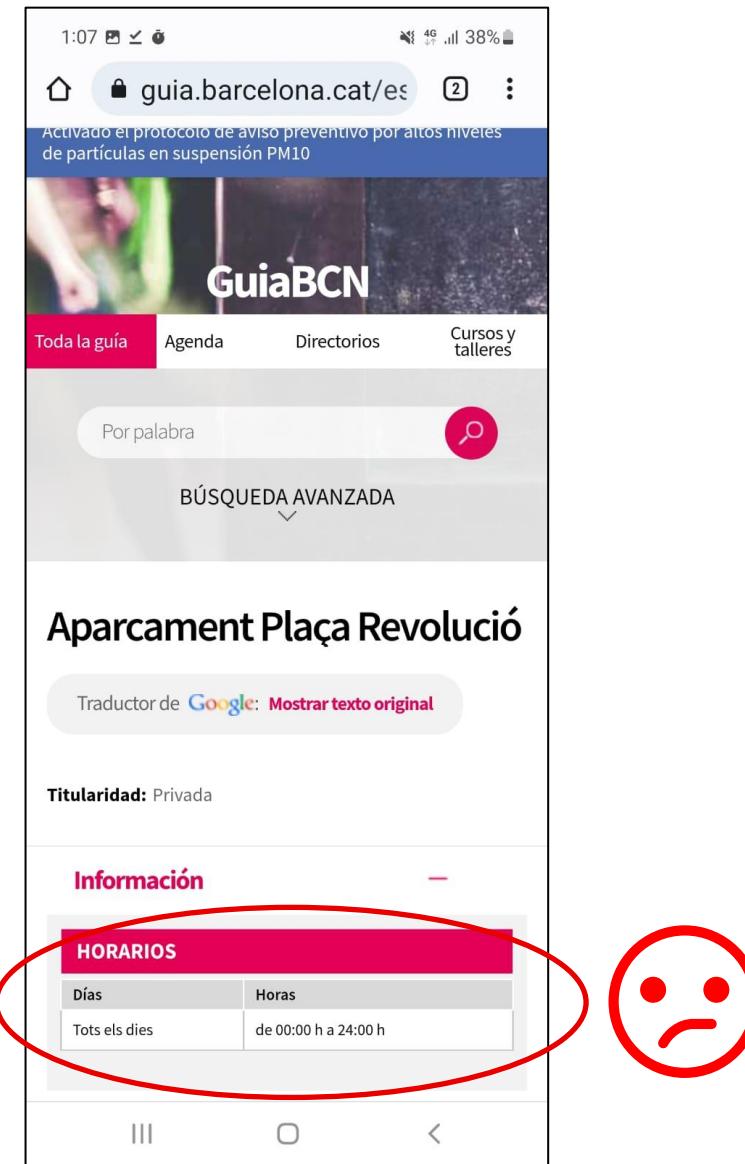


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de Catalunya



**El Punto Neutro de
Internet en Cataluña**

Maria Isabel Gandía Carriedo
ESNOG28, Barcelona
13-05-2022

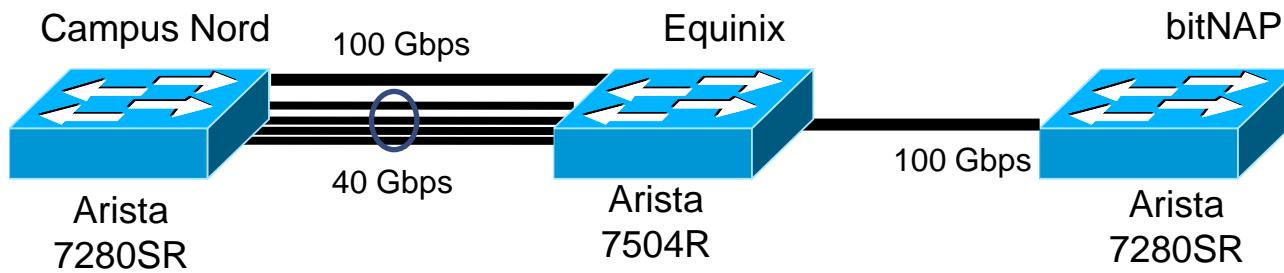


Agenda

- ✓ Actualización CATNIX
- ✓ Herramientas Euro-IX

Ampliación de la conexión entre Campus Nord y Equinix

- ✓ Enlace principal a 100 Gbps + Backup 40 Gbps with ECMP.
- ✓ Backup a 40 Gbps (4x10 Gbps con ECMP).
 - Menor prioridad para los 40 Gbps usando MED en BGP.
 - ECMP en el enlace de 40 Gbps para balancear el tráfico.
 - BFD para detectar caídas en el enlace.
- ✓ Migrado sin corte de servicio gracias a los mecanismos de backup configurados. Se probaron ambos en ventana programada.

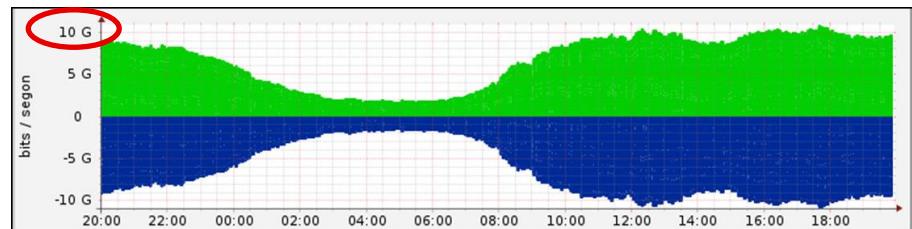


Renovación cableado en Campus Nord (y en Equinix)

