

ANNUAL REPORT 2016



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FranceIX
www.franceix.net

1 CORPORATE OUTLOOK

“

France-IX is the Premier Internet Peering Service Provider in France, offering public and private interconnection services through its carrier and data centre neutral exchange points in Paris and Marseille.

Founded in June 2010 with the support of the French Internet community, France-IX is a member-based association whose core values are neutrality, sustainability and constant improvement of the Internet.

”



1.1

CHRISTIAN KAUFMANN



PRESIDENT, FRANCE IX ASSOCIATION



Hello and welcome to the inaugural France-IX Annual Report.

In September 2016 I was privileged to re-join France-IX as Board Member for the second time and now I find myself in the very fortunate position of being able to update you, not just on our progress in recent times, but more importantly on our vision for the future.

So much has happened and so many people have helped to make things happen since our community-driven non-profit Internet Exchange Point was founded in 2010.

But this seems the appropriate time to thank the outgoing president and my former colleague at Akamai, Martin Hannigan, for his tireless work prior to my reappointment, his work and leadership brought us to where we are today. Thanks again for this.

France-IX is special because its members make it so. Our community is at the heart of everything we do.

When we founded France-IX seven years ago, Paris had 11 Internet Exchange Points, and it is fair to say that the technological and financial fragmentation of the landscape was hindering the growth of Internet-based economies not just in France but in the wider world. We wanted to drive consolidation in the market and give France the place it deserved in the IX landscape.





In just seven years France-IX has grown to become the fourth largest community-driven exchange in Europe with nine PoPs in Paris and two in Marseille, and nearly 330 members. Our impact goes beyond providing peering connectivity, we also bring countries, regions, people and businesses together on a social level. So when you join France-IX you're not just buying access to a switching platform, you're part of something bigger called a community.

A community starts when people share the same interests and values. When you work with people who believe into the same things as yourself trust gets established and grows. Without trust, we can not innovate, experiment or take risks. To peer at an Internet Exchange, you need to trust the Exchange itself and the other connected members.

With the creation of the France-IX Marketplace in 2016, a unique programme which enables service providers to offer their solutions to members connected through France-IX, we have widened the scope and offerings for our members. Leading service providers started offering a range of services such as IP transit, anti-DDoS and cloud access via the Marketplace creating a bigger and more attractive ecosystem for the community.

Looking forward we intend to keep building the community organically by improving the services and products that we offer and by supplying Service Level Agreements to increase the trust of the community. We

are also welcoming new remote peering partners from France and internationally to increase the diversity of networks on the IX.

A key part of our own diversification has been the establishment of France-IX Marseille. From a standing start in 2013, we opened a second PoP in Marseille in 2015. Over the coming years we will expand our presence in Marseille and make it the established Internet hub for Europe, Africa and the Middle East. The past year has shown that we are ahead of the curve in this development and 2017 will confirm our leading ability.

And last, but by no means least, in 2017 we are on the way to upgrade our platform across the board as it comes to the end of its natural hardware lifecycle. The new platform will use state-of-the-art technology and will ensure France-IX has a future-proof infrastructure moving forwards.

Being a non-profit community-based organisation enables us to make these huge investments in the future for the benefit of our community, instead of generating profit for a group of stakeholders.

France-IX is built on the spirit of "**liberté**", "**égalité**", and "**fraternité**". You, the members, are the ones making France-IX successful.

Thank you for your trust in 2016.

Merci pour votre confiance en 2016.



1.2

FRANCK SIMON



PRESIDENT, FRANCE IX SERVICES



When I joined France-IX in 2010 the online world was a different place. Broadband penetration in France rose from 66 percent in 2010 to 79 percent in 2016, while smartphone penetration has jumped from 26 percent to 65 percent over the same period.

Individuals today can declare their taxes, register their cars and benefit from health services instantly thanks to digital transformation in public services made possible by enhanced connectivity.

As an employer you can declare your social contributions and pay your employees online, as a student you can enrol in higher education and even take virtual classes, as a consumer you can share your passions using social media and get the latest fashions delivered to your door the next day.

The French market and its consumers have benefitted hugely from the advent of the Internet age. Putting things into perspective, when our IXP was created, businesses in France could not access Amazon Web Services and nobody had heard of Uber. It's funny how quickly people adapt to new technologies. Major web services, like AWS and Uber, have become part of the fabric of our lives

today so much so that it is difficult to remember how we managed before they arrived. Who knows what lies ahead, virtual reality and the arrival of the autonomous car are no longer a pipedream, for those services it is a matter of when not if. Someone out there today, maybe even reading this report, is going to invent something that no one saw coming.

France-IX, as a network, has grown significantly and now interconnects hundreds of networks from all over the world, representing an awesome diversity in terms of profiles: operators, Internet service providers, CDNs, hosting providers, DNS resources, emedias (TV, radio, newspapers), gaming, cloud services, social networks, e-commerce, e-mailing, security services,

datacentres, corporate companies. France-IX, as an organisation, has also evolved and improved to become more professional and provide a high level of services to its community of members.

The France-IX board of directors suggested that now was the appropriate time to go further and release an annual report, as any professional organisation would do. This report represents a 12-month snapshot of our time as an organisation. It doesn't tell the full story of all the hard work and dedication that has driven our evolution over the past seven years. However, I know many of you have been on that journey with us and will know all about our growing pains and achievements. Moving forward we aim to bring annual updates that will chronicle our development as a member-led non-profit professional organisation for many years to come.

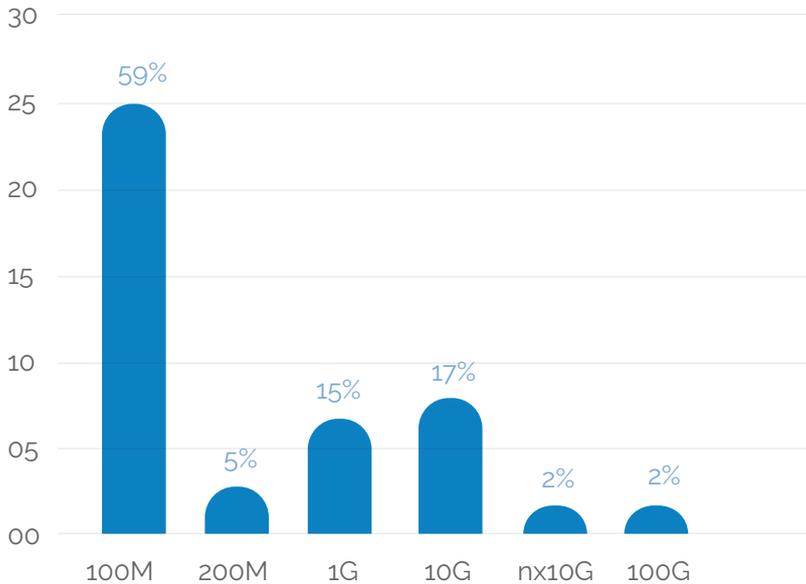
As we look forward to the year ahead we can expect continued growth at France-IX, and the more we grow the stronger we become in terms of the support we provide. The decision to consolidate French Internet exchanges and form a non-profit exchange for the benefit of all has never looked better.



1.3 2016 KEY STATISTICS

MEMBERSHIP ACQUISITION

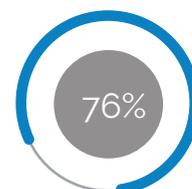
New connected Members (total Paris and Marseille)



New connected Members per Sales Channel (total Paris and Marseille)



41
Total new connected Members



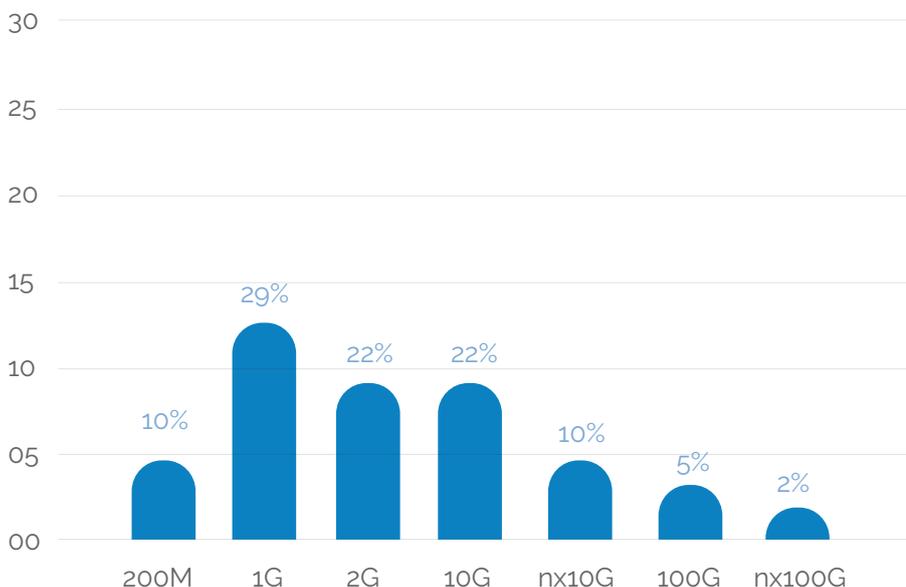
30
Direct members



11
Members via Resellers

MEMBERSHIP GROWTH

Upgrades from existing Members (total Paris and Marseille)



Upgrades from existing Members per Sales Channel (total Paris and Marseille)



41
Total upgrades from existing members



38
upgrades from direct members

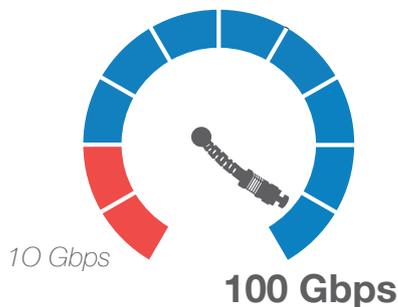
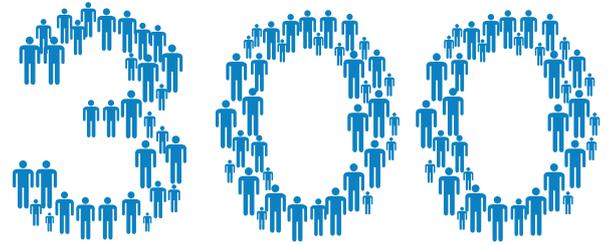


3
upgrades from members via resellers



2016

- **300th member** milestone for Paris and Marseille
- **Tenth** active reseller worldwide
- ***600 Gbps** peak traffic in Paris
- **100 Gbps** peak traffic in Marseille
- **Marketplace** programme launch with five sellers
- New **blackholing** service
- **100 Gbps** port first provisioning in Marseille
- **Tenth** employee milestone
- Paris office expansion to welcome new employees
- Strategic partnership with the London Internet Exchange (LINX)
- Ranking in the top five IXPs in Europe

