

MIX REPORT

2016

THE MAIN ITALIAN INTERNET EXCHANGE POINT AND AMONG THE FIRST IN EUROPE

NOT FOR PROFIT

UNIQUE MANAGER OF THE PEERING LAN

CO-FOUNDER OF OPEN HUB MED

MIX

CO-FOUNDER OF EURO-IX

ISO 27001 CERTIFIED

OPEN - IX CERTIFIED

OWNS AND OPERATES ITS DC HOSTING MIX CORE

NEUTRAL FROM TOP TO BOTTOM

MIX

**CARINI
OHM**



A photograph of Joy Marino, President of MIX, sitting in a white armchair on a stage. He is wearing a dark suit jacket over a light-colored shirt and a red lanyard. He is gesturing with his right hand while speaking. Behind him is a large screen displaying his name and title. The background of the screen shows a stylized cityscape with geometric shapes.

Joy Marino Presidente

“An IXP is a key factor of growth for any country
and represents the only effective gateway
for all the international operators.
This is the role of MIX since ever.”

Joy Marino MIX President

“During the Board meeting, while presenting the Budget for the FY 2017, I announced that the year 2017 would have been a very serious year from the financial point of view: the number of investments planned for this year was equal to what MIX had invested in the past 7 years.

For the first time we would have asked for financial loans, both from our key suppliers and from our bank.

I am proud to say that, thanks to the excellent work everybody brought till the end during the year, the plan had been successfully completed.

The list of the realised investments is long: starting from the complete renewal of the power station up to the new MIX Data Center where there were the old premises.

The ISO 27001 certification, together with the Open IX Certification officially “certificate”, if needed, the extreme excellence of the services offered by MIX.

The increase of the traffic exchanged among operators through the MIX infrastructure is one of the biggest in Europe for the closing year. And for us this is the first indicator that confirms we are doing well and keep us hoping positively for the future: with the cooperation among all stakeholders interested in the development of the Italian Internet Ecosystem, we might bridge the gap with the other big European Hubs.

THE CHAIRMAN’S COMMENT

The growth and the progress of the Italian market is also confirmed by the opening of neutral DCs in the Milan and Lombard area in general, where MIX plays an important role as catalyst, establishing strategic agreements and trying to create an interconnection fabric which will gradually lead to move from the dependence from the Caldera Center.

The activation of the two MIX PoPs within SUPERNAP and DATA4 Data Centers following that one in EQUINIX, confirms that MIX is going this direction.

Looking to the near future, our commitment to implement this “interconnection fabric” which will enable all operators to peer wherever they are located (into what we are going to name “the Lombard Ring”) raises two worthwhile considerations: 1) this deployment does not only require capital investment in equipment and fibers, but also the resolution of regulatory knots that obsolete regulations make too tight and costly; 2) the quality and the extent of the colocation offer in the Milan area is going to be on equal foot with those of the large European hubs; in this scenario the (tiny) DC owned by MIX will just have a role of coordination and technical supervision, a kind of opportunity that insofar many of the big European IXPs would longed for.”

2016@MIX in brief

+33%

1,78 Tb

Members
Access Capacity

+25%

397Gbps

Traffic peak

+231

950

Cross
connections

+63%

3,6 Tb

Switching
Capacity

+17%

251

Peering
Ports

+24

185

AS connected

+240

935

Equipment
in DC

+20%

185000

Prefixes
Announced

2560 h/man

1070

Accesses
in DC

MIX is the leading Italy-based Internet Exchange Point (**IXP**) and among the most significant and active at European level.

MIX institutional mission is to interconnect IP networks of national and international operators who provide internet services in Italy.

MIX provides **over 180** (as of 31 December 2016) connected **Autonomous Systems** a highly reliable platform that allows IP traffic exchange through agreement and direct one-to-one relationship ("**Peering**").

MIX TO KEEP LOCAL TRAFFIC LOCAL

KEEP LOCAL TRAFFIC LOCAL is our mantra. To MIX members this means:


- infrastructural costs containment
- performances improvement
- direct control over traffic flows
- easier networks management
- reduction of latency: by making shorter the length of data paths and the international backbones usage
- more flexibility in congested paths management
- simple redundancies management

- ❖ Over **180 Autonomous Systems** connected (*)
- ❖ The exchanged traffic reaches almost **400Gbps** (*)
- ❖ Over **185.000** IP network prefixes announced on MIX (almost the **30%** of the **Full Routing table**)
- ❖ It's a steadily increasing IX: greater geographical presence, year-per-year investments to improve the switching platform, its own Data Center enlargement and strengthening
- ❖ Direct peering with **I-root, K-root e J-root** name servers and many **ccTLD** and **TLD DNS**
- ❖ More than **70%** of MIX peers are connected to the **route-servers** platform provided and managed by MIX
- ❖ Provision of its **own DC spaces** to ISP and Carriers equipment, within DC managed and controlled by MIX staff and subject to **high physical and logical security levels**
- ❖ Over **40 Carriers** equipment, to provide large-scale of interconnection, transport and transit services

WHY CONNECTING TO MIX

- ❖ **It manages the entire service chain with its own staff**, from the co-location of network equipment to their interconnection on the peering devices, providing **H24x365dd** support
- ❖ It provides reliable, safe and low-cost **Meet-Me-Room services**
- ❖ It provides many flexible methods of local and remote connection, suitable for any technical requirement
- ❖ It provides for its members tailored **monitoring and statistics** tools

(*) As of 31 December 2016



**TO INCREASE
AND MAKE INTERCONNECTION
FAST AND EASY**

**THIS IS MIX CONTRIBUTION
TO
THE DIGITAL ECOSYSTEM**

LOCAL CONNECTION

Connection to the Peering switches through routers installed either in MOX's DC or in DC where a MIX PoP is located.

Remote Peering

Public/Private Peering

Unicast/Multicast IPv4/IPv6

MIX

99,99%

Colocation

Meet-Me-Room

REMOTE CONNECTION

Connection to the Peering switches through routers installed in DC remote with respect to any MIX PoPs.

