

RedIRIS

Connecting universities and Spanish R&D&I since 1988.
www.rediris.es

What is RedIRIS?

Founded in 1988, RedIRIS has been the Spanish academic and research network for over 30 years. It is comparable to other similar networks worldwide, which are members of the European association GÉANT.

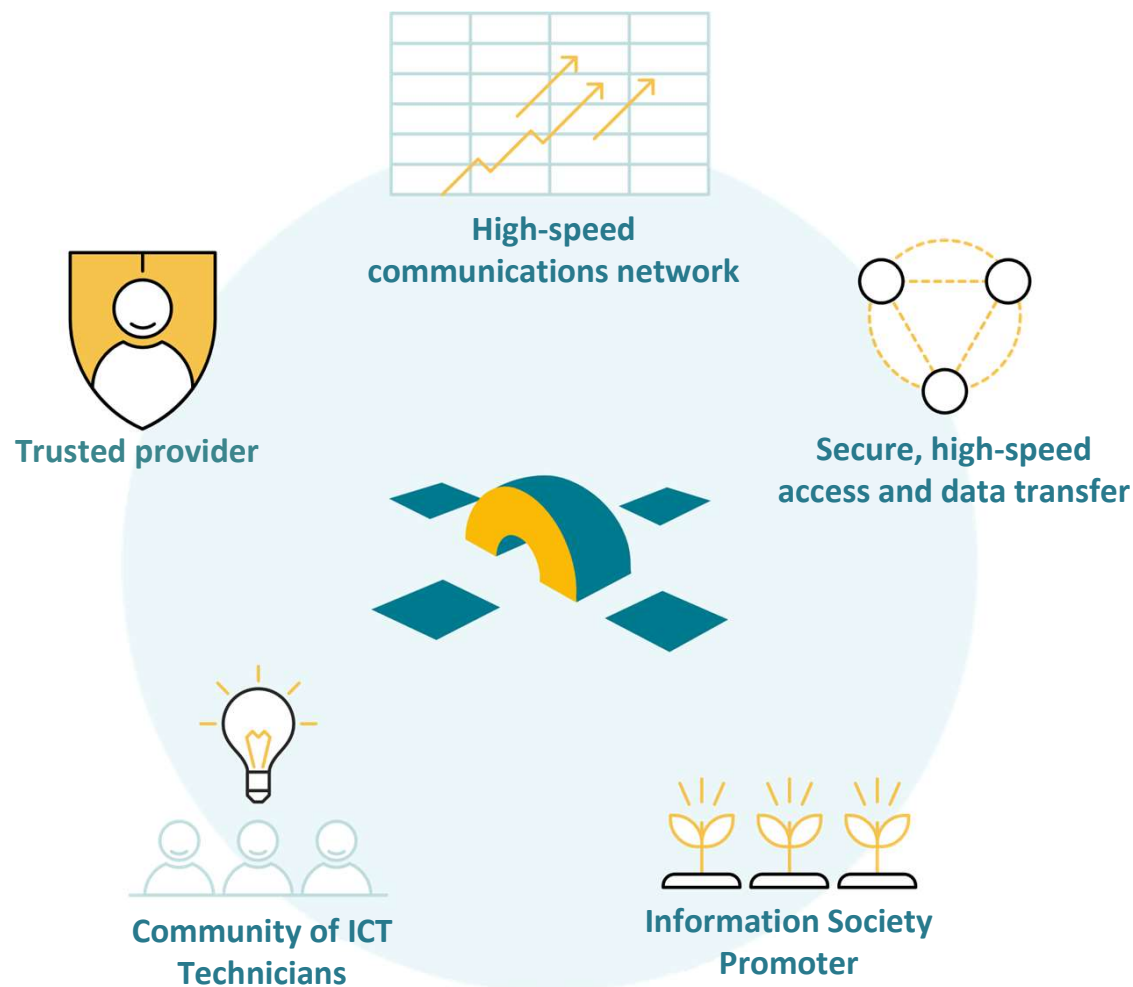


What is RedIRIS?

It is the Spanish academic and research network that provides advanced communications and other ICT services to the scientific community and national universities.

RedIRIS deploys multiple links of up to 100,000 Mbps (compared to the 600 Mbps normally offered by domestic fibre connections), which are used both for scientific projects and to facilitate teaching activities.

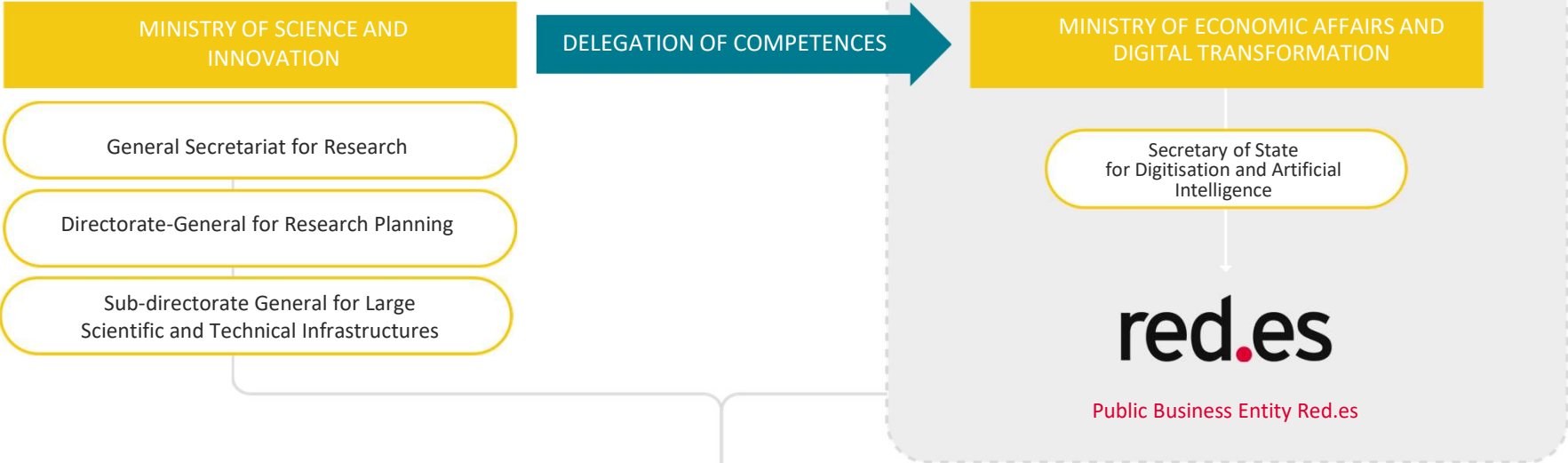
RedIRIS uses its ICT services to promote the development of e-science and education.



Institutional context

RedIRIS is an ICTS* funded by the Ministry of Science and Innovation, which is responsible for its strategy.

RedIRIS is managed by the Public Business Entity Red.es, which reports to the Ministry of Economic Affairs and Digital Transformation.

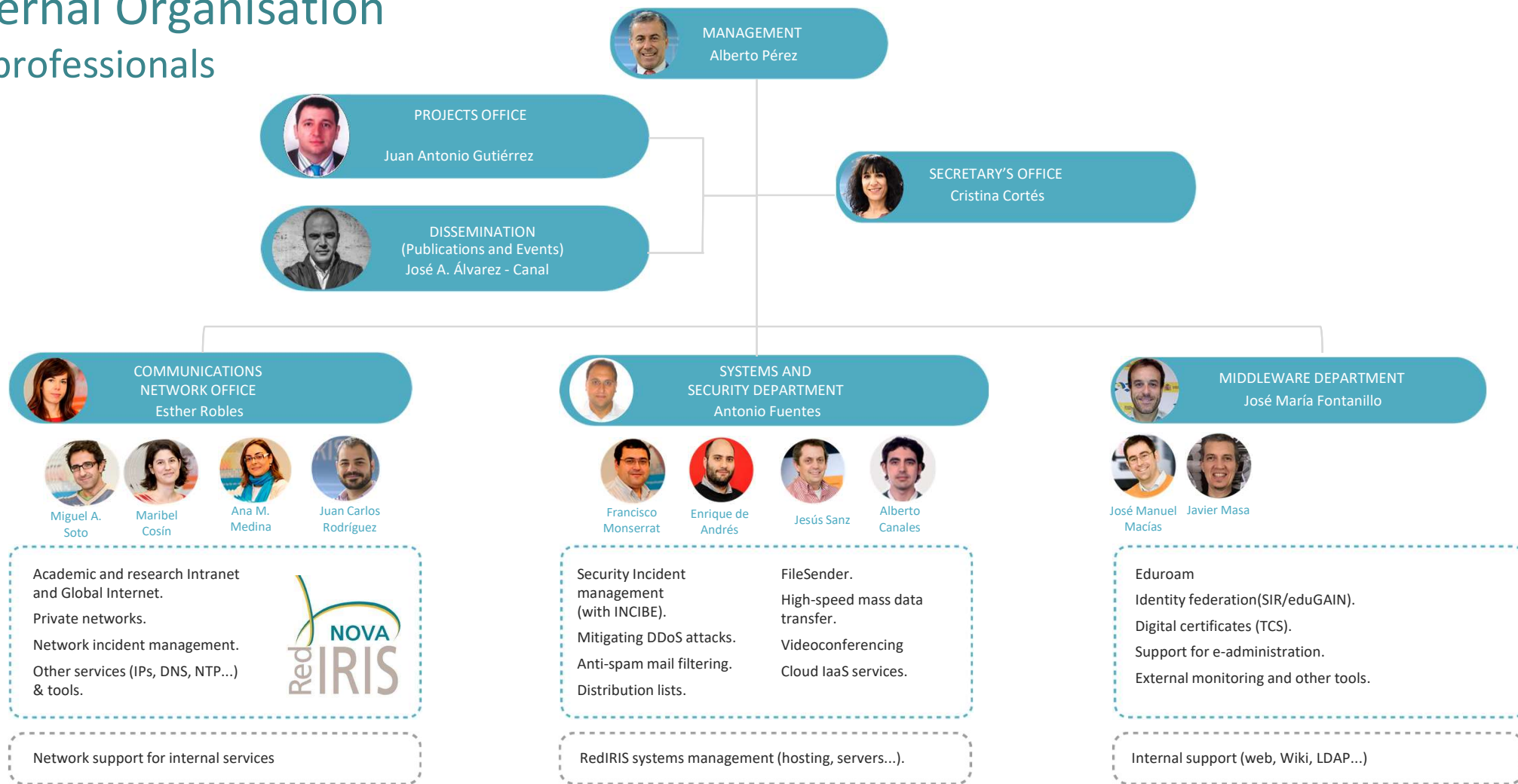


(*) Unique Scientific and Technical Infrastructure approved by the Ministry of Science and Innovation. These are the main scientific infrastructures in terms of cost and relevance.