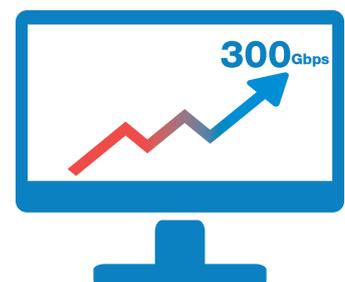


2015

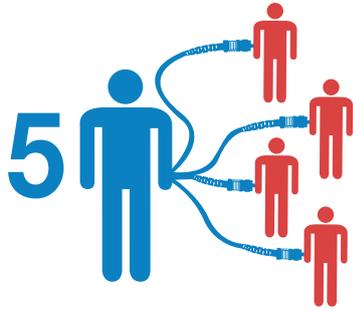
- **20th** member milestone in Marseille
- **50 Gbps** peak traffic in Marseille
- **30%** of the shortest Internet paths reachable via France-IX (RIPE study)
- **100 Gbps** port first provisioning in Paris
- Migration of copper to fibre connections
- New PoPs (*Saint Denis; Telehouse 3, Magny-les-Hameaux; Jaguar Network, Marseille*)
- New public **weathermap** and new advanced looking glass
- Deployment of new out-of-band network and security filters policy to improve resiliency
- Partner for the future launch of the Casablanca Internet Exchange (CASIX) and the Senegalese Internet Exchange (SENIX)

2014

- **250th** member milestone for Paris and Marseille
- **300 Gbps** peak traffic in Paris
- **Sixth** active reseller in France and Europe
- New PoP (Iliad DC3, Vitry)
- Second infrastructure full upgrade allowing higher density of **10 Gbps** port and **100 Gbps** deployment
- Ranking in the top **10 IXPs** in Europe

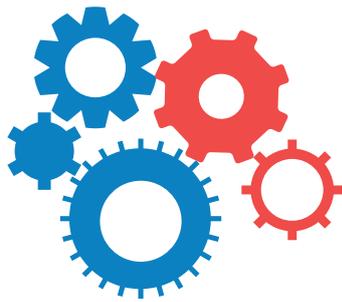


* Learn more about statistics and the calculation method
<https://www.franceix.net/en/technical/traffic-statistics/>



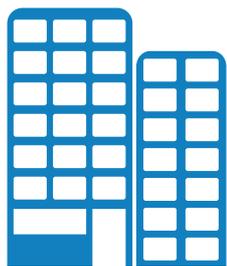
2012

- **150th** member milestone
- **160 Gbps** peak traffic in Paris
- Free **100 Mbps** interconnection for any TOP-IX and TOUIX members
- **Reseller programme** launch
- First infrastructure **full upgrade**
- Development of in-house information system
- Launch of customer **web portal** (tools.franceix.net)



2010

- **Commercial** and **technical** launch of France-IX in Paris
- **Six founding members:** Akamai, Jaguar Network, Neo Telecoms (now Zayo France), Interxion, Google and Bouygues Telecom
- **Six PoPs** operational from day one in Paris (Interxion 1, 2, 5, Telehouse 1, 2, Teletcity Courbevoie)
- **Two** full-time employees



FranceIX
Convergence hub

2013

- **200th** member milestone for Paris and Marseille
- **200 Gbps** peak traffic in Paris
- **Fifth** active reseller in France and Europe
- Launch of **France-IX Marseille** with the first PoP in Interxion MRS1, Marseille
- **Partner** of the AXIS project with the Internet Society (ISOC) to run regional IXP training sessions in Guinea and Comoros



2011

- **100th** member milestone
- **PANAP** members one-night migration to France-IX in Paris and official closing of PANAP
- **Two new PoPs** (Teletcity Condorcet and Iliad DC2)
- Free **100 Mbps** interconnection for any LU-CIX, LYON-IX and SFINX members
- **Fifth** employee milestone

2009

- Creation of working group called "**Pheon-IX**" driven by **Neo Telecoms** (now Zayo France), **Google**, **Jaguar Network** and **Akamai**
- Survey suggested a strong expectation for an IXP to federate all French operators in Paris and to provide a high quality of service



	Association	Company
Meeting	General meeting	Shareholders meeting
Board	Executive board	Supervision board
Management	—	Executive Management

France-IX is based on two entities: an association and a private company. This is done so that one side is a dedicated company that deals with the operations, commercial and marketing activities, and on the other side is a non-profit association being the unique shareholder of such private company. This atypical structure guarantees independence and neutrality, as the stakeholders of the private company are members of the association, with each one given a voting right independently from its size. Members vote annually to renew the board of directors and to validate the accounts of the private company.

The importance of sound corporate governance cannot be overstated, particularly for a non-profit where absolute transparency of operations is demanded by the membership. Achieving a good balance of technical and business expertise from businesses and individuals representing the range of actors with an interest in the success of France-IX is vital.

France-IX has eight board members, six of whom represent corporate entities plus two individuals.

This distribution is historic rather than being related to the original articles of the association. The main reason for such a distribution is because France-IX was created by founding members that were companies from the Internet community, and these companies helped to sustain the development of France-IX. It is important to note, however, that the articles of association allow either company seats or individual seats without any specific conditions regarding the ratio between the two.

While the ratio is not set, there are some crucial differences between company and individual seats.

In the case of a company seat, an official letter from the management is required to confirm the support from the company. For such a seat, if a company representative cannot attend a meeting, he/she may be temporarily replaced by another representative. In situations where representative individuals leave a company, the company must nominate a new representative. If the company is not able to nominate a new representative, the seat is considered vacant and available for the next annual election. When a company validates/confirms an individual candidacy, it does so understanding that it will support travel costs incurred whilst fulfilling the role. Individuals representing company seats are expected to collect the vision and strategy of their company as an actor of the global Internet ecosystem.

Individual members are not required to secure official support from their company. They should be active members of the Internet community, and should be known and respected by that community. When an individual cannot attend a meeting they can allocate voting rights to someone on the board. All expenses related to attending board meeting are reimbursed upon justifications.

In both cases, either as a company or an individual, board members will demonstrate knowledge of the market to identify and collect needs, and to express a vision and contribute to the development of France-IX. The board is responsible for validating the France-IX global strategy and provide on-going counsel to the CEO and management team via bi-annual face-to-face meetings and monthly conference calls.

To achieve the best possible levels of neutrality, ideally the board will be composed of a mixture of operators, CDNs, and other corporates, in addition to the individual members. Board members sit for three-year terms before re-election is required. In 2017 four seats will become open for re-election; two individuals and two companies. France-IX invites open applications for company and individual seats.

The relevance of individual viewpoints at board level is growing as France-IX matures. Individuals help to provide a much-needed level of neutrality in strategic decision making. It is important to note that board members of France-IX cannot be present on competing boards, indeed, France-IX board members must sign a code of conduct that requires them to declare commercial interests and they cannot vote on issues where a conflict of interest exists.

Christian Kaufmann, Senior Director Network Services, Akamai is the current France-IX President. Christian has responsibilities covering peering and capacity planning. He also serves as a RIPE WG co-chair, a RIPE NCC Executive Board Member and as the Chairman of the AMSIX Executive Board. Before Akamai, Christian was Peering Manager at TeliaSonera, and Technical Operations Manager at Cable & Wireless. He also holds various technical certifications, including both a CCIE & JCNIE.

Other members of the board include networking consultant Clément Cavadore, Vice President; Jérôme Fleury, Secretary, and Network Engineering Manager at Cloudflare; Benoit Plessy, Treasurer, and Lead Technical Architect & Peering Manager at Bouygues Telecom; with member support from Stéphane Bortzmeyer, Network and Systems Architect at AFNIC, Yvan Lyko, Strategic Negotiator at Google, Nicolas Strina, Director, Global Infrastructure Development at Twitch, and Bocar Kane, Chairman of Kaylene Group, but present as an individual member of the France-IX board.



CHRISTIAN KAUFMANN
President



CLÉMENT CAVADORE
Individual Member
Vice-President



JÉRÔME FLEURY
Secretary



NICOLAS STRINA
Member



BENOIT PLESSY
Treasurer



STÉPHANE BORTZMEYER
Member



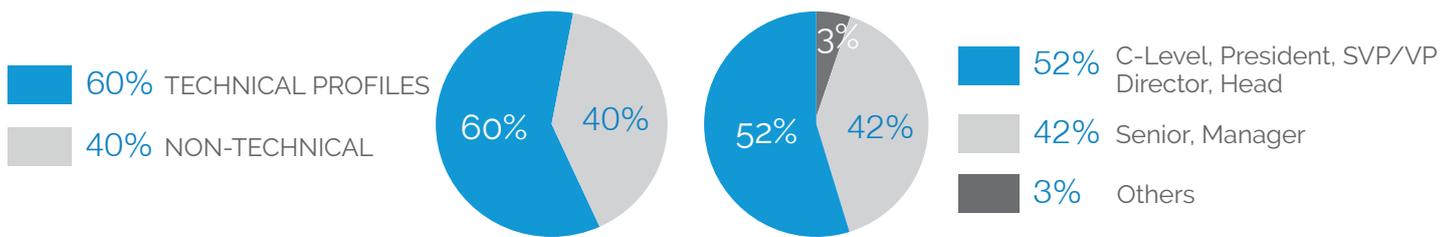
YVAN LYKO
Member



BOCAR KANE
Individual Member

At the end of September France-IX held its Annual General Meeting at the Crowne Plaza Hotel in central Paris. As in previous years the General Meeting provided France-IX with an opportunity to provide feedback to its members on the developments of the past year and also to ratify decisions requiring the community involvement (approval of its financial accounts and elections of its Board Members).

A total of 140 persons attended and heard presentations from 14 different speakers over the course of the day. The France-IX team provided a business, marketing and technology update, while guest speakers from ADVA Optical Networks, BICS, Console Network Solutions, Kentik, LINX, MSK-IX, RIPE, TouSIX and Navigacom presented on a wide range of industry topics. Marketplace partners were gathered and presented for the first time: Hurricane Electric, Kentik, Orange and Zayo.



2016 STATISTICS

140



PARTICIPANTS

105



COMPANIES

16



PRESENTATIONS

9



INDUSTRY LEADERS SPEAKERS

3



NEW BOARD ELECTED DIRECTORS

10



SPONSORS SINCE CREATION

BOARD MEMBERS CHANGES



MARTIN HANNIGAN



The General Meeting also gave France-IX an opportunity to thank outgoing board president Martin Hannigan for all of his hard work over the years and to wish him well in the future.



NICOLAS STRINA



The General Meeting provided the platform for members to hear from three nominees for a vacant position on the board. Nicolas Strina, Director Global Infrastructure Development at Twitch was elected as a new board member. As a founding member of France-IX, Nicolas brings a wealth of IXP experience to the table, in addition to experience gained in recent years in live video streaming industry.

WHY DID THEY ATTEND?



Cube Optics has supported France-IX since its inception. We are present at every General Meeting, because it is a great occasion to meet our partners and customers, in the perfectly organised yet friendly setting that the France-IX team manages. It is also one of the concrete ways in which we support France-IX, beyond the optical transmission solutions we supply them with.