PARTNERSHIP PROGRAM POOLING @ MIX

Connection to the Peering switches shared among multiple remotely connected parties. Via a Pool several networks can be connected to the Peering LAN sharing the access circuit and port on MIX switches.

FE/1Gb/10Gb/100Gbports

SERVICES AVAILABILITY

H24x365gg H&E

Route servers

PARTNERSHIP PROGRAM RESELLING @ MIX

Carriers having their transmission equipment in MIX Red Area, or IX or DC providers can resell MIX ports to their customers. Administrative and technical relationship is between MIX and Resellers who can benefit of aggressive kickback on ports for remote customers connections.

PEERING PORTS SPEED AT

100 1000 10000 100000 Mbps

PUBLIC PEERING

The exchange of data takes place on a **VLAN shared** by all the networks connected on MIX switches. A **back-up VLAN** is also available through simple configuration steps and without additional costs.

PRIVATE PEERING

Private VLAN are configured to make available Private Peering relationships.

Available also **Closed User Groups**, private VLANS shared by groups of operators that need to share a LAN for routing specific traffic types and subject to the interests (SLAs) of the group.

UNICAST MULTICAST IPv4 IPv6

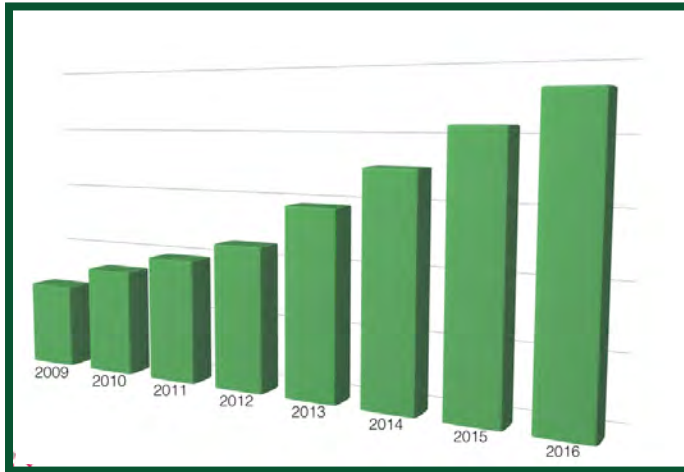
PEERING VIA ROUTE SERVER

It's possible to activate peering relationships with over the **120AS connected** to the fully redundant **Route Server platform provided by MIX** opening only one peering session.

The route server system is based on the BIRD daemon which over the time has proven to be stable and has been adopted by many other IXPs.

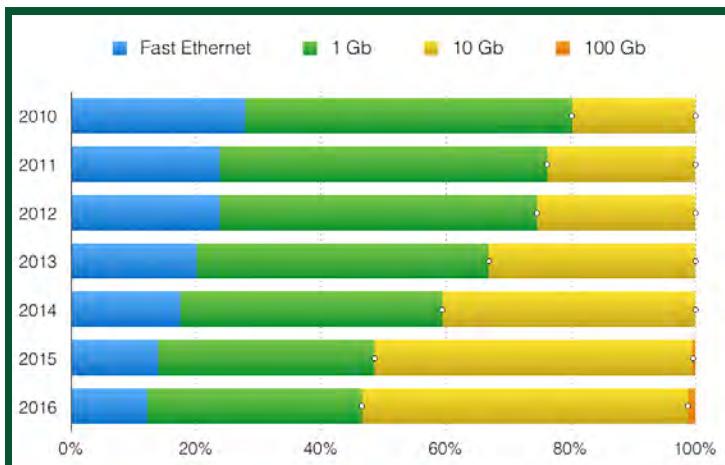
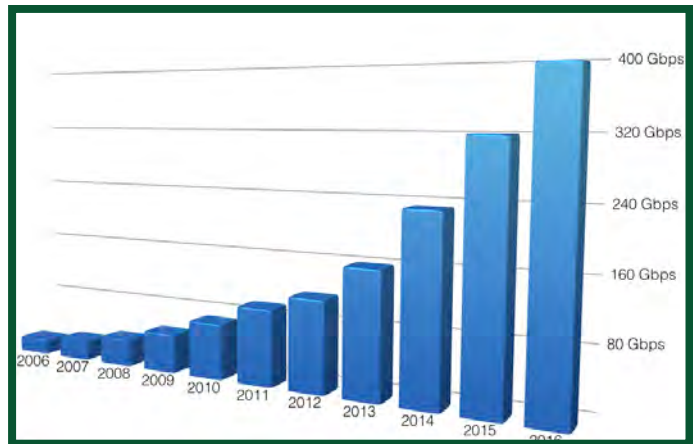
PEERS@MIX