Internal Organisation

17 professionals



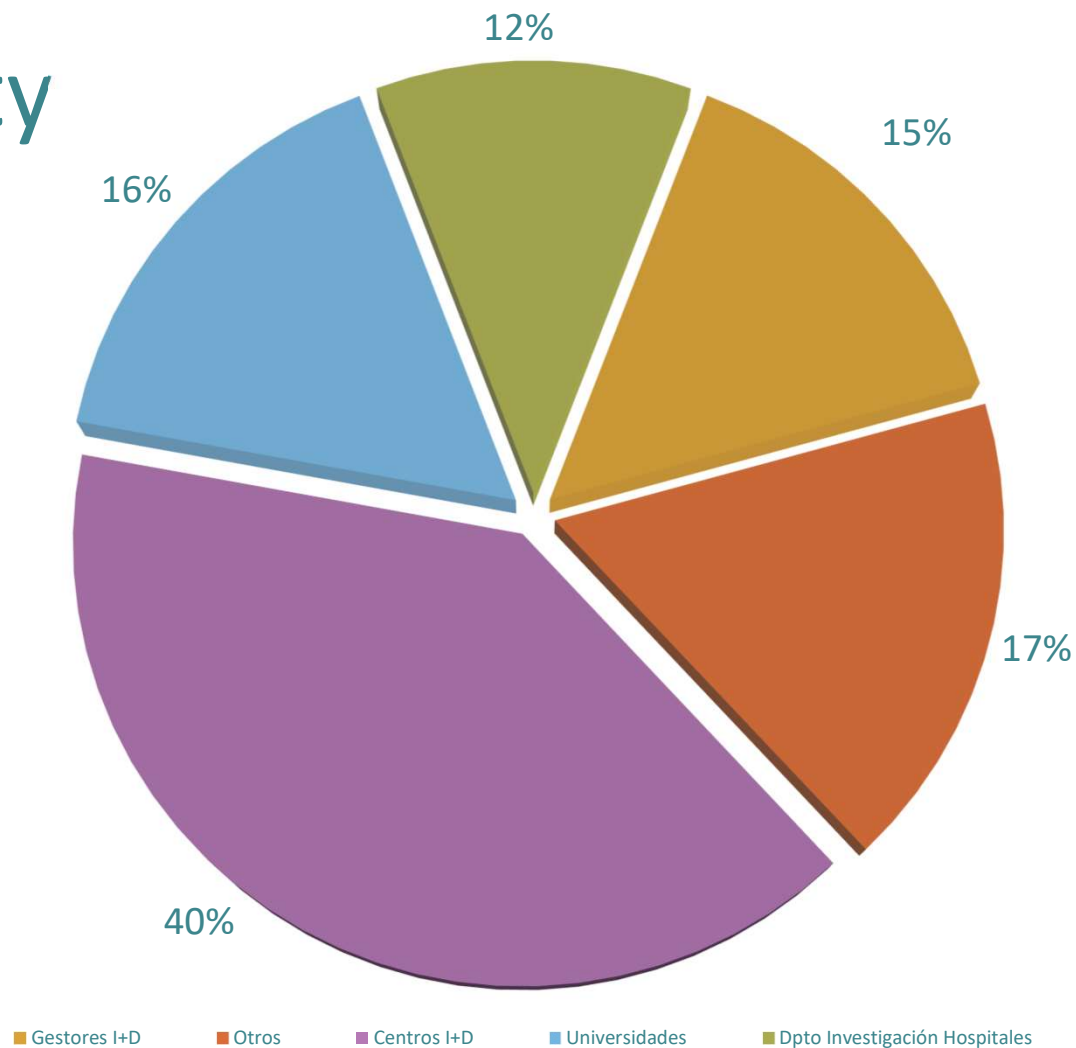
The RedIRIS Community

RedIRIS offers its services to more than 500 institutions including:

- Universities
- ICTSs and PRIs
- Research Centres
- Health research departments
- Managers of content of academic and scientific interest
- R&D managers, and some Ministries and public bodies
- School networks

Our milestones:

- Around 2,000,000 users in universities and science centres
- Around 3,000,000 primary and secondary school students
- More than 5 million users in all



Our users

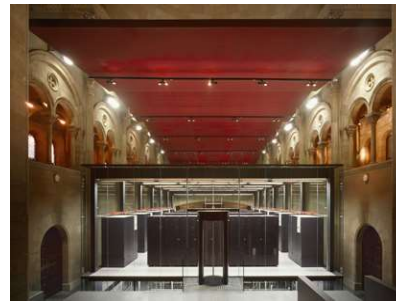
More than 500 institutions (including regional networks, Spanish universities and public research centres and ICTSs) trust us.



Calar Alto Observatory (Almería)



National Microelectronics Centre, CSIC



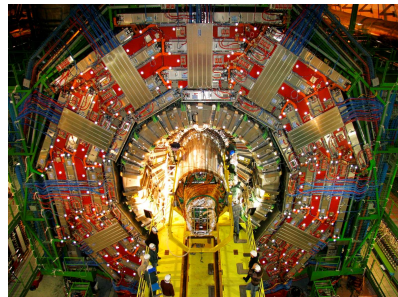
Marenostrum, Barcelona Supercomputing Centre



Doñana Biological Station



Telescope of the Astronomical Centre of Yeves (Guadalajara)



CERN (Switzerland)



Laboratory of the Polytechnic University of Madrid



Gran Telescopio de Canarias (The Great Telescope of the Canary Islands), IAC

Our users

We offer different personalised services depending on the type of user. We adapt to users' services and needs at all times:

A. Basic Service

Web browsing, e-mail
Many potential users, low bandwidth
Example: university students

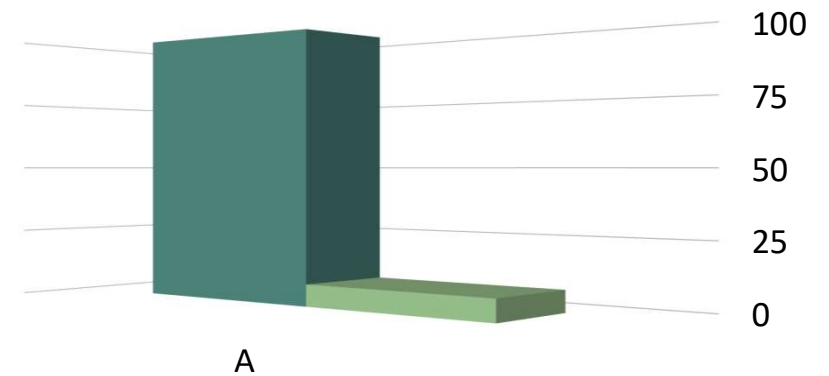
B. Research projects

Service adaptation (Multicast, VLAN's, VPN, QoS...)
User communities, virtual organisers
Example: Multicast for live streaming

C. Major e-Science projects

High-energy physics, astronomy, biomedicine, natural sciences,
Information Technology research, etc.
Supercomputing and Grid users
Requires high speed links (10Gb - 100Gb)
Example: Large Hadron Collider (LHC)

■ Nº de usuarios ■ Capacidad utilizada por el usuario



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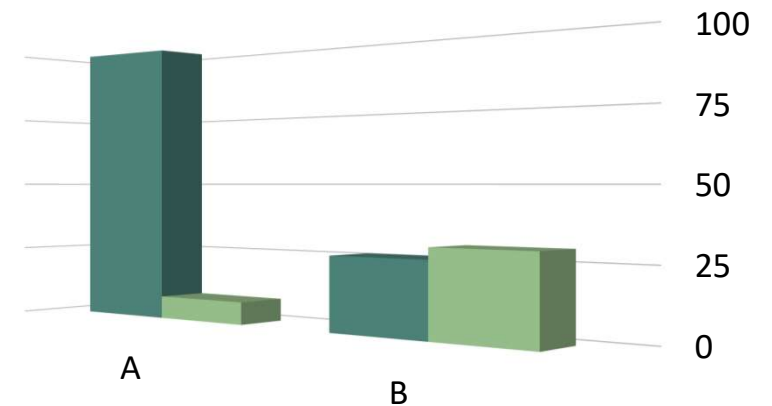
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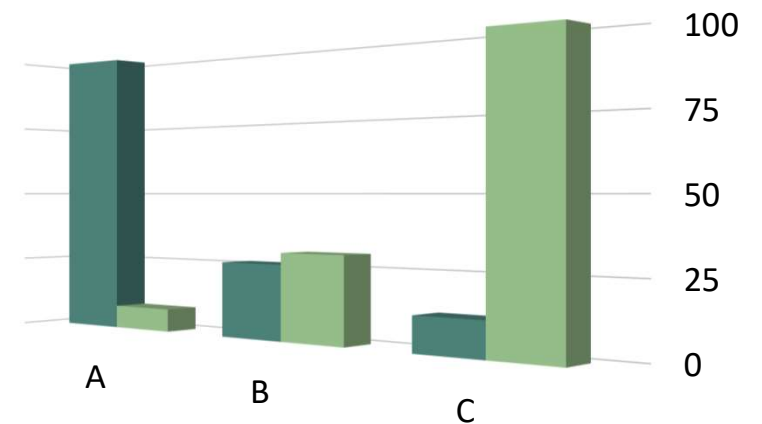
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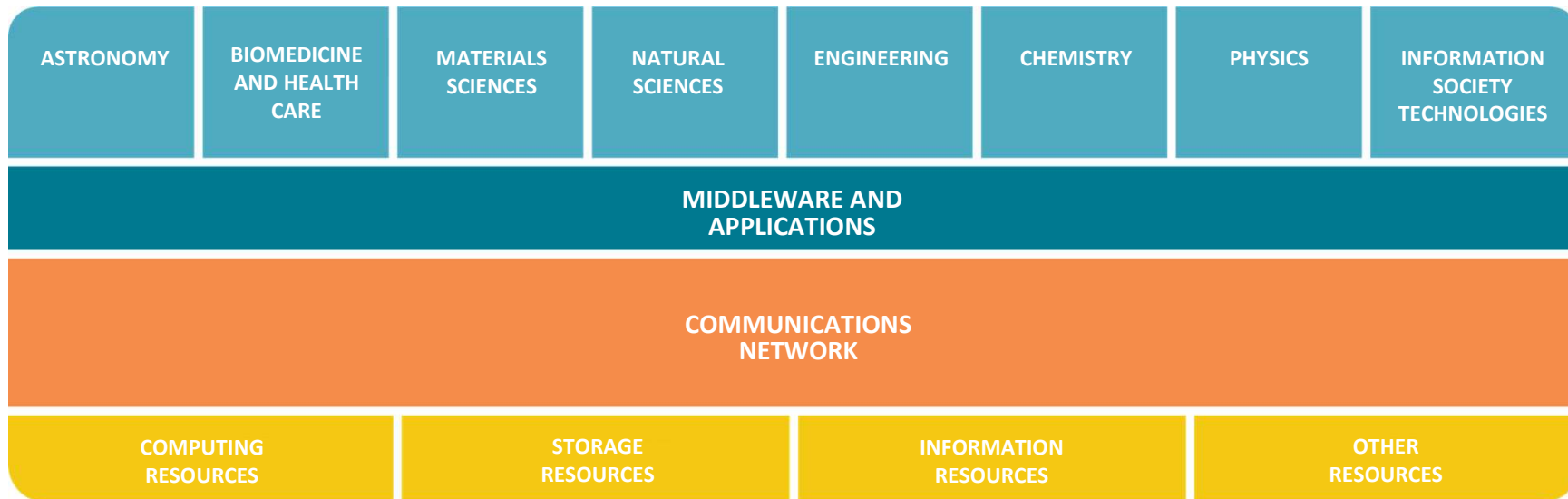
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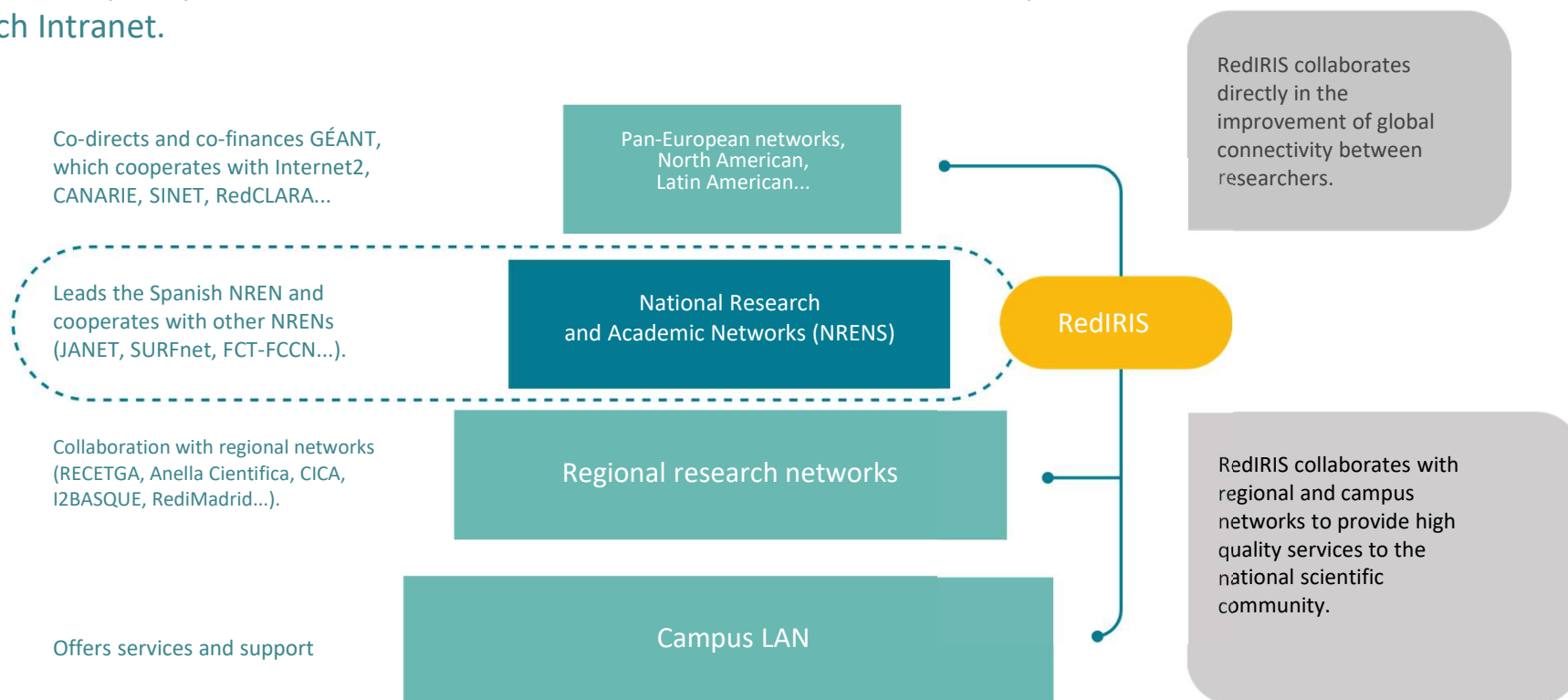
RedIRIS and e-Science