THIERRY SAMAMA



AVI FREEDMAN



The France-IX general meeting is a perfect place to meet and build connections with an industry-leading community. Kentik was proud to participate in 2016 and we look forward to joining again as in 2017.



Telehouse is pleased to join the France-IX general meeting, it became a regular appointment in order to meet Telehouse ecosystems. We are delighted to participate as a sponsor of France-IX general meeting this year.



JULIEN PELLEGRIN





2 COMMUNITY DEVELOPMENT



“

France-IX interconnects several hundreds of telecommunications carriers, ISPs, content providers, content delivery networks and all other Internet networks worldwide with significant traffic in the Internet French market.

”

2.1



OVERVIEW

In business, as in life, we are judged by the company that we keep, and the France-IX community reads like a who's who of the French Internet. From companies who own Internet content, cloud or users, to companies who use these resources, France-IX gathers a wide diversity of businesses with one common objective: to improve the accessibility and the latency of their network in France.

GEOGRAPHY



France-IX members are mostly based in France but a growing number originate from other European countries, the Middle East, Africa, USA and Asia Pacific;

BUSINESS SIZE

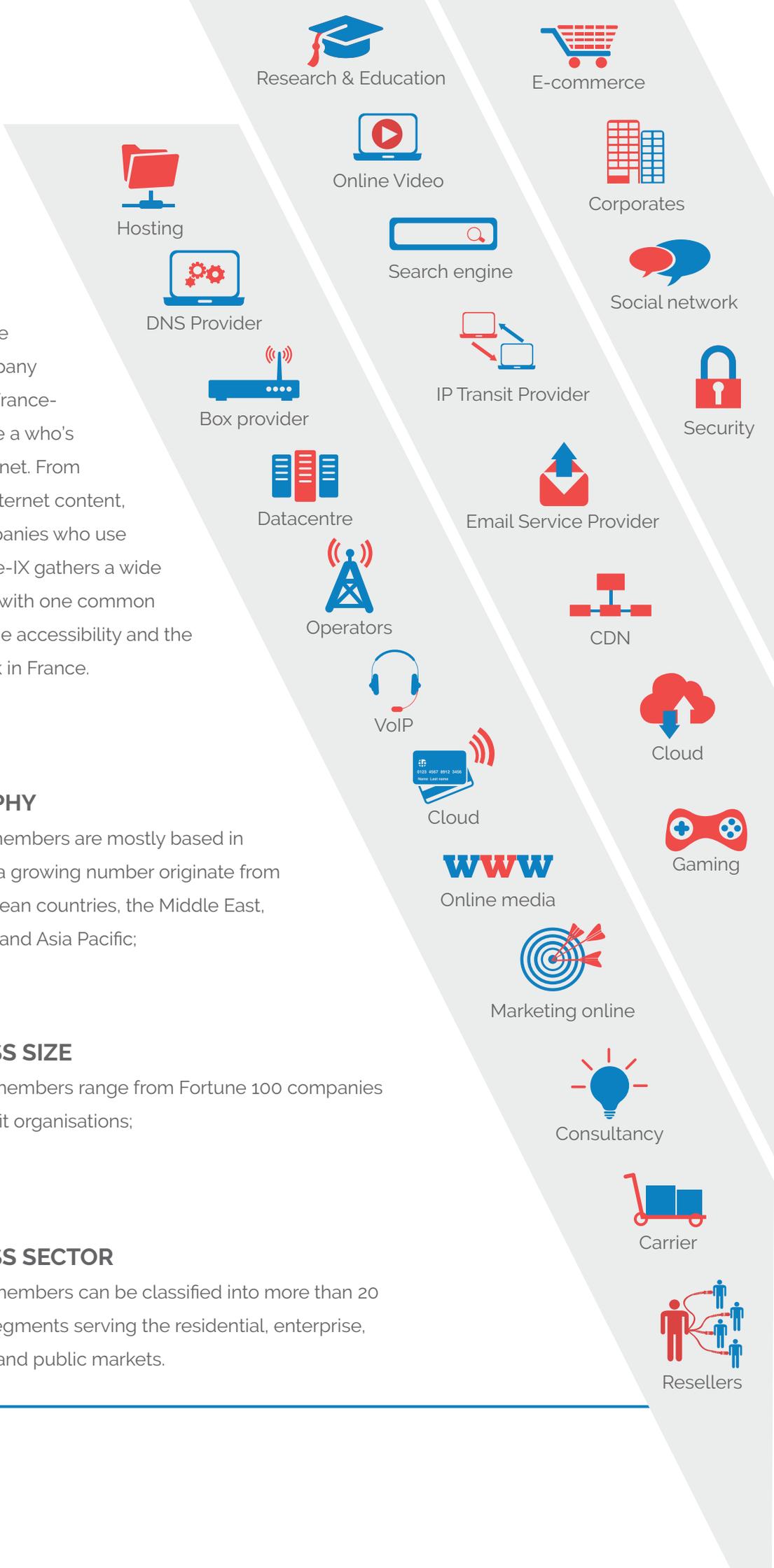


France-IX members range from Fortune 100 companies to non-profit organisations;

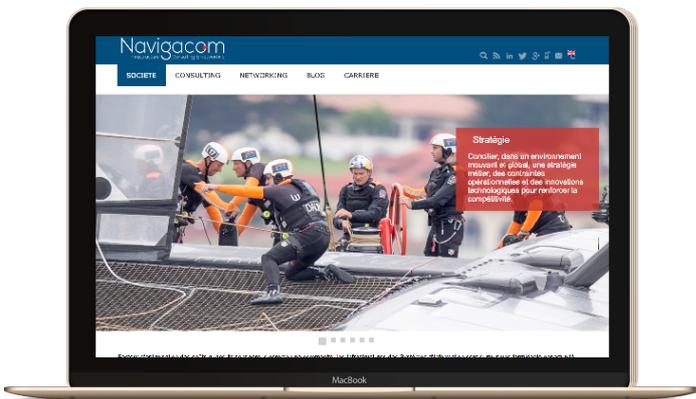
BUSINESS SECTOR



France-IX members can be classified into more than 20 business segments serving the residential, enterprise, wholesale and public markets.



LARGE FRENCH CORPORATIONS: ON THEIR WAY TO DIGITAL TRANSFORMATION THROUGH PEERING



The rapid adoption of cloud services by the French corporate world is opening new ways for France-IX to provide its services to international corporations, headquartered in France. In 2016, the peering pioneers were Axa Technology Services, Kering, Lacoste, Les Nouveaux Constructeurs, Saint Gobain and Schneider Electric.

Thanks to its unique membership, France-IX is able to provide high levels of resiliency and low latency for enterprises looking to connect with multiple cloud providers, CDNs, media, content and hosting providers, as well as mobile operators, and national and international carriers.

In 2016, France-IX partnered with the French consulting firm Navigacom to demystify peering for the largest French corporations. Navigacom, which has been advising major enterprises on the growth of their digital infrastructures since 1999, has developed a solid expertise in IP networks and cloud access strategies. A small group event was organised allowing Navigacom to explain the high level concepts of peering, the definition of Internet Exchange Points and demonstrate the benefits of IXPs using the real life case studies.

In addition, throughout the year, France-IX has worked with other consulting firms, both national and international, to explain public peering and showcase its benefits to a wide audience of IT and cloud experts, working on the digital transformation of the largest French corporations.

MARSEILLE MANAGING INTERNATIONAL AND NATIONAL COMMUNITIES



Marseille represents a high-growth market for France-IX. With two points of presence in 2016 we anticipate that number to rise as organisations look to tap into markets in North Africa and the Middle East. France-IX grew its international membership in the Middle East, Africa and Asia with the arrival of international carriers such as Saudi Telecom Company, Gulfnet Kuwait, Reliance Jio and Telin.

Marseille is almost on par with Paris in term of traffic convergence and offers a highly competitive redundancy value proposition. A wealth of French carriers, content providers, hosters, CDNs and public cloud providers are already connected to France-IX Marseille. This adds an incredible value to all networks in the south, such as regional or local carriers and ISPs, growing cloud providers and their users, and the high tech sector in that dynamic territory.

In 2016, France-IX joined the Aix-Marseille French Tech (AMFT) label. French Tech is an accreditation awarded to French cities recognised for their start-up ecosystem, the local French Tech gathers 150 Tech champions (annual turnover of more than €5 million) and an extremely developed digital economy with more than 40,000 employees on the Aix-Marseille territory.

Following visits to local networks, a strong requirement to educate and provide community networking was identified. To deliver this and start managing its community, France-IX organised a one-day peering introduction in Marseille in November 2016. The day gathered about 25 individuals from local members and prospective members, datacentre partners and Marketplace partners. The agenda included an overview of peering and IXP structure, a local member testimonial from Evolix, an overview of the datacentre partners (Interxion and Jaguar Networks), the introduction of the France-IX Marketplace and its partners in Marseille (Hurricane Electric, Orange) and finally a hands-on session for network engineers to help them get started with peering. Participant feedback was extremely positive and more "learn & network" events of this type are planned for 2017.

ORANGE

THE PARTNERSHIP OF THE FUTURE



France-IX is the largest Internet peering service provider in France, in Paris for the French, international and enterprise market and in Marseille addressing Europe, the Middle East and African markets. Orange is one of the largest operators of mobile and Internet services in Europe and Africa and a global leader in corporate telecommunication services. With 18 million broadband customers worldwide, nearly two million fibre customers in Europe, Orange is one of the strongest global network service providers in the world with a particular strength in emerging markets, supplying 220 countries with end-to-end connectivity and operating 445,000 km of submarine cable.

The possible synergies are endless from the development of the Internet in Africa to complementary services on the Marketplace. 2016 was an enlightening year for both organisations and France-IX had the honour of welcoming Orange to the Marketplace in Paris and Marseille.

This means France-IX is now able to provide access to ISP Orange's national and international IP network. Orange France's national network, identified by its Autonomous System number 3215, provides access to all clients of the ISP Orange (General public, Mobile phones, Professionals and Corporate). The direct interconnection via the AS3215 can also be used to access all major French ISP networks, and the entire Internet, through its interconnection with Orange's International network (International Open Transit AS5511). In December 2016, no less than 5 Tbps were exchanged during peak periods over the 3215 network. All France-IX members in Paris and Marseille can now subscribe to IP connectivity services directly with Orange Wholesale France and have the service delivered to their current France-IX port within days by simply configuring an additional VLAN.

2.2 2016 MEMBERS

THANK YOU TO OUR MEMBERS WHO TRUSTED FRANCE-IX FOR THE FIRST TIME IN 2016 AND TO OUR MEMBERS WHO CONTINUED TO GROW THEIR TRAFFIC WITH FRANCE-IX IN PARIS AND/OR MARSEILLE.