2bite	Easynet	Interplanet	Nexus	T.Net
3P System	Elmec Inf.	Intred	Optima	Team System
Abilene	Elsyconn	IPROUTE	Orange	Tecno General
Acantho	Engineering	IPTP	OVH	Tecnotel
Active Network	Enter	Irpinia Net	Planetel	TelecityGroup
AdalNetwork	Eolo	It.Net	Positivo	Telecom Italia
Afilias	ePress	ITGate	Postecom	Telecom SM
Akamai	Estracom	IPKom	Professional Link	Telemar
Alfanews	Etisalat	j.root-server	Progetto 8	Telnet
Amazon	Eurocall	Jcom	Qcom	Terra
AMT Services	Facebook	i.root-server	Radiofibra	Time-Net
Aria	Fastnet	IX Reach	RAI	Tiscali
Aruba	Fastweb	k.root-server	Redder	Trentino Network
Asdasd	Fibering	Knipp	Registro.IT	TTK
AT&T	FUB	KPNQwest	Retelit	TWT
BBBel	Gandi	Leaseweb	Retn	TWS
Blizzard Ent.	GARR	Leonet	RIOT GAMES	Unidata
Biesse Solution	GEANT	Lepida	RIS (RIPE)	Univ. di Bolzano
Brennercom	Genesys	Level 3	ScanPlus	Uno Communication
BT Global S.	Geny Comm.	Limelight	Seeweb	Utility Line IT
BT Italia	Globecorp	Linea Com	Seflow	Verizon/Edgecast
BT Italia / I.Net	Go Internet	Logos Tech.	Servereasy	Verizon Italia
CDLan	GOLINE SA	Lottomatica	SI.EL.CO	Vimpel
CDNetworks	Google	Mainsoft	Sg.Gs	Videobyte
Cesena Net	Grifonline	Mandarin	Siportal	Vodafone D2
Clio	H3G	Mc-Link	SiriusTec	VOIX
Cloudflare	Hibernia	Mediaset	SistemiHS	Webdiscount
CloudItalia	Horizon	Metrolink	Sky	Websense
Cogent	Hurricane	Microsoft	SOFTLAYER	Welcome Italia
COLT	ICT V.Umbra	MYNETWAY	SpazioTempo	Wifiweb
Continent 8	ICTeam	NEMO	S.P.E.	Wind
Convergenze	IFOM	NETandWORK	StackPath	WispOne
D.T.S.	Il Sole 24 Ore	Netflix	Stadtwerke Hall	Wolnext
Dada	Imperva Inc.	NetIX Comm.	Stelkom	Xmatica
Deltaweb	Infracom	Net Global	Spin	ZGelettronica
Digitel Italia	Intercom	Newtec	Stel	ZScaler
DIR.org	Internet One	Nice Blue	Sunrise	
E4A	Internet One S.A.	NovaNetwork	Supernap	
EasyConn	Interoute	Nexin	Swisscom	



CONNECTED ASes GROWTH

TRAFFIC GROWTH



ACCESS CAPACITY EVOLUTION

MIX peering LAN is available to Internet Service providers, Carriers, Content providers, CDN, Videostreaming and Gaming providers, Broadcasters, WEB Hosters, Research Networks, Public Administrations, WISP, WEB Providers to any subject who offers Internet services and owing its own Autonomous System regularly released by a Public registry (Afrinic, Apnic, Arin, Lacnic, RIPE-NCC, ...)



MIX is certified **Open-IX OIX-1, the most important certification** for Internet Exchange points: it sets the service levels and network engineering standards that constitute the best practices for IXPs interconnection services. **MIX is the second IXP in Europe and the tenth in the world** to have been awarded this certification.

Open-IX has been developed in the United States with the approval and support of the managers of the largest Internet Exchanges worldwide, of Global Carriers and Over The Top operators, to promote the development of technical and operational standards that could be useful to DCs and IXPs both offering crucial services for the global Internet functionality.

CERTIFICATIONS

ISO 27001

In year 2016 MIX has been awarded the ISO 27001 certification, that specifies the set of criteria and recommendations related to the security of data, the informations and, more generally, to the risks and vulnerabilities management. With this certification **MIX confirms the security and reliability level of its services.**

MIX was founded in 2000 with **the objective to improve and develop the infrastructure of Internet in Italy, facilitating the intercommunication between different European Internet operators.**

It strategically set up its operational headquarters in the Via Caldera technological campus in Milan, where the backbones of the most significant national and international telecommunications operators that work in Italy come together. The Campus, which covers about 45.000 m2, includes the largest Data Centres in the area, which are independent of each other, both electrically and physically.

The **corporate structure** of MIX consists of 21 companies that hold shares of capital under the maximum threshold of **15%** permitted by Statute.

MIX HISTORY

AIIP	9,75%
BT Italia	10,85%
Clio	2,20%
Cubecom	1,10%
Energy (*)	1,10%
Eolo	9,75%
Eutelia (**)	1,10%
Fastweb	1,10%
Infracom Italia	1,10%
ITNet	5,25%

(*) In liquidation (**) In receivership

KPNQwest Italia	10,75%
MC-Link	10,75%
Orange Business	1,10%
Sequenza	3,30%
Spin	1,10%
Telecom Italia	10,85%
Tiscali Business	1,10%
Tiscali Italia	2,20%
Utility Line Italia	3,60%
Vodafone Enterprise	2,20%
Wind	9,75%

In year 2016 MIX DC spaces have been doubled bringing the DC space to **800sq.**

Big investments also into the electrical power plant: MIX owns now a medium-voltage substation and power up to **1MW**, with empowered cooling and continuity systems.

MIX DC hosts the **peering LAN core switches** and it is dedicated to host members transmission and peering equipment. Members equipment are installed within the different areas which the DC is logically divided in, each one electrically and infra-structurally equipped depending on members services destination (formerly: **BLU Area** for peering services, **RED Area** for Carriers services, **YELLOW Area** for L2 interconnection services, **GREEN Area** for optical boxes, and the mix equipped **ORANGE Area**).

It is entirely managed by MIX's staff H24x365dd and this makes possible to independently provide **services to members from their arrival on campus to the peering ports.**

It is fully redundant and equipped with a full range of alarm systems to guarantee the physical security and operation of the hosted equipment.

MIX DATA CENTER CARRIER INDEPENDENT

MEET ME ROOM

The coexistence of over 900 equipment, **500** of them **active equipment**, generated an environment where operators at MIX can offer and use transit services, dedicated peering and PNIs.

At the end of year 2016, almost **1000 fibres** have been lying within MIX DC, making it a big "**Meet-Me-Room**" that represents the most **neutral/carrier independent** one **in Italy**.



