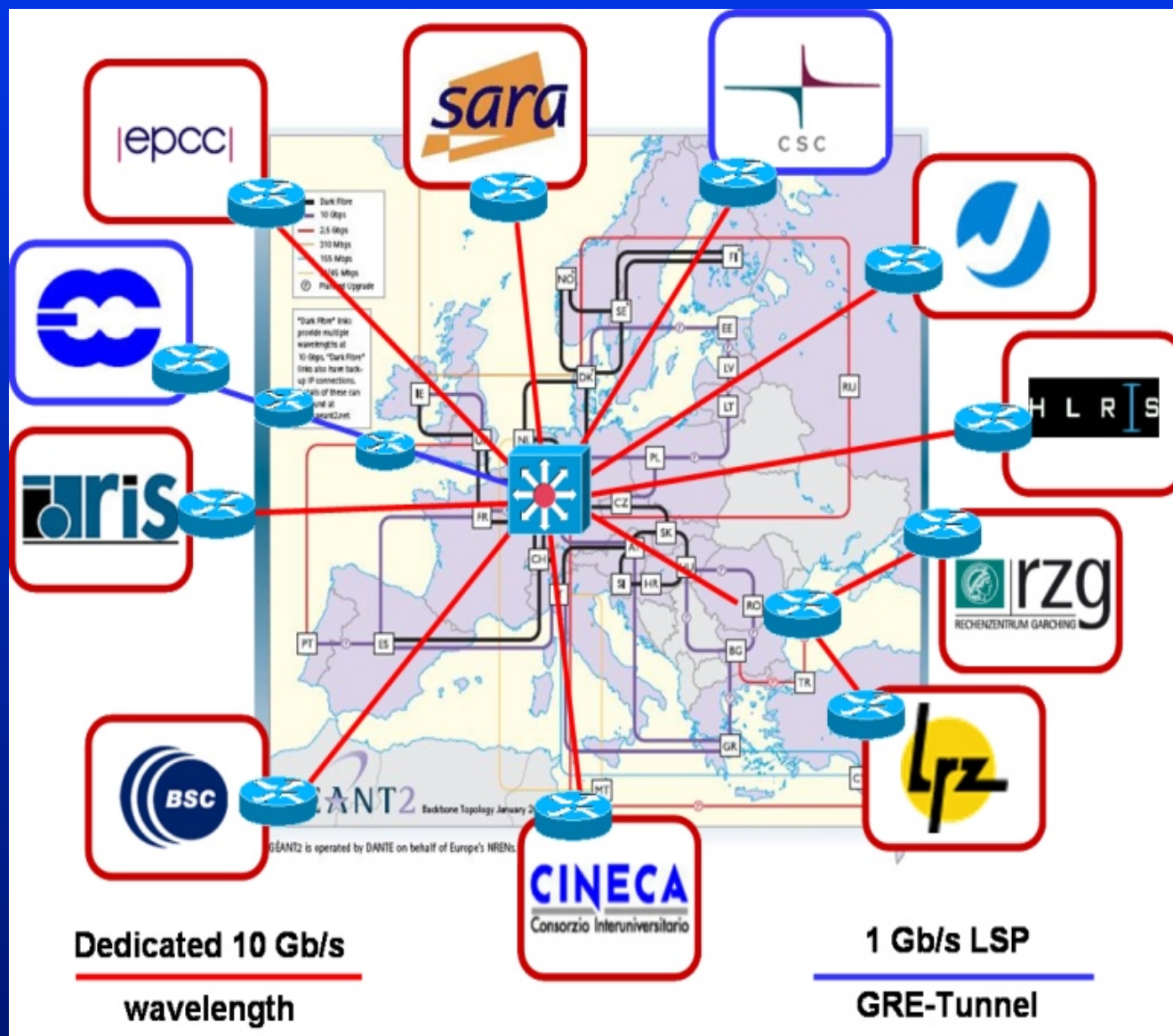


PRACE

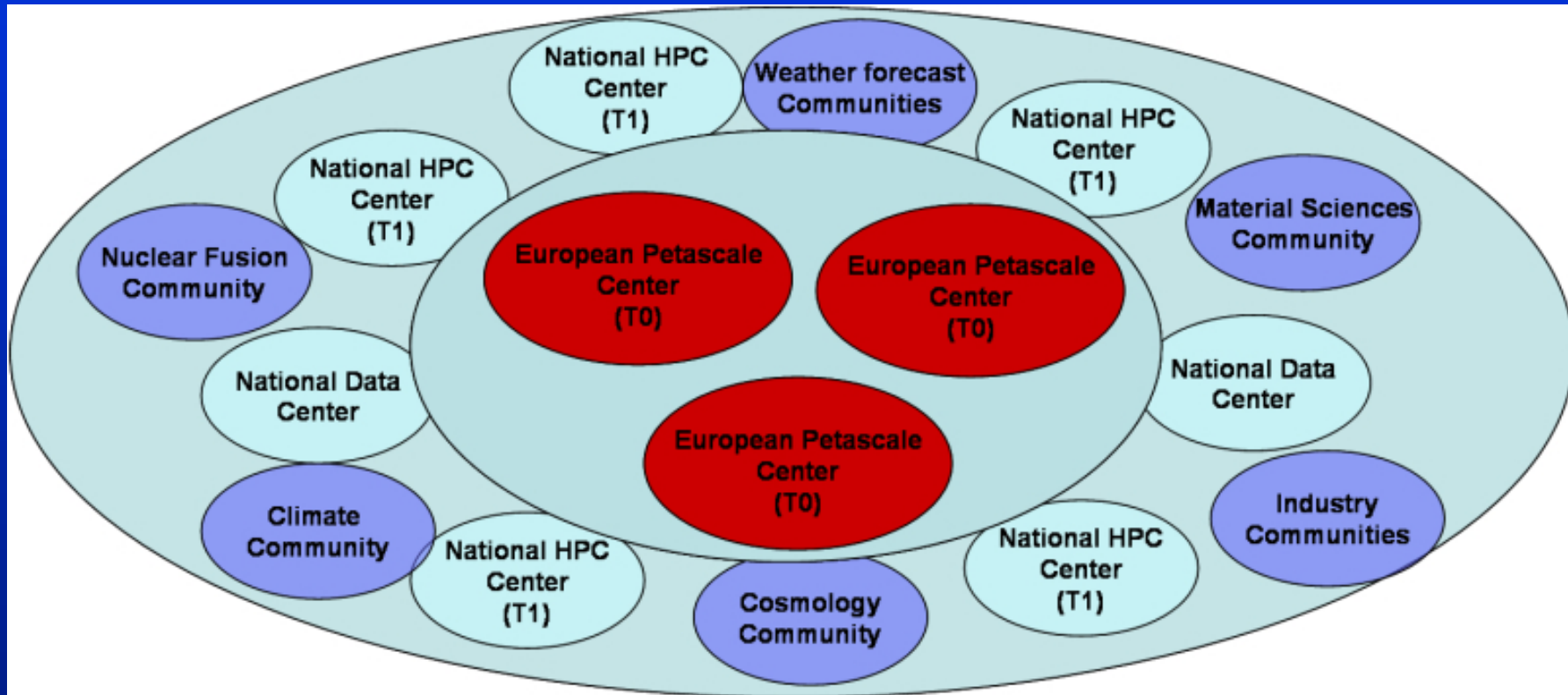
PaRtnership for Advanced Computing in Europe