NEW MEMBERS ON BOARD IN 2016

 Add-on telecom	 Gulfnet	 Reliance Jio
 AFNIC	 iBrowse SARL	 Riot Games Limited
 Alcatraz Information Security	 KALYST SARL	 RIPE NCC - K-Root server
 AS2613	 Leitwert GmbH	 Saclak Network
 AZA Telecom	 MTX Services SARL	 Saudi Telecom Company (STC)
 Azylog	 New Continuum	 Seacom Ltd.
 Brandwatch	 Nexeon Technologies	 Serbia Broadband SBB
 COMUTO BLABLACAR	 NEXT2i	 Sofa Connect
 Erre Elle Net S.a.s.	 OOREDOO TUNISIE SA	 Symphony communication
 FRANCE TELEVISIONS	 ORANGE BUSINESS SERVICES	 public company limited
 Fullsave	 Oxymium	 System-net
 Gedefi Conseil	 PIXAGILITY	 TAS France
 Giants For Renting Computer	 PJSC Vimpelcom	 Telandgo
 Systems Company W.L.L	 PT Telekomunikasi Indonesia	 Yahoo!
 Global Cloud Xchange	 (TELIN)	

MEMBERS WITH EFFECTIVE UPGRADE IN 2016

 Acorus Networks	 DRI	 NForce Entertainment BV
 Adobe Systems France SAS	 Evolink AD	 Online
 AFR-IX Telecom SL	 GIGALIS	 Owentis
 Altitude Infrastructure Exploitation	 Gulfsat Madagascar	 Reliance Jio
 APPLIWAVE SAS	 Hexaglobe	 RETN
 BlueGIX	 iBrowse SARL	 Saint Gobain
 Bouygues Telecom	 IELO-LIAZO	 Schneider Electric
 Bretagne telecom	 Jastel Network Ltd.	 Seacom Ltd.
 China Mobile International	 Kwao.com	 Sewan Communications SAS
 Clever Network	 Lacoste Operations	 Sipartech
 Cloudflare	 Le Figaro	 Telma
 Colt Technology Services	 M6web	 Tetaneutral
 Covage Networks	 Naitways	 WIOCC
		 Zeop Reunicable

2.3 | FRANCE-IX PARIS

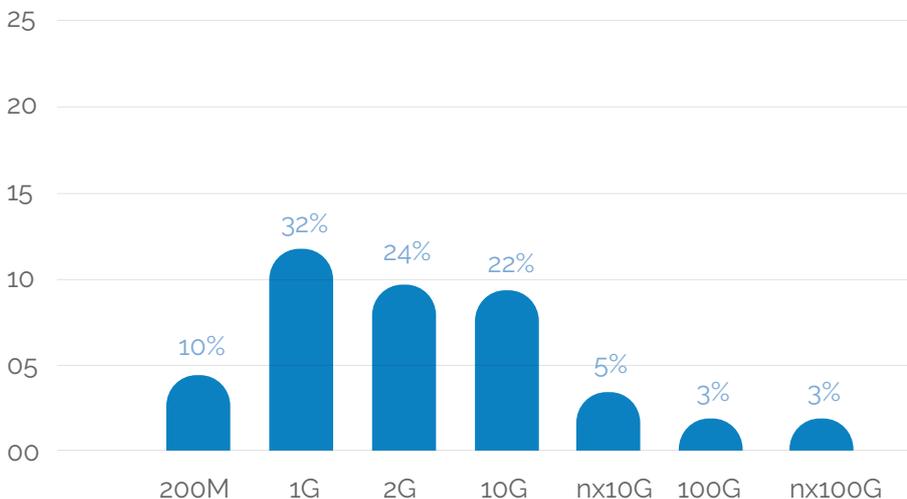
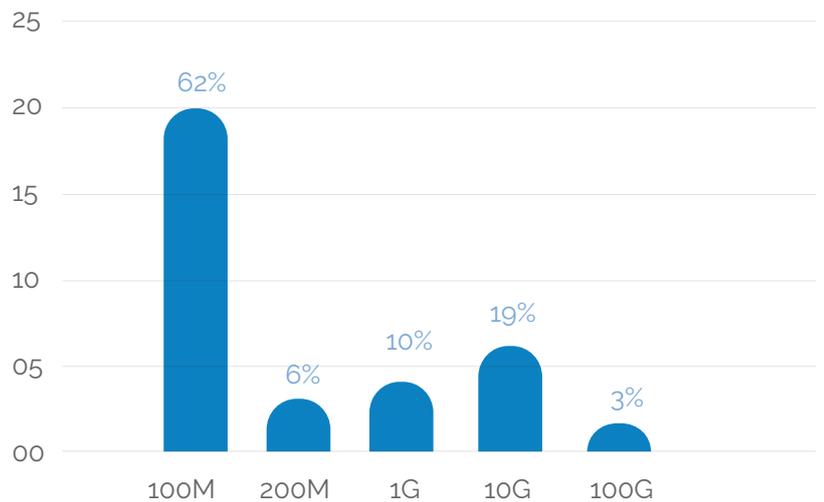
Paris represents the heartland for France-IX with nine PoPs, 291 members connected to 274 ports as of December 31, 2016. Two standout facts during 2016 help to demonstrate that Paris has achieved a perpetual organic growth, year-on-year:

- 16 percent of new members joined Paris helping to contribute to a 50 percent increase in traffic;
- New strong demand for 100Gbps ports.

In order to accommodate this growth, technical operations performed during 2016 in the backbone included the addition of new routers and linecards, which helped increase backbone capacity. In the first half of 2016 France-IX doubled the capacity between the three core PoPs in Paris to 200G, while also adding capacity between the edge devices and the core PoPs.

MEMBERSHIP ACQUISITION

New connected Members (Paris)



MEMBERSHIP GROWTH

Upgrades from existing Members





CONTINUOUS ORGANIC GROWTH

With 38 new members and 39 upgrades, France-IX Paris demonstrated impressive expansion in 2016. Analysing the typology of new members, we observe a vast diversity, with local and international players. Regarding upgrades, around 20% of existing members performed an increase of capacity, a sign their needs are certainly growing on the exchange. As a result, we noticed a traffic growth of 50%.

To address this demand, the architecture of our main PoP has been changed: a new Juniper EX9214 has been activated on Telehouse 2 PoP so that members are split between two different chassis. This infrastructure offers additional capacity and redundancy for members that would like a dual attachment on different devices.

A key number that can simply translate the activity during 2016 is the number of new ports connected, order by type of port:



LX

1Gbps

24 ports



LR

10Gbps

36 ports



LR4

100Gbps

4 ports





FAST ADOPTION OF 100G PORTS

Digital content creation and consumption, the boom in mobility and cloud services, big data analytics and enhanced communications are all helping to drive up the value and volume of Internet traffic and will place far greater demands on IXP infrastructure moving forward. France-IX started offering 100G ports in the three core PoPs end of 2015 with few demands.

The jump from offering 10G to 100G provides members with significant improvements in efficiency, furthermore they also enjoy cost benefits realised through economies of scale. With the introduction of the new 100G ports, members can choose to upgrade from paying €4,400 per month for 4x10Gbps to €5,500 for a 100Gbps port. Then, during 2016, France-IX received more than expected 100G requests, on different PoPs. Therefore, three PoPs were upgraded to support 100Gbps interfaces (Online DC2 and DC3, Equinix-Telecity PA6).

The demand for 100Gbps is definitely here and will increase in 2017. The current technology using 2x100G or 4x100G ports per line card will not be enough to address the huge demand

on 2017. Chassis would be filled too quickly and is clearly not the most cost effective way of delivering 100G ports to our cost-savvy members. Hence, France-IX plans to anticipate the replacement of its core infrastructure by mid 2017 in order to deploy the next generation of 100G platform, offering up to 36x100G ports per line card. This will enhance the density in terms of ports per card, and therefore improve our cost effectiveness dramatically, and consequently our 2018 peering pricing.

After these operations, France-IX will be able to deliver 100G ports within two working days, with the same provisioning efficiency as for any 1G and 10G ports.

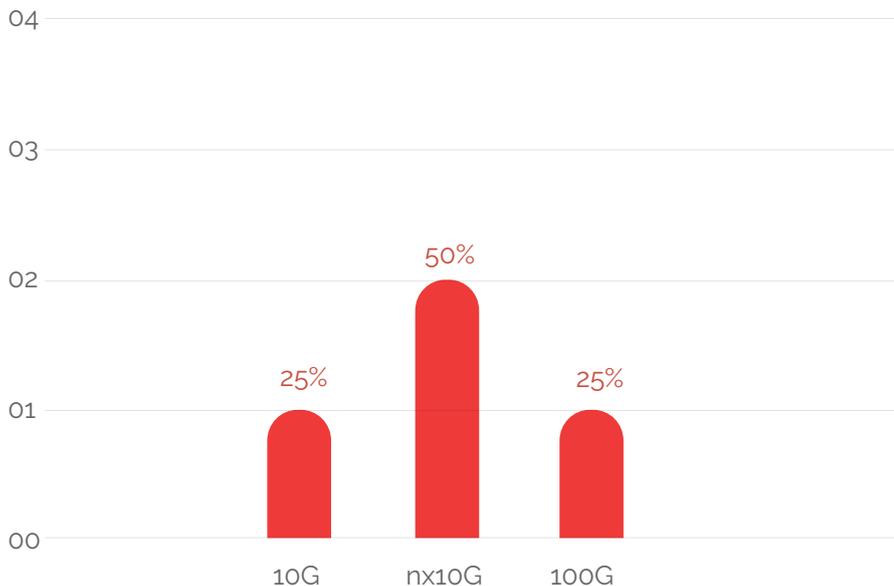
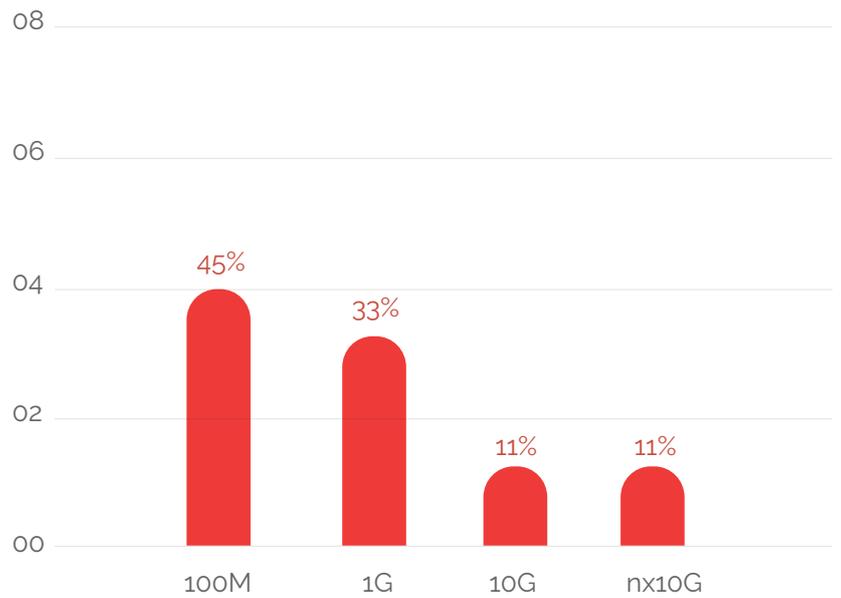


2.4 | FRANCE-IX MARSEILLE

The expansion of the France-IX network in Marseille has been a key development in recent years. At the end of 2016, 30 networks interconnect in Marseille. At the beginning of 2016, the community consisted mainly of French and African operators, in addition to US content providers. At the end of 2016, Marseille welcomed international major carriers from the Middle East and Asia, regional IT and cloud providers, new Marketplace sellers and national and international resellers.