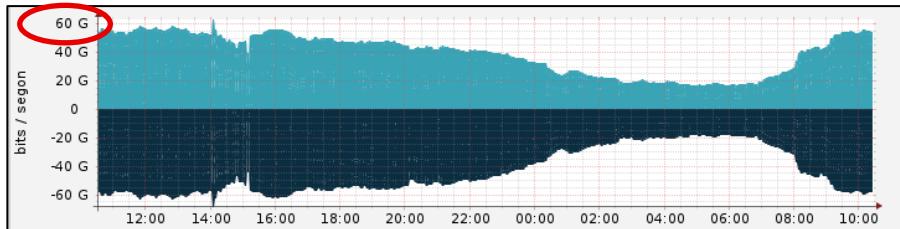


+ Limpieza de configuraciones

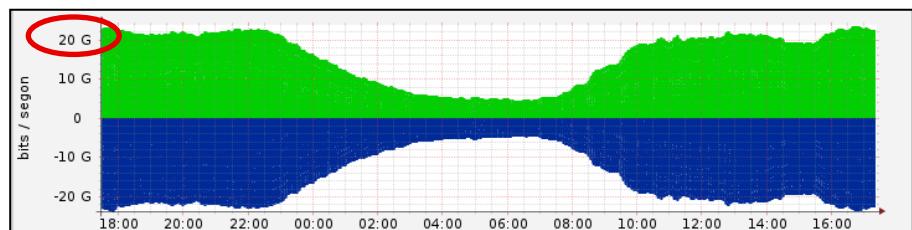
Evolución del pico de tráfico



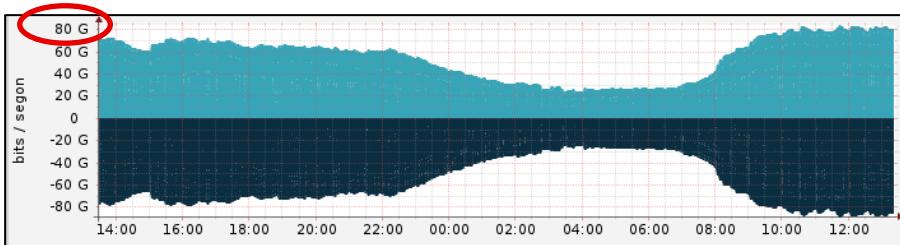
2016, 10 Gbps



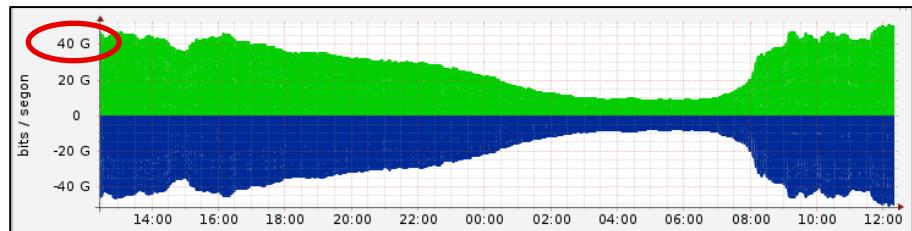
2019, 60 Gbps



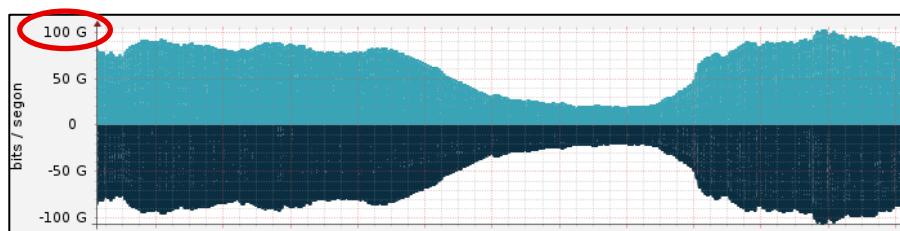
2017, 20 Gbps



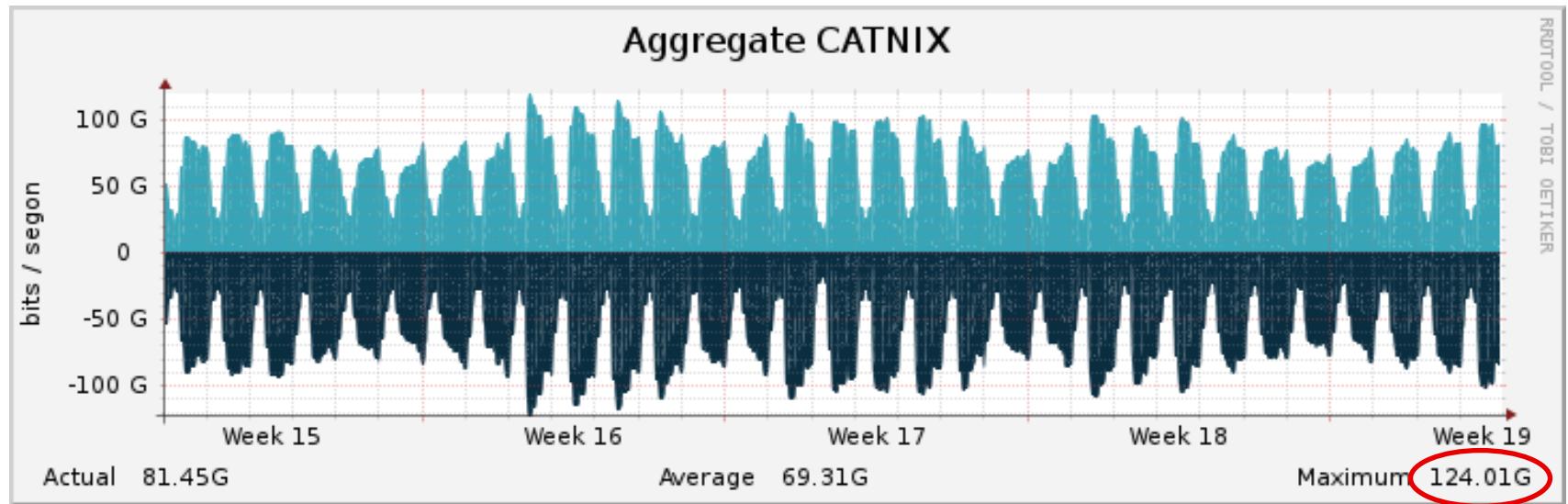
2020, 80 Gbps



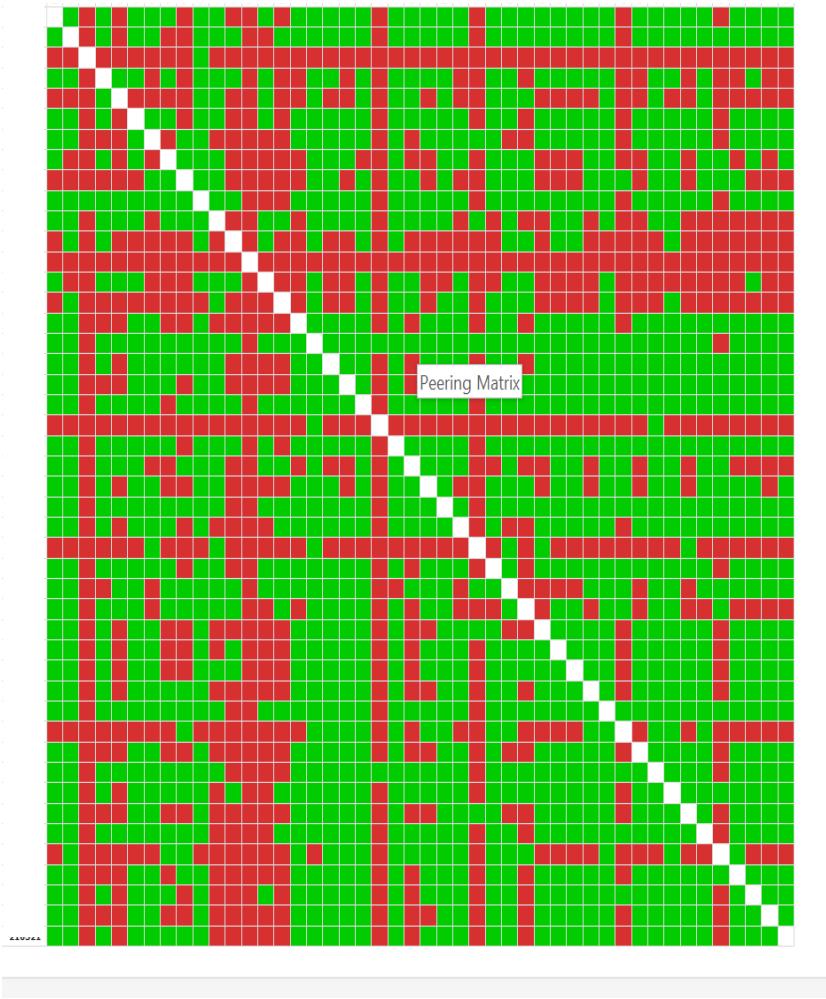
2018, 40 Gbps



2021, 100 Gbps



- ✓ La peering matrix muestra intercambios bilaterales o vía route-server



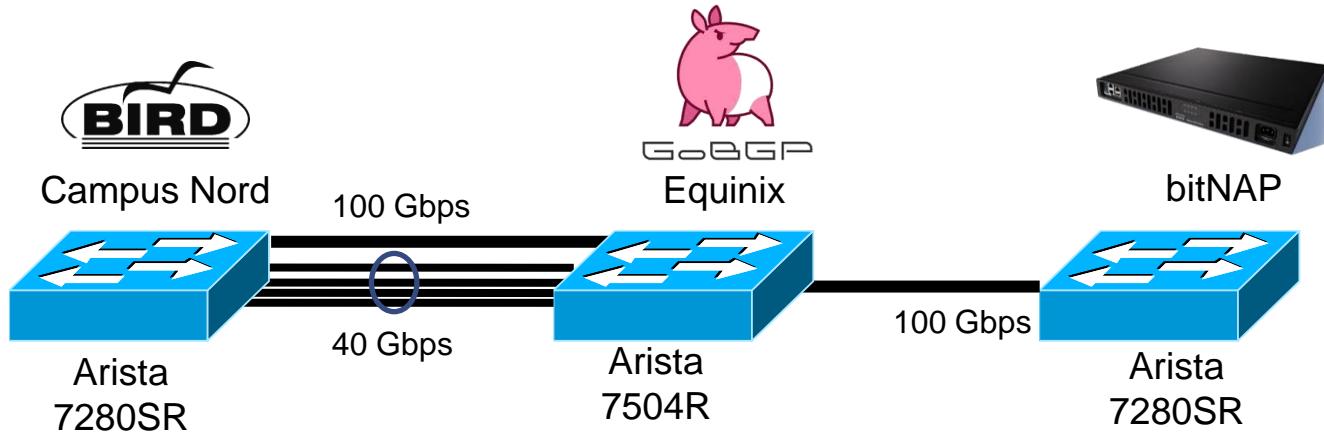
✓ Tres route-servers:

- Campus Nord: bird on a VM.
- bitNAP: Cisco ISR443.
- Equinix: GoBGPd on a VM

✓ Bio-diversidad: La infraestructura en cada nodo es completamente independiente.

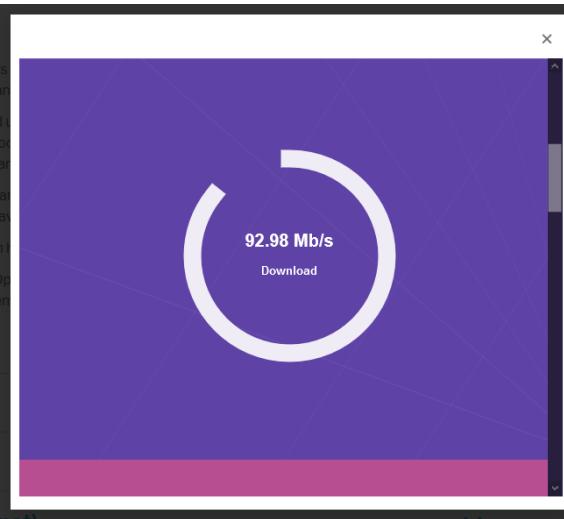
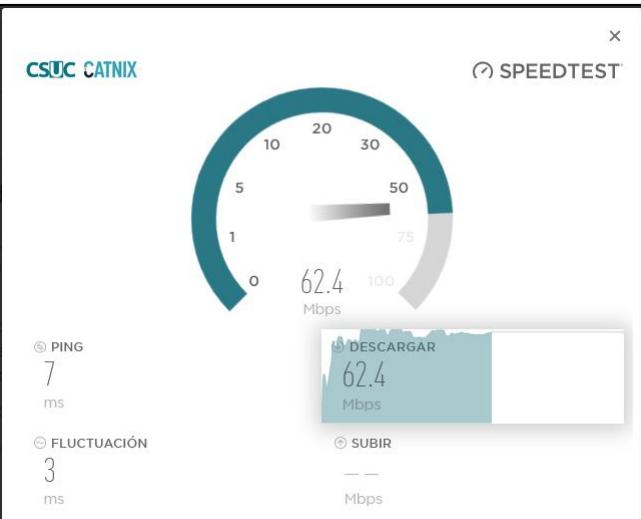
✓ Filtrado RPKI en todos ellos.