Interconexión Tier1 (DEISA)

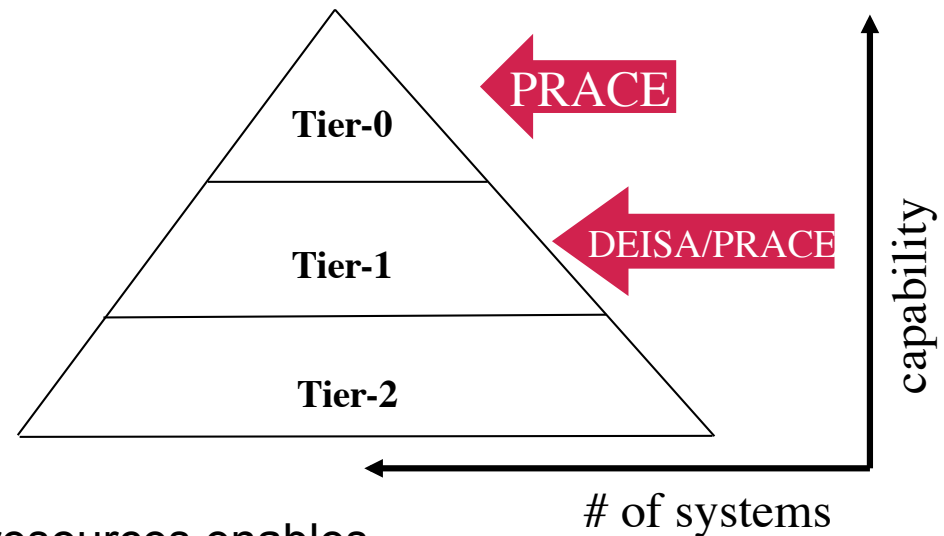


Estructura Tier0 Tier1

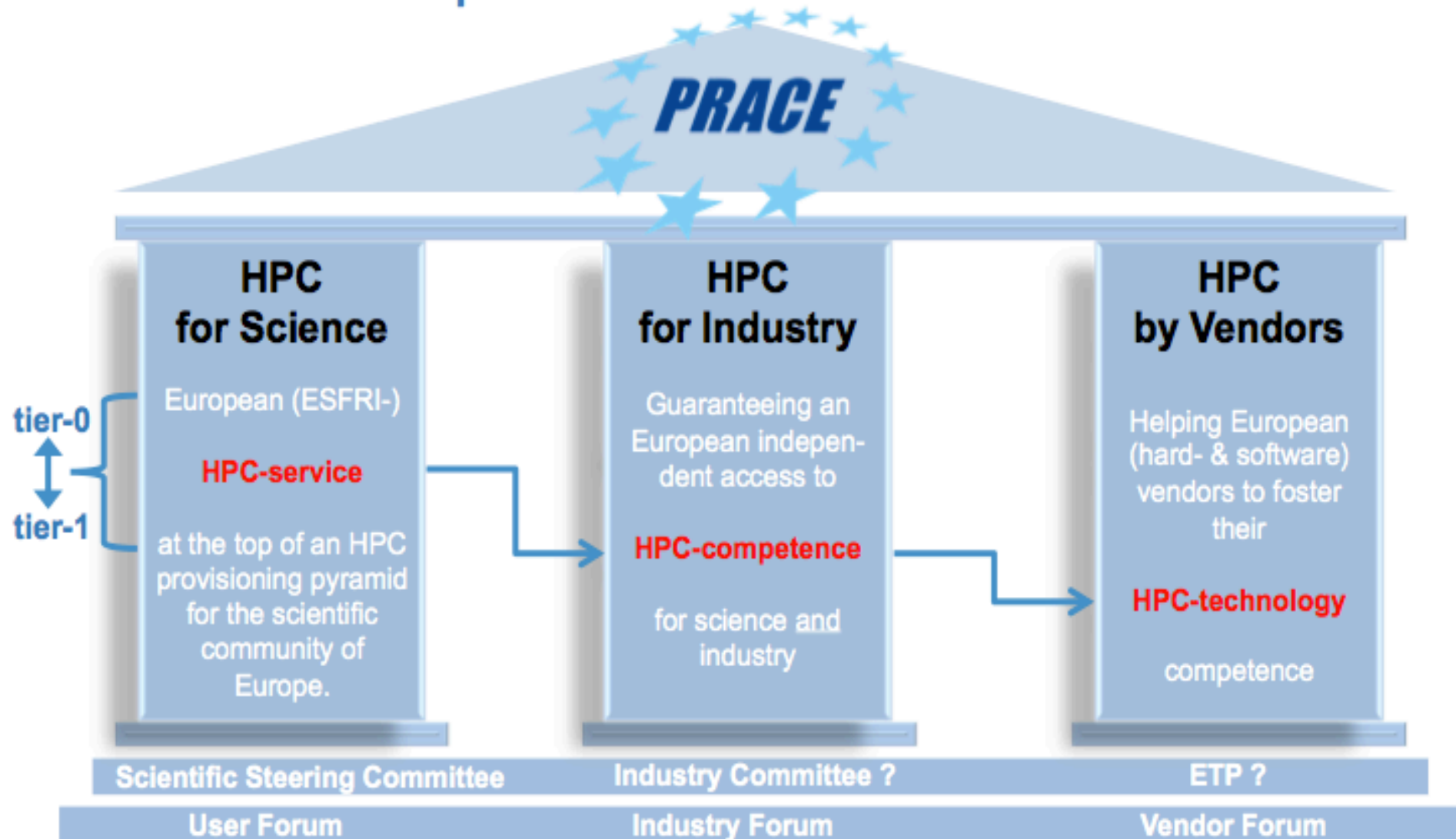


Ecosystem Integration

- Ensure the right level of integration in/with the tiers
- Tier-0 – full integration
 - Creation of new high-end resources
 - Single access route
 - Single operational model
- Tier-1
 - Integration of existing national resources enables non hosting countries to contribute
 - Different funding / governance requires adapted approach
 - Leverage DEISA successes, like network, DECI
- Tier-2 / Grids
 - Different funding and usage models, overlapping user groups
 - Cooperate and inter-operate for the benefit of users



Three pillars of the PRACE Mission



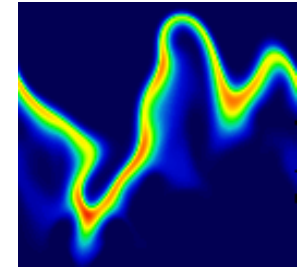
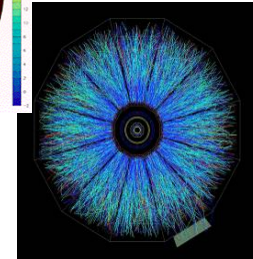
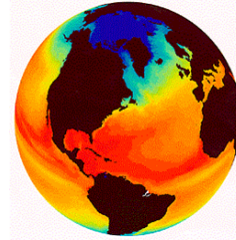
PRACE AISBL goals

- The **development and provision** of an Infrastructure at European level which allows the scientific communities, including those within industry, to **access** European High-end Computing (HeC) systems (**Tier-0**);
- The **management of the coordination** between the Infrastructure and existing national computation centres (**Tier-1**) and also, if agreed, regional computation centres (**Tier-2**), to allow for the **establishment of relationships** with the HeC **user communities**; and
- The **provision and rationalization of access** to the Infrastructure by qualified European and international **scientific communities**, either academic or industrial, whose projects may be **evaluated** for such purpose.

