Consorzio TOP-IX Interconnection Services Service Description

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Service Description

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1. INTRODUCTION

Interconnection services offered by Consorzio TOP-IX to consortium Members and Partners are based on the use of a geographically distributed transmission infrastructure (or platform) across North-West of Italy, and designed to allow the following types of connections:

- **Peering** connections using BGP protocol to implement mutual visibility sessions between the Autonomous System of Members and Partners connected to the platform.

- **Marketplace** designed to allow the sale of interconnection services (e.g. IP Transit, Cloud, remote Ethernet, etc.) between Members and Partners connected to the platform.

- **Transit** designed to implement point-to-point connections for private services (e.g. backhauling) for Members and Partners connected to the platform.

Any relation between connecting entities is carried out directly between the relevant involved parties without any technical or financial involvement by TOP-IX. TOP-IX is solely responsible for providing the configuration on the platform required by Members.

2. TOP-IX Backbone Architecture

The interconnection platform managed by TOP-IX operates at Level 2 (Ethernet). It is characterized by a high level of reliability and availability thanks to the redundant architecture of the local physical platforms building the network nodes and their interconnecting backbones.

As shown in Figure 1, the platform currently covers all the main cities in Piedmont and Valle d'Aosta regions, as well as the metropolitan Milan metropolitan area.
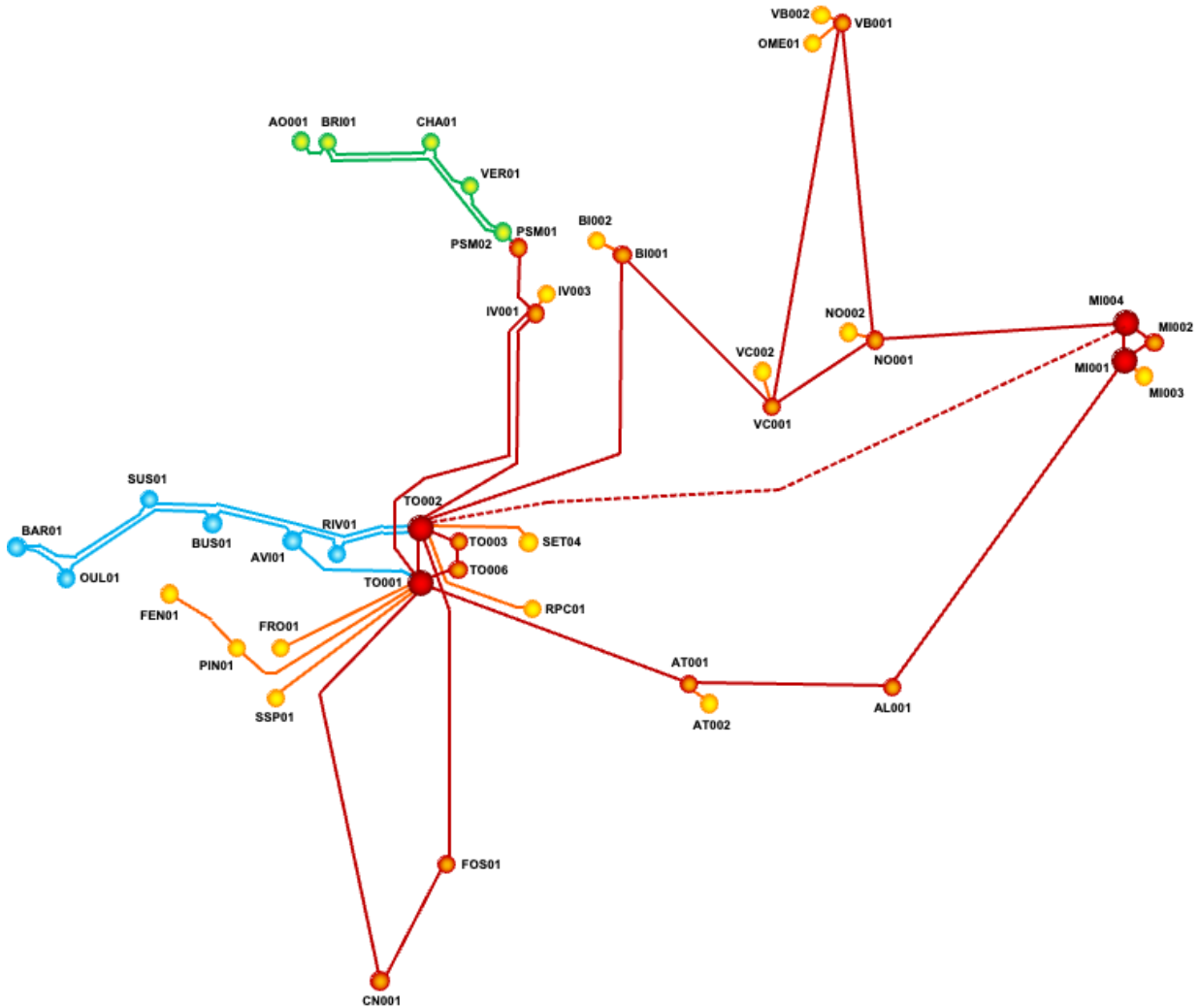

Figure 1 - TOP-IX network platform

2.1 TOP-IX Platform Access Nodes

Depending on the specific features of local platforms and interconnecting backbones, four types of node can be identified. Each node differs in terms of its level of reliability, robustness and performance.