✓ Blackholing.



1. Network Diagnosis:

- Speedtest
- M-lab
- RIPE Atlas
- RIPE Anchor
- RIPE RIS
- Looking-glass



2. DNS root servers

3. NTP servers

4. GGC

5. PCH/Quad9

6. ServiceDesk

7. PeeringDB

8. Out-of-band

9. Automation of MAC filtering

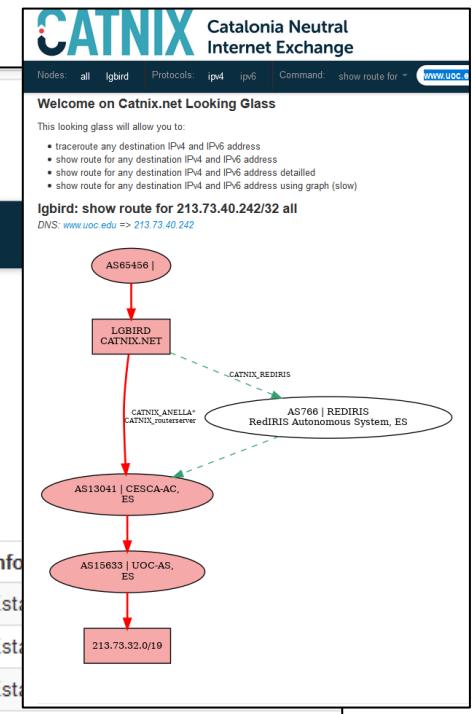
10. Research and education synergies



The screenshot shows the CSUC CATNIX ServiceDesk interface. At the top, it says 'Welcome! You can raise a CATNIX request from the options provided.' Below that is a search bar with the placeholder 'What do you need help with?'. There are three main buttons: 'Support' (Realizar consultas), 'Scheduled maintenance' (Anunciar trabajos programados), and 'Incident' (Reportar incidencias). The 'Support' button has a question mark icon, 'Scheduled maintenance' has a calendar icon, and 'Incident' has a warning sign icon.