The European Scientific Case

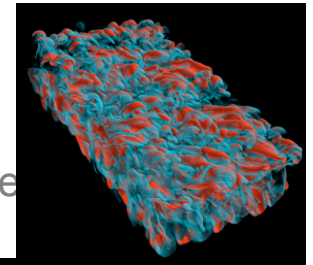
- Weather, Climatology, Earth Science

- degree of warming, scenarios for our future climate.
- understand and predict ocean properties and variations
- weather and flood events



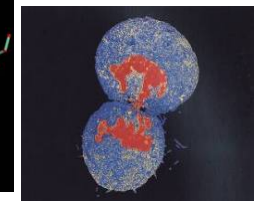
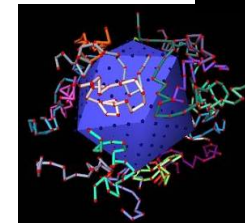
- Astrophysics, Elementary particle physics, Plasma physics

- systems, structures which span a large range of different length and time scales
- quantum field theories like QCD, ITER



- Material Science, Chemistry, Nanoscience

- understanding complex materials, complex chemistry, nanoscience
- the determination of electronic and transport properties

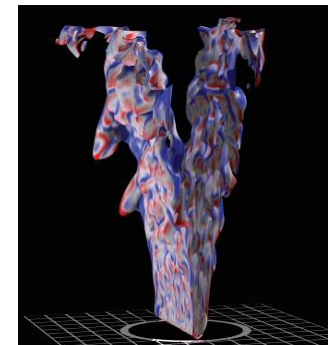
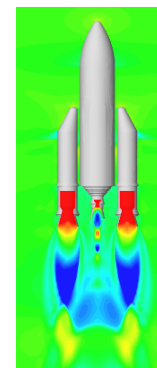
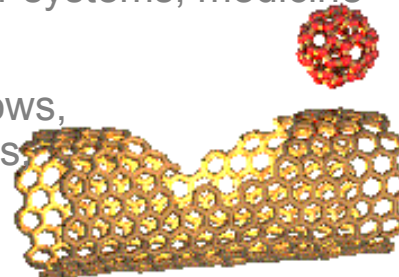


- Life Science

- system biology, chromatin dynamics, large scale protein dynamics, protein association and aggregation, supramolecular systems, medicine

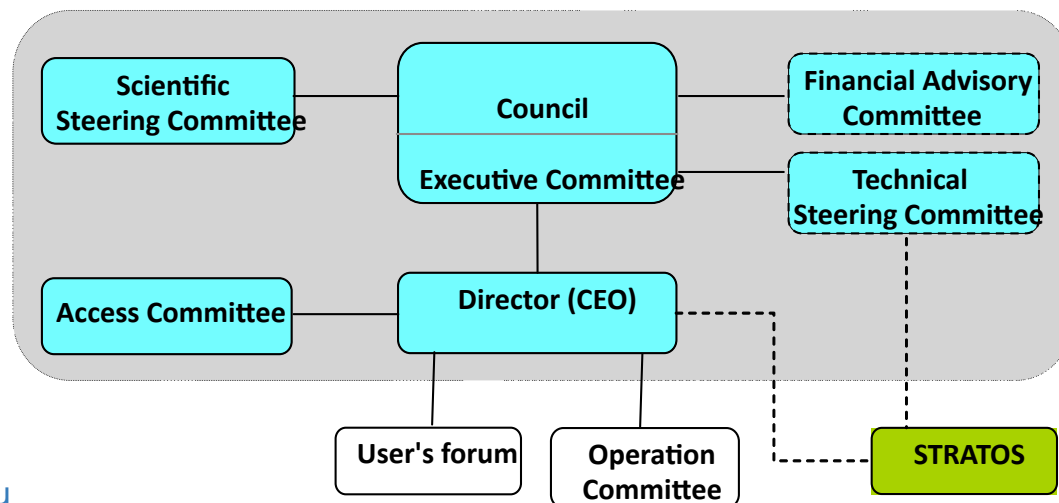
- Engineering

- complex helicopter simulation, biomedical flows, gas turbines and internal combustion engines, forest fires, green aircraft,
- virtual power plant



Governance of the Association

- Modelled after successful examples of existing RIs
 - Council as main decision making body
 - Director with strong managing mandate
 - Scientific Steering Committee and Access Committee to give scientific advice and to steer the Peer Review process
 - Further committees will be instantiated by the Council as needed