MEMBERSHIP ACQUISITION

New connected Members (Marseille)



MEMBERSHIP GROWTH

Upgrades from existing Members (Marseille)

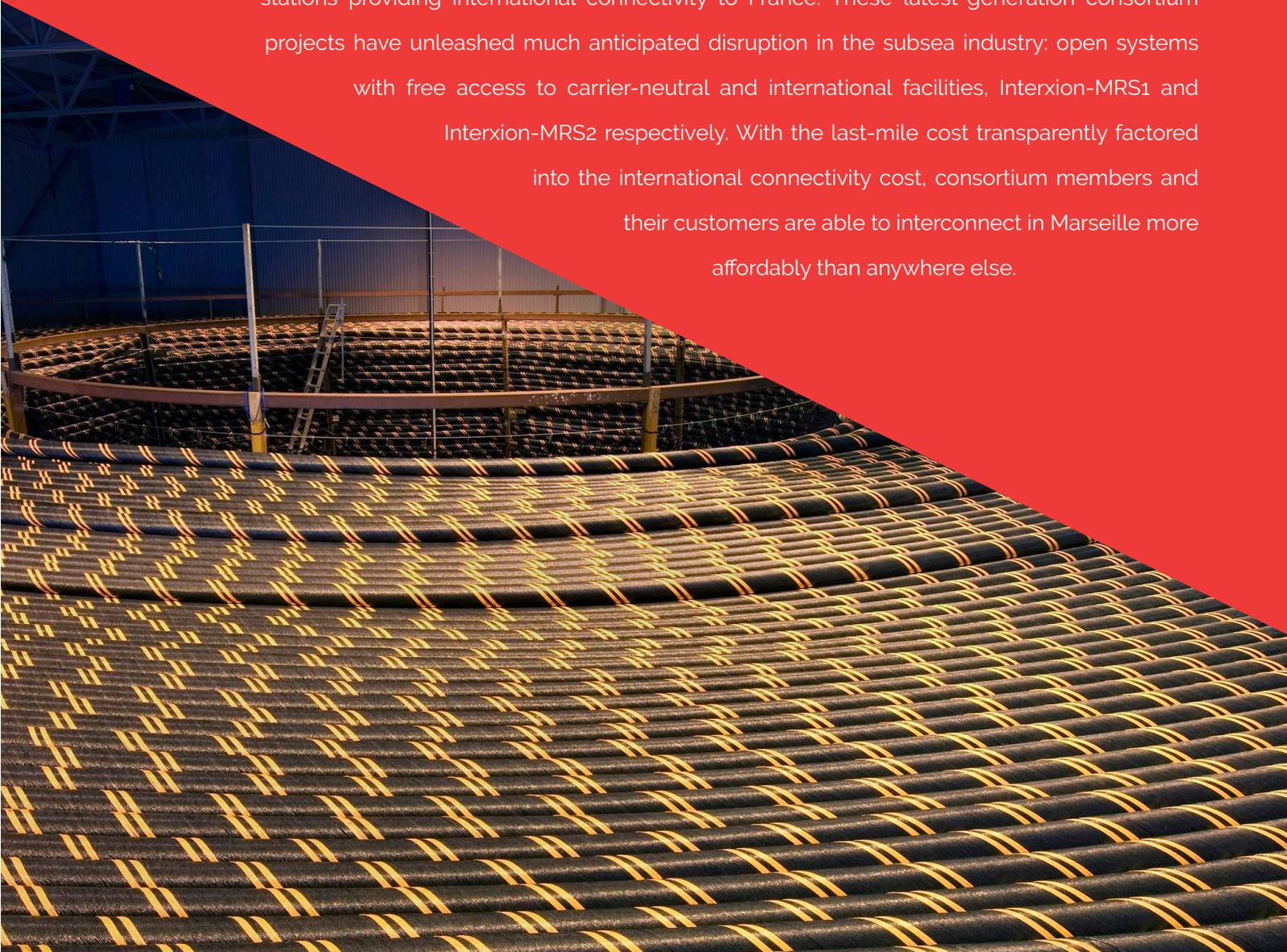




WELCOME TO THE NEW PARADIGM OF SUBSEA CABLES

France enjoys a favourable geographical setting when it comes to accessing the oceans. Consequently, a number of submarine cables have landed in France to support the Internet's international bandwidth. A total of 20 international submarine cables land in France providing a bandwidth gateway to England, Northern Europe and the Americas through the North Sea, the English Channel and the Atlantic Ocean, additional bandwidth entry points to Africa, Middle East and Asia exist via the Mediterranean Sea and Panama Canal.

With the official launch of SEA-ME-WE 5 in December 2016 and the announcement of AAE-1 shortly afterwards, the south of France now welcomes half of all of the landing stations providing international connectivity to France. These latest-generation consortium projects have unleashed much anticipated disruption in the subsea industry: open systems with free access to carrier-neutral and international facilities, Interxion-MRS1 and Interxion-MRS2 respectively. With the last-mile cost transparently factored into the international connectivity cost, consortium members and their customers are able to interconnect in Marseille more affordably than anywhere else.





A GROWING ECO-SYSTEM

2016 has seen the arrival of major international operators from the Middle East and Asia such as Saudi Telecom Company (STC), Gulfnet Kuwait, Reliance Jio and PT Telekomunikasi Indonesia Int (Telin), the consolidation of the French operators and the launch of news services with the announcement of Orange and Hurricane Electric on France-IX Marseille Marketplace. Furthermore as a result of growing demand from the Aix Marseille high tech sector, new members including Kalyst, Fullsave and Alcatraz have joined Marseille. France-IX Marseille has also been joined by a new national partner ielo-liazo which resells France-IX services, in addition to the international operator BICS.

The three member segments are now balanced and contribute to the France-IX Marseille value proposition: the intersection of French operators, international carriers and international content providers (public cloud, content delivery network, hosting, social media).



FAST TRAFFIC GROWTH AND 100G ADOPTION

Marseille provides an alternative for members and also contributes to the provision of higher resiliency. France-IX upgraded all of its equipment in Marseille to ensure that there will be the required amount of additional capacity to peer and such equipment renewal also allows for the provision of 100Gbps ports for members.

This development is significant, as Marseille – as an Internet exchange point – has been growing for a whole year now. Traffic peaked around 50Gbps during the spring and doubled in just six months to reach a peak of 110Gbps during the autumn of 2016. The first 100G port was delivered in November 2016 to Indian carrier Reliance Jio in less than a business week. France-IX Marseille featured in the top five of France-IX's Points of Presence in 2016 and recently it entered the top four.



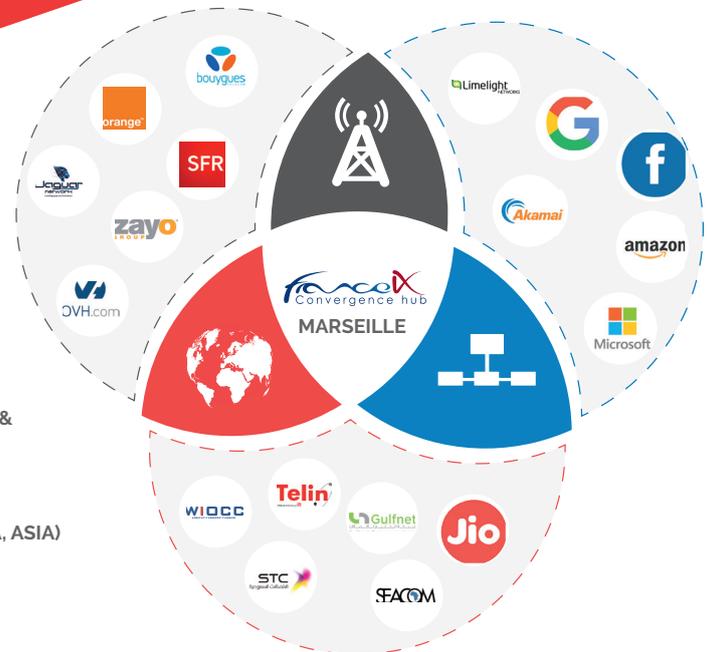
60% OF THE TOP 10 FRENCH ISPS



50% OF THE TOP 10 FRENCH INTERNET CONTENT & 8 OF THE WORLDWIDE LARGEST CDNS



INTERNATIONAL CARRIERS (MIDDLE EAST, AFRICA, ASIA)



2.5 | REMOTE PEERING

Remote peering provides an affordable method for communication service providers of all sizes to expand their network footprint. Thanks to a growing number of partnerships, France-IX can offer members with no presence in either Paris or Marseille the peering options they require without the requirement to physically co-locate in common points of presence.

Increasingly, as smaller firms look to gain from the benefits of peering and bigger firms look to deploy as fast as possible with limited investments, we will see a much greater reliance on remote peering. Consequently, remote peering is an area of the organisation that France-IX expects to grow over the coming years. The ratio of networks peering directly or via a partner rose from 18% at the end of 2015 to 24% at the end of 2016.

France-IX has remote peering partnerships with a wide selection of carriers and service providers. At the end of 2016, a total of 12 resellers was gathered, representing a 50% growth in less than one year and offering several hundreds of virtual France-IX points of presence in France, Europe, North America, Middle East and Asia.

During 2016, France-IX managed to double its remote peering partners with the addition of BICS in Paris (in addition to Marseille), Ielo-Liazo in Marseille (in addition to Paris), and the group of Interoute, IP-Max, RETN Ltd and Sofia Connect, all in Paris. The new remote peering partners joined a group of 8 loyal partners: BICS, Console Network Solutions, Hibernia Networks, Ielo-Liazo, InterCloud, NL-IX, Phibee Telecom and Zayo France. France-IX takes this opportunity to thank all its remote peering partners for their continuous activity and for their efforts to promote France-IX during 2016 in France and abroad.

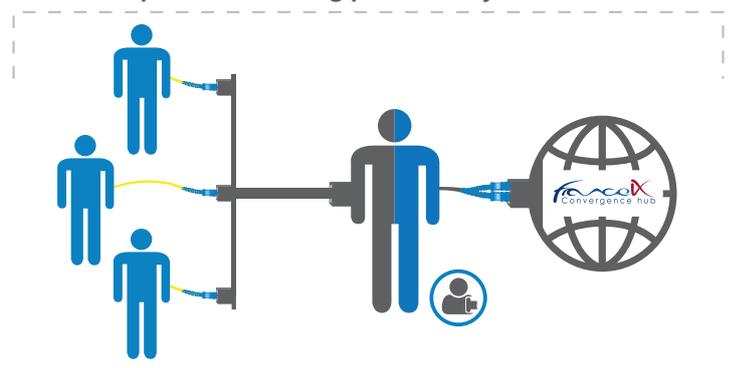
New connected Members per Sales Channel (total Paris and Marseille)



11

New members via Resellers

Transport and Peering provided by Reseller Partner



 Member

 Reseller Partner

 France-IX Community

BEYOND A STRATEGIC PARTNERSHIP, A COMMON VISION WITH BICS ON PARIS & MARSEILLE

France-IX and BICS, the international leading wholesale solution provider announced their partnership in August 2016 with the aim to offer one unique, simple and competitive solution for any network looking to peer remotely at France-IX Paris or France-IX Marseille or both.