E-science is the scientific activity that makes widespread use of new technologies. Common horizontal e-infrastructures, including advanced communication networks for universities and research centres, such as RedIRIS, play an important role in this environment.



RedIRIS and the Global Research Intranet

RedIRIS cooperates in a multi-domain, multi-network environment, which requires high levels of quality and coordination between all the networks that make up the Research Intranet.



Evolution of RedIRIS

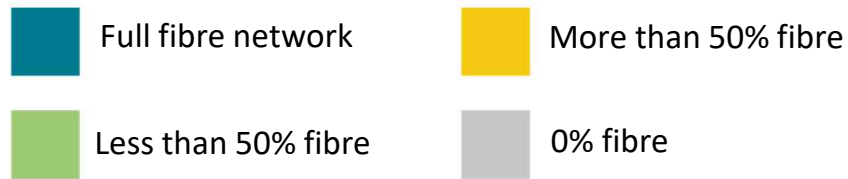
We manage a **high-capacity backbone network** that has been evolving since its creation in 1988, and which currently offers **communications services of the highest capacity**, with very high levels of security and quality, **at a lower cost.**

Evolution of RedIRIS

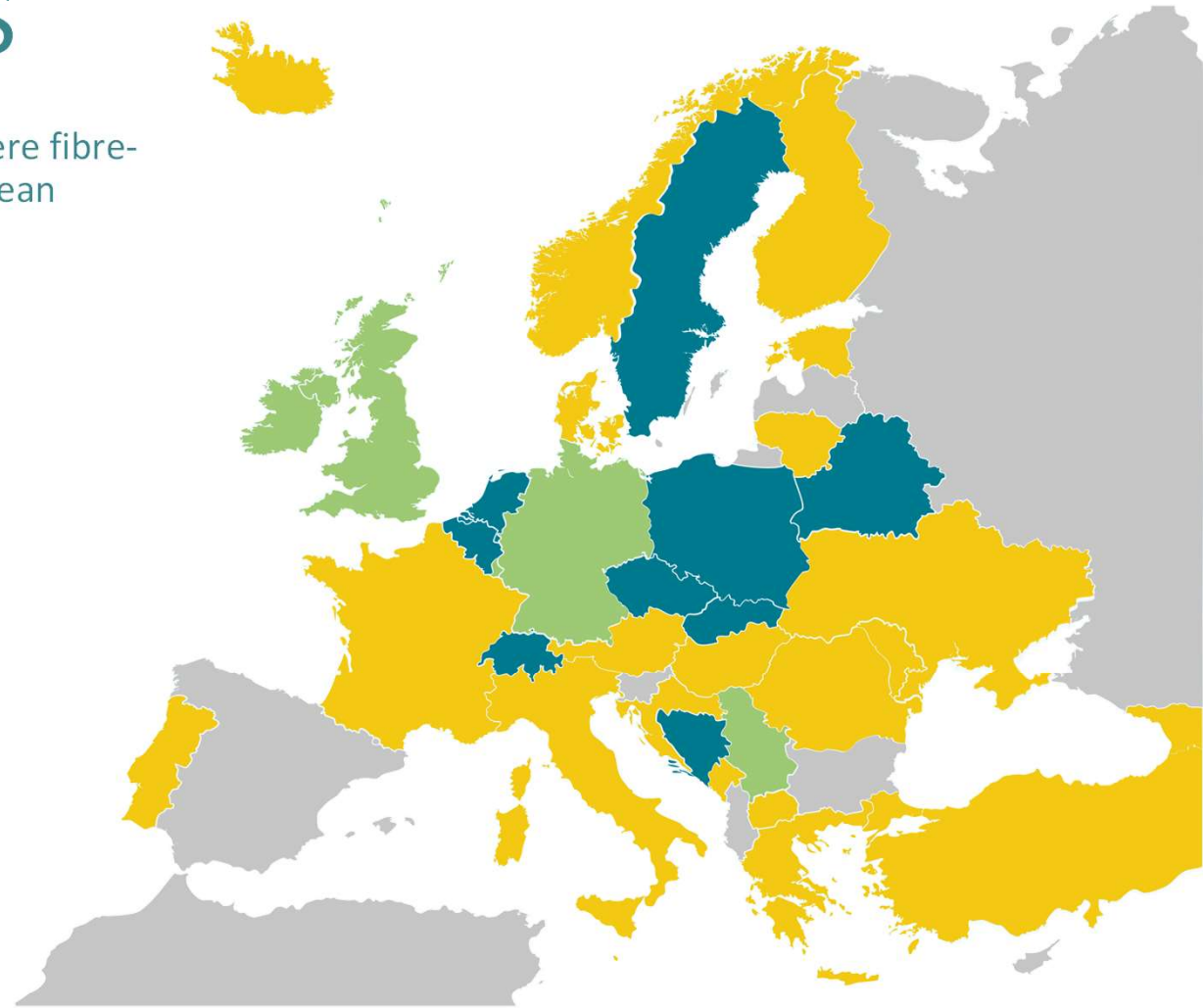
Before 2006, most European research networks were fibre-based. Spain was at the bottom of the list of European countries.

The solution to this situation:

The RedIRIS-NOVA Project



* Data on TERENA 2006



GOBIERNO DE ESPAÑA

MINISTERIO DE CIENCIA E INNOVACIÓN

MINISTERIO DE ASUNTOS ECONÓMICOS Y TRANSFORMACIÓN DIGITAL

SECRETARÍA DE ESTADO DE DIGITALIZACIÓN E INTELIGENCIA ARTIFICIAL

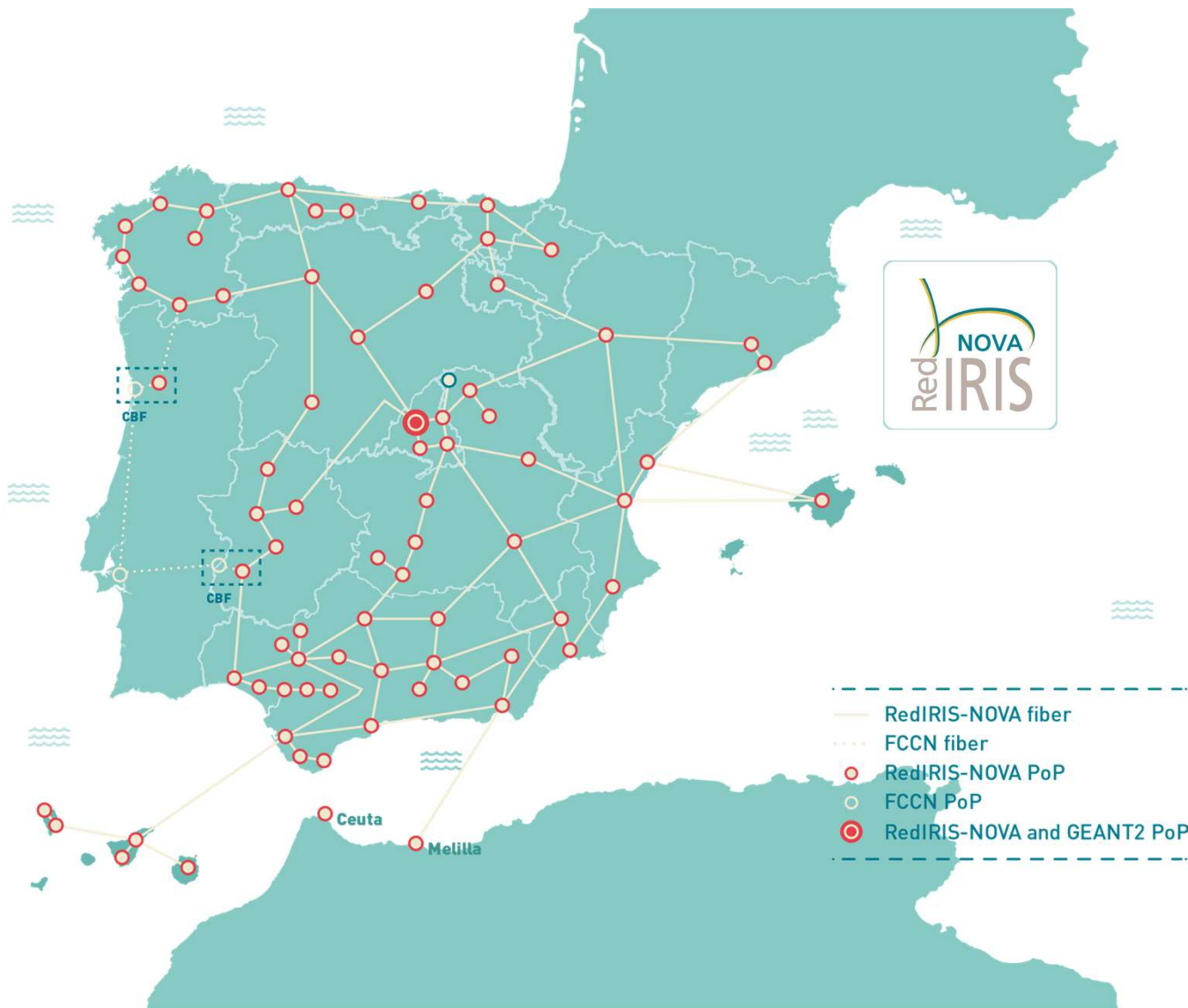


Infraestructuras Científicas y Técnicas Singulares

Our Network

We have a first-class optical backbone infrastructure that will enable us to meet the challenges of e-science connectivity in the long term.

It is a key tool to enable remote collaboration between researchers or teachers, regardless of their geographical location.