PRACE Tier-0 Systems

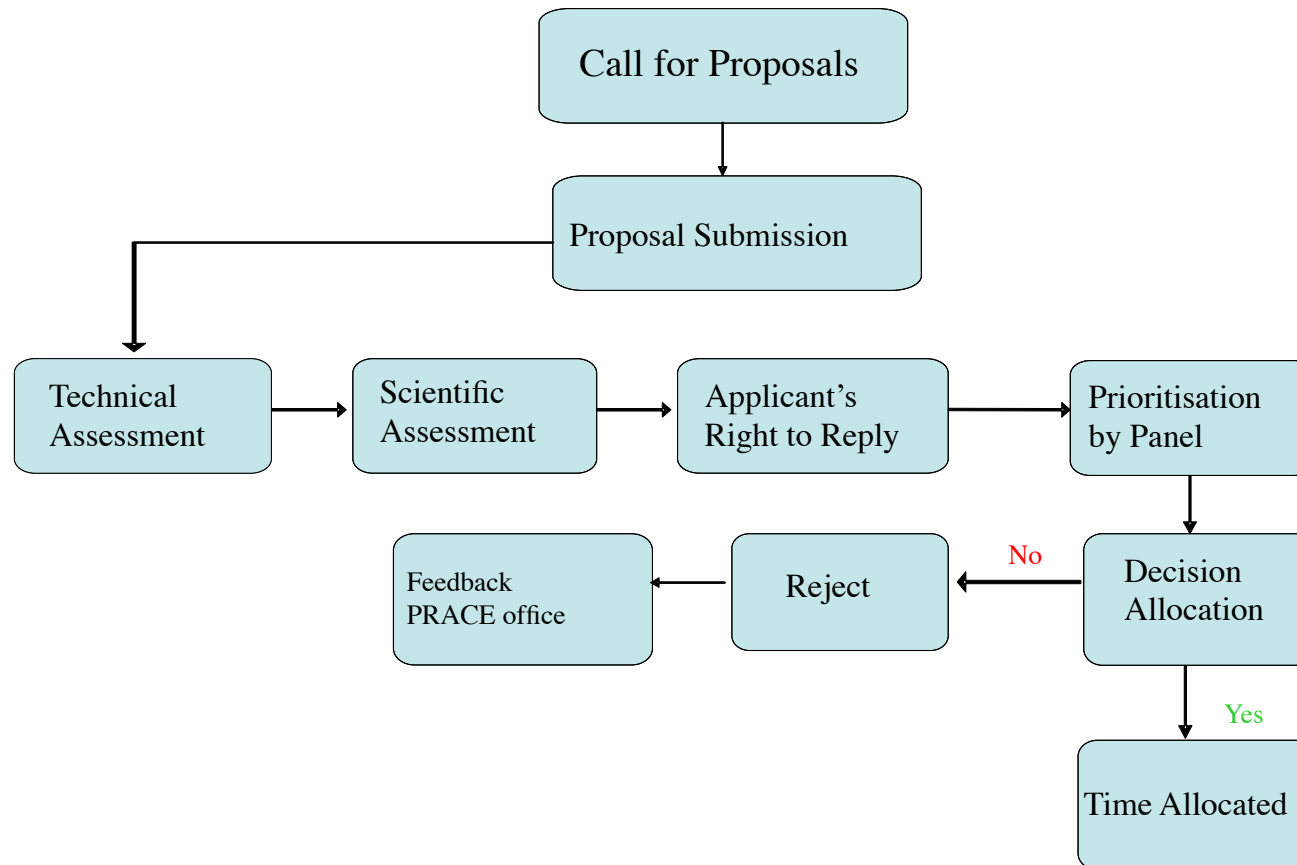
- 1st Tier-0 System provides cycles since August 1
 - Jugene: BlueGene/P in GCS@Juelich
 - 72 Racks, 1 PFlop/s Peak
 - 35% of capacity provided to PRACE
- 2nd Tier-0 System announced by GENCI on October 5
 - Curie: Bull Cluster with Intel CPUs operated by CEA
 - 1.6 PFlop/s peak in Oct. 2011 (1st step in 10/2010)
 - Largest fraction of capacity provided to PRACE
- Next Systems and procurements (in alphabetical order)
 - BSC, CINECA, GCS@HLRS, GCS@LRZ
 - Procurement plan based on analysis of user requirements and market



Peer review principles

- Transparency
- Fairness
- No parallel assessment
- Avoiding conflict of interests
- Reviews by non-conflicted experts
- Confidentiality
- Right to appeal technical and scientific evaluations

Peer Review Process



PRACE ...

- has prepared the creation of an operational European Tier-0 HPC service
- has secured national (400 Million €) and European (70 Million €) funding commitments
- has extended its geographical coverage in Europe from 14 to 20 countries
- has established itself as the key European HPC player
- is addressing a huge demand, as the high over-subscription of the current Tier-0 resources demonstrates

PRACE is rapidly ramping up its services and proceeds to integrate the HPC ecosystem



Exascale en Europa: EESI

- De los 1000 Tflops (1 Petaflop) a los 1000 Petaflops (1 Exaflop)
- Proyecto EESI
 - » The European Exascale Software Initiative (EESI) goal is to **build a European vision and roadmap to address the challenge of the new generation of massively parallel systems composed of millions of heterogeneous cores which will provide Petaflop performances in 2010 and Exaflop performances in 2020.**