BICS remote peering solution provides an affordable method for communication service providers of all sizes to expand their network footprint. Its network offers a truly global footprint with 112 PoPs worldwide in addition to local networks in all major markets. It has full access to 20 submarine cables covering all key routes around the world, including EIG, AAE-1, SeMeWe-3, SeMeWe-4, SAT-3/WACS and SAFE.

The new approach offered by France-IX and BICS meets the connectivity requirements of major carriers and Internet players, while providing agility, flexibility and cost-savings. In addition, the solution provides increased bandwidth granularity with increments as small as 100Mbps, faster deployment times as short as two business days, and finally estimated cost savings up to 50 percent per month. This can be achieved because the France-IX/BICS model requires the activation of one single service with BICS.

MARSEILLE EXPANSION

France-IX Marseille can now count on 2 remote peering partners: BICS since 2015 and now, Ielo-Liazo, remote peering partner in Paris since 2013 and in Marseille since December 2016. Ielo-Liazo, a unique wholesale infrastructure and service provider focused on the French market, offers a unique fibre network of 600km in France, representing 60 PoPs in 20 cities, spread in 6 countries.

The company's strategy has been to own and control its dark fibre network since its creation in 2002, which enables them today to offer the best value for money for its high-demanding customers, such as France-IX members.



Welcome to BICS from Brussels, InterCloud from Paris, IP-Max from Geneva, Interoute and RETN from London and Sofia Connect from Sofia for beginning this Remote Peering journey with us during 2016.



Thank you to Console Network Solutions, GTT (fka Hibernia Networks), NL-IX, Phibee Telecom and Zayo for being a trusted Remote Peering Partner year after year and to ielo-liazo for expanding this partnership to Marseille in addition to Paris.



3 SERVICE INNOVATION

“

*France-IX enhances the affordability
and latency of the Internet traffic
exchanged between its members
and thus improves the overall quality
of the Internet in France.*

”



3.1 NETWORK AND TECHNICAL OVERVIEW

SUPPLY ALWAYS AHEAD OF DEMAND

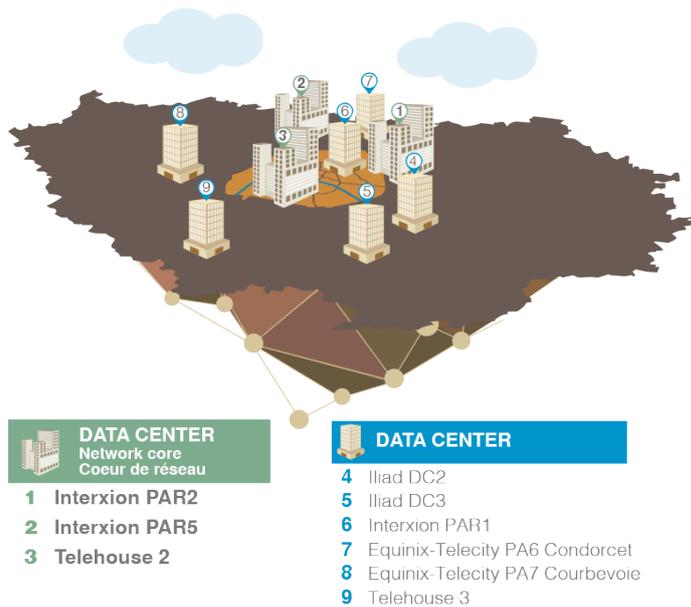
As the France-IX membership grows so does the volume of traffic. In Paris, traffic increased by 50 percent in 2016, while in Marseille the figure reached 100 percent. One of the basic network rules is that France-IX backbone is over-provisioned to ensure that there is no risk of congestion even when new customers get connected. To support increases in traffic volume, France-IX has a set of engineering rules in place where a 50 percent capacity threshold triggers the requirement to upgrade backbone capacity.

Thanks to this policy of delivering the potential for supply ahead of demand in addition to the professional full-time technical team to operate and maintain its network, France-IX backbone has been extremely stable. For the year 2016, the France-IX network availability across nine PoPs in Paris was 99.999 percent, while for the two PoPs in Marseille it peaked at 100 percent.

PROVISIONING AGILITY

The operations in the backbone were mainly driven by 100G requests. Four additional Juniper EX9214 were installed during 2016:

- Thanks to new 100G requests, three Brocade MLX-8 have been replaced by three Juniper EX9214: Iliad DC2, Iliad DC3 and Equinix PA6 PoPs have been upgraded;
- New Juniper EX9214 chassis has been installed at Telehouse 2 PoP. This chassis offers additional capacity and redundancy for members requiring dual attachment on different devices;
- Additional 100G linecards have been installed in Paris and Marseille to address the important number of requests;
- Backbone capacity upgrade: once new boxes have been installed, additional capacity, based on DWDM passive network has been added: 200G at Iliad DC2 and DC3, 160G at Equinix-Telecitey PA6.



These operations (new equipment and additional backbone capacity) provided France-IX with the expected delivering agility: any new member can be connected within two working days, as everything is provisioned in advance.

NEW TECHNICAL ADD-ON SERVICES

The upgraded backbone infrastructure has enabled the launch of the following new add-on features of France-IX peering services, at no extra cost for France-IX members:

- Blackholing
- QoS probes
- New customer's statistics portal

In addition, France-IX removed its gateway between Paris and Marseille with BICS signing up as the first remote peering partner for the Paris-Marseille France-IX package.

The impact on the backbone has been to simplify engineering requirements. Over time, as more carriers offer remote peering between Paris and Marseille, members will enjoy lower costs and increased redundancy.



3.2 QUALITY OF SERVICE

THE INTRODUCTION OF QUALITY OF SERVICE

IP networks on the public Internet are best effort, and until now France-IX has delivered its services with much the same philosophy. However, with the processes, systems and networks in place and the professional full-time people to run the organisation, the best effort service provided by France-IX to its members resulted in satisfaction levels of 95 percent according to France-IX customer survey conducted in August 2016. Growing from a standing start in 2010 to over 300 members this year is testament to the continued levels of service excellence France-IX provides.

However, as our membership numbers have grown, so has the sophistication and complexity of our member organisations. The fact remains that some organisations cannot commit to using a service without measurable assurances that those services will continue to be provided at a level they demand. With that in mind, in 2016, France-IX decided that the time was right to offer visibility on the provided Quality of Service (QoS).

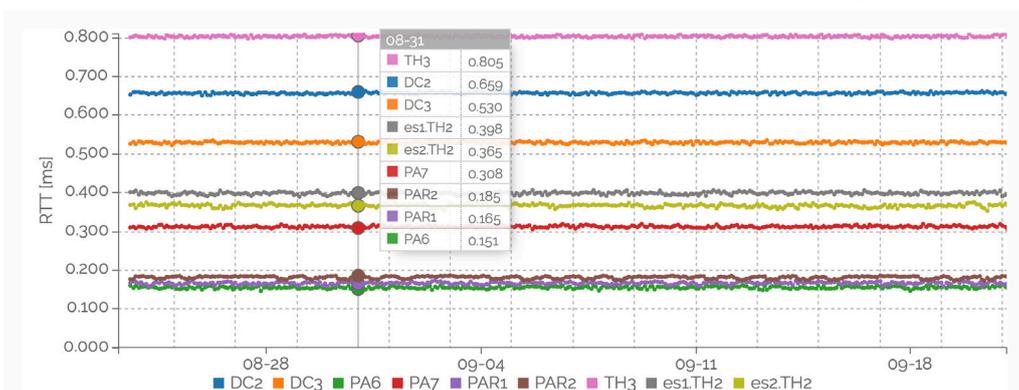
		RTT		Jitter		Loss					
To	From	es1.TH2	es2.TH2	PAR1	PAR2	PAR5	DC2	DC3	PA6	PA7	TH3
es1.TH2			0.161	0.265	0.273	0.380	0.375	0.515	0.290	0.351	0.894
es2.TH2		0.164		0.286	0.308	0.334	0.308	0.463	0.297	0.387	0.934
PAR1		0.265	0.343		0.411	0.145	0.715	0.572	0.444	0.377	1.041
PAR2		0.275	0.329	0.415		0.180	0.502	0.629	0.437	0.514	0.754
PAR5		0.397	0.336	0.174	0.181		0.674	0.549	0.137	0.311	0.809
DC2		0.360	0.337	0.735	0.504	0.659		0.276	0.593	0.873	1.125
DC3		0.505	0.485	0.613	0.616	0.514	0.276		0.562	0.731	1.238
PA6		0.283	0.322	0.455	0.474	0.149	0.638	0.584		0.443	1.045
PA7		0.365	0.384	0.365	0.492	0.310	0.891	0.758	0.449		1.118
TH3		0.906	0.935	1.036	0.735	0.777	1.110	1.229	1.031	1.120	

RTT : Round trip time of packets between two PoPs.

Jitter : Deviation between the average and the high/low RTT.

Loss : Lost packets between two PoPs.

RTT MEASUREMENTS FROM PROBE PAR5



- Probes are installed on each FranceIX PoPs and connected to a 10G interface on the public peering VLAN.