RED AREA -48DC
217

ORANGE AREA -48DC/220V
104

GREEN AREA
PASSIVE
74

BLUE AREA 220V
512

MMR
950 X-Connections

YELLOW AREA 220V
28

CARRIERS@MIX

Aruba	Infracom	Telecom Italia
Asdasd	Interoute	Telecom Sparkle
BT Italia	It.Net	Telia Sonera
CDLan	KPNQwest	Telnet
CloudItalia	Level 3	Tiscali
Cogent	Mc-Link	Uno Communication
COLT	OVH	Verizon Italia
D.T.S.	Progetto Vendita	Vodafone
Easynet	Qcom	Welcome Italia
Engineering	Retelit /E-Via	Wind
Enter	Seeweb	Xmatica
Eolo	Supernap	
Fastweb	T.Net	

PARTNERS@MIX

RESELLERS

Enter
Equinix Italia
Interoute

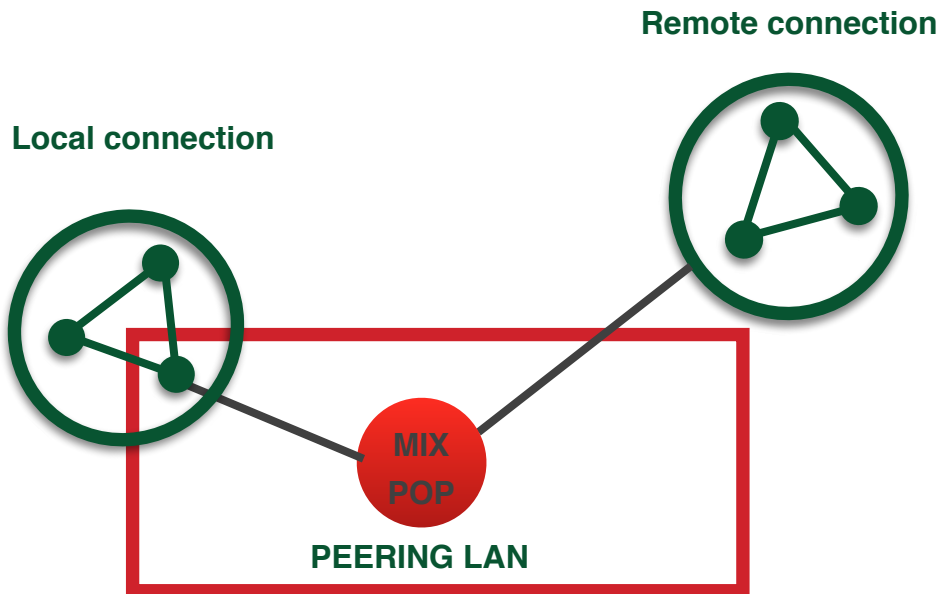
POOLERS

BBanda
Console Network Solutions
InternetOne
Lepida



“IXes are functional elements in the Network. More they are able to be technical flexible and to run their services at the same level for any market segment, more they contribute to the development of the Network itself, of new markets creation and of the digitalisation of their Country. This is how MIX worked since ever and the reason why it subsidised OHM. OHM and MIX together represents in Italy the true neutral ecosystem to bring Italy at the top of the international telecommunication world”

Valeria Rossi - MIX General Manager
and OHM President



DIRECT CONNECTION

LOCAL CONNECTION

The connection to the Peering LAN is made on members equipment hosted in the MIX DC or in a DC hosting a MIX PoP.

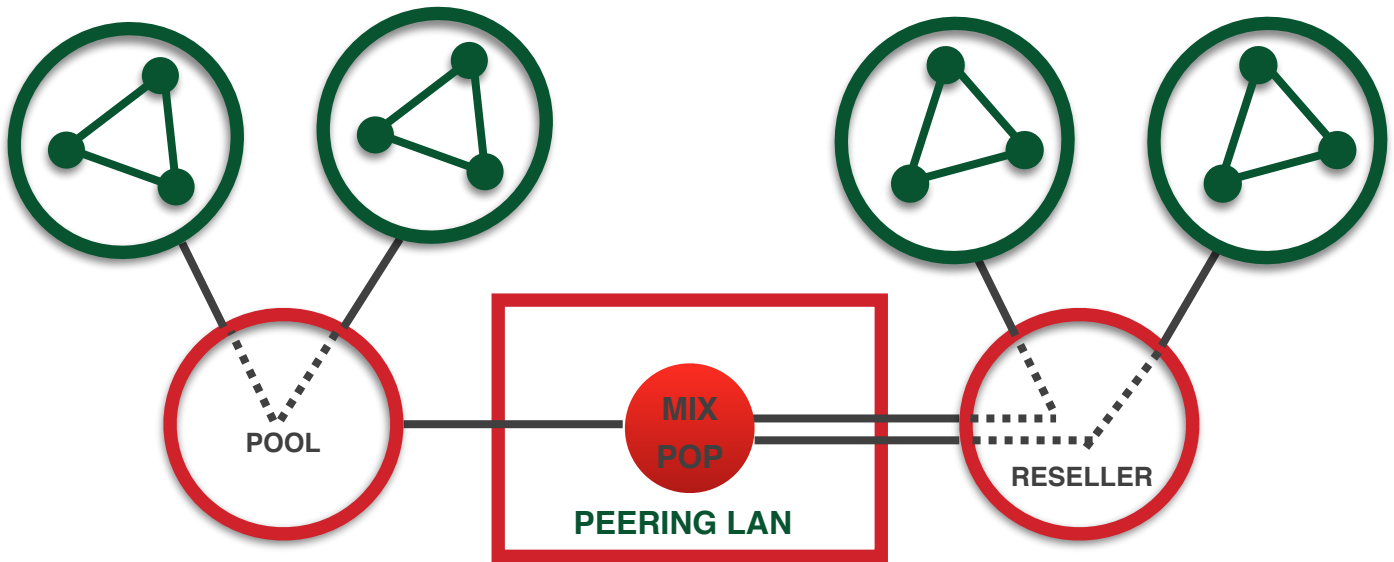
Members equipment installed in MIX DC are co-located in shared racks provided by MIX and, with some limitations in terms of space and power, is free of charge. Furthermore the link between the members equipment and the Peering LAN is implemented by pre-cabling provided by MIX.