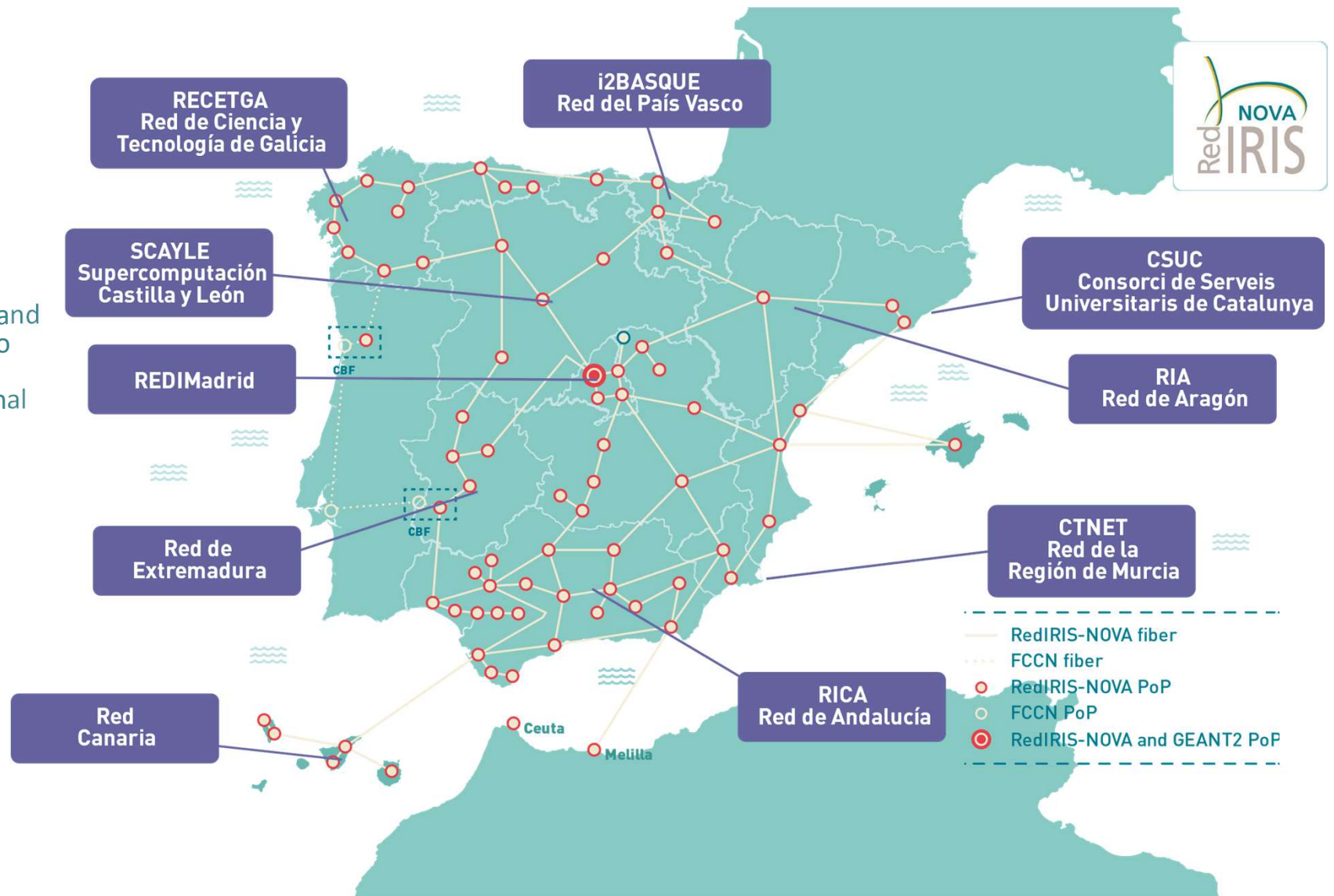
Our Network

- Very high capacity circuits (up to 100G)
- 15,000km of fibre optics, terrestrial and underwater
- More than 70 points of presence
- Connects ICTSs
- Much more powerful network than the previous one based on capacity rental, for a much lower cost (55 million euros for 20/30 years, plus 50 million euros FEDER)
- More efficient, flexible and robust (redundancy)
- Dedicated optical channels for research projects
- Supports the development of regional networks
- Subsequent additional fibre optic deployments for some Autonomous Communities and member institutions.



Our Network

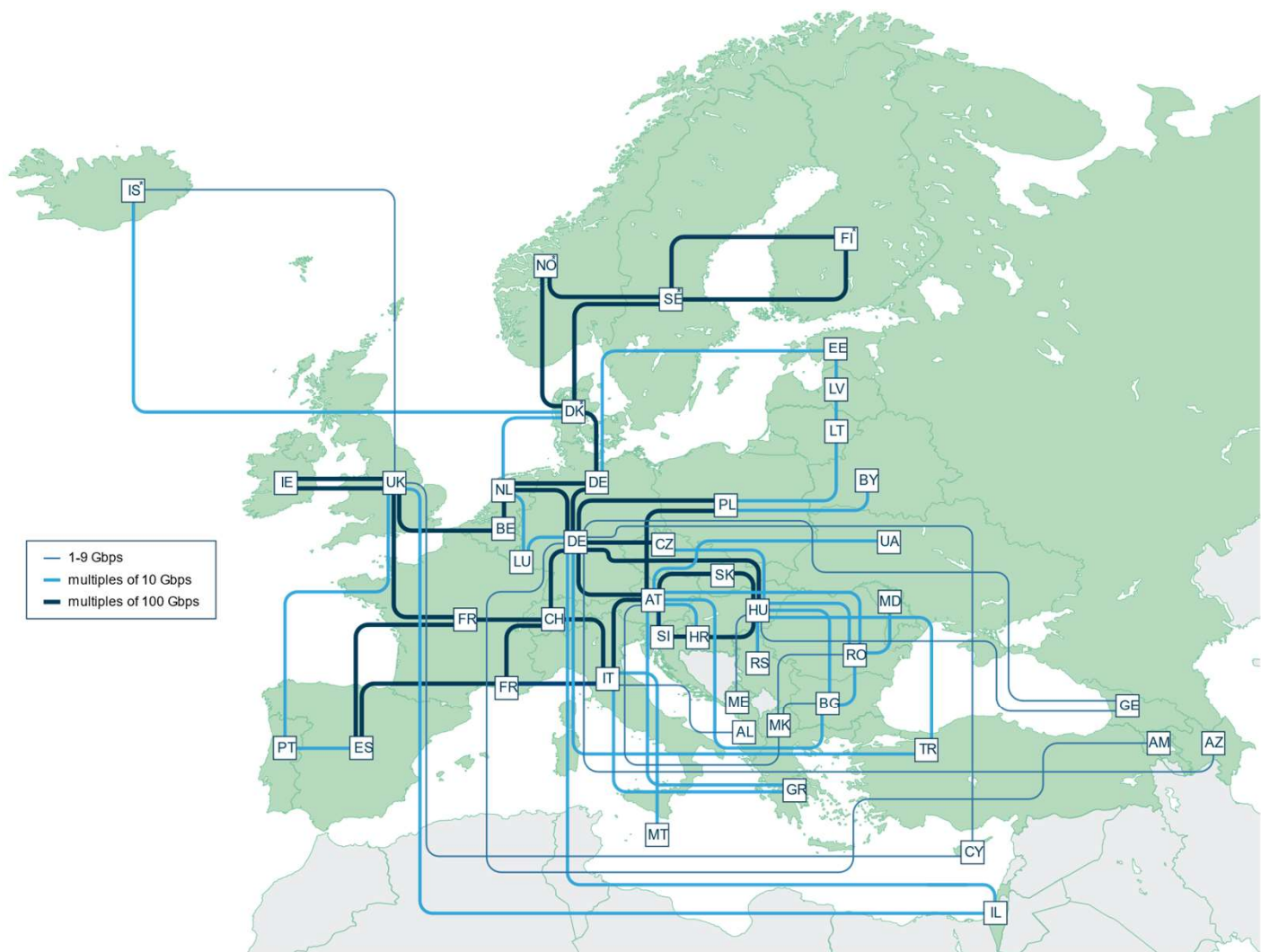
It connects university and research institutions to each other, with the collaboration of regional networks.



Our network

Global research intranet:

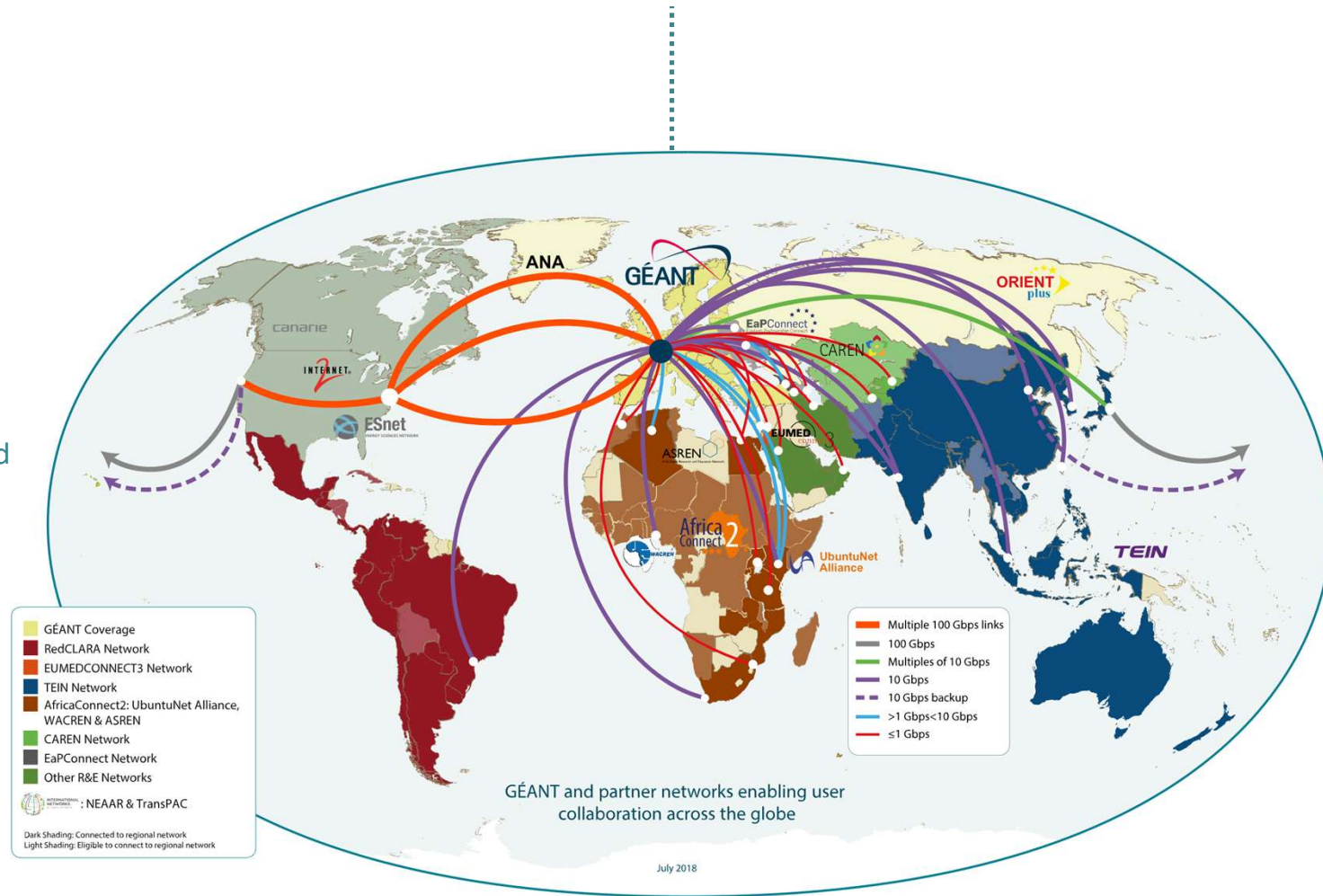
RedIRIS collaborates with other European national academic networks (NRENs) to jointly deploy and manage a pan-European academic and research network, GÉANT, which connects European national academic networks to each other and to other parts of the world.