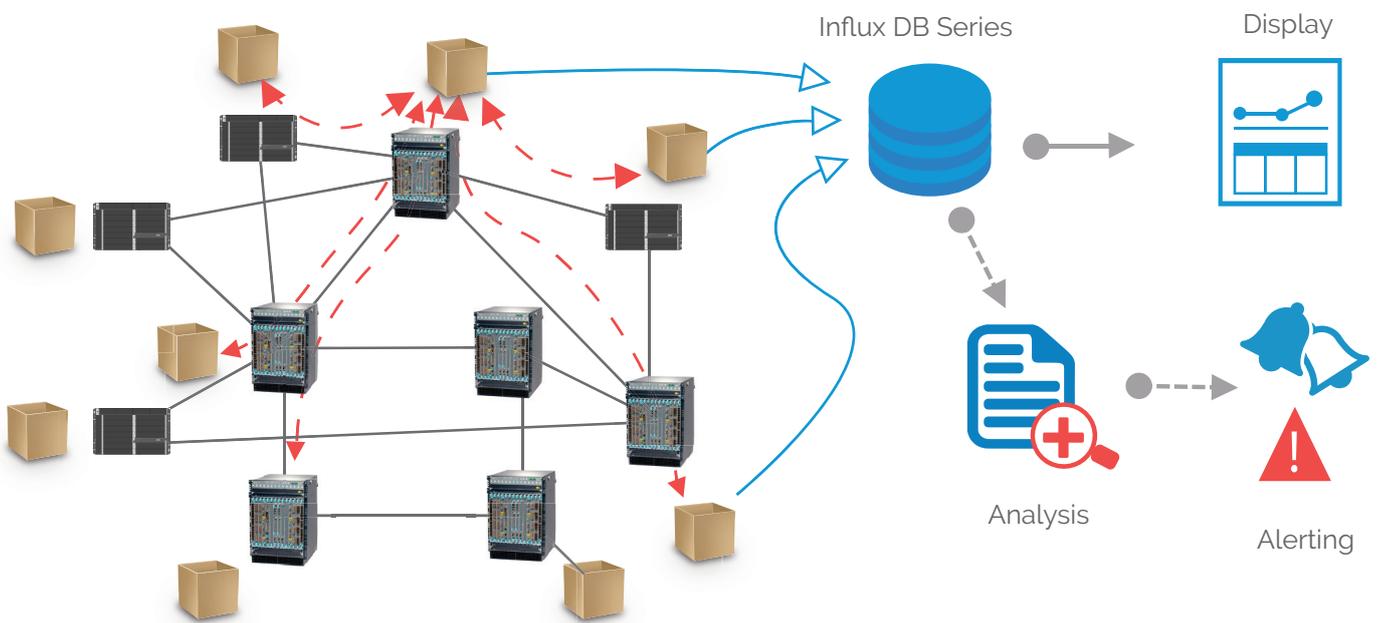
- UDP packets are sent every 5 minutes.

NATIONAL NETWORK PROBES DEPLOYMENT

In order to measure the QoS delivered to its members, France-IX deployed a network of probes that could accurately measure a variety of metrics. A decision was taken to develop the probe technology in-house using open source software solutions rather than buying an off-the-shelf solution. Not only this helps to keep the costs down, but more importantly France-IX remains free from any vendor system and always agile for the provisioning and development of QoS metrics, today and tomorrow.

Once the software had been created and tested, a 10G probe was installed in every France-IX PoP in both Paris and Marseille. Measurements were then taken with five-minute intervals on delay, jitter and frame loss. The QoS probes also enable the ability to drill down globally, per PoP and per member across each of the metrics being measured.

The final phase in the introduction of QoS visibility was the development of an attractive customer facing user interface. The GUI deployed provides every member with a user-friendly browser-based interface showing an overview of network data in near real time, and also allows historical analysis across each of the metrics measured. This GUI is available on the France-IX portal <https://tools.franceix.net> once the member is logged in.



---> Measurements - France-IX Peering LAN

—> Data export - OOB LAN

●---> Under development

SERVICE AVAILABILITY CALCULATION

Finally, one of the key indicators extracted from this QoS platform is the network availability. It is calculated, following this formula:

$$\text{Availability} = \frac{\text{Total time} - \text{maintenance time} - \text{outage time}}{\text{Total time} - \text{maintenance time}} \times 100$$

- Paris Availability: > 99,999%, one outage impacting 20 members during less than 1 hour
- Marseille Availability: 100%, zero outage

In addition to provide QoS measurements, this platform improves France-IX peering services for all France-IX members globally. If, for instance, a data point measured falls below or even starts to fall towards a certain threshold level, France-IX will be in a better place to respond more quickly and identify traffic issues in order to take appropriate measures to minimise potential impacts.

With all these data in place, this is the first step to provide in the future guaranteed QoS, commonly called SLAs. We expect that as the membership grows, particularly with larger corporate customers and cloud users in general, SLAs will become a must-have service feature.

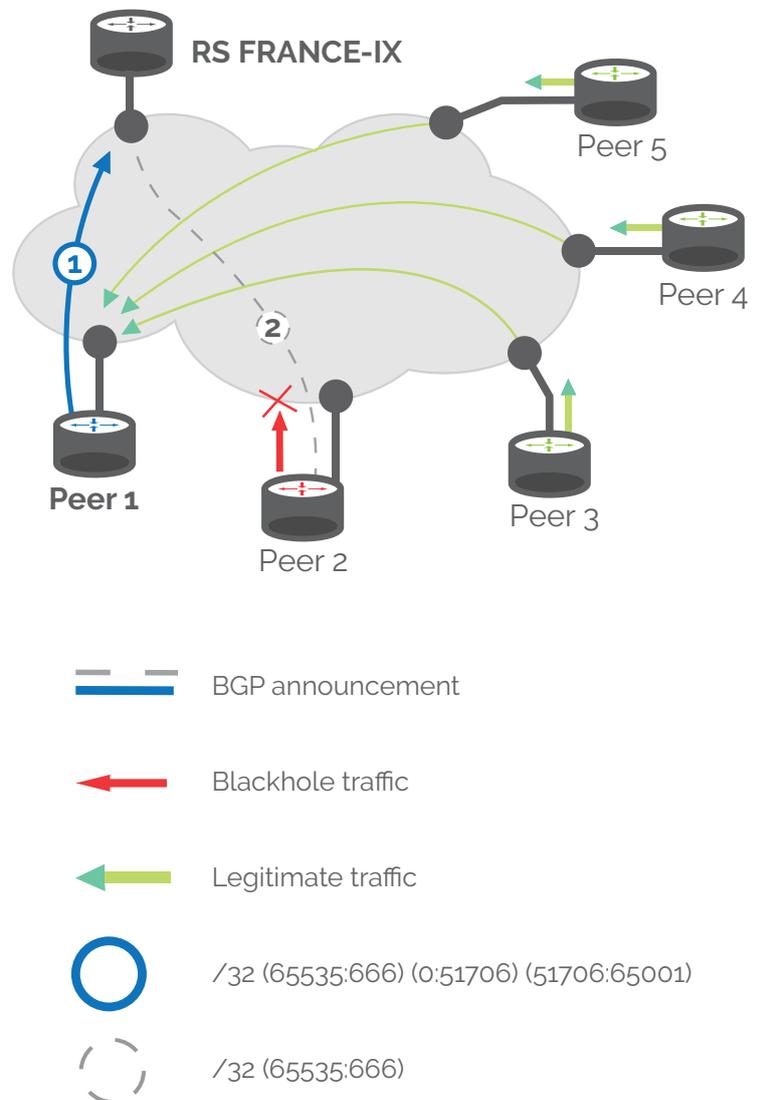
3.3 | BLACKHOLING

HOW TO HELP OUR MEMBERS TO PROTECT THEIR INFRASTRUCTURE AGAINST DDOS ATTACKS

In order to help our members to fight against DDoS (Distributed Denial of Service), France-IX has deployed a blackholing service available in Paris and Marseille. Members are able to use BGP communities on the route servers (RS) or a specific BGP next hop to blackhole on the edge traffic going to a prefix.

DDOS ATTACKS

- In the past, DDOS attacks came from specific networks, through IP transit providers, IXPs were not impacted
- Even if DDOS attacks are rare on IXP compared to IP transit providers:
 - IXPs are concentrating a very large diversity of players, coming from everywhere
 - DDOS attack's typology is changing (IoT, etc) and the origin of the attack can be also victims connected to local players (Eye balls, etc)
- FranceIX launched a free service to help members to protect against DDOS attacks
- Based on BGP communities, it is very easy to activate DDoS filtering for a specific prefix
- Traffic is filtered on the edge of the exchange, to avoid to transport DDOS traffic on backbone links



3.4 MARKETPLACE

A NEW WAY TO BUY AND SELL IP-CENTRIC SERVICES USING THE FRANCE-IX PLATFORM

In April 2016 France-IX launched officially the Marketplace platform. It enables France-IX to extend and diversify its eco-system by offering services complementary to its peering services for its existing members, looking for constant cost optimisation and agility. The Marketplace is a toolkit for any peering or network manager, offering seven must-have services: IP transit, anti-Ddos solutions, cloud direct access, paid peering, Ethernet transport, network visibility and analytics solution and remote peering.

Services are available instantly in all France-IX points of presence. This allows all France-IX members to access all the Marketplace services anywhere, irrespectively of their equipment location.

Members are purchasing services directly to Marketplace sellers. Once the commercials are set between buyers and sellers, France-IX members request the activation of private connection towards the selected seller. Provisioning takes maximum one business day with a limited one-time installation fee charged by France-IX to the member, who pays directly its service to the Marketplace seller. France-IX does not require any commission from the seller.

OUR AMBITION: DELIVER LONG-TERM VALUE TO OUR MEMBERS

France-IX members will benefit from cost efficiencies when they buy services through the Marketplace. Cost optimisation is created through seamless provision of the service they buy and how simple it is; members already have a port in place and there is no need for them to use additional resources or order a new cross-connect.

When members use their ports for peering only, there is often unused capacity which could be partly filled by subscribing to additional services, optimising then the cost of the peering port. Further cost benefits are gained from multiple sellers of the same service offering competitive pricing.

Fast provisioning, in matter of hours instead of weeks, means new ways to stay agile for network managers and stay competitive in today's world. Behind every type of motivation – back up, redundancy or new service launch – the France-IX Marketplace delivers access to IP-centric services easily and in one place.

PARTNERSHIPS BASED ON INNOVATION, NEUTRALITY AND CONSTANT IMPROVEMENT

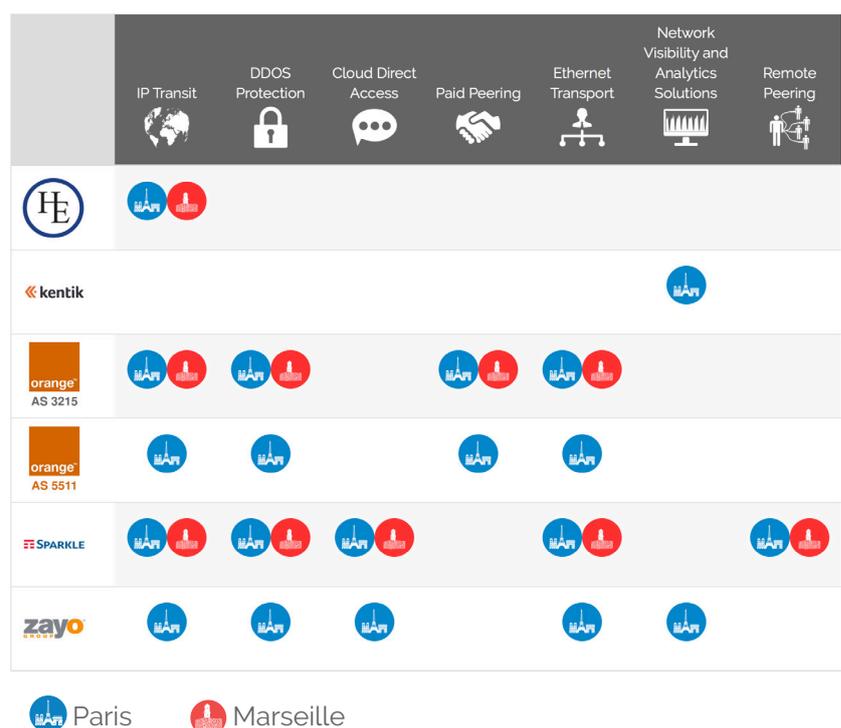
The Marketplace sellers are targeted for their quality, innovation and even disruption. They don't need to be peering members. But if they do, aggregation of peering and marketplace traffic over the same port is not authorised.