REMOTE CONNECTION

When members equipment are installed in DCs remote with respect to the MIX PoPs, the connection to the Peering LAN is terminated on members optical boxes hosted in the MIX DC or in a DC hosting a MIX PoP.

The optical box installed within MIX DC is co-located in shared racks provided by MIX and is free of charge.

Remote connection



CONNECTION VIA PARTNERSHIP PROGRAM

POOLING

More members (**Pool Elements**) connect to the Peering LAN sharing the access circuit and the MIX LAN port. The Pool is led by the **Pool Registrar** who has a direct relationship with MIX for any matter related to the Peering port.

It's an easy way to reduce national and international transport costs.

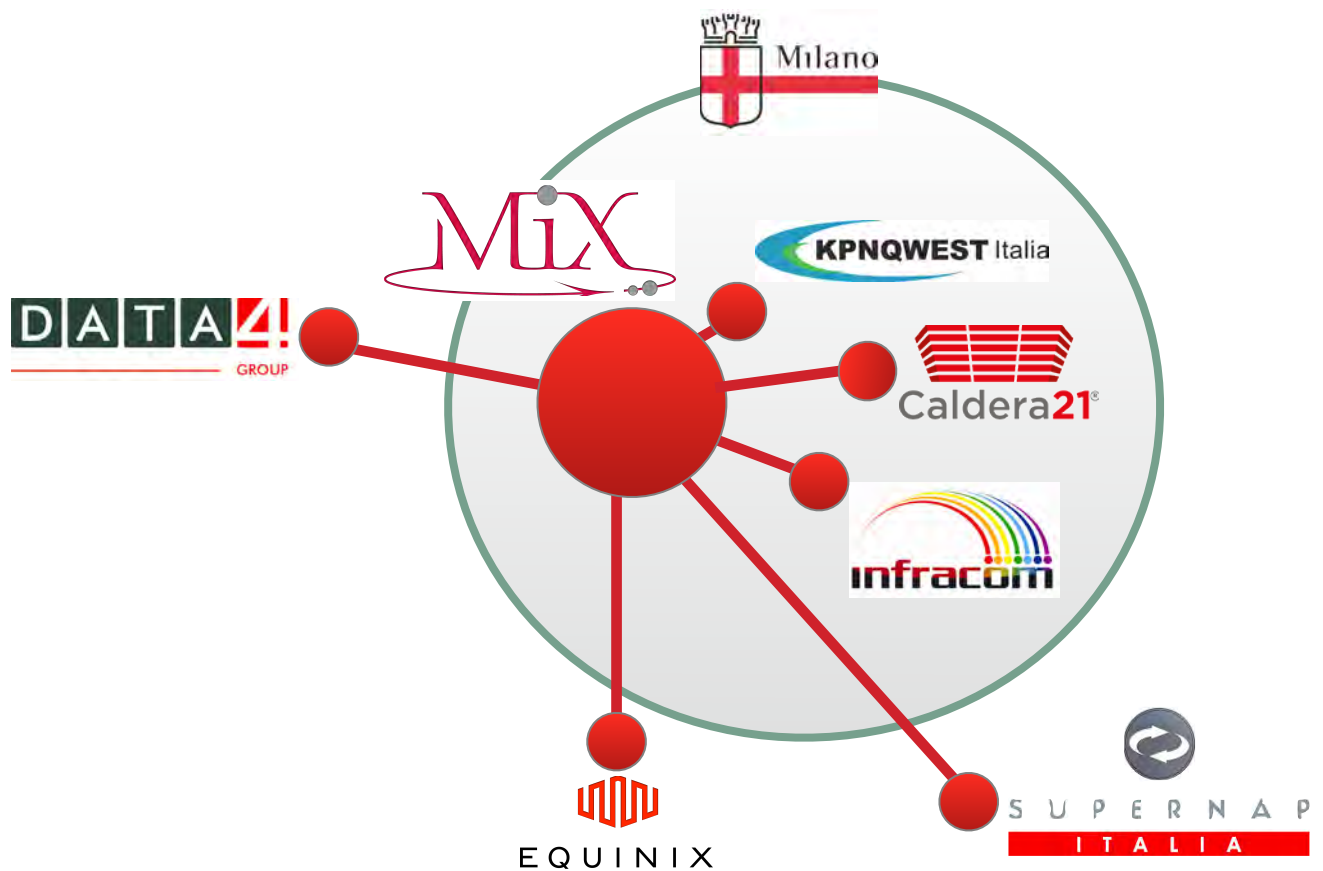
At the end of year 2016 **25** Pool Element are connected to MIX.

RESELLING

Reselling a well known service in any main Internet Exchange. Carriers and DC providers complete their offers including the MIX Peering ports. The administrative relationship and the first level support are between MIX and the Resellers.

At the end of year 2016 **4** MIX members are connected to the Peering LAN through resellers.