✓ bird-lg looking-glass:

Name	protocol	table	state	since	info
CATNIX_ACENS	BGP	master	UP	2020-09-02	Established
CATNIX_ADAM	BGP	master	UP	2020-09-03	Established
CATNIX_ADAMO	BGP	master	UP	2020-09-02	Established
CATNIX_ALTECOM	BGP	master	UP	2020-09-23	Established
CATNIX_ALTERCOM21	BGP	master	UP	2020-09-02	Established
CATNIX_ANDORRA_TELECOM	BGP	master	UP	2020-10-20	Established



- ✓ Permite utilizar un histórico de comandos.
- ✓ Dibuja mapas de rutas (bgpmap).
- ✓ Hace consultas 'whois' para dar información sobre rutas y AS.
- ✓ Se puede consultar desde cualquier dispositivo.

- ✓ The RIPE Routing Information Service de RIPE collects BGP information to detect routing modifications.
- ✓ The historical data can be accessed and downloaded.
- ✓ RIS peering request form:
<http://www.ris.ripe.net/cgi-bin/peerreg.cgi>
- ✓ The RIS Route Collector to select is "CATNIX (RRC18)".
- ✓ Addresses: 193.242.98.118, 2001:7f8:2a:0:1:1:1:2654
- ✓ AS: 12654



RRC18	CATNIX, Barcelona	12654	193.242.98.118	2001:7f8:2a:0:1:1:1:2654
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Server DELL PowerEdge R320 with 1600 Mhz and 8 GB RAM

RRC18 -- Catnix, Barcelona, Spain -- Peer List

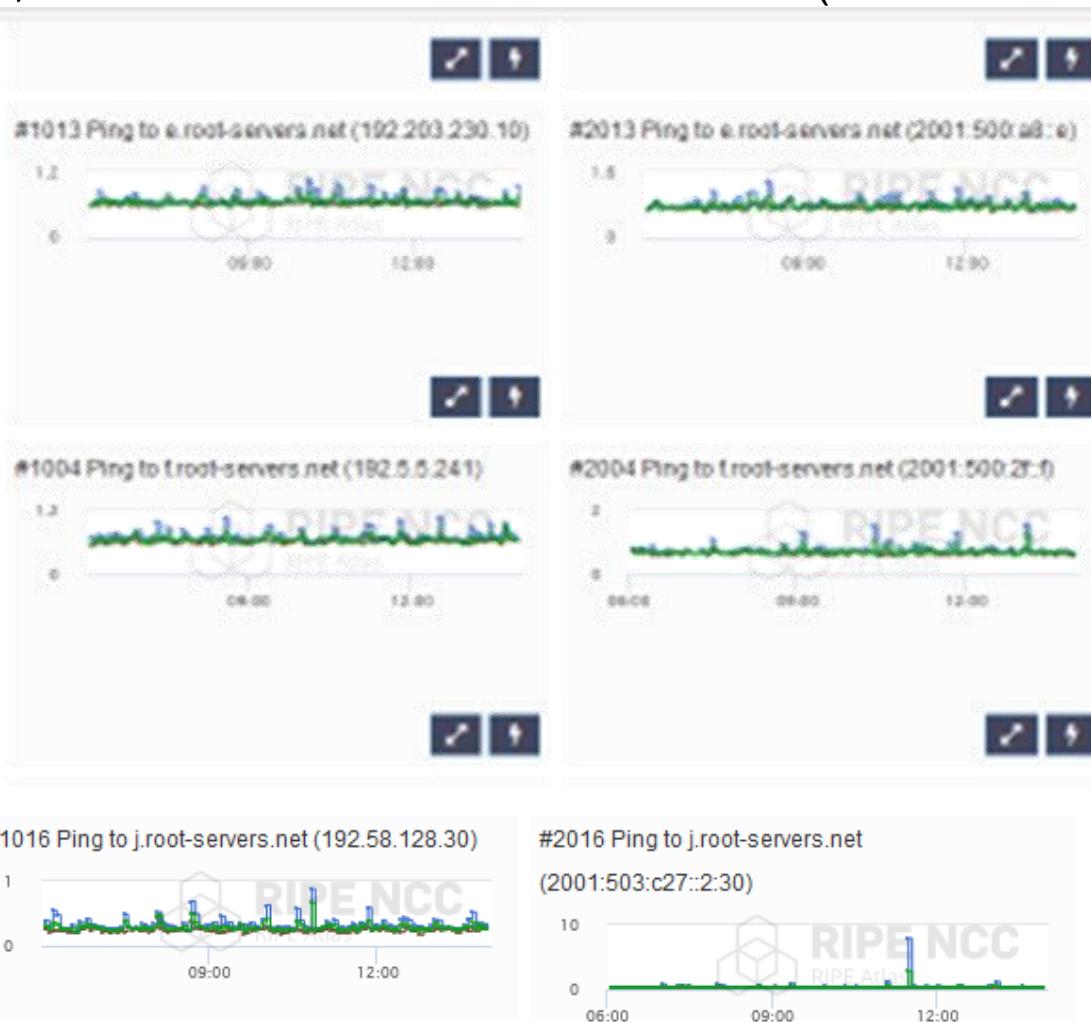
Status	ASN	Description	Address	IPv4 prefixes	IPv6 prefixes
Up	AS766	REDIRIS - Entidad Publica Empresarial Red.es	193.242.98.19	159	0
Up	AS766	REDIRIS - Entidad Publica Empresarial Red.es	2001:7f8:2a:0:1:1:0:766	0	18
Up	AS8220	COLT - COLT Technology Services Group Limited	193.242.98.13	4264	0
Up	AS8220	COLT - COLT Technology Services Group Limited	2001:7f8:2a:0:1:1:0:8220	0	550
Up	AS13041	CESCA-AC - Consorci de Serveis Universitaris de Catalunya	193.242.98.38	10	0
Up	AS13041	CESCA-AC - Consorci de Serveis Universitaris de Catalunya	2001:7f8:2a:0:1:1:1:3041	0	3
Up	AS15699	AS_ADAM - OGIC Informatica S.L.	193.242.98.137	29	0
Up	AS15699	AS_ADAM - OGIC Informatica S.L.	2001:7f8:2a:0:2:1:1:5699	0	2
Up	AS16030	ALTECOM - Alta Tecnologia en Comunicacions, S.L	193.242.98.4	108	0
Up	AS20940	AKAMAI-ASN1 - Akamai International B.V.	193.242.98.157	6	0
Up	AS20940	AKAMAI-ASN1 - Akamai International B.V.	2001:7f8:2a:0:2:1:2:940	0	5
Up	AS24592	NEXICA-AS - COM 2002, S.L.	193.242.98.133	5	0
Up	AS24592	NEXICA-AS - COM 2002, S.L.	2001:7f8:2a:0:2:1:2:4592	0	1
Up	AS26415	VERISIGN-INC	193.242.98.125	2	0
Up	AS26415	VERISIGN-INC	2001:7f8:2a:0:1:1:2:6415	0	2
Up	AS29680	VOZTELECOM - VozTelecom Oigaa360, S.A.	193.242.98.141	828471	0
Up	AS29680	VOZTELECOM - VozTelecom Oigaa360, S.A.	2001:7f8:2a:0:2:1:2:9680	0	94600
Up	AS30892	T-SYSTEMS-ELTEC - T-SYSTEMS ITC IBERIA S.A.	193.242.98.130	6	0
Up	AS30892	T-SYSTEMS-ELTEC - T-SYSTEMS ITC IBERIA S.A.	2001:7f8:2a:0:2:1:3:892	0	2
Up	AS35699	ADAMOEU-AS - Adamo Telecom Iberia S.A.	193.242.98.143	819047	0
Up	AS43578	BITNAP - MBA DATACENTERS S.L.	193.242.98.160	40	0
Up	AS43578	BITNAP - MBA DATACENTERS S.L.	2001:7f8:2a:0:3:1:4:3578	0	8
Up	AS49835	GUIFINET-AS - Fundacio Privada per a la Xarxa Lliure, Oberta i Neutral, guifi.net	193.242.98.144	81	0