France-IX announced Orange International Carriers (AS 5511) as the first Marketplace seller in Paris and quickly announced buyers of its Open Transit service. Orange International Carriers was followed by Orange Wholesale France (AS 3215) to highlight its Internet connectivity service within the country at the regional and national level, as well as in overseas territories. Orange is one of the largest operators of mobile and Internet services in Europe and Africa and a global leader in corporate telecommunication services. Its comprehensive portfolio of innovative and flexible solutions is now available to France-IX's operators, international carriers and OTT peering members in Paris.

In September, France-IX announced Hurricane Electric as the first Marseille marketplace seller. Hurricane Electric operates its own global IPv4 and IPv6 networks and is considered to be the largest IPv6 backbone in the world as measured by the number of its interconnections to other networks. By offering IP transit services to the France-IX community in Paris and Marseille, Hurricane Electric will benefit from reaching a wider customer base within the EMEA region, offering additional value to France-IX members.

In addition to IP transit, other services include VPN services that ensure customers get a guaranteed level of secure service, anti-DDoS scrubbing that enable the filtering of malicious traffic, as well as direct access to Cloud Providers such as Microsoft and Amazon Web Services. All these services were available with the announcement of Zayo's introduction to the Marketplace. Zayo shares a long-lasting partnership with France-IX by being one of the founding members (originally Neo Telecoms), a peering member, a reseller and now a Marketplace seller.

In December, through the arrival of Telecom Italia Sparkle, a new service was added to the portfolio: remote peering, or the availability for any France-IX member to peer remotely to another IX in Europe who has a partnership in place with Sparkle. Finally, Sparkle, through its Seabone Transit service, its Cloud direct service and Ethernet service, offers a great market alternative to the previous services.

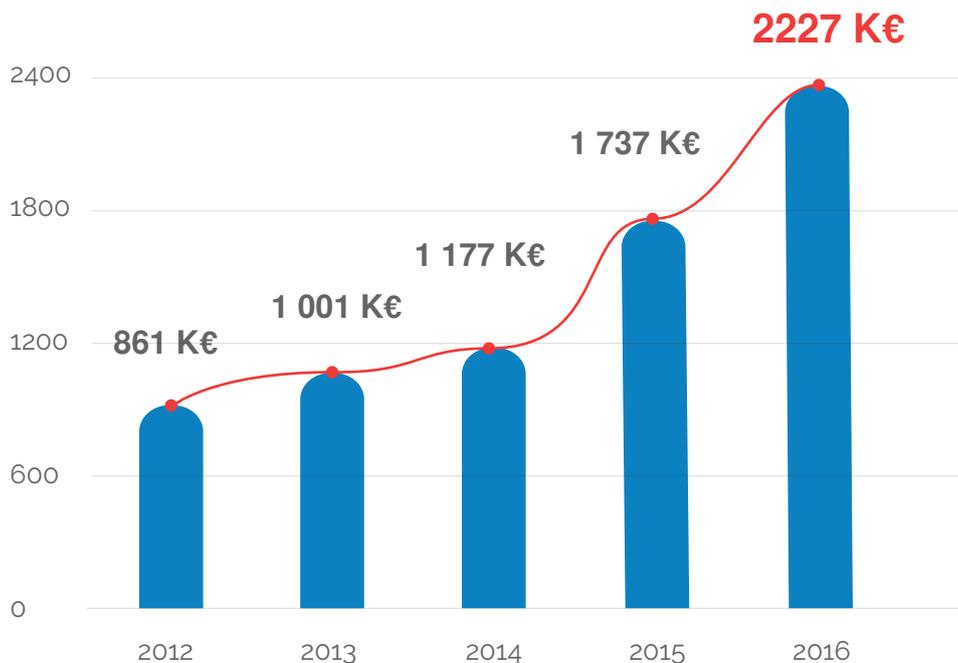


4 FINANCIAL REPORT

“
*France-IX is a member-based
organisation, able to sustain its
operational expenses in the long run
without threatening the company
solvency.*
”



France-IX Services closure of accounts is effective every 30th of June. The accounts are presented to the France-IX community every year during the annual meeting where members are given the opportunity of placing a vote of validation. The numbers shown in this report are related to the time period of 1st of July 2015 till 30th of June 2016.



During the last few years, the increase of revenues has been more sustained due to the exchange having reached critical mass in terms of connected members. This has provided France-IX with a much more stable financial position in addition to enabling the reduction of pricing to the members, providing France-IX with the capability to keep some financial resources to invest in new brand equipment (which are amortised on three years from an accounting point of view).

Revenues between 2015 and 2016 went up by 28%, even if in January 2016 the average decrease of pricing applied on our services was about 10-15% depending on the offers and type of ports, leading to €2227K of revenues by end of June 2016. For the whole year 2016 the total revenues were exceeding €2600K.

OPERATING EXPENSES

France-IX aims to maintain a state-of-the-art platform for its members. In order to keep initial capital expenditure to a minimum, France-IX acquires its technology via a leasing mode over 35 months. This enable France-IX to main a high quality standard platform and still optimise the related expense: after the human costs, equipment is still the second biggest item in the France-IX budget.

OPERATING EXPENSES	2016	2015
Equipment - leasing (switches, servers)	238 808 €	113 972 €
Equipment - buying (WDM MUX, WDM optics, Out-of-band)	141 834 €	75 998 €
Partners (NOC, providers)	141 230 €	167 976 €
Travel & transportation expenses	89 130 €	57 085 €
Intermediary fees (lawyers, outsourcing of human resources management)	86 586 €	38 900 €
Premises - Rent	71 607 €	N/A
Advertising (sponsoring, press releases, press agency)	38 350 €	99 154 €
Telecom expenses	36 860 €	17 455 €
Office supplies, furniture & others	12 789 €	7 764 €
Insurances (equipment, premises, civil insurance)	11 477 €	11 487 €
Other operating expenses	14 955 €	10 100 €
Total	916 952 €	617 250 €

In line with the exchange's sustained growth, came the requirement to buy additional chassis and line-cards to connect new members, and to upgrade the backbone accordingly, consequently equipment expenses grew in 2016, compared to 2015.

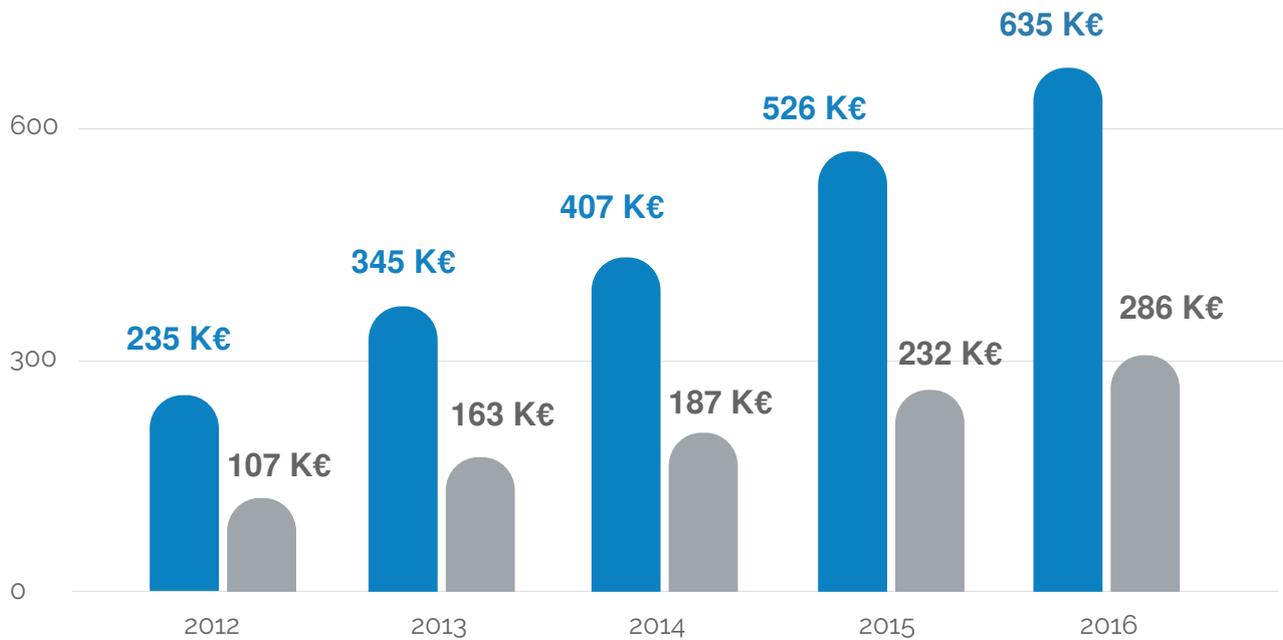
Increase in transportation expenses has also increased, both related to the fact that the team is travelling more to cover events in order to attract and collect new members, and by the fact that the team itself has grown, allowing us to cover even more events. Some significant efforts have been put also to cover events which would contribute to grow Marseille as a global gateway to reach Middle-East and Africa.

Finally, a new item worth mentioning is the fact that France-IX has grown enough to get its own premises. For many years, as a very small team, the exchange was kindly hosted by its founding members: this explains why a Premises-Rent line now appears in the accounts.

MANPOWER COSTS

The France-IX team is growing over time, however, to guarantee members with good value for money staff levels will be kept as low as is feasibly possible. The exchange will continue to take care with regards optimising various expenses, including human resources. In 2016 staff expenses represented €920K (including charges and taxes), representing 28% of the turnover (as per figures for 2015), and we can expect to maintain this ratio moving forward.

● GROSS WAGES ● PAYROLL TAX EXPENSES



CASH FLOW

In 2016 the cash flow position continued to improve, standing at more than €400K by end of June 2016. Zero loans were on-going in 2016, with everything having been reimbursed.

The improvement of members' payments has also contributed to a reduction in the average delay of payment from 25 to 21 days. As a reminder, the normal delay of payment required is 30 days.

France-IX does not apply VAT when billing its members, but does collect back VAT when paying its suppliers for instance, meaning the exchange benefits from regular VAT credits: for 2016 the credit refund went up to €200K.

CAPITAL INCREASE

As a result of greater financial stability and by driving a common procedure consisting in growing the capital by incorporating benefits (administrative procedure) France-IX's capital stands at €250K up from €60K.. Such increase is important, both in terms of amount, but also in terms of positive impact when it comes to negotiating interest rates to be applied on leased equipment or payment conditions with certain suppliers.

It should be noted that France-IX Services does not intend to keep growing capital. In fact, this should be the last time such an increase is carried out, since there is no financial gain associated with further growth.



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