MIX METROPOLITAN AREA NETWORK 2016



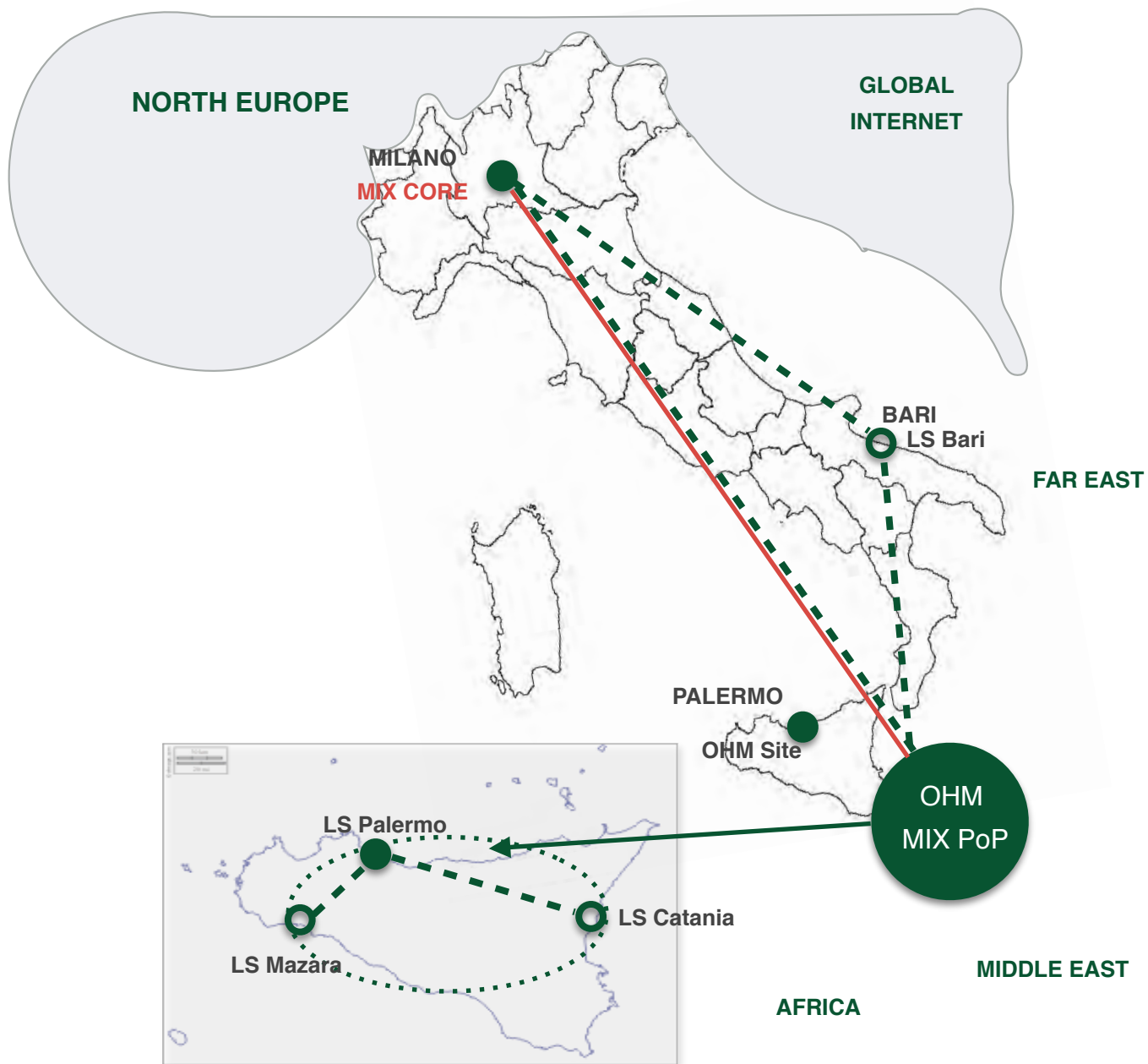
MIX peering LAN is currently implemented with BROCADE MLX class Ethernet switches.

The backbone core is hosted inside MIX headquarter data rooms on the ground floor Orange Building, Via Caldera business campus in Milano. The high performance ethernet fabric is configured following a dual star redundant topology, and multiple paths are available between all switches, using 100 Gbps multiple fiber connections configured using logical link aggregation group (LAG) technology, to ease the upgrade of the inter-switch link in the quickest possible way, to meet traffic growth demand anytime.

MIX NETWORK

MIX points of presence inside Via Caldera business campus are connected by multiple runs of proprietary dark fiber, with a dual redundant path from each location to the core.

Mix points of presence outside Via Caldera are connected through at least dual long haul fiber runs following diverse paths and lit directly by MIX employing CWDM technology at nx10gbps. Also in this case LAG technology is used to ensure the quickest possible upgrade process, meeting peering traffic growth demand.



OPEN HUB MED

OHM Consortium was founded at the end of year 2015 by MIX and the main national and international players.

OHM is the first real alternative to the historical HUB in Marseille aimed to aggregate the submarine cables touching Sud Italian coasts and coming from Nord Africa, Middle East and Asia. OHM is built within **its own neutral and carrier independent DC** where **the main Italian Landing Stations** are bind thanks to OHM members' infrastructures.

During year 2016 the Consortium has operated to build up the DC whose opening is foreseen in the 1Q of year 2017.