Our network

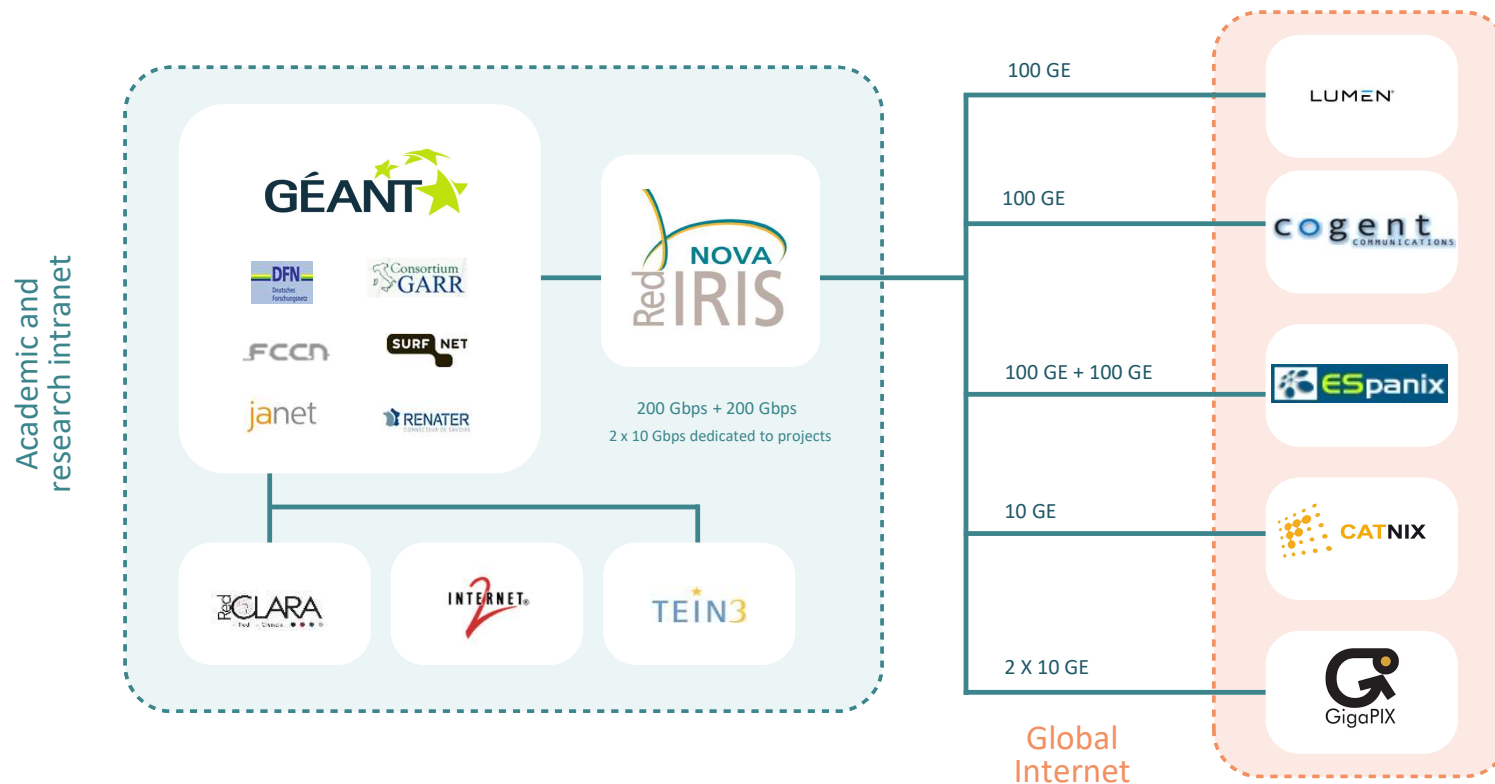
Global research intranet:

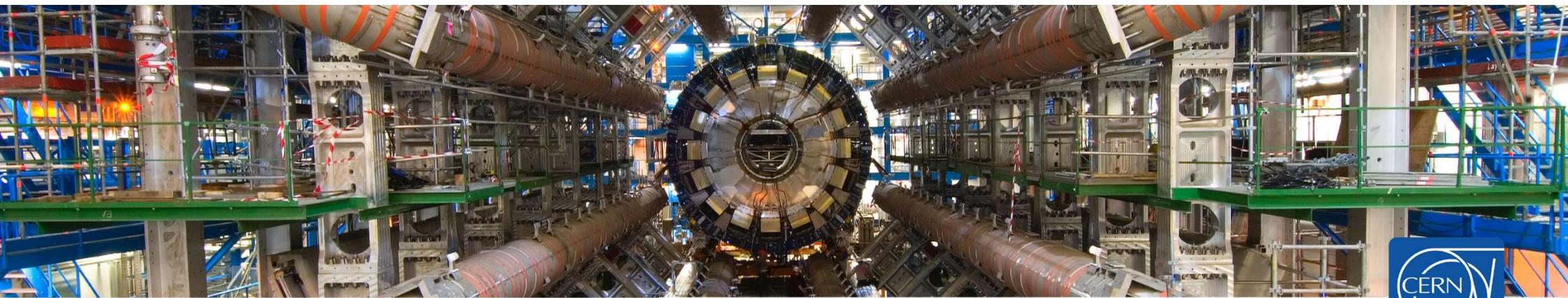
RedIRIS AND GÉANT enable Spanish researchers to access academic networks in other geographical areas, such as Internet2 (USA), Canarie (Canada), RedCLARA (Latin America) and TEIN (Asia Pacific), among others.



Our network

Provides access to both the academic and research Intranet and the Global Internet. It uses connections with global commercial operators, and is present in neutral Internet traffic exchange points in Spain (ESPANIX and CATNIX) and Portugal (GigaPIX).





Use case LHC

RedIRIS transports massive amounts of data from the LHC (Large Hadron Collider, CERN's particle accelerator).

RedIRIS uses a 10 Gbps circuit to connect the Spanish TIER1 centre ("Port d'Informació Científica", "PIC") to the LHCOPN (LHC Optical Private Network), and provides advanced connectivity between the 7 Spanish TIER2 centres and the PIC. In addition, it connects 2 Portuguese Tier2 centres to the PIC.





EUROPEAN
SUPERCOMPUTING
INFRASTRUCTURE



Use cases

Supercomputing

Spain has a network of supercomputers linked together (the RES), which in turn are linked to the European supercomputing infrastructure through the PRACE/EuroHPC project. Thanks to RedIRIS, which establishes the connections, huge amounts of data are transmitted.



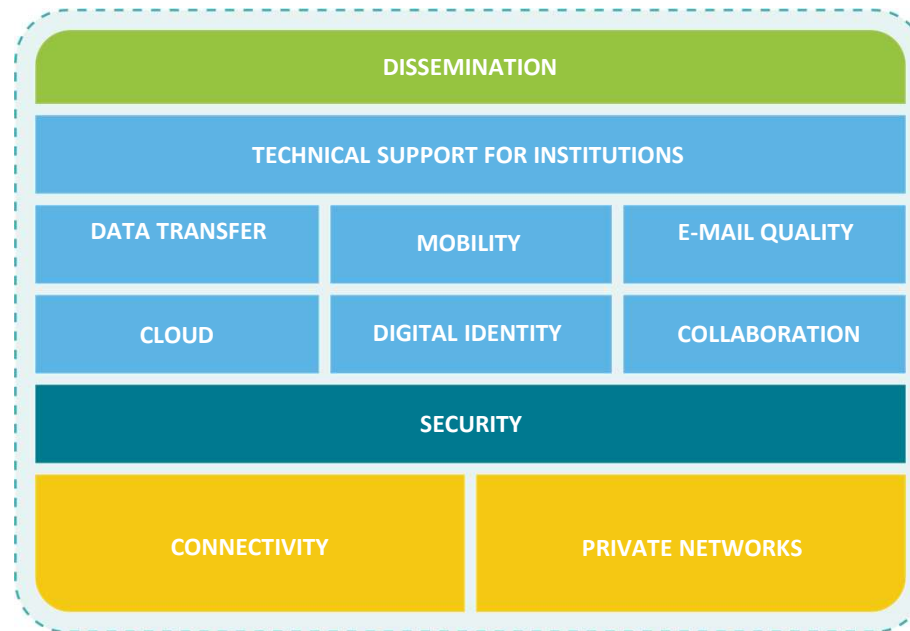
RedIRIS services

Quality and adaptation to demand

Past

- Domains
- WEB pages
- Webmail
- News
- SingleSignOn (PAPI)

Present



Future

- Support the Open Science Cloud
- Possible cloud services on a pay-as-you-go basis (e.g., IRIS-Mail, webconference...)
- New security services
- Virtual networks programmable by users
- See impact of new technologies (blockchain, 5G, big data, AI, IoT & smart campus) in RedIRIS

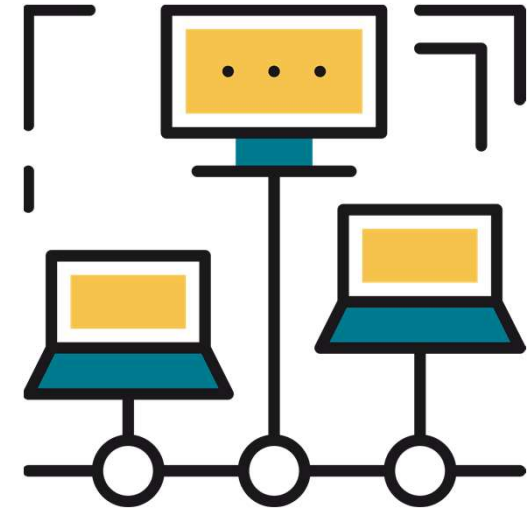
RedIRIS services

Connectivity

RedIRIS provides its member institutions with a very high-capacity communications backbone (multiple 10,000 Mbps links, soon 100,000 Mbps), which gives them access to both the worldwide research Intranet and the Global Internet.

RedIRIS also offers other connectivity-related services, such as IPv4 and IPv6 addressing and time synchronisation, among others.

www.rediris.es/servicios/conectividad/

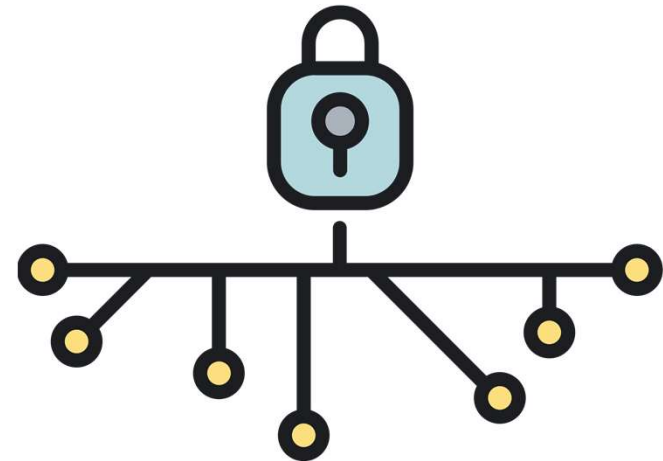


RedIRIS services

Private networks

RedIRIS provides member institutions with high-capacity end-to-end optical circuits (10Gbps lightpaths), as well as virtual private circuits (VPNs), which enables groups located in different geographical locations to interconnect as if they were on the same network.

www.rediris.es/servicios/conectividad/



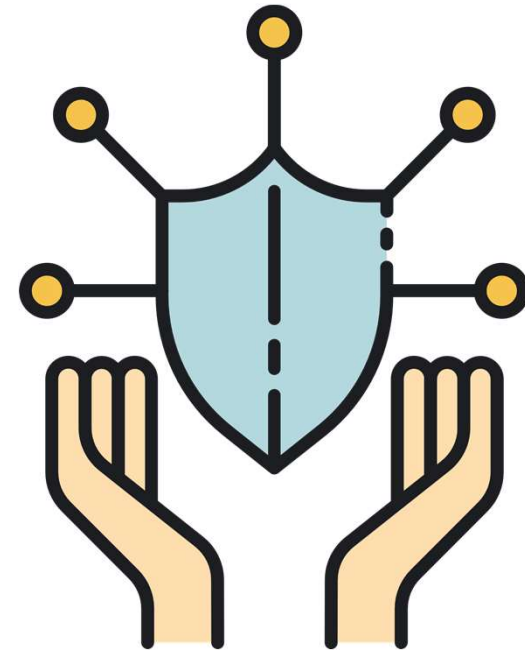
RedIRIS services

Security

RedIRIS has a team of experts that ensures the security of its network and the communications that take place on it.