<http://www.ris.ripe.net/peerlist/rrc18.shtml>

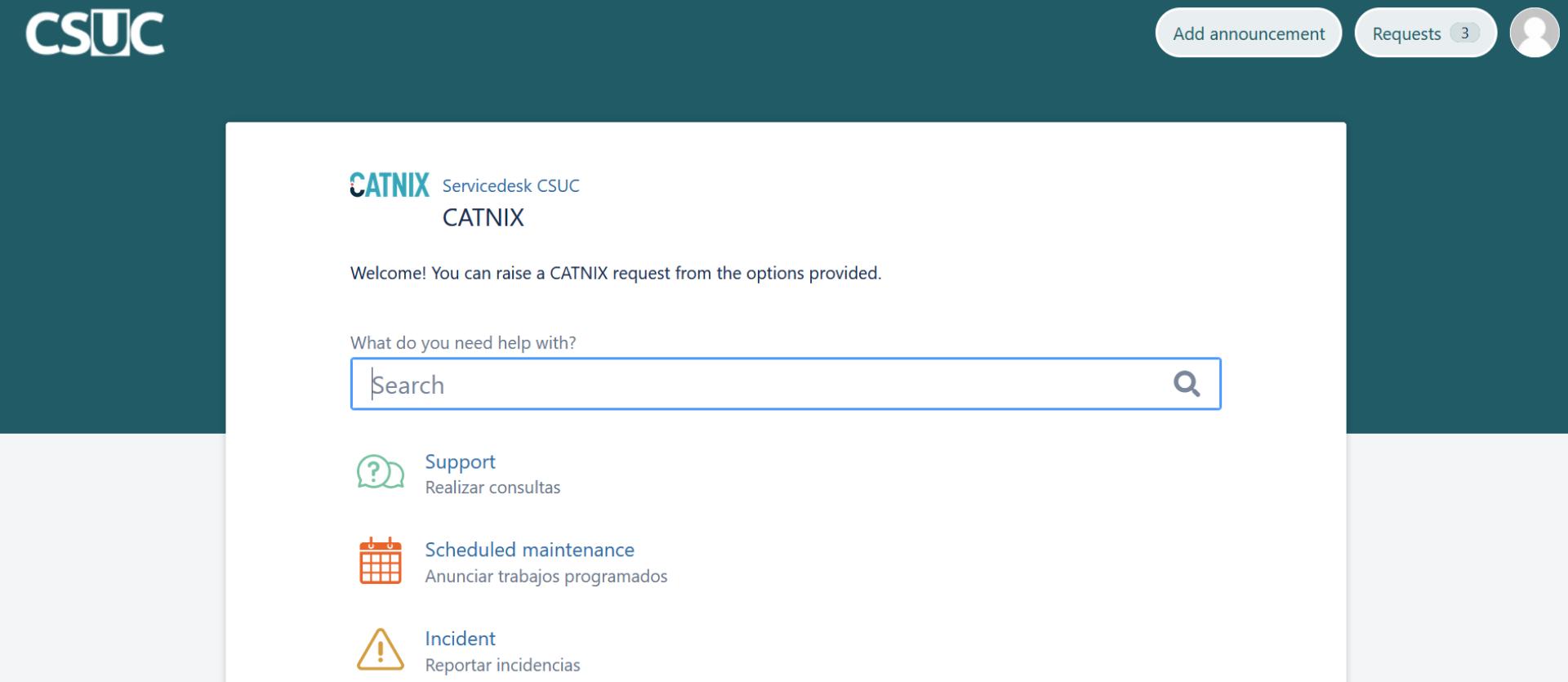
- ✓ RIS data can be accessed via [RIPEstat](#). Widgets (old interface):
 - The [Routing Status](#) widget shows if a prefix is routed and, therefore, if the ASN is in use.
 - The [Routing History](#): time range(s) when a particular prefix was announced, and by which AS it was announced
 - The [Announced Prefixes](#): tabular view of prefixes announced by an AS in the last two weeks
 - The [ASN Neighbours](#): neighbouring ASNs
 - The [ASN Neighbours History](#) widget provides historical information about neighbouring ASNs
 - The [Related Prefixes](#): related networks of the prefix
 - The [BGP Looking Glass](#) widget allows you to query our route collectors
 - [BGPlay](#): routing history related to a specific set of resources (prefixes, ASs, IPs) by means of an animated and highly interactive graph

<https://www.ripe.net/analyse/internet-measurements/routing-information-service-ris/routing-information-service-ris>

- ✓ All root servers at CATNIX are less than 2 ms away from the members, most of them are less than 1 ms (view from AS13041)



- ✓ Nueva versión de la herramienta de ticketing.



The screenshot shows the CATNIX ServiceDesk homepage. At the top, there is a dark header bar with the CSUC logo on the left and three buttons on the right: "Add announcement", "Requests 3", and a user profile icon. Below the header is a large white content area. In the top left of this area is the CATNIX logo and the text "Servicedesk CSUC". Below that is the word "CATNIX". A welcome message follows: "Welcome! You can raise a CATNIX request from the options provided." Underneath, a search bar is labeled "What do you need help with?". Inside the search bar, the placeholder text "Search" is visible, along with a magnifying glass icon. Below the search bar are three main service options, each with an icon and a brief description:

-  **Support**
Realizar consultas
-  **Scheduled maintenance**
Anunciar trabajos programados
-  **Incident**
Reportar incidencias

The image consists of four vertically stacked screenshots of a web-based management interface for network interfaces.