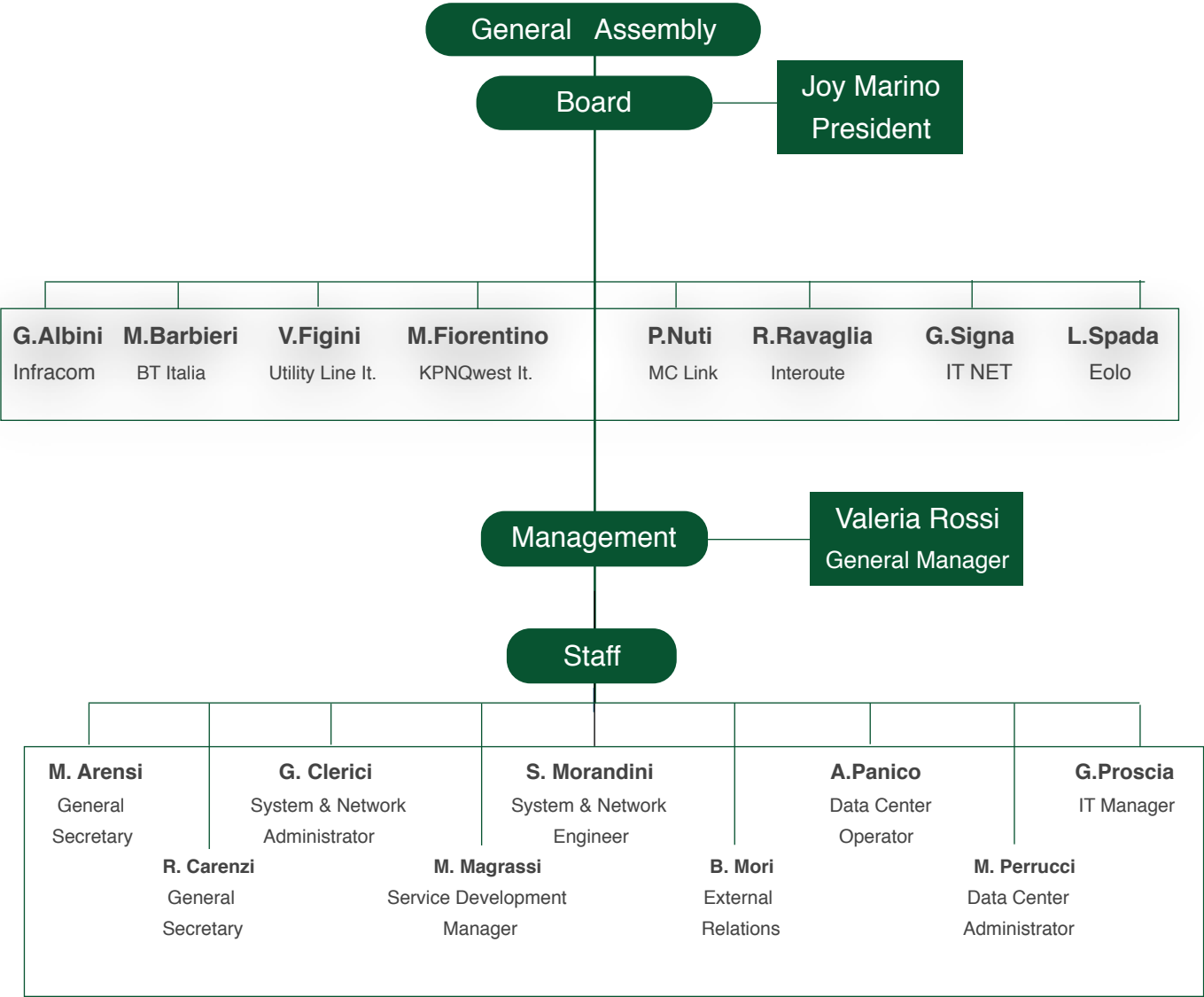
OHM Members at the end of 2016 are: **Equinix Italia, Fastweb, Interoute, Italtel, Eolo, MIX, Supernap Italia, Vuetel Italia, Consorzio XMed.**

MIX & OPEN HUB MED

As soon as the OHM DC will be up and running, MIX will activate a resilient PoP that will be connected to MIX core.

This connection will serve local peers in Sicily to allow them to open peering relations with all MIX peers in Milan.

MIX presence in OHM will allow to all operators in OHM DC to exchange locally their traffic: this will reduce significantly the latencies and the costs with respect to use other European location. Furthermore, thanks to the interconnection of MIX peering VLANs, these operators will benefit of **direct peering with the main national and international networks** since the day one.



Few months after its foundation, MIX together with AMS-IX (Amsterdam), BNIX (Bruxelles), DE-CIX (Frankfurt), LINX (London), NETNOD (Stockholm) and VIX (Vienna), participated in the **foundation of Euro-IX**, the first and the most dynamic association of Internet Exchange Company in the world. For the first six years, Valeria Rossi of MIX had been a member of the Board of Directors of this Association and, starting from November 2016, with the election held during the 29th Euro-IX Forum in Cracow, **MIX is represented in the Board by Mauro Magrassi**.

15 years after its foundation, Euro-IX has 82 affiliates: 56 are from 46 European Countries and the other 26 are from the rest of the world. Euro-IX encouraged and supported the birth of other Regional associations (AP-IX, AF-IX and LAC-IX); in the year 2014 they gave birth to the **IX-F**: the IX Federation in the world with the purpose of realising an IXP global Community helping each IXP in their development.