It provides support for security incident management, in collaboration with INCIBE, and offers a DDoS mitigation service, which is currently being expanded.

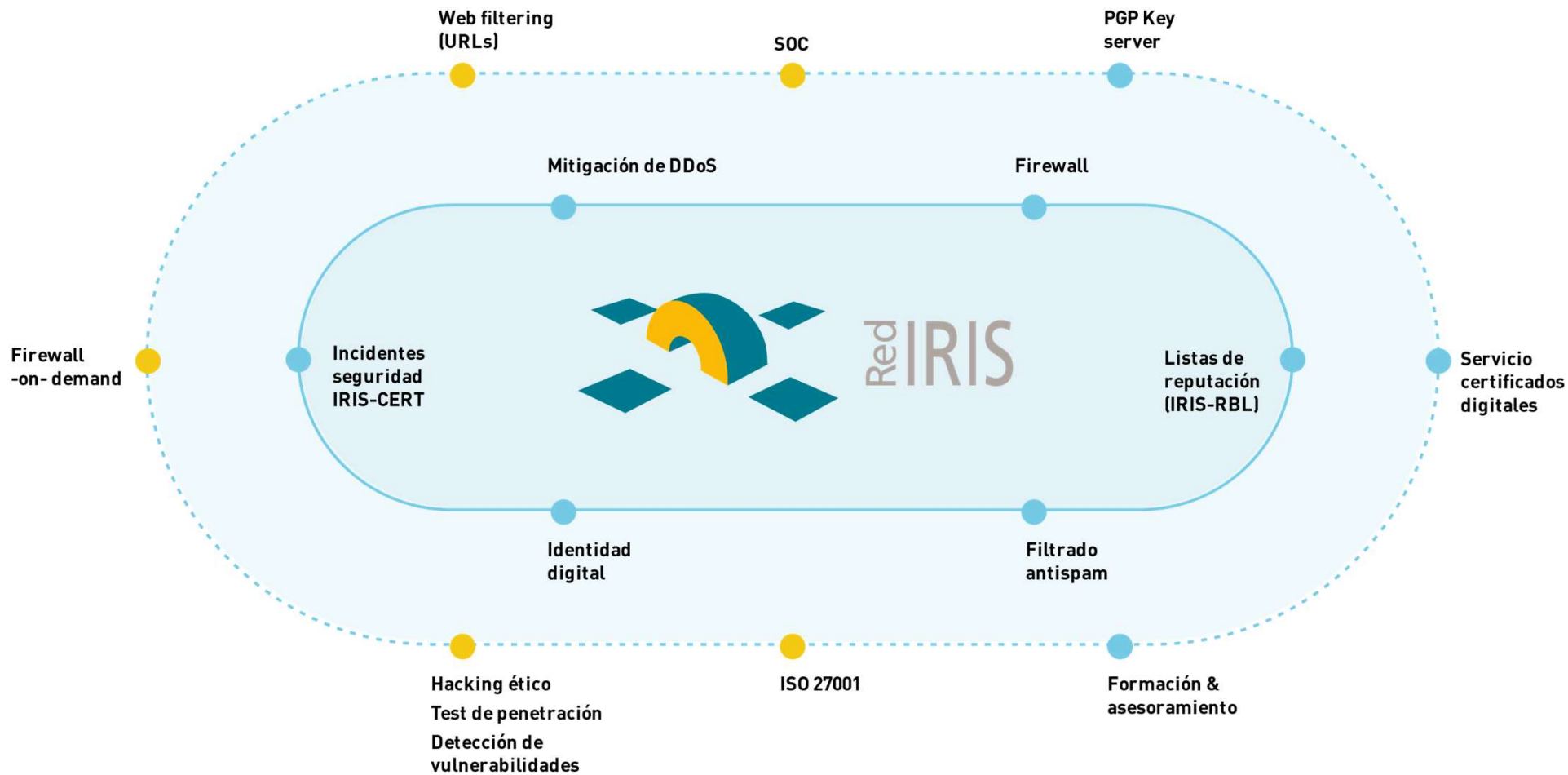
www.rediris.es/servicios/seguridad/

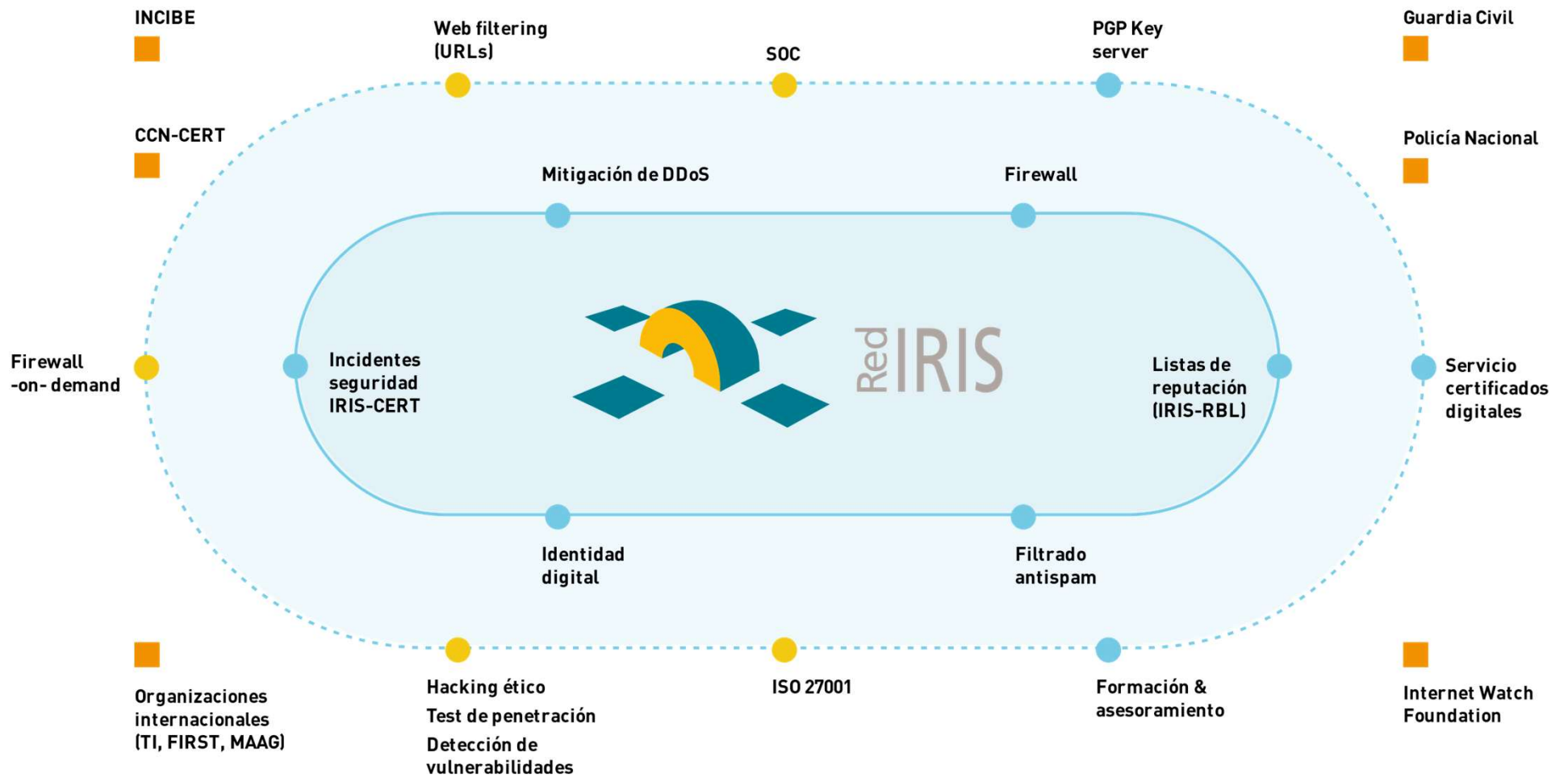


RedIRIS is not only a network but also a secure one

Security measures for RedIRIS and its member institutions







RedIRIS services

Digital identity

RedIRIS Digital Identity services simplify access by users of member institutions to different online services, by means of mechanisms that allow flexible data exchange, in accordance with the highest privacy and security standards.

The SIR (RedIRIS Identity Service) and TCS (Trusted Certificate Service) services are the most relevant.