CORE: robust, reliable and high-performance platforms nodes comprising composed by redundant equipment. The backbones links connecting the nodes to the rest of the platform have a meshed topology with physically diverse routes, with a speed of 400 Gbps / N x 100 Gbps (towards other Core) and N x 100 Gbps / N x 10 Gbps (towards other types).

BACKBONE: reliable and high-performance platforms nodes. The backbones links connecting the nodes to the rest of the platform have a meshed topology with physically and/or logically diverse routes, withs speed N x 100 Gbps or N x 10 Gbps.

EDGE: reliable and high-performance platforms nodes. The backbones links connecting the nodes to the rest of the platform have a meshed topology with diverse routes on selected nodes, with a speed of N x 10Gbps but not always meshed.

REMOTE ACCESS: access nodes with a passive, single way xWDM interconnection technology. These nodes are designed to house backbone, point-to-point radio devices for traffic backhauling.

The following table shows all the active nodes highlighting location and classification.

ID	Location	Type
AL001	ALESSANDRIA - Lungo Tanaro Magenta 7/a	Backbone
AO001	AOSTA - Via Lavoratori Vittime col Du Mont 24	Edge
AT001	ASTI - Viale Pilone 103	Backbone
AT002	ASTI - Piazza Catena 3	Remote Access
AVI01	AVIGLIANA - Lungo Autostrada A32 Casello lato Torino	Edge
BAR01	BARDONECCHIA - Lungo Autostrada A32 accesso direzione Torino	Edge
BI001	BIELLA - Via Quintino Sella, 12	Backbone
BI002	BIELLA - Via Fratelli Rosselli 2 (IIS "Sella")	Remote Access
BRI01	BRISSOGNE - Località Ile Blonde, 5	Edge
BUS01	BUSSOLENO - lungo Autostrada A32 Galleria "Prapontin"	Edge
CHA01	CHATILLON - Via Tornafol	Edge
CN001	CUNEO - Corso Soleri 2	Backbone
FEN01	FENESTRELLE - Via Roma 8	Remote Access
FOS01	FOSSANO - Strada Torino 164/166	Backbone

ID	Location	Type
FRO01	FROSSASCO - Via Rinaldo Asvisio 2	Remote Access
IV001	IVREA - Strada Torino 50	Edge
IV003	IVREA - Via della Fornace San Giovanni d'Ivrea	Remote Access
MI001	MILANO - Via Caldera 21 Orange Building (Presso Irideos)	Core
MI002	MILANO - Via Savona 125 (Presso Equinix)	Backbone
MI003	MILANO - Via Caldera 21 Yellow Building (Presso Caldera21/CDLAN)	Edge
MI004	MILANO - Via Monzoro, 101-105 Cornaredo (Presso Data4)	Core
NO001	NOVARA - Viale Manzoni, 26	Backbone
NO002	NOVARA - Via San Bernardino da Siena 10 (IIS "Nervi")	Remote Access
OME01	OMEGNA - Lungo Lago Buozzi 25	Remote Access
OUL01	OULX - lungo Autostrada A32 cavalcavia SS335	Edge
PIN01	PINASCA - Via Pola 2-6 (Comune di Pinasca)	Remote Access
PSM01	PONT SAINT MARTIN - Viale Carlo Viola 76 (Presso Engineering)	Edge
PSM02	PONT SAINT MARTIN - Viale Carlo Viola 76 (Presso Pépinière)	Remote Access
RIV01	RIVOLI - lungo Autostrada A32 Galleria "La Perosa"	Edge
RPC01	RIVA PRESSO CHIERI - Via Olivetti / Via Agnelli	Remote Access
SET04	SETTIMO TORINESE - Piazza Freidano	Remote Access
SSP01	S. SECONDO DI PINEROLO - Via Repubblica 1	Remote Access
SUS01	SUSA - lungo Autostrada A32 PCC	Edge
TO001	TORINO - Corso Unione Sovietica 216 (Presso CSI Piemonte)	Core
TO002	TORINO - Corso Svizzera 185 (Presso It.Gate)	Core
TO003	TORINO - Environment Park Via Livorno 60 (Colt Technology Services)	Backbone
TO006	TORINO - Corso Castelfidardo 22 (Officine Grandi Riparazioni)	Backbone
VB001	VERBANIA - Via dell'Industria, 29/1	Backbone
VB002	VERBANIA - Via dell'Industria	Remote Access
VC001	VERCELLI - Via San Cristoforo, 3	Backbone
VC002	VERCELLI - Piazza Risorgimento 12	Remote Access
VER01	VERRES - Via Luigi Barone	Edge

2.2 INTERCONNECTION TO THE PLATFORM

The choice of the access node and the connection speed are at the discretion of the individual user who may also choose whether to:

- implement a direct remote interconnection from its own premises to the TOP-IX node while keeping the network equipment at its own premises;
- exploit the housing location at the TOP-IX node to host the network equipment.