- Screenshot 1:** Shows a header with tabs for "graphs", "MAC-Add", and "mapes". Below the header, it says "Logged in as [REDACTED] (Logout)" and "comprova_mac". A message reads "Select an Interface for the given MAC". Two radio buttons are present: "Eth14" (unchecked) and "Eth35" (checked). A "submit" button is at the bottom.
- Screenshot 2:** Shows a header with tabs for "graphs", "MAC-Add" (highlighted in red), and "mapes". Below the header, it says "Logged in as [REDACTED] (Logout)" and "MAC-Add". A message reads "Select the Switch of the new MAC address." Three radio buttons are shown: "CampusNord" (unchecked), "BitNap" (checked), and "Equinix" (unchecked). Below this, a text input field and a "Submit Query" button are shown. A note states "Write the new MAC address. It only accepts the following format: 'xxxx.xxxx.xxxx' where x is an hexadecimal value." and "This action may take some minutes to complete."
- Screenshot 3:** Shows a header with tabs for "graphs", "MAC-Add", and "mapes". Below the header, it says "Logged in as [REDACTED] (Logout)" and "comprova_interface". A message reads "Please, wait while we are processing your request...". In the center is a large, semi-transparent circular progress indicator with a red arc.
- Screenshot 4:** Shows a header with tabs for "graphs", "MAC-Add", and "mapes". Below the header, it says "Logged in as [REDACTED] (Logout)" and "comprova_interface". A message reads "Thanks!" and "Your request has been processed".



MANRS

<https://www.manrs.org/>

Network Operators:

- ✓ Adam
- ✓ Andorra Telecom
- ✓ Claranet
- ✓ Colt
- ✓ CSUC (Anella Científica)
- ✓ Google
- ✓ Nexica
- ✓ NTT
- ✓ RedIRIS
- ✓ RIPE NCC
- ✓ Verisign
- ✓ VozTelecom

CDNs and Cloud providers:

- ✓ Akamai Technologies
- ✓ Cloudflare
- ✓ Google
- ✓ Microsoft

IXPs:

- ✓ CATNIX

Equipment vendors:

- ✓ Arista





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de Catalunya

¡Gracias! Sigo...

mariaisabel.gandia@csuc.cat



Euro-IX Update

ESNOG – May 2022

Maria Isabel Gandia

EURO-IX MEMBERS



ARISTA

 **Extreme**[®]
networks

 **Internet
Society**

smartoptics

cira.

 **FLEXOPTIX**

JUNIPER
NETWORKS

 **SOLID OPTICS**
Optical Transceiver Technology

 **EQUINIX**
WHERE OPPORTUNITY CONNECTS

interxion™
A DIGITAL REALTY COMPANY

NOKIA

 **ribbon**[®]

Membership Association of IXPs



Events

- Two Membership events per year hosted by our Members
- Workshops & hackathons
- Online/ virtual workshops



Services

- Reports
- Newsletters
- Mailing list
- Keeping the community connected – Virtual events



Tools & Community Projects

- Internet eXchange Point Database – IXPDB
- Peering Toolbox
- Fellowship & Mentor-IX
- Route Server Large BGP Communities list
- A new IXP Film

The IX-F & IXPDB

euro-IX



What is the Internet eXchange Federation ?



What is the IX-F JSON Schema?

- A community driven schema that allows IXPs to report their data in a standard automated fashion.
- It includes data sets on:
 - The IXP participants
 - IXP locations
 - Hardware used at IXPs and its participants
 - Route Servers
- You can find the schema and documentation here -
<https://github.com/euro-ix/json-schemas>
- IXPs can also add their IX-F export APIs to PeeringDB -
<https://docs.peeringdb.com/ix-f-json-import-rules/>

What is the IXPDB?

- The Internet Exchange Point Database (IXPDB) is an authoritative and fully comprehensive set of data on Internet eXchange points (IXPs).
- The IXPDB imports the IX-F JSON schema **directly from IXPs**
- The data can be used in order to provide a single comprehensive and graphical view of the global internet ecosystem.

IXPDB Key Features

- **Automated data collection**
 - Organisational
 - Infrastructure
 - IXPs & facility locations
 - Peering LAN prefix(es)
 - Switch hardware
 - Connected networks
 - Ports and speeds
 - MAC & IP address(es)
 - (Prefixes announced – coming soon)
 - Aggregate traffic
- **Easy integration**
 - Standardised JSON schema
 - Automatic export from IXP Manager / Asteroid
- **Incorporates third party data sources**
 - MANRS
 - PeeringDB
- **Web-based GUI**
 - Search interface
 - Data tables & visualisations
 - Comparison tools for IXPs & ASNs
 - User accounts for manual data entry

Homepage Statistics - Live Data

IXPs by Connected ASNs

Name	City	Country	Last updated	API	Traffic	MANRS	# of ASNs
IX.br Sao Paulo, SP (SP)	São Paulo	BR	2021-09-23 8:11:49 UTC	✓	✗	✗	2413
DE-CIX FRA (DE-CIX Frankfurt)	Frankfurt am Main	DE	2022-04-20 18:08:58 UTC	✓	✗	✓	1067

AM:

Newest IXPs in the Database

EPI:

NAF	Name	City	Country	Last updated	API	Traffic	MANRS	# of ASNs
EPI:	Era-IX	Amsterdam	NL	2022-04-20 14:12:06 UTC	✗	✗	✗	0
IX.b	Namex Bari	Bari	IT	2022-04-06 8:37:12 UTC	✗	✗	✗	0
Dat	AMS-IX Singapore	Singapore	SG	2022-04-04 10:13:41 UTC	✗	✗	✗	0
IX.b	AMS-IX Hyderabad	Hyderabad	IN	2022-04-04 10:05:33 UTC	✗	✗	✗	0
	DE-CIX Phoenix	Phoenix	US	2022-04-20 18:08:55 UTC	✗	✗	✓	0

IXP Directory and Compare Tool

IXP COMPARISON

Home / IXPDDB / IXP Directory / Providers Comparison

IX-F ID, name, city or country

COMPARE

IX-F ID	Name
899	48 IX (4)
900	4IXP (4E)
123	6NGIX (6G)
699	A.IX (Adsl)
276	AAIX (AIX)
893	ABQIX (AIX)

CATNIX (Catalunya Neutral Internet eXchange)

GIGAPIX (Gigabit Portuguese Internet Exchange)

VSIX Nap (VSIX)

Maximum Transmission Unit, MTU	CATNIX (Catalunya Neutral Internet eXchange)	GIGAPIX (Gigabit Portuguese Internet Exchange)	VSIX Nap (VSIX)
9198	-	-	9000
Speed 10M	-	-	-
Speed 100M	-	-	100 EURO
Speed 1G	200 €	-	300 EURO
Speed 10G	500 €	-	700 EURO
Speed 40G	-	-	-
Speed 100G	2900 €	-	3500 EURO
Number of ASNs	42	43	52

Common ASNs

#1 Hurricane Electric

Unique ASNs	#30 10dencehisphahard SL(CDMON)	#31 ALMOUROLTEC SERVICOS DE INFORMATICA E INTERNET LDA	#51 3P System Acantho Airbeam Airgrid Asco TLC AsdAsd AsI srl Axera Comune di Padova Consortium GARR DB Network
Acens Technologies S.A.	ADAM ECOTECH S.A.	Anacom	
Adamo Telecom Iberia S.A.	AireNetworks del Mediterraneo S.L.U.	Angola Cables	
Alta Tecnologia en Comunicacions, S.L	Altercom21, S.L	AR Telecom	
Andorra Telecom	Anynet	Associacao Porto Digital	
Anella Cientifica	Byfitel comunicaciones S.L	Be Artis	
Centre de Telecommunications i	Cloud Telecom	Cloud Telecom	

Metadata and dynamically filtered tables

No active filters

Information Table M Analytics Custom view Filters

Filters

Search records...

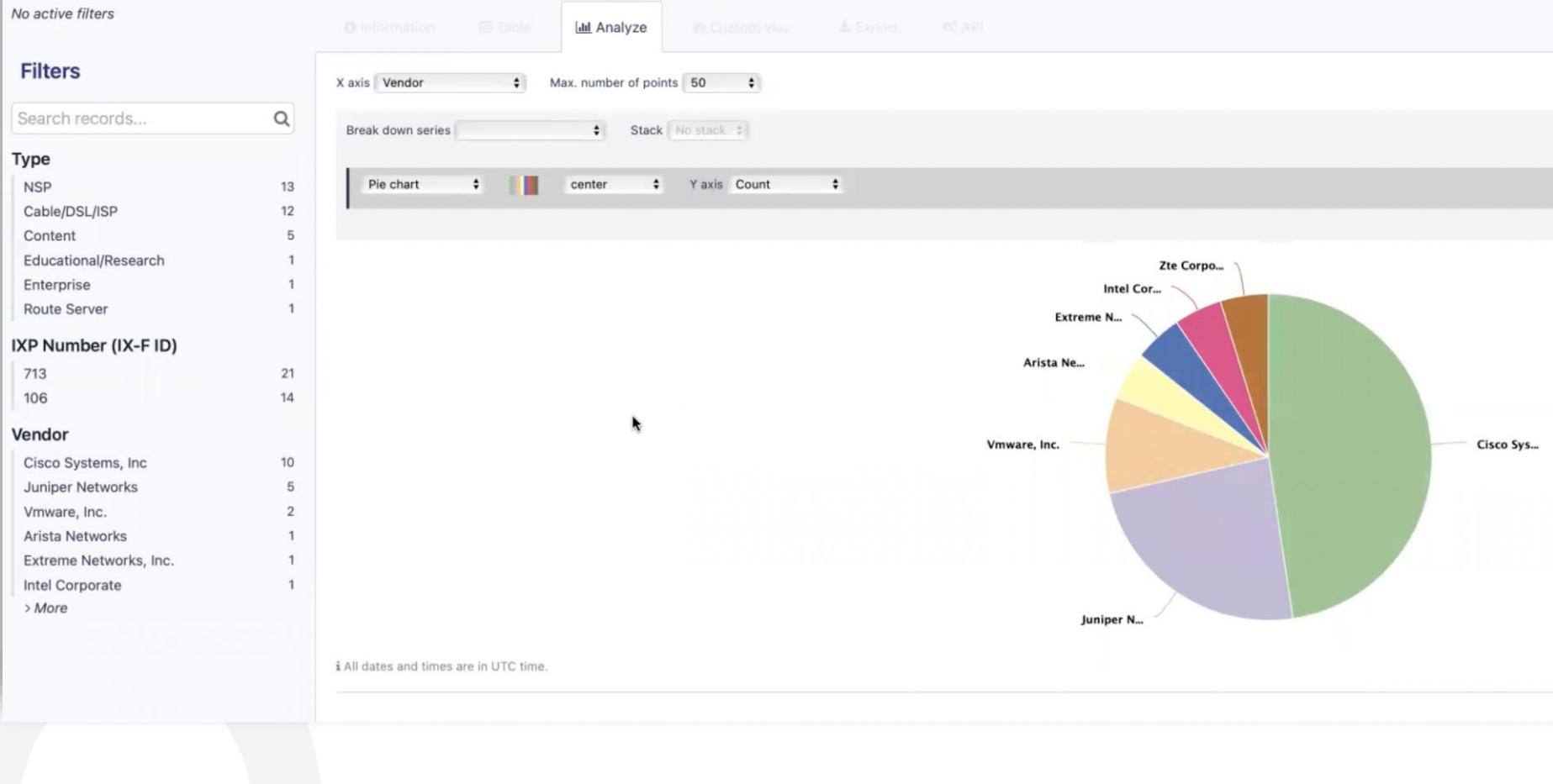
	ASN	CC	Name	Type	IXP Number (IX-F ID)	MAC	Vendor	IPv4	IPv6	MANRS1	MANRS2	MANRS3	MANR
1	2603	DK	NORDUnet	Educational/Research	106	44:4c:a8:74:43:b6	Arista Networks	192.121.80.74	2001:7f8:3e:0:a500:0:2603:2	YES	YES	YES	YES
2	39351	SE	31173 Services AB	NSP	713	4c:71:0d:24:b0:67	Cisco Systems, Inc	185.1.88.36	2001:7f8:b0:0:0:3:1173:1	NO	NO	NO	NO
3	39651	SE	Com Hem AB	Cable/DSL/ISP	713	84:78:ac:4d:90:a1	Cisco Systems, Inc	185.1.88.24	2001:7f8:b0:0:0:3:9651:1	YES	YES	YES	YES
4	3399	SE	Obenetwork AB	NSP	713	a4:4c:11:2c:d5:fc	Cisco Systems, Inc	185.1.88.30	2001:7f8:b0:0:0:3:3399:1	NO	NO	NO	NO
5	8896	NO	Xfiber AS	NSP	713	00:a7:42:45:66:eb	Cisco Systems, Inc	185.1.88.23	2001:7f8:b0:0:0:8896:1	NO	NO	NO	NO
6	42708	SE	GleSYS AB	NSP	713	00:bc:60:5f:14:d9	Cisco Systems, Inc	185.1.88.45	2001:7f8:b0:0:0:4:2708:2	NO	NO	NO	NO
7	62183	SE	NC in Scandinavia AB	NSP	713	10:8c:cf:17:ba:8a	Cisco Systems, Inc	185.1.88.32	2001:7f8:b0:0:0:6:2183:1	NO	NO	NO	NO
8	201983	SE	Anslutn Hosting i Sverige AB	Cable/DSL/ISP	713	b0:aa:77:82:3f:40	Cisco Systems, Inc	185.1.88.43	2001:7f8:b0:0:0:20:1983:1	NO	NO	NO	NO
9	44034	SE	Hi3G Access AB	Cable/DSL/ISP	713	84:78:ac:6a:60:86	Cisco Systems, Inc	185.1.88.41	2001:7f8:b0:0:0:4:4034:1	NO	NO	NO	NO
10	49362	DK	DSV A/S	Enterprise	713	00:2a:10:c3:e7:06	Cisco Systems, Inc	185.1.88.21	2001:7f8:b0:0:0:4:49362:1	NO	NO	NO	NO
11	50304	NO	Blix Solutions AS	NSP	713	00:8a:96:c8:18:50	Cisco Systems, Inc	185.1.88.27	2001:7f8:b0:0:0:5:0304:1	NO	NO	NO	NO
12	6939	US	Hurricane Electric	NSP	713	d8:84:66:a8:79:15	Extreme Networks, Inc.	185.1.88.46	2001:7f8:b0:0:0:6939:1	NO	NO	NO	NO
13	42541	DK	Fiberby ApS	Cable/DSL/ISP	713	00:1b:21:b8:37:64	Intel Corporate	185.1.88.19	2001:7f8:b0:0:0:4:2541:1	NO	NO	NO	NO
14	49544	NL	i3D.net	NSP	713	3c:8c:93:4e:30:0e	Juniper Networks	185.1.88.17	2001:7f8:b0:0:0:4:9544:1	NO	NO	NO	NO
15	13335	US	Cloudflare	Content	713	30:7c:5e:ec:6e:a6	Juniper Networks	185.1.88.20	2001:7f8:b0:0:0:1:3335:1	NO	NO	NO	NO
16	33891	DE	Core-Backbone GmbH	NSP	713	4c:16:fccb:2d:da	Juniper Networks	185.1.88.35	2001:7f8:b0:0:0:3:3891:1	NO	NO	NO	NO
17	32934	US	Meta	Content	713	d4:04:ff:d8:34:09	Juniper Networks	185.1.88.38	2001:7f8:b0:0:0:3:2934:2	NO	NO	NO	NO
18	205206	DK	Netsite A/S	Content	713	2c:21:31:3f:0f:11	Juniper Networks	185.1.88.26	2001:7f8:b0:0:0:20:5206:1	NO	NO	NO	NO
19	51519	SE	Bahnflow AB	NSP	713	00:0c:29:0d:00:38	Vmware, Inc.	185.1.88.44	2001:7f8:b0:0:0:5:1519:1	NO	NO	NO	NO
20	202687	SE	Mainloop Anycast DNS	Content	713	00:50:56:a3:85:c5	Vmware, Inc.	185.1.88.28	2001:7f8:b0:0:0:20:2687:1	NO	NO	NO	NO
21	60876	DK	Gigabit ApS	Cable/DSL/ISP	713	cc:1a:fa:e2:bb:20	Zte Corporation	185.1.88.29	2001:7f8:b0:0:0:6:0876:1	NO	NO	NO	NO
22	12552	SE	GlobalConnect Group	NSP	106					NO	NO	NO	NO

Autonomous System Number Name (identifier) **asn** Type text Sample 2603

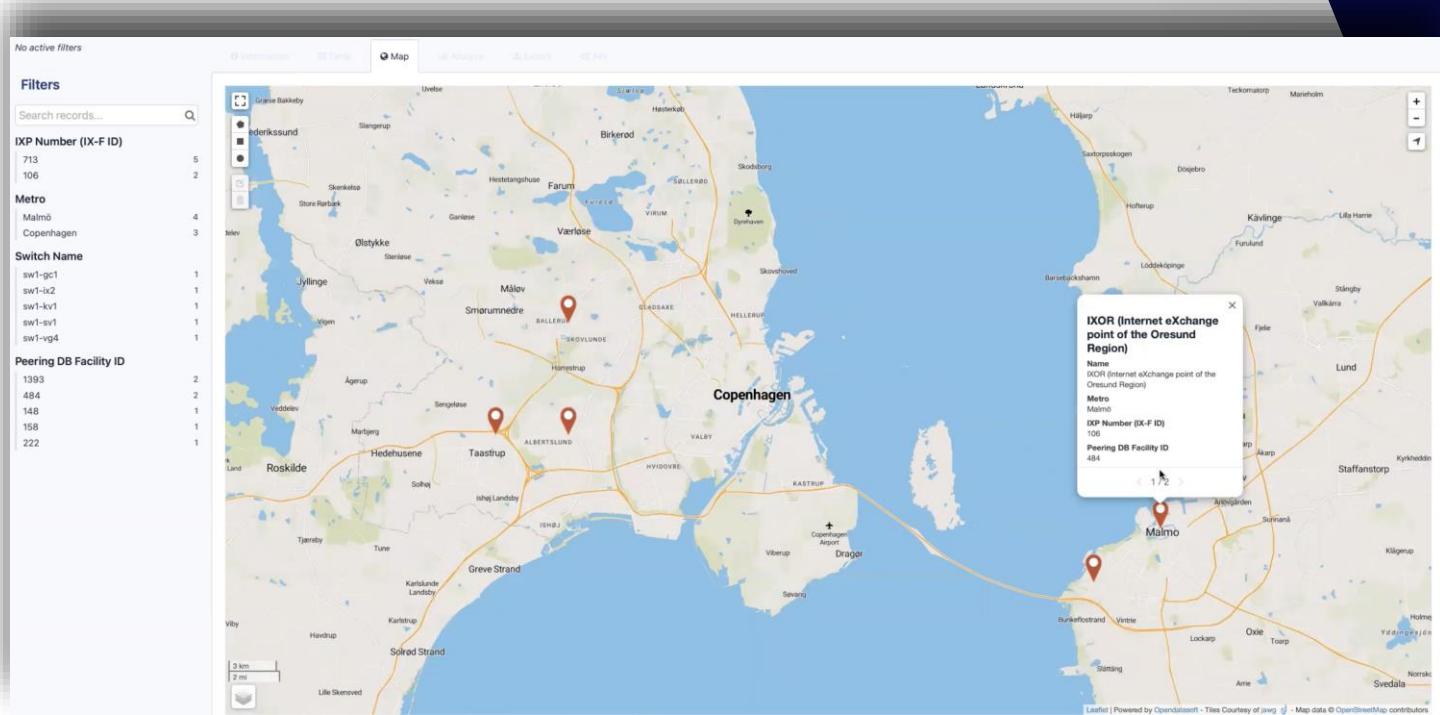
CC Name (identifier) **cc** Type text Sample DK

ISO 3166 Country Code

Dynamic charting



Interactive maps





Other Information

- Mailing list for users - <https://lists.euro-ix.net/mailman/listinfo/ixpdb>
- GitHub JSON Member List Schema - <https://github.com/euro-ix/json-schemas>
- API - <https://api.ixpdb.net>
- Website - <https://ixpdb.euro-ix.net/en/>
- IXPDB admin team - ixpdb-admin@euro-ix.net

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peering
toolbox
peeringtoolbox.euro-ix.net

Peering Toolbox

New tool for the Community

What is the Peering Toolbox?



By the Community

- Community focused Euro-IX project
- Organisations involved include LINX, NAPAfrica, DE-CIX, Kentik, HEAnet



Aims

- Provide a learning structure and best practice information for new entrants into the interconnection community



Aims

- The toolbox will act as a reference/guide that IXPs and networks can point others to for best practice information and learn how meet the IXP and peers requirements

Peering Toolbox

There's already a lot of good work done by the community

- We want to pull it together and make it available in one place
- Act as a reference point for best practice information.

Coming soon - Peering Academy

- We are creating a learning structure that's easy for new entrants to follow and discover what they need to learn to make the best decisions for their network.
- The learning will be broken down into small pieces to make it easy, e.g. beginner, intermediate and expert to learn the community best practices both technical and business.
- Get in touch to find out more - peeringtoolbox@lists.euro-ix.net

Questions

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