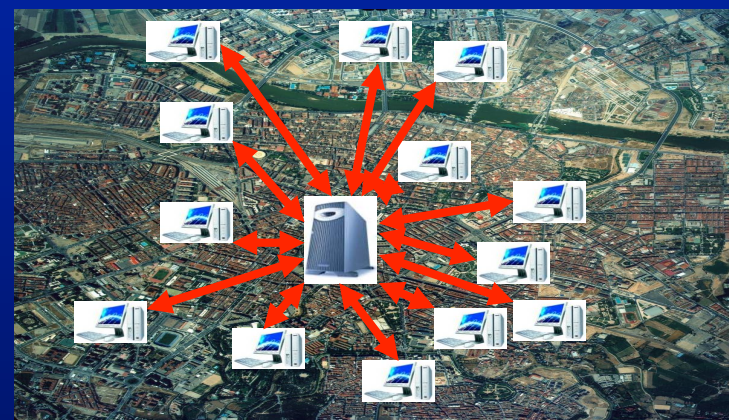


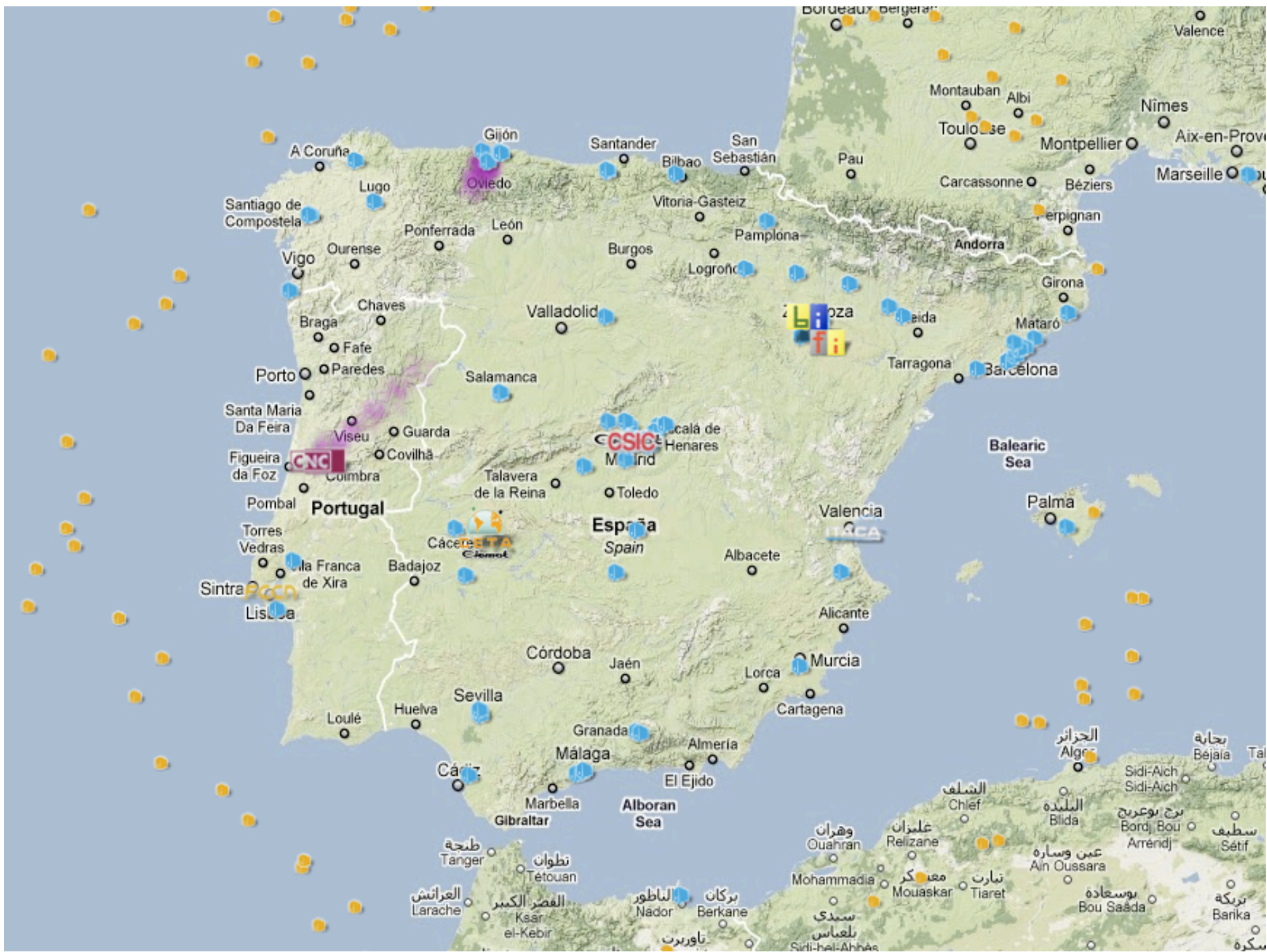
Otras posibilidades



Computación ciudadana

- Aplicaciones con paralelismo nulo
- Runs segmentables en periodos cortos
- Baja necesidad de memoria
- Baja necesidad de Input/Output
- Licencias de Software





Datos

- Diluvio de datos, crecimiento exponencial
- Necesidad de pasar de un modelo de silos a un modelo de compartición e interoperabilidad

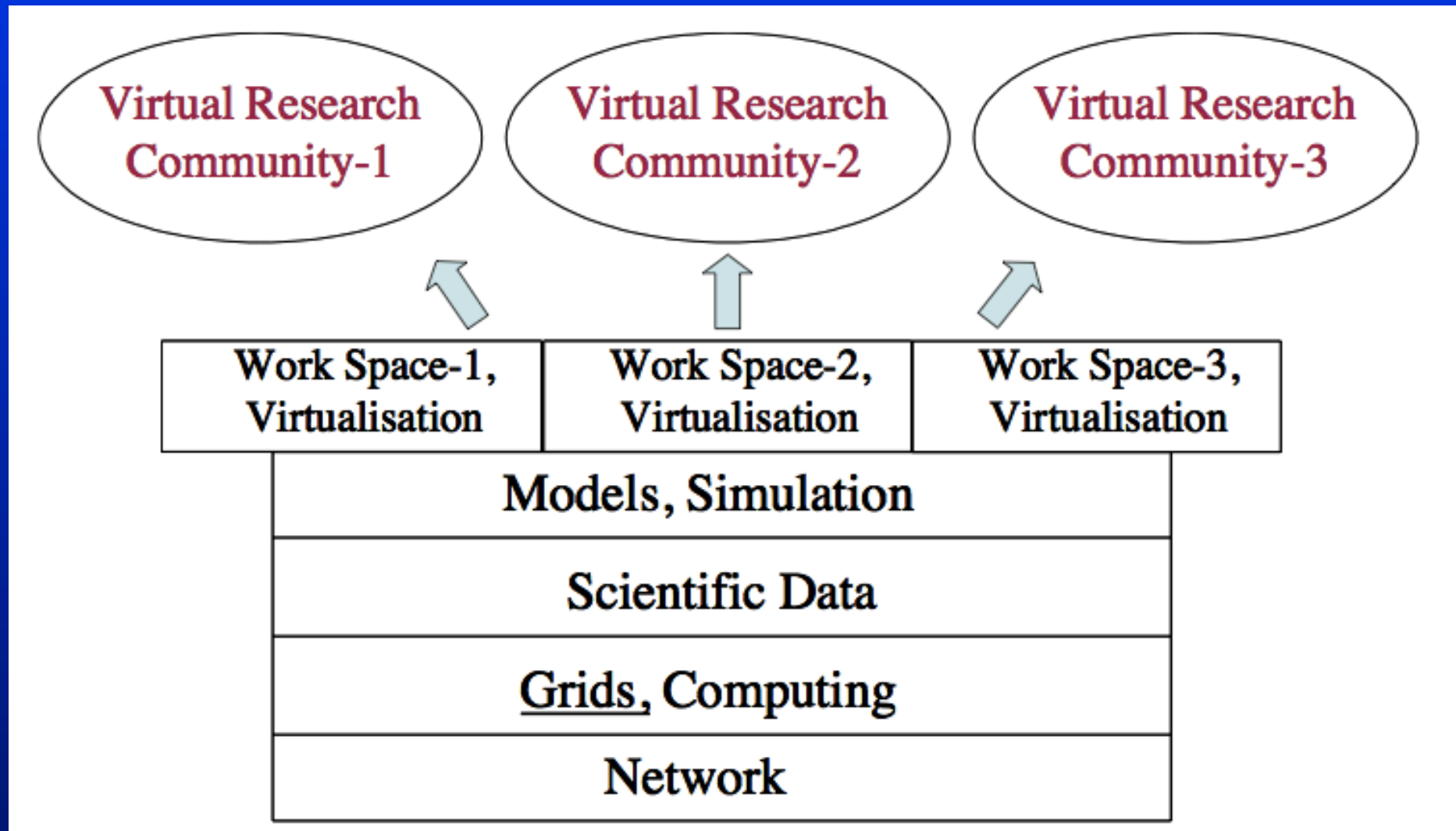
Foros proyectos: Eudat



Datos científicos

- Repositorios de datos
 - » Accesibilidad, Metadatos y calidad
 - » Interoperabilidad, Evolución tecnológica
 - » Integración con grid middleware y NRENS
 - » Hacia el despliegue de un ecosistema de repositorios
 - » **e-IRG Data Management Task Force**
 - » **Informe del High Level Expert Group on Scientific Data** http://ec.europa.eu/information_society/newsroom/cf/itemlongdetail.cfm?item_id=6204

Tendencia actual



eHumanidades

CLARIN

Common Language Resources and Technology Infrastructure



- Home
- Mission of CLARIN
- Vision
- Executive Summary
- Events
- Basic concepts
- Language Resources & Technology
- Research Infrastructures
- Background
- Architecture
- Education
- Role of Languages
- Organization
- Structure
- Work Packages
- Members
- Become a Member
- Contact
- Connections
- Networks
- Expertise and Standards
- Member Area