MIX & EURO-IX



15 year of board@Euro-IX

MIX SALON 2016

THE MEDITERRANEAN: FROM CROSSROADS OF HISTORY TO KEY HUB OF THE GLOBAL NETWORK

Chair: Enrico Pagliarini - Radio24 Il sole 24 Ore

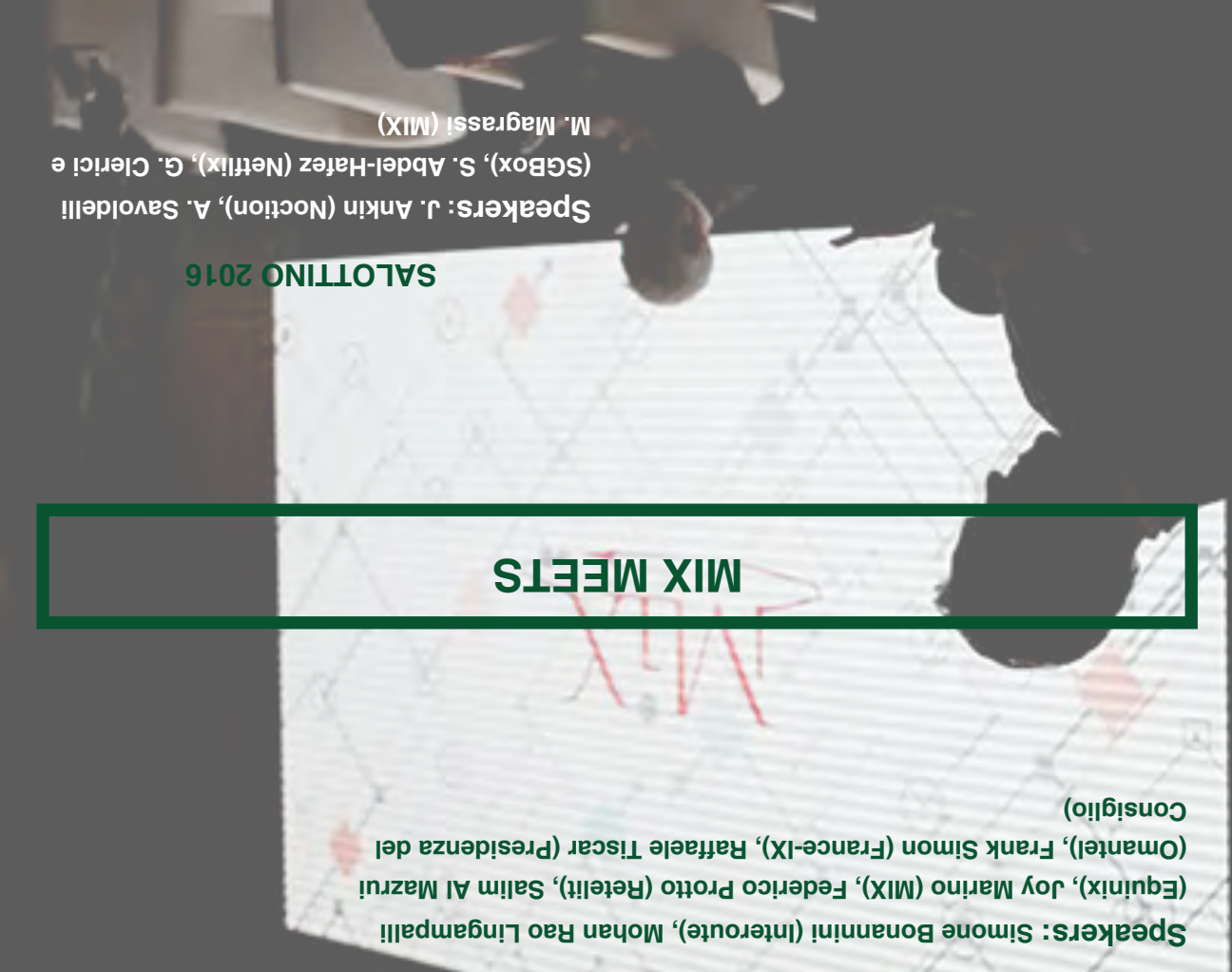
Key Notes Speakers: Lingampalli Equinix, Valeria Rossi for OHM

Speakers: Simone Bonannini (Interoute), Mohan Rao Lingampalli (Equinix), Joy Marino (MIX), Federico Proto (Retelit), Salim Al Mazrui (Omantel), Frank Simon (France-IX), Raffaele Tiscar (Presidenza del Consiglio)

MIX MEETS

SALOTTINO 2016

Speakers: J. Ankin (Noction), A. Savoldelli (SGBbox), S. Abdel-Hafez (Netlix), G. Clerici e M. Magrassi (MIX)



By the time, MIX is well known in the Ministerial Programmes concerning the project school / job. There is an increasingly request from different institutes of the secondary school in order to spend a day by us: our **Simone Morandini** describes the students how the Internet network runs and how this network allows their smartphones to work and allows them to be connected on the "social" in the whole world.

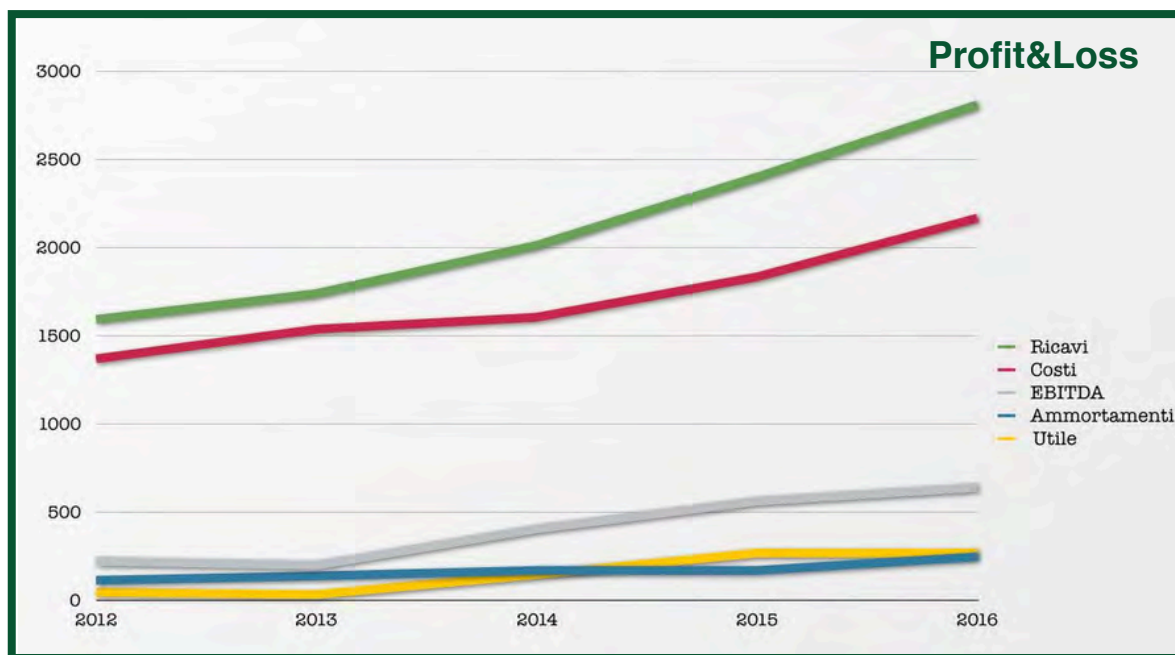
In the year 2016 we met **250 students** from 6 different secondary schools and, for the first time, we met a group of **Engineers**, directly organised by the Class of the Engineers of Bergamo.

Guaranteed is the "guided tour" in MIX DC under the supervision of our Mr. Michele Perrucci and Mr. Gianmarco Clerici.

A DAY IN MIX



Liceo Scientifico Bonvesin Milano



FINANCIAL RESULTS