www.rediris.es/servicios/identidad/



RedIRIS services

SIR service Identity Federation

Users



Universidad
Rey Juan Carlos



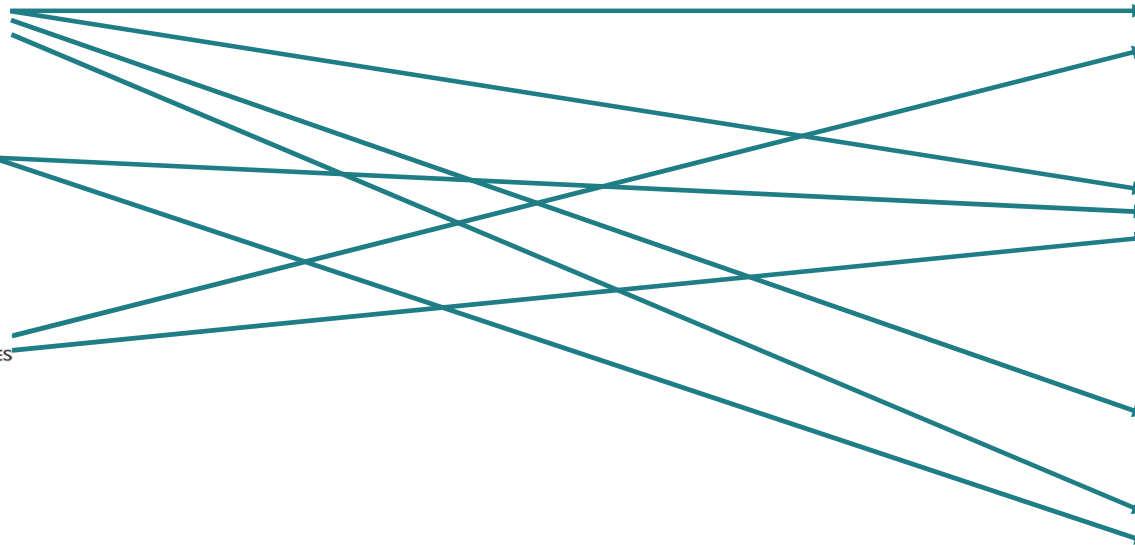
CONSEJO SUPERIOR
DE INVESTIGACIONES
CIENTÍFICAS

Services



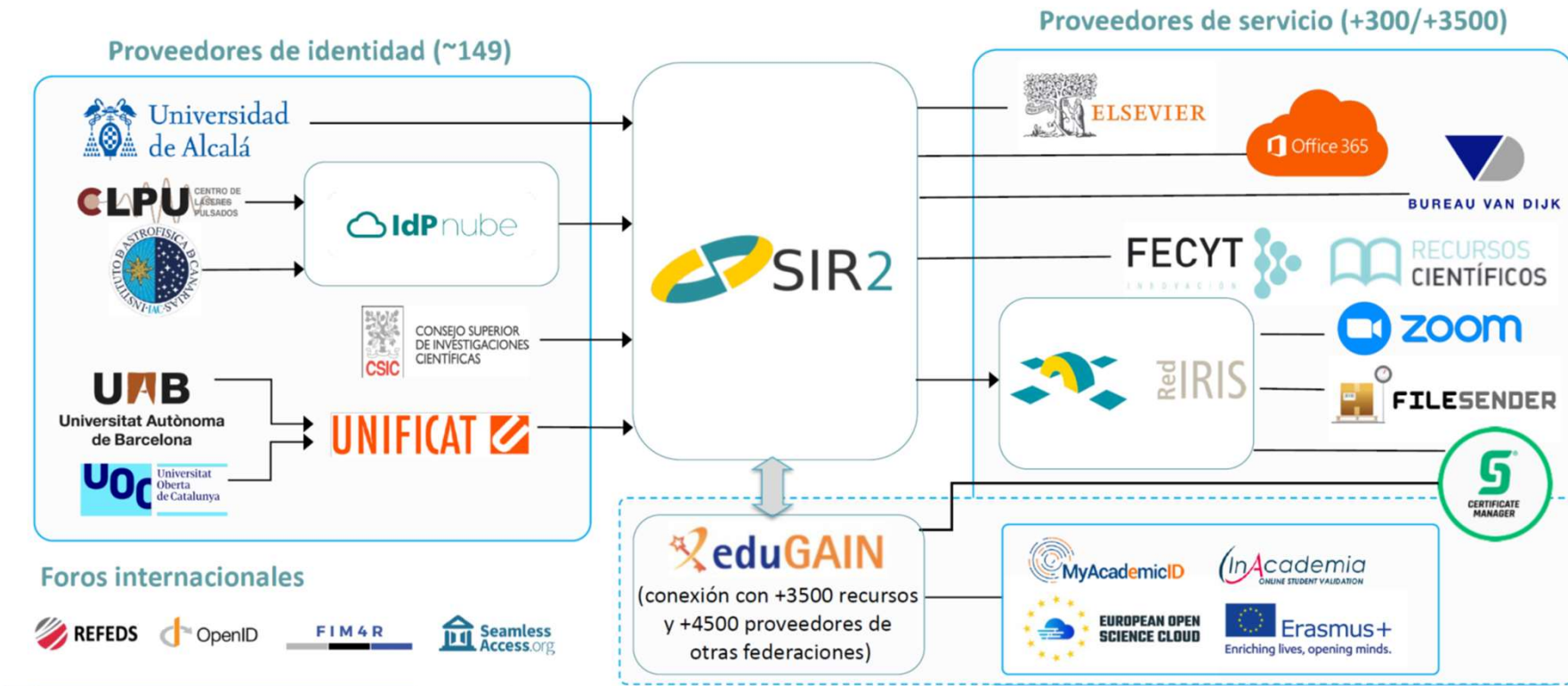
Microsoft

Google



RedIRIS services

Digital identity Federation



RedIRIS services

TCS service Digital security certificates

- Tender for the purchase of certificates in the European academic and scientific environment
 - Each academic network pays a flat rate
 - Each member institution applies for as many certificates as it needs
- Indicators
 - Average cost per certificate: ≈14 euros ¹
 - Unit cost on the market: 145 euros (²)
 - Certificates issued in 2019: 5123
 - More secure communications & taxpayer savings of more than 600 thousand euros.

¹ Average cost for a server certificate, multi-domain via TCS

² Unit cost of a server certificate, for one domain, with Digicert

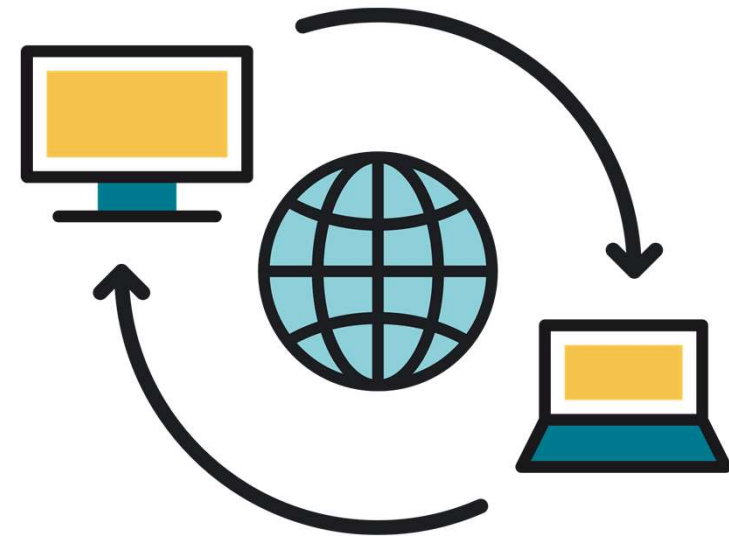


RedIRIS services

Mobility

RedIRIS uses its eduroam.es service to allow members of scientific and academic centres to directly access the WiFi networks of other similar centres in Spain and in many other countries, using the credentials of their centre of origin.

www.rediris.es/servicios/movilidad/



“Open your laptop, and you’re connected”



About eduroam

Global WiFi roaming service for academic and scientific institutions in more than 100 countries.

In Spain, widely deployed thanks to the red.es Campus en Red (online campus) programme.

Statistics (2019):

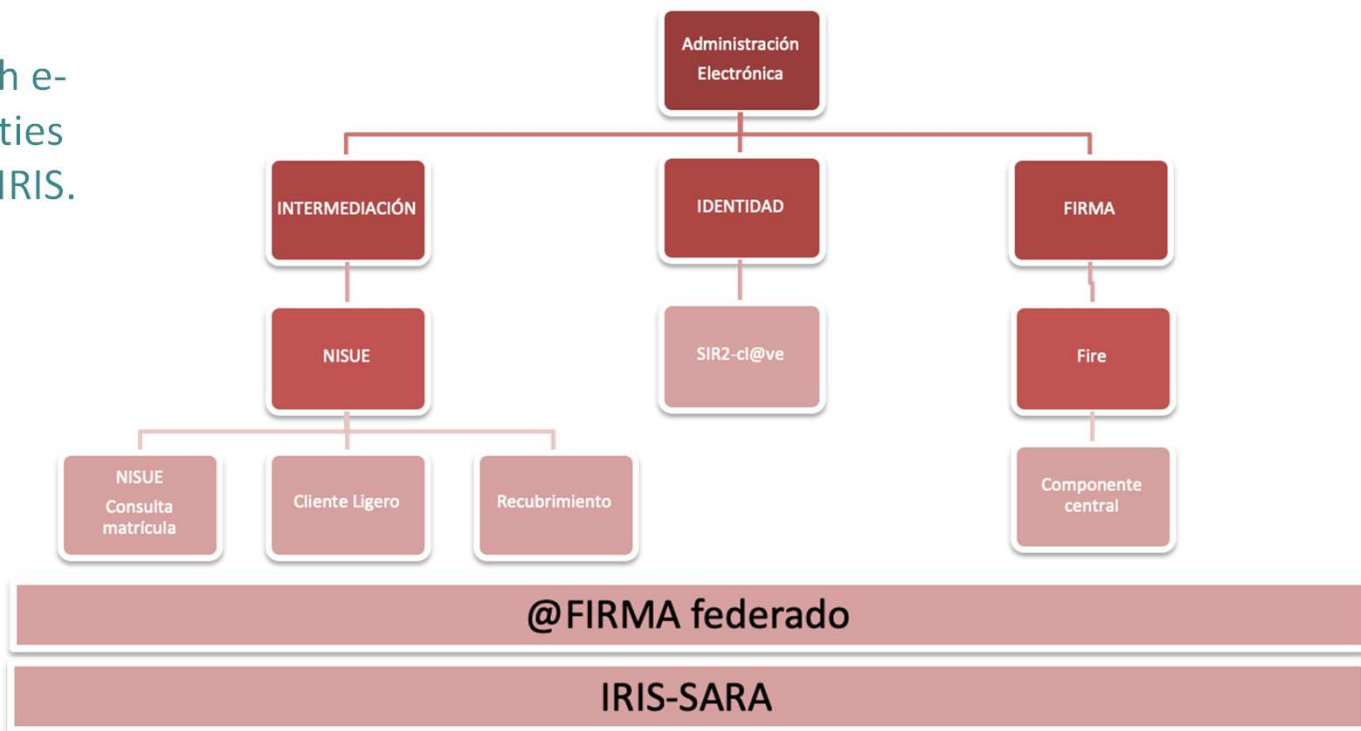
- 140 institutions connected in Spain
- > 10 million international mobility authentications on RedIRIS per month



RedIRIS services E-administration

Services that facilitate compliance with e-administration regulations by universities and other member institutions of RedIRIS.

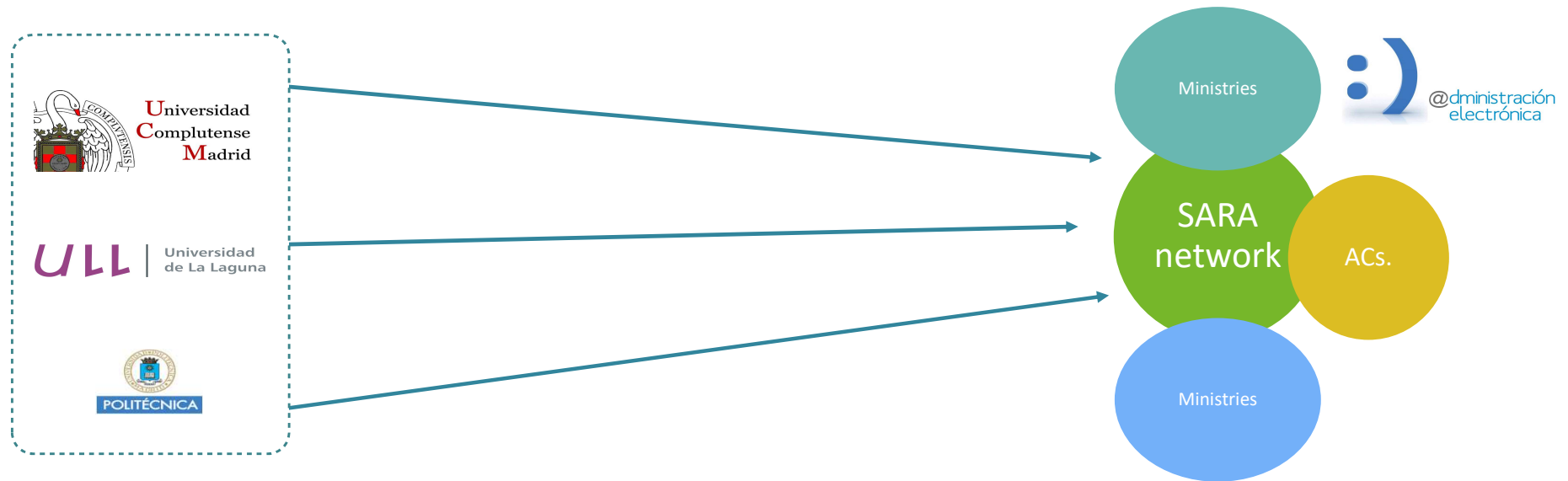
<https://www.rediris.es/ae/>



RedIRIS services

IRIS SARA service

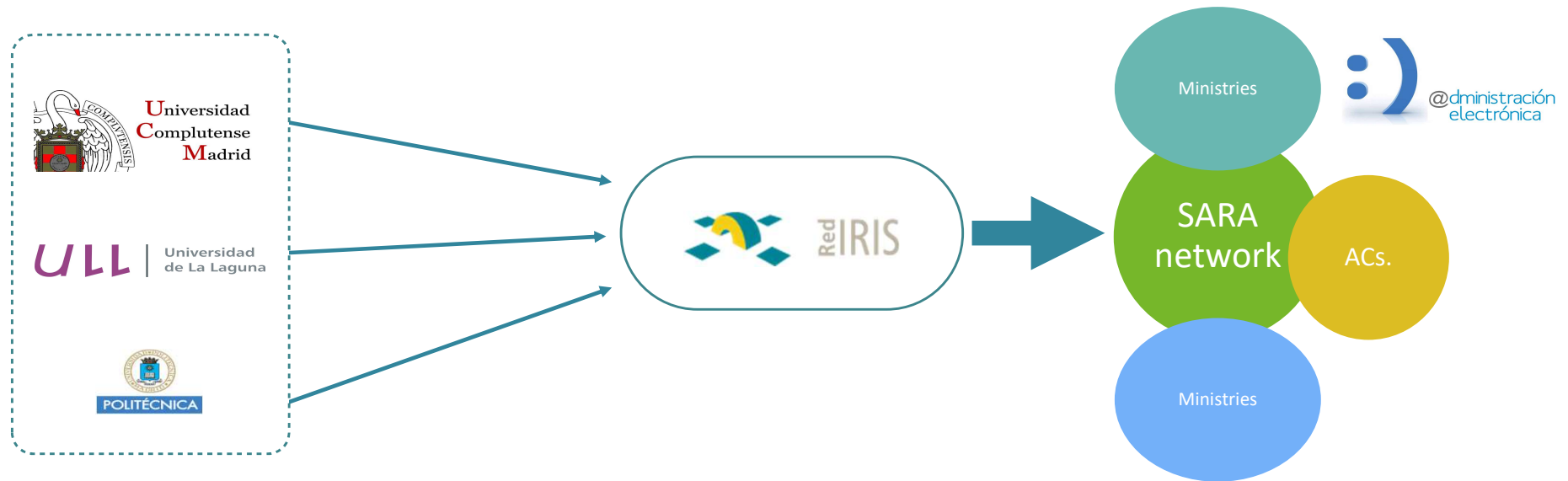
- RedIRIS as a SARA Access Provider for universities, PRIs and ICTSs
 - Rationalisation of infrastructures and management of accesses
 - Possibility of extension to other member institutions of RedIRIS



RedIRIS services

IRIS SARA service

- RedIRIS as a SARA network Access Provider for universities, PRIs and ICTSs
 - Rationalisation of infrastructures and management of accesses
 - Possibility of extension to other member institutions of RedIRIS



RedIRIS services

NISUE (Interoperability Node of the Spanish University System)

It facilitates the transfer of academic data from the universities to the rest of the Public Authorities, through the intermediation service of the Ministry responsible for those authorities.



<https://www.rediris.es/nisue>

RedIRIS services Cloud

RedIRIS works in coordination with GÉANT, the European association of academic and research networks, to provide our Community with agreements with commercial Cloud solution providers on particularly advantageous terms and conditions.

This is not only about better prices, but also about addressing the requirements of trust, security, privacy, legislation, contracting, interconnection and interoperability required by the institutions.

www.rediris.es/servicios/cloud/



RedIRIS services Cloud. Use Case

GÉANT has negotiated a European **framework contract** for the provision of IaaS (Infrastructure as a Service) Cloud services.

This agreement has generated a great deal of interest due to its **multiple benefits**:

- Cost savings (discounts and significant reduction of traffic costs)
- Agility (joint tendering already carried out by GÉANT)
- Multi-supplier and no minimum consumption values
- Compliance with European regulations on security and GDPR
- Single Sign-On (SSO), with each institution's own credentials, through the RedIRIS Identity Federation Service (SIR - eduGAIN)
- Optimised connections with cloud providers



26 Spanish institutions are already benefiting from this agreement (most of them are Universities).



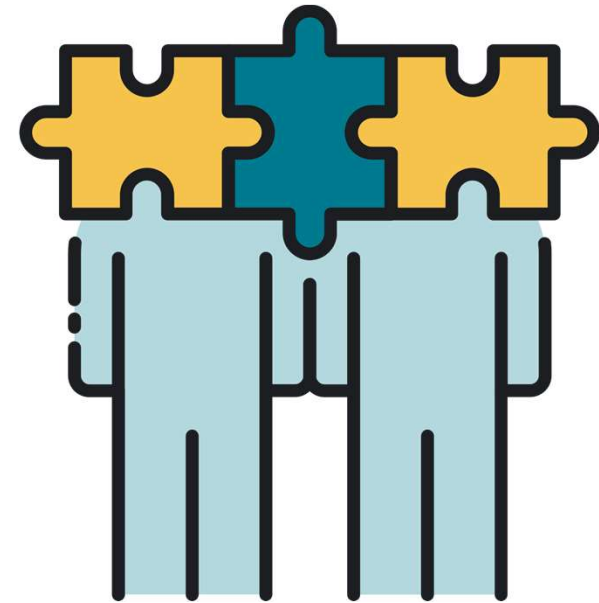
GÉANT has also established agreements with providers such as Box, Nextcloud, Owncloud, Dropbox and Google

RedIRIS services

Collaboration

Mailing lists, so that users with common interests can exchange information quickly (150,000 subscribers, 5 M messages/month).

www.rediris.es/servicios/colaboracion/



RedIRIS services

E-Mail Quality

Anti-spam filtering system in the cloud ("washing machine") so that institutions have this important service covered by RedIRIS (more than 80% of messages are spam) at no cost to them (80 institutions, 900,000 mailboxes, more than 200 million SMTP connections per month).

http://www.rediris.es/servicios/calidad_correo/lavadora/



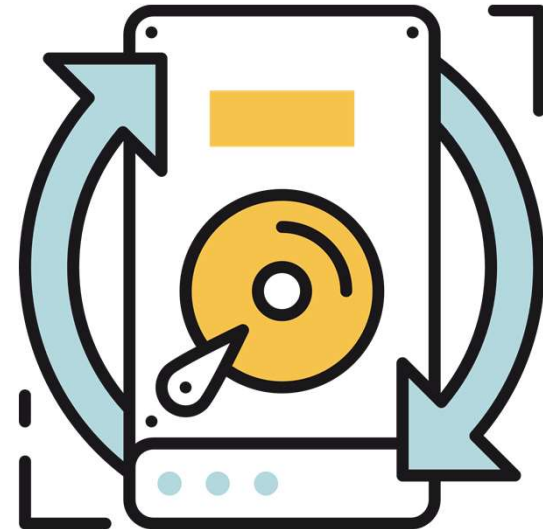
RedIRIS services

Data transfer

FileSender for sending files too large to be attached to e-mails (up to 100GB).

<https://filesender.rediris.es/>

There is also a pilot project for the high-speed transfer of large files, in which genomics, astrophysics and supercomputing centres are successfully taking part...

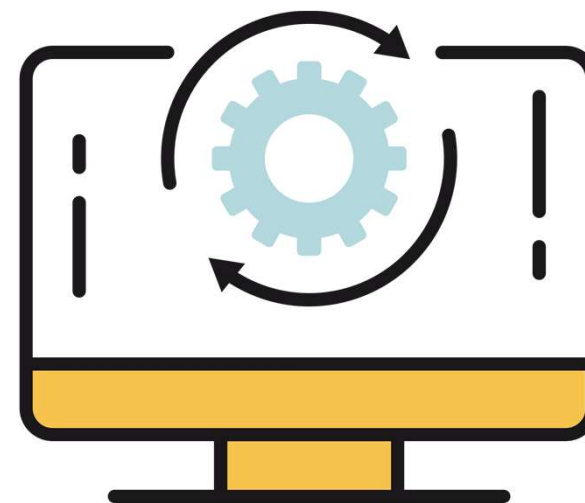


RedIRIS services

Technical support for institutions

RedIRIS offers technical support to its member institutions for issues related to the management of communications networks, service monitoring, equipment and network security, installation and use of systems, or any other issue related to RedIRIS activity.

www.rediris.es/servicios/soporte_instituciones/



RedIRIS services

Communication (Publications, Events and Collaborations)

We publish informative announcements of interest to affiliated institutions, the media and the general public, disseminate an e-Newsletter with the latest developments, disseminate use cases and are present on the main social networks.



In recent years, RedIRIS has deployed a wide range of dynamic activity through the almost 200 events organised, which have been attended by representatives of its more than 500 affiliated institutions.



User satisfaction

Satisfaction survey 2019:

5.78/6

Average Level of Satisfaction - RedIRIS Services Survey	RedIRIS
1. Attention received from Red.es/RedIRIS during the provision of the service	5.86/6
2. Quickness in resolving incidents arising during the provision of the service.	5.72/6
3. Ease of contact with Red.es/RedIRIS during the provision of the service (Quality of communication channels: e-mail, other means, etc.)	5.74/6
4. Overall level of satisfaction with service provision	5.79/6
Overall average level of satisfaction	5.78/6



Strategy Plan 2021-2024

RedIRIS as an ICTS

Mission:

«To deliver excellent connectivity and related ICT services to Spanish research and educational institutions, in close cooperation with those institutions and with regional and international Research and Education Networks, in order to facilitate access to e-infrastructures and remote collaboration at national and international level»

Vision:

«To be recognized as the trusted partner of reference for IT-related issues by the Spanish research and educational institutions, promoting cooperation among these institutions and providing them with a catalogue of world class connectivity and related ICT services, centrally managed or procured, which will boost e-Science and advanced learning»

Strategy Plan 2021-2022 RedIRIS as an ICTS

Goal 1:	Progress towards consolidation of the infrastructure
Goal 2:	Excellence in the delivery of secure, reliable services which provide significant added value
Goal 3:	Embrace a user-centric approach in the management of the services lifecycle, in order to increase service usage and user satisfaction
Goal 4:	Actively collaborate in the development of an integrated e-science environment at the European and national level, in which the RedIRIS contribution will be focused on the fields of data transfers, security, trust & identity, collaborative tools and shared cloud services

Strategy Plan 2021-2024 RedIRIS as an ICTS

Objective	Strategy	Description
O1. Progress towards consolidation of the infrastructure	S1.1. Improve RedIRIS infrastructure	Part of the equipment needs to be replaced (firewalls, load balancers, servers, etc.) and then it will be necessary to deploy additional equipment for high-availability and improvement of some services
	S1.2. Extend the RedIRIS-NOVA fibre footprint	In order to bring the full benefits of the RedIRIS model to additional relevant research and education centres.
	S2.1. Reinforce the IT security of RedIRIS and its users	Deployment of new security equipment and services and implementation of security procedures and standards.
	S2.2. Increase the reliability of the services	Audit of possible points of failure, increased redundancy, strengthened service support.
O2. Excellence in the delivery of secure, reliable services which provide significant added value	S2.3. Ensure the operational sustainability of RedIRIS	Stable budget; appropriate administrative arrangements; improved knowledge management; staff policy that tackles the current severe shortage and keeps staff motivated and up to date.
	S2.4. Constant improvement of the value proposition of RedIRIS services	Implementation of a roadmap of upgrades of the existing services; keeping track of new trends (big data, AI, quantum computing and networking, Blockchain, etc) through cooperation with relevant stakeholders (research networks, advanced users, providers).
	S2.5. Aggregation of user demand and centralised procurement	Provide added value to the members of RedIRIS by offering them a meeting point which allows them to act together in their relations with the ICT market.

Strategy Plan 2017-2020 RedIRIS as an ICTS

<p>03. Embrace a user-centric approach in the management of the services lifecycle, in order to increase service usage and user satisfaction</p>	<p>S3.1. Enhanced collaboration with key stakeholders to improve user outreach</p>	<p>Collaboration with regional research networks, and other organisations (CRUE-TIC, RES, CCN-CERT, ICTSs consortiums) that can help RedIRIS to reach its users. This might include the development of new tools; joint surveys to improve knowledge about users' needs; and joint dissemination campaigns and events.</p>
	<p>S3.2. Improvement of RedIRIS business intelligence</p>	<p>Updated information about users' data and views; new internal tools; review of KPIs; RedIRIS and user dashboard; BI reports.</p>
	<p>S4.1. Contribute, together with GÉANT, to the development of EU E-Science policies</p>	<p>Contribution to EU policies (EOSC, EDI) through GÉANT, the GNx project, and direct participation in EOSC Association, taking into account implications of these activities at a national level.</p>
<p>04. Actively collaborate in the development of an integrated e-science environment at the European and national level</p>	<p>S4.2. Network of ICTS on E-Science</p>	<p>Develop new ideas and projects for the development of e-science through direct participation in the Network of ICTS on E-Science created by the Ministry in mid 2020, with a special focus on coordination of all major Spanish stakeholders.</p>
	<p>S4.3. Enhance RedIRIS service portfolio in key areas for e-science</p>	<p>Focus on the services that have been identified, at an EU and national level, as most important for E-Science: data transfers; security; trust & identity; collaborative tools and shared cloud services. Possibility of providing some EOSC services for Spanish research centres and education institutions.</p>

Connecting the Spanish R&D&I since 1988

RedIRIS

Thank you very much!

www.rediris.es