*Towards an integrated and interoperable
research infrastructure of language resources
and its technology enabling eHumanities*

*Easy access to Language Resources and Technology
for the Humanities community*



Archivos en red

CESSDA PORTAL
COUNCIL OF EUROPEAN SOCIAL SCIENCE DATA ARCHIVES

[Home](#) | [Data Portal](#) | [Member Archives](#) | [About CESSDA](#)

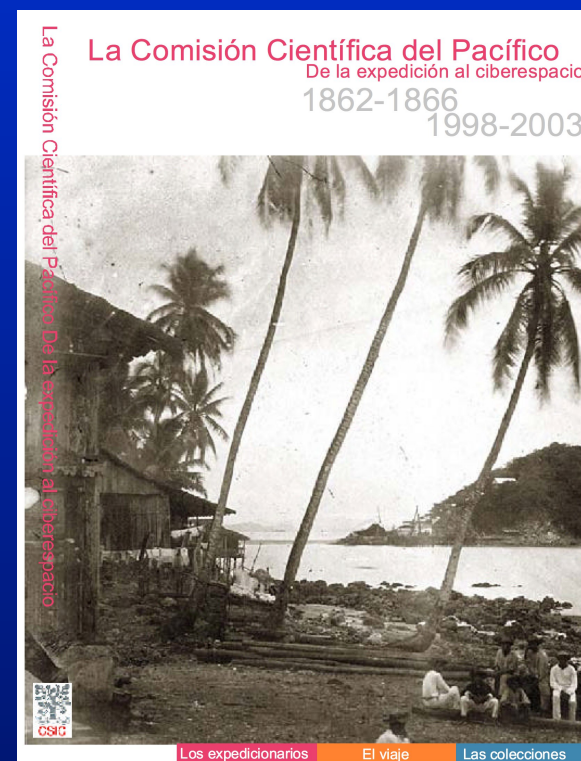
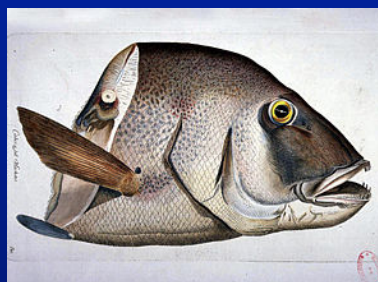
CESSDA Member Archives

Archive Name	Description	Location
DDA	Danish Data Archives	ODENSE
NSD	Norwegian Social Science Data Services	BERGEN
SSD	Swedish Social Science Data Services	GÖTEBORG
FSD	Finnish Social Science Data Services	TAMPERE
ESSDA	Estonian Social Science Data Archive	TARTU
DANS	Data Archiving and Networked Services	THE HAGUE
UKDA	UK Data Archive	ESSEX
ISSDA	Irish Social Science Data Archive	DUBLIN
ZA	Zentralarchiv für Empirische Sozialf.	COLOGNE
CEPS/INSTEAD		LUXEMBOURG
ARCES	Archivo de Estudios Sociales	MADRID
Réseau Quetelet		PARIS
SIDOS	Swiss Information and Data Archive Service for the Social Sciences	NEUCHÂTEL
ADPSS Sociodata		MILAN
ADP	Arhiv družboslovnih podatkov	LIUBLJANA
GSDB	Greek Social Data Bank	ATHENS
SDA	Sociological Data Archive	PRAGUE
WISDOM	Wiener Institut für Sozialwissenschaftliche Dokumentation und Methodik	VIENNA
RODA	Romanian Social Data Archive	BUCHAREST
TARKI	Social Research Informatics Center	BUDAPEST

www.cessda.org

Bibliotecas digitales

- Contenido digital
- Archivos y acceso en red
- Más allá del acceso on-line



Documentos científicos en red

- Tendencia al Open Access
 - » Promover el acceso libre y sin restricciones a la publicación científica
 - » Incremento del impacto de los investigadores e instituciones
 - » Publicación en revistas de acceso abierto
 - » Ejemplo <http://digital.csic.es/>



Repositorios d'e-información



Tesis doctorales

- Desde 2001
- 19 instituciones
- 5.131 tesis
- <http://www.tesisenred.net>



Revistas catalanas de acceso abierto

- Desde 2006
- 34 instituciones
- 151 revistas
- 45.843 artículos
- <http://www.raco.cat>



Repositorio de documentos de investigación

- Desde 2005
- 15 instituciones
- 119 colecciones
- 3.952 documentos
- <http://www.recercat.net>



Patrimonio digital de Cataluña

- Desde 2006
- 1.004 webs
- 2.720 capturas
- 34M de archivos en 2 TB
- <http://www.padi.cat>

Movilidad



- education roaming
- Federación (confederación)
- Segura
- IEEE 802.1x
- Autenticación en tu organización
- Europa, Asia Pacífico, Canadá, USA
- LA?

Eduroam.org



Red Española de e-Ciencia

- Promover y coordinar el desarrollo de la e-Ciencia en España
 - » Foro de encuentro entre usuarios y e-Infraestructuras
 - » Grupos de trabajo:
 - Información de recursos y acceso
 - Gestión de recursos en proyectos (sostenibilidad)
 - Ventanilla única
 - » Foros tecnológicos: Cloud computing, Green IT
 - » Repositorios de datos, etc.
 - » Coordinación con Portugal en Ibergrid



Interacción con los usuarios:

Conocer sus
necesidades

Usos actuales

Casos emblemáticos

Problemática: Grupos de
trabajo

Informar

Posibilidades

Nuevos servicios

Test beds

Formar

Coordinar

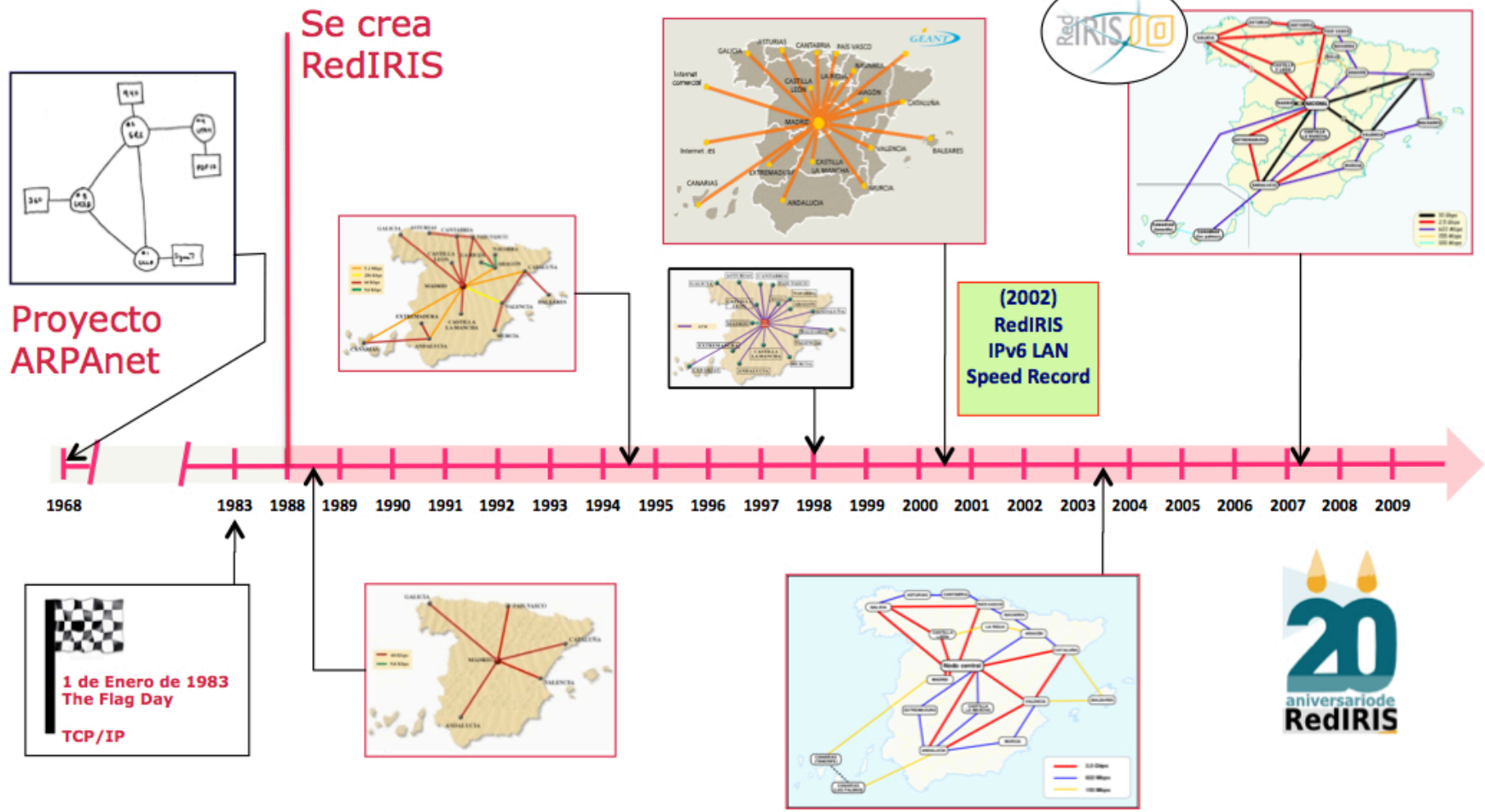
e-Infraestructuras

Otros actores

Usuarios

e-Infraestructuras, Instituciones, otros

RedIRIS ha evolucionado con Internet



primeras redes de investigación europeas

primeros servidores Web en España

(1993) se constituye DANTE

(1998) empieza el proyecto TEN-155

(2001) empieza el proyecto GEANT

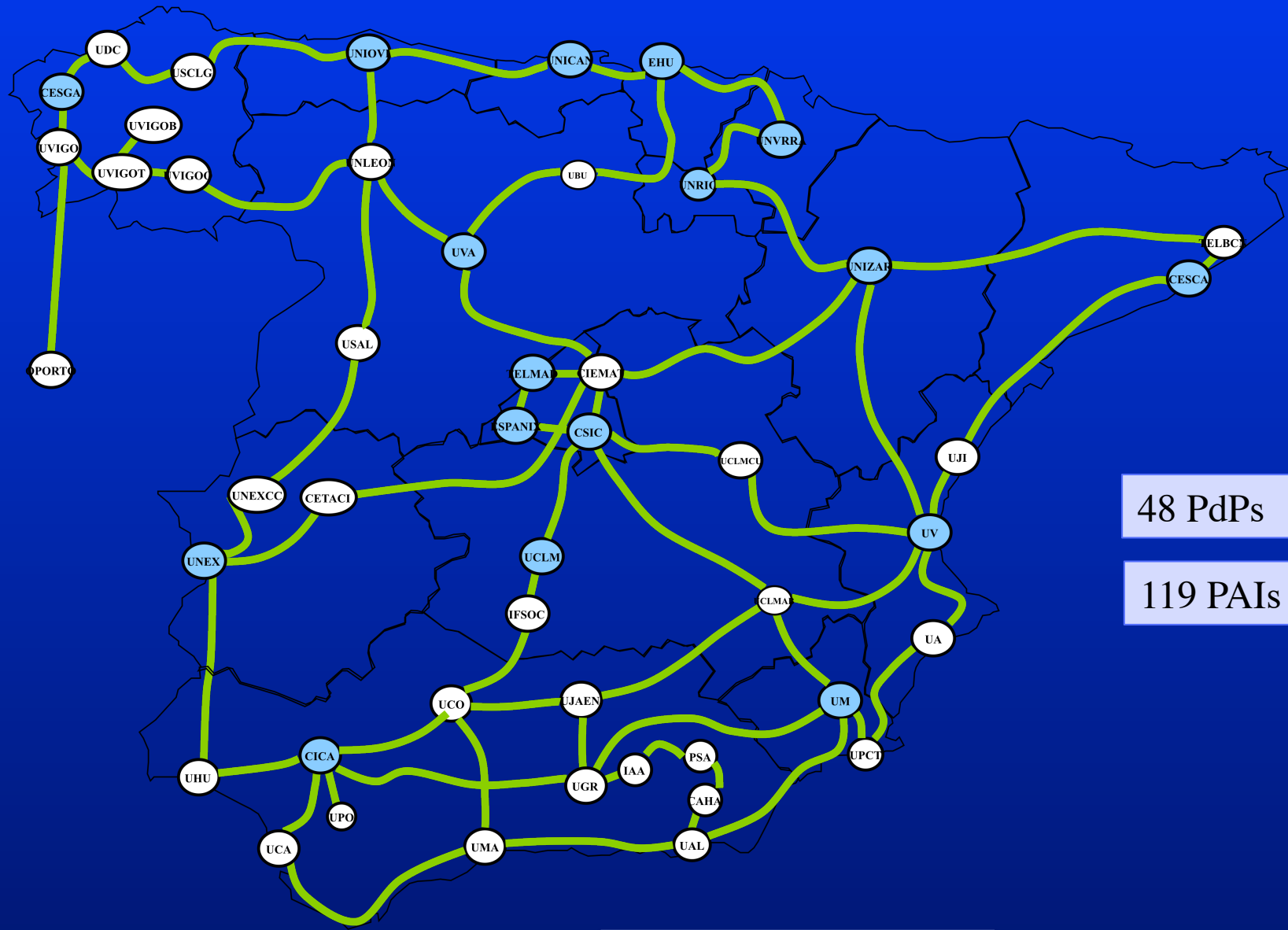
(2004) empieza el proyecto GEANT2



red.es

Presentación General de RedIRIS-NOVA

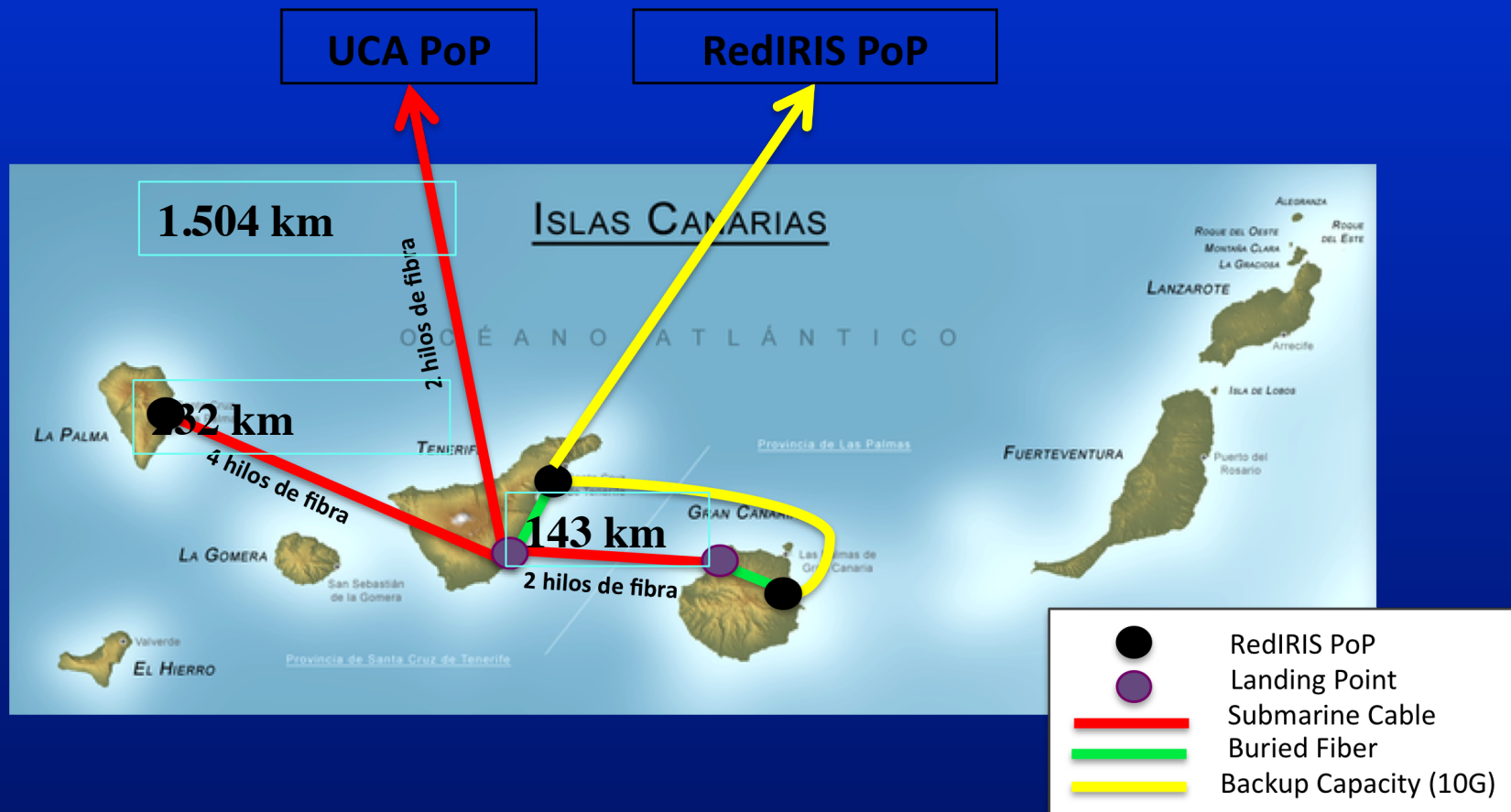
Huella de fibra de RedIRIS-NOVA



> 10.000 km de fibra

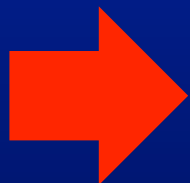
Resultados Contrato II

- **Islalink**
 - Nuevos cables submarinos – 2.000 km
 - G.656 and G.652D
 - **IRU a 30 años**
 - Despliegue hasta 2012
- **Infraestructura Submarina:**
 - Soporte hasta 128 λ x 10Gbps
 - 10 λ x 10G provisionadas inicialmente
 - Escalable hasta 64 λ , sin coste adicional



Evolución de las redes

- Servicios estables de grandes requerimientos (Proyectos ESFRI, CERN, HPC, ITER, etc.)
- Conexiones e2e
- Provisiones de ancho de banda bajo demanda (Federica 1Gbps)
- Conexiones transfronterizas



“Infrastructure as a Service”

Conclusiones

- Gran despliegue de redes (NRENs) propiciando la e-Ciencia
- Necesidad de potenciar a nivel nacional e internacional la e-Ciencia