The service demarcation point is located at layer 2 physical port made available to TOP-IX Member on the network node chosen by the Members. The Member is responsible for any physical cross connect needed from the physical access port on the TOP-IX network device to its own network infrastructure or to its equipment hosted in the node.

In selected locations, TOP-IX offers a housing service dedicated exclusively to host network transmission equipment (the installation of equipment such as servers, storage, etc. is not permitted).

The housing services is not included in the interconnection services and are well described in Housing Services - Service Description also available on TOP-IX website.

In-site cross-connect between equipment from different consortium Members must be requested to TOP-IX and are managed directly by TOP-IX staff.

2.3 INTERFACE AND PHYSICAL ACCESS STANDARDS

TOP-IX platform have Ethernet access interfaces. The access speeds and standards are listed in the following table for each PoP:

ID Nodo - Tipologia	Ethernet 1 Gbps	Ethernet 10 Gbps	Ethernet 100 Gbps
AL001 (BACKBONE)	1000BASE-LH	10GBASE-LR	100GBASE-LR4
AO001 (EDGE - Valle d'Aosta)	1000BASE-T	-	-
AT001 (BACKBONE)	1000BASE-LH	10GBASE-LR	100GBASE-LR4
AT002 (REMOTE ACCESS)	CWDM/DWDM	DWDM	-
AVI01 (EDGE - Valle di Susa)	1000BASE-LH	10GBASE-LR	-
BAR01 (EDGE - Valle di Susa)	1000BASE-LH	10GBASE-LR	-
BI001 (BACKBONE)	1000BASE-LH	10GBASE-LR	100GBASE-LR4
BI002 (REMOTE ACCESS)	CWDM/DWDM	DWDM	-
BRI01 (EDGE - Valle d'Aosta)	1000BASE-LH	10GBASE-LR	-
BUS01 (EDGE - Valle di Susa)	1000BASE-LH	10GBASE-LR	-
CHA01 (EDGE - Valle d'Aosta)	1000BASE-T	-	-
CN001 (BACKBONE)	1000BASE-LH	10GBASE-LR	100GBASE-LR4
FEN01 (REMOTE ACCESS)	DWDM	DWDM	
FOS01 (BACKBONE)	1000BASE-LH	10GBASE-LR	100GBASE-LR4
FRO01 (REMOTE ACCESS)	CWDM/DWDM	DWDM	-

IV001 (EDGE)	1000BASE-LH	10GBASE-LR	-
IV003 (REMOTE ACCESS)	DWDM	DWDM	-
MI001 (CORE)	1000BASE-LH	10GBASE-LR	100GBASE-LR4
MI002 (BACKBONE)	1000BASE-LH	10GBASE-LR	100GBASE-LR4
MI003 (EDGE)	1000BASE-LH	10GBASE-LR	-
MI004 (CORE)	1000BASE-LH	10GBASE-LR	100GBASE-LR4
NO001 (BACKBONE)	1000BASE-LH	10GBASE-LR	100GBASE-LR4
NO002 (REMOTE ACCESS)	CWDM/DWDM	DWDM	-
OME01 (REMOTE ACCESS)	CWDM/DWDM	DWDM	-
OUL01 (EDGE - Valle di Susa)	1000BASE-LH	10GBASE-LR	-
PIN01 (REMOTE ACCESS)	CWDM/DWDM	DWDM	-
PSM01 (EDGE - Valle d'Aosta)	1000BASE-LH	10GBASE-LR	-
PSM02 (REMOTE ACCESS)	CWDM/DWDM	DWDM	-
RIV01 (EDGE - Valle di Susa)	1000BASE-LH	10GBASE-LR	-
RPC01 (REMOTE ACCESS)	CWDM/DWDM	DWDM	-
SET04 (REMOTE ACCESS)	CWDM/DWDM	DWDM	-
SSP01 (REMOTE ACCESS)	CWDM/DWDM	DWDM	-
SUS01 (EDGE - Valle di Susa)	1000BASE-LH	10GBASE-LR	-
TO001 (CORE)	1000BASE-LH	10GBASE-LR	100GBASE-LR4
TO002 (CORE)	1000BASE-LH	10GBASE-LR	100GBASE-LR4
TO003 (BACKBONE)	1000BASE-LH	10GBASE-LR	100GBASE-LR4
TO006 (BACKBONE)	1000BASE-LH	10GBASE-LR	100GBASE-LR4
VB001 (BACKBONE)	1000BASE-LH	10GBASE-LR	100GBASE-LR4
VB002 (REMOTE ACCESS)	CWDM/DWDM	DWDM	-
VC001 (BACKBONE)	1000BASE-LH	10GBASE-LR	100GBASE-LR4
VC002 (REMOTE ACCESS)	CWDM/DWDM	DWDM	-
VER01 (EDGE - Valle d'Aosta)	1000BASE-T	-	-

REMOTE ACCESS nodes don't have switches to exchange traffic. For this it's mandatory having a a DWDM/CWDM channel towards the next CORE / BACKBONