

EUROPEAN INTERNET EXCHANGE
ASSOCIATION

euro-IX

30th Forum Guide



HOST WELCOME CATNIX

The Catalonia Neutral Internet Exchange Point (CATNIX) was created in 1999 by the Catalan Government under the objective of setting the bases and defining the actions to turn Catalonia into a leading actor within the Information Society. CATNIX is located in Barcelona, a well-connected Mediterranean city with a long tradition for trading and exchanging. It is managed by the Consorci de Serveis Universitaris de Catalunya (CSUC), a public Consortium that provides services to universities and research institutions, and where neutrality, collaboration and sharing are the main goals.

Besides its own datacentre at Campus Nord, CATNIX has two additional sites (PoPs) at Itconic and bitNAP. To date, CATNIX has 32 members connected between 1 Gbps and 10 Gbps. The balance between local and international members makes CATNIX a good meeting point for peering.

As the manager of the Research and Education Network in Catalonia, Anella Científica, and the Internet exchange, CATNIX, CSUC has traditionally promoted the development of services that improve internet monitoring, security and resilience, like DNS servers or local and international monitoring projects.

Regarding DNS, CATNIX hosts several root servers: F from ISC, J from VeriSign, K from RIPE and L from ICANN, as well as the .com, .net, .es and .cat replicas.

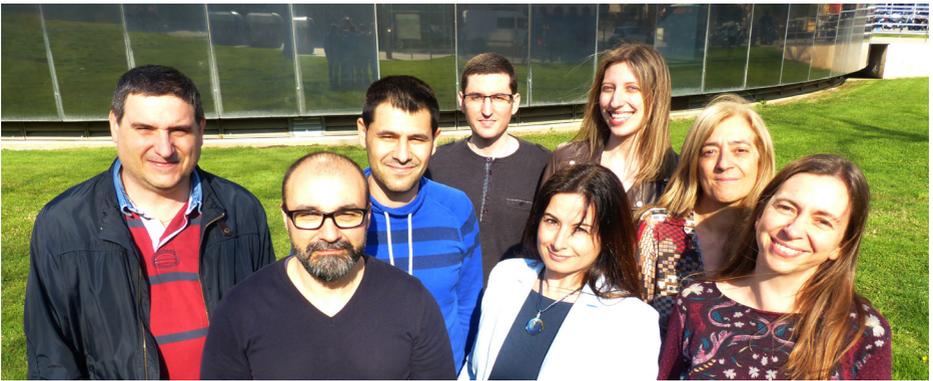
CSUC hosts a RIPE Atlas anchor and two probes, one of them at CATNIX, and it feeds data into RIPE stats through the Routing Information Service (RIS), helping users to see and download historical data for routing changes and incidents. The data, opened to the community, is also useful for academic research.

CATNIX also hosts a LISP DDT root (Locator/ID Separation Protocol Delegated Database Tree) whose aim is experimenting with a network architecture and set of protocols that implements a new semantic for IP addressing.

Regarding monitoring, CATNIX offers its members information about the

operating status of the connections and the capacity of the links. A congestion detection process avoids that an undersized line, from any member, may deteriorate the service for the rest of the members. Finally, with a speed test instance, CATNIX members can check their connection bandwidth in a neutral server outside their network.

Fifteen years after the first forum edition took place in Barcelona, we welcome you here again to celebrate the 30th Euro-IX Forum!



(From left to right) Ramon Viñolas, Fran Banderas, Manel Pérez, Eduardo Juárez, Teresa Via, Anna Mirats, Caterina Parals, Maria Isabel Gandia



Sunday evening social and coffee breaks sponsored by:



Connectivity provided by:



Secretariat



Bijal Sanghani
SECRETARY GENERAL



Richard Yule
PROJECT MANAGER



Rebecca Class-Peter
EVENTS COORDINATOR

Euro-IX provides a unique platform for IXPs to share information and discuss current topics and issues of interest. Euro-IX provides its members with a web portal to help attract further customers, several databases of information that are relevant to IXPs, mailing lists for current discussions, regulatory reports, IXP reports, and the opportunity for all member IXPs to come together twice a year for face to face discussions at Euro-IX Forums. Euro-IX is the ideal place to allow inter-IXP relationships to flourish.

PO BOX 73533 , LONDON, UK [_email info@euro-ix.net](mailto:info@euro-ix.net) www.euro-ix.net

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The Euro-IX Board is ultimately responsible for the organization and administration of the Association, ensuring that the organization reliably and satisfactorily performs accounting, auditing and other financial functions. The Board shall regularly control the Associations finances. The Euro-IX board is responsible for the approval of the Euro-IX annual budgets and to provide the strategic direction of the Association. The Board functions with an appointed chairman (Kurtis Lindqvist), a secretary (Harald Michl) and a treasurer (Kjetil Otter Olsen). The Euro-IX board is led by its chairman, who leads the work of the Board and ensures that the board fulfils its responsibilities. The chairman is also responsible for ensuring that board meetings are called according to the Governance model calendar and that extra meetings are called if so required. The chairman is also responsible to ensure that the board material is supplied to all board members in a timely manner.

Read all the Board biographies here: <https://euro-ix.net/about-euro-ix/euro-ix-board/>

EURO-IX PATRONS



ARISTA

Arista Networks was founded to pioneer and deliver software-driven cloud networking solutions for large data centre and high performance computing environments. Arista's switching platforms, ranging in Ethernet speeds from 10 to 100 gigabits per second, redefine scalability, agility and resilience. At the core of Arista's platform is the Extensible Operating

System (EOS™), a ground-breaking network operating system with single-image consistency across hardware platforms, and modern core architecture enabling in-service upgrades and application extensibility.

Arista solutions bring cloud scale and programmability to the Internet Exchanges with the evolution of merchant silicon to achieve internet routing scale. Arista has also been recognized by Gartner as a 'leader' in its '2016 Magic Quadrant for Data Center Networking' based on a number of factors, including high growth, technology solutions and flexible software.



BROCADE

Highly scalable infrastructure, standards-based interoperable protocols and programmable automation are just a number of topics that are on top of every networking CIO's and architect's mind as a basis of the Digital Transformation driving Modern Infrastructure.

However, IT infrastructure is only as agile as its least agile component. In order to help operators to build a network, Brocade has released the future ready SLX family of products, supporting embedded network visibility and integrated analytics capabilities. In addition, the Brocade Workflow Composer is a network automation platform that automates the entire network life cycle and integrates with cross-domain workflows to improve business agility.

Come and see us during the Euro-IX forum in Barcelona.

EURO-IX PATRONS



Ciena is a network strategy and technology company. We leverage our deep expertise in packet and optical networking and distributed software automation to deliver solutions for next-generation networks.

We enable high-scale, programmable networks that can be controlled and adapted by network-level applications, and provide open interfaces to coordinate computing, storage, and network resources in a unified, virtualized environment. Our technology is complimented with a high-touch consultative business model. We're committed to developing and applying technologies that facilitate openness, virtualization, automation, collaboration, and offer the greatest degree of choice to deliver the most rewarding customer experiences and business outcomes.



Coriant is excited to be a patron of Euro-IX and help support its objectives of an open interchange of Internet Exchange Point (IXP) ideas and experiences. We bring our extensive experience and expertise in Data Center Interconnect (DCI) and packet optical transport

networking to this important industry association, while benefiting from the shared knowledge of others in the community. Founded on a distinguished heritage of technology innovation from Siemens Optical Networking and Tellabs, Coriant delivers high-performance networking solutions for a fast-changing and cloud-centric business world.

Coriant DCI solutions provide the programmable, high speed (400G and beyond), secure bandwidth that cloud applications require, with industry-leading low power consumption, high density, and flexibility for data center connectivity at the lowest total cost. From the best-in-class, purpose-built Coriant Groove™ G30 Muxponder and Open Line System, to the industry's most comprehensive portfolio of SDN-enabled packet optical transport systems, Coriant offers network operators right-sized DCI WAN and transport solutions to power tomorrow's cloud experience.

EURO-IX PATRONS



THE ELASTIC NETWORK

ECI is a global provider of ELASTIC network solutions to communications service providers, IXPs, data center operators, and utilities. Along with our long-standing, industry-proven packet-optical transport, we offer a variety of SDN/NFV applications, end-to-end NMS, a comprehensive cyber security solution, and a range of professional services. ECI's ElastiCLOUD data center solution encompasses high speed DCI connectivity, enterprise connectivity to data centers, and SAN connectivity for business continuity. Noteworthy features include high density 400G connectivity, class leading encryption, very low power consumption, small form factor solutions, SDN applications like bandwidth-on-demand and bandwidth scheduling, and an NFV-based L1-L7 cyber security suite.



EQUINIX

Equinix is proud to support Euro-IX as a Patron.

With 8,000+ customers, 145+ Data centers and a global footprint covering 14 million square feet of data center space on five continents, Equinix colocation services offer the highest levels of security and operational reliability. Inter-connection within and between industries fueling the digital economy is critical to business growth and opportunity:

- 1,400+ Networks
- 2,500+ Cloud and 600+ IT service providers
- 475+ financial buy-side and sell-side firms
- 40 top markets in 21 countries

Equinix is also a proud Euro-IX member, operating 23 Internet Exchanges worldwide and with 5 located in Europe.

EURO-IX PATRONS



Extreme Networks, Inc. ([EXTR](#)) delivers software-driven networking solutions that help IT departments everywhere deliver the ultimate business outcome: stronger connections with customers, partners and employees. Wired to wireless, desktop to datacenter, on premise or through the cloud, we go to extreme measures for our 20,000-plus customers in more than 80 countries, delivering 100% insourced call-in technical support to organizations large and small, including some of the world's leading names in business, education, government, healthcare, manufacturing, retail, transportation, logistics and hospitality. Founded in 1996, Extreme is headquartered in San Jose, California. For more information, visit Extreme Networks' [website](#)



Huawei is a leading global information and communications technology (ICT) solutions provider. Driven by responsible operations, ongoing innovation, and open collaboration, we have established a competitive ICT portfolio of end-to-end solutions in telecom and enterprise networks, devices, and cloud computing. Huawei use SDN concepts to form open, simple, and secure networks that are faster and more flexible, helping enterprises stay ahead of the competition. Huawei offers the industry's most complete line of enterprise network and security products, including:

- Ethernet switches
- Enterprise routers
- WLAN products
- Security products
- Network management products

These products and technologies all work together to form integrated, basic network platforms for campuses, branches, WANs, and data centers.

EURO-IX PATRONS

The logo for interxion, featuring the word "interxion" in a bold, blue, sans-serif font with a trademark symbol.

Interxion is the interconnection hub for the world's digital businesses. For 20 years we've been helping our customers increase their market share, transform the quality of their services and extend their reach into new markets.

We house over 600 connectivity providers and over 20 Internet Exchanges this means we offer more choice and more value than ever before. Our network-neutral data centres are strategic assets for increasing revenue and reducing cost of delivery. Wherever customers invest with Interxion, they'll have the right connectivity for their business.

The logo for Juniper Networks, with "JUNIPER" in a large, blue, sans-serif font and "NETWORKS" in a smaller, blue, sans-serif font below it.

Juniper Networks enable Cloud providers and Internet exchanges to expand and grow their networks to accommodate the constant traffic increase.

Open, interoperable, secure data center interconnects use coherent WDM integrated into MX Series Routers or QFX10000 Switches, or deployed on BT17800 Packet Optical Transport Platforms. The optical ProNX Service Manager controls the optical layer end-to-end and simplifies network operations on all Juniper's product lines.

The logo for MRV, featuring a stylized purple and white graphic to the left of the word "MRV" in a bold, black, sans-serif font.

MRV Communications is a global provider in converged packet and optical solutions that empower the optical edge. MRV's [optical transport solutions](#) are engineered to support the growing demand for [data center connectivity](#). These solutions are the optical transport

foundation for some of the largest carrier neutral providers and data centers in the world. Offering ultra-low latency, lowest power consumption and compact footprint, these flexible optical platforms meet the needs of diverse applications and scale to support Terabit transmissions over fiber and offer the highest performance and most cost-effective approach to data center interconnect. For more information please visit www.mrv.com

EURO-IX PATRONS

The Nokia logo is displayed in a bold, blue, sans-serif font.

Nokia is a global leader innovating the technologies at the heart of our connected world. Powered by the research and innovation of Nokia Bell Labs, we serve communications service providers, governments, large enterprises and consumers, with the industry's most complete, end-to-end portfolio of products, and services. From the enabling infrastructure for 5G and the Internet of Things, to emerging applications in virtual reality and digital health, we are shaping the future of technology to transform the human experience. www.nokia.com

The Telehouse logo features a stylized blue icon of three curved lines to the left of the word "TELEHOUSE" in a bold, blue, sans-serif font.

TELEHOUSE

[Telehouse](#) is the pioneering data centre colocation provider established in 1989. It is an owner operator of global data centres, connectivity and managed ICT solutions to over 3000 corporations around the world. Telehouse is the data centre subsidiary of Japanese corporation KDDI, a leading Japanese mobile and fixed-line telecommunications and ICT solution provider with 106 offices in 28 countries around the world and a Global Fortune company.

* If you are interested in becoming a Patron, please contact secretariat@euro-ix.net

30th Forum

Pre-Forum Workshop - JSON Schema

The JSON schema allows IXPs to export a structured member list and will soon be used by the Euro-IX website as an alternative to the current csv exports. The workshop will take place on Sunday 9th April, in room Plaza 1, on level -1, from 17:30 - 19:30.

For further information about the JSON Export Schema, including a list of IXP implementations please see:

<https://github.com/euro-ix/json-schemas> and the wiki for this project:

<https://github.com/euro-ix/json-schemas/wiki>

Registration

Registration is in the mornings from 8am in the foyer on level -1, with the conference starting promptly at 9am.

On first arrival, please give the name of your IXP or organisation, followed by your surname to speed up the process. You'll be given a delegates badge. Please wear your badge at all times to gain entrance to the conference facilities.

Schedule

For the up-to-date schedule including social information and attendee lists, please view our webpage [here](#) where you can start planning your own personal timetable.

- On Monday 10th April, the forum will begin at 09:00. The forum will close at 17:30
- On Tuesday 11h April, the forum will begin at 09:00. The forum will end at 16:30

Conference Rooms

We are using two conference rooms this year:

- JSON Schema Workshop: on level -1 of the hotel, room Plaza 1
- Main conference room: on level -1 of the hotel, room Barcelona A + B

WIFI info:

- * SSID: EUROIX
- * Password: welovepeering



Refreshments, Lunch and Breaks

There will be refreshments in the 30 minute morning and afternoon breaks in the foyer, adjacent to the main conference room.

There is also a lunch break of one hour each day. Lunch will be served in the hotel restaurant on the ground floor (same room where breakfast is served).

Socials & Tour

The tour bus will arrive at the hotel at 10:45, and the tour will start at 11:00. There will be a tour of Plaça Espanya - Gran Via - Passeig de Gràcia - Diagonal - Travessera - Camp Nou (FC Barcelona Stadium) - Avinguda Pedralbes - Torre Collserola (visit) - Port Olímpic (where lunch will be served). After having lunch, you will visit the Sagrada Família. The tour will end around 17:20.

The other socials at this forum will take place on Sunday and Monday evening.

- For the Sunday welcome social, guests will have cocktails on the roof terrace of the hotel from 19:30 - 20:15 (weather permitting), before having a buffet reception in the hotel foyer on level -1, from 20:15 - 22:30.
- The second social will take place on Monday at the [Miramar Restaurant](#), from 19:15 - 22:30. Buses arrive at the hotel at 18:00 and will depart from the hotel to San Sebastian Tower promptly at 18:20. From San Sebastian Tower, guests will use the port cable car to access the dinner venue (approximately 8 minutes at a time). We hope you enjoy the fantastic views of the Barcelona skyline and the shoreline at dusk.

Finally....

CATNIX, the Euro-IX Secretariat, the Euro-IX Board and the FPC hope you have a useful, interesting and dynamic forum. See you in Barcelona!

**In case of an emergency, contact
Rebecca on +44 757 268 7511**

itconic
CONNECTING THE FUTURE

FORUM PROGRAMME COMMITTEE (FPC)



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TREX



Marc Bruyere

TOUIX



Kay Rechthien

ECIX



Greg Hankins

NOKIA



Mikael Holmberg

EXTREME NETWORKS



Robert Lister

LINX

The role of the FPC is to develop the forum programmes. The Chair of the FPC is Greg Hankins and Vice-Chair is Kay Rechthien.

The FPC meet (online) approximately once a month and discuss ideas and future content for the coming forums. The FPC are looking for an additional member to join the team. They are looking for enthusiastic IXP or Patron representatives that are willing to bring along new ideas, concepts and remain committed to seeing the programme from draft through to fruition. The FPC members are expected to work actively to solicit content for Euro-IX Forums and review submissions.

If you are interested in nominating yourself or someone else, please send the FPC an email (fpc@lists.euro-ix.net) with a brief description of why the nominee would be a good addition to the FPC.



The FPC and Euro-IX Secretariat would like to thank outgoing members Colin Silcock and Thomas King for their valued contribution to the team and to the forums. We wish Colin and Thomas all the best in their future endeavours.

FELLOWSHIP PROGRAMME



Ahmed Bakhat Masood



Biography

Ahmed Masood is the Deputy Director (ICT/Network) in Pakistan Telecom Authority (PTA), previously worked in PTCL and Instaphone. Ahmed holds an MS Telecom & Networks from Iqra University Islamabad Pakistan, and a Master in Computer Science (MCS), Lead auditor ISO 27001, MCSE. Ahmed played a pivotal role in the establishment of Pakistan IXP, in making consensus amongst all stakeholders of IXP in Pakistan and currently working as secretary to IXP board. Ahmed coordinates with national and International organizations on Internet development, Internet Governance and capacity building Issues, and played a vital role in the success of South Asian Network Operators Group (SANOG) 29, at Islamabad Pakistan. He is a member of the Arabic and Latin Script Language communities of ICANN, for generation of domain names in local languages, a member of Program Committee of Middle East DNS Forum, ICANN and a member of steering committee of Pakistan School on Internet Governance (PKSIG).

About PTA/ PKIX

Pakistan Telecommunication Authority (PTA) was established under Telecom Reorganization Act 1996, to regulate the establishment, operation and maintenance of telecommunication systems, and the provision of telecom services, in Pakistan. Pakistan Internet Exchange Point PKIX was established, after deliberations amongst all stakeholders at neutral location of Pakistan Education and Research Network (PERN), with the consent of all stakeholders.

FELLOWSHIP PROGRAMME



Fabian Mejia



Biography

Fabián Mejia got a bachelor degree in Electronic and Telecommunications engineering at Escuela Politécnica Nacional from Quito, Ecuador. His main skills and professional experience are related to several scopes of telecommunications and the internet, such as wire & wireless access networks, networking (CCNA, CCNP), IPv6, Linux administration, cybersecurity, internet governance, and internet exchange points. He is a former participant of the Next Generation Leaders (NGL) program of Internet Society ISOC. He currently works for AEPROVI where is responsible for the management and operation of the Ecuadorian internet exchange point called NAP.EC. Also, he is chair of the Regional Interconnection Forum of LACNIC, and he is a board member of LAC-IX (the Latin American Internet Exchange Association).

About NAPE.C

NAP.EC was established in 2001 by AEPROVI, and today it has 2 colocation facilities: Quito and Guayaquil. AEPROVI is a non-profit organization that gathers Ecuadorian internet service providers and ICT-related companies. NAP.EC is considered a cornerstone in the local internet infrastructure because its operation has contributed to improve performance, stability and resilience of the Ecuadorian internet services, and it has allowed to decrease costs. Under Mr. Mejia's leadership, NAP.EC deployed IPv6 and connected the first CDN node in 2009, and it performs RPKI-based origin validation since 2014.

FELLOWSHIP PROGRAMME



Mauricio Oviedo



CRIX Update

Mauricio joins us for the second time after being able to take back so much from the first meeting, he's come for more...

Since the last Euro-IX meeting we were able to start the automation process within our IXP.

The first thing we did was to start testing IXP-Manager as an alternate platform for the one we have (public website + open source management/monitoring tools). We are in the configuration/deployment process and we expect for it to go live in May 2017. On the other hand, we also started working with Ansible as our automation tool.

We still need to learn much more on its operation but already automated a couple of processes. The goal is to integrate Ansible with IXP Manager in this first semester to have regular configuration tasks within the IXP automated. The purpose is to avoid human error as much as possible and to increase the efficiency and standardization of the processes. Lastly, we are on populating our IX statistics within Euro-IX database, and following previous recommendations with use the new JSON schema format.

Our main challenges now are to accomplish sustainability of the IXP and scale according to the natural growth of the IXP in a way that security and stability along with low costs can be maintain.

FELLOWSHIP PROGRAMME



Nico Tshintu Bakajika



KINIX Update

KINIX development, “Challenges and Advances”

KINIX is a non-profit IXP operating under an independent economic model. Launched in 2012 with a low traffic exchanged between connected operators, its economic model was unable to ensure its development. Its functioning was supported by ISPA-DRC (Guardianship Organization) and partner’s donations.

The effectiveness of its economic model depends on its ability to attract more operators. Thus its actions are focused on hosting added values services, and the upgrading of technical and technological knowledge and network equipment. Actually, a CDN (Google) is connected and two other (AKAMAI, PCH) will be connected within a short time, the IXP management network is functional.

A slow and gradual evolution has been observed: connected ISPs increased from 3 to 5 and 8 other ISPs announced their connection; the traffic increased from 0.80Mbps to 850Mbps. So gradually, KINIX begins to ensure its development and needs a nudge further.

FELLOWSHIP PROGRAMME



Leonard Obonyo



KIXP Update

KIXP is at a period of growth, we added 10 new members in the past one year. Some of the recent initiatives at KIXP is also embracing digital broadcasters, who were previously unable to distribute their content effectively, but now have an appropriate avenue to exchange and distribute content digitally via KIXP. We have begun the digital broadcasting project of one peer at the moment and we intend on signing up over 40 digital broadcasters in Kenya. The GRX project is also on course and it has begun with the Kenyan Telcos before proceeding to the rest of Africa Telcos. In addition to our projects, we are undertaking a massive hardware upgrade exercise, which will see KIXP incorporate the latest routing and switching technology to ensure KIXP can cope with the increasing demand for its services. One of the challenges we had was purchasing of new equipment but through our partners KIXP has been able to acquire modern switches to enhance peering at the exchange. TESPOK together with the Kenyan ICT Ministry will be hosting the 2017 Africa Internet Summit (AIS) from 21st May to 02nd June 2017, in Nairobi. The AIS is the pinnacle multi-stakeholder event combining, workshops, conferences and networking for the internet industry. The annual summit attracts internationally renowned Instructors, Experts and Speakers to share the latest innovations and Best practices in the Internet industry. This is the place where the African Technical Institutions and Af* such as AfNOG, AFRINIC, AfREN, AfricaCERT, AfTLD - AROC, ISOC Africa, AfrICANN, AfGWG etc. meet.

I really appreciate this opportunity to attend the 30th Euro-IX forum, as I will be able to network with other industry players. This will help me to get in touch with what is happening in the industry, new developments and gain new concepts with regards to IXP technology, networks, processes and tools. This is a good arena of really knowing my potential clients or possible joint venture associates. Bringing in more international peers will really help in growing KIXP.

DONORS



IXPDB UPDATE & FUNDING

The Internet Exchange Point Database (IXPDB) is an Internet Exchange Federation (IX-F) initiative to bring an accurate view of the IXPs around the world.

The project covers:

- a database schema for all IXPs to record information about their relationships with the network operators that they serve.
- a database and associated tools and APIs so the network operator community, researchers and related stakeholders can benefit from centrally collected data.
- Community outreach to ensure that all IXPs have the practical support they need to implement the necessary export schemas.

What is still needed

Whilst the core database is now available there is still work to be completed to achieve the project goals. These include:

- The automation of data import to the database
- Extend and internationalise the administration interface for all IXPAs
- Practical outreach to the global IXP community, helping their implementation
- Completing data exchange projects with other databases such as PeeringDB
- Creating bespoke, maintained, API instances for specific NGOs and Researchers
- Revising the database schema to capture more data.

How you can help

The initial stages of the project have been funded through the resources of the IXPAs.

Completing the project will require additional funding for development, support, administration and management. We are therefore seeking sponsors from the Internet industry and community to help complete this important work.

Please contact secretariat@euro-ix.net for more information.

GET INVOLVED

Support Programs

Mentor-IX Program: this program is for IXPs looking for one-on-one commercial or technical support and training from other IXPs.

If you are looking for support or would like to make a donation, get in touch!
secretariat@euro-ix.net

Mentor-IX Partners:



Fellowship Program: this program funds IXP participation at Euro-IX fora and one years Remote Membership. All Euro-IX forums will run a Fellowship Program, as long as there is sufficient funds. Previous participants of the Fellowship Program include KINIX (Kinshasa), GIXA (Ghana), UIXP (Uganda), ARMIX (Armenia), BeirutIX (Beirut), CRIX (Costa Rica) and KIXP (Kenya).

If you are interested in getting involved or have an idea of where we could help, talk to us! secretariat@euro-ix.net

We request all forms to be submitted at least four weeks in advance of the forum to secretariat@euro-ix.net

Thank you to our donors:



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