- Necesidades de información, coordinación y financiación de la e-Ciencia
- Actores: NRENs, Redes Regionales, Entes financiadores, usuarios
- Importancia de la sostenibilidad y la gobernanza
- Coordinación internacional a todos los niveles
- Mucho trabajo por hacer en repositorios de datos, Green IT, uso del Cloud

Referencias I

- ESFRI http://ec.europa.eu/research/infrastructures/index_en.cfm?pg=esfri
- e-IRG <http://www.e-irg.eu/> <http://www.e-irg.eu/publications.html>
- <http://www.e-irg.eu/e-irg-workshop-madrid-17-june-2010.html>
- eInfraNet <http://www.e-infranet.eu/>

- EEF <http://www.einfrastructure-forum.eu/>

- EGI <http://www.egi.eu/>
- DEISA <http://www.deisa.eu/>
- PRACE <http://www.prace-project.eu/>
- RES http://www.bsc.es/plantillaC.php?cat_id=451
- Comisión Europea <http://cordis.europa.eu/fp7/ict/e-infrastructure/>

- ES-NGI <http://www-es-ngi.es>

Referencias II

- Red Española e-Ciencia:
- <http://www.e-ciencia.es/>
- <http://www.e-ciencia.es/wiki/index.php/Portal:Aplicaciones>
- [wiki http://www.e-ciencia.es/wiki/](http://www.e-ciencia.es/wiki/)
- Ibergrid <http://www.ibergrid.eu/>
- Ibercivis <http://www.ibercivis.es/>
- Construyendo la Ciencia del Siglo XXI priorización ESFRI española
- <http://www.micinn.es/stfls/MICINN/Investigacion/FICHEROS/Construyendo%20la%20ciencia%20del%20siglo%20XXI%20con%20portada.pdf>

- RedCLARA <http://www.redclara.net/>
- GISELA <http://www.gisela-grid.eu/>

Muchas gracias !!!!

Victor.Castelo en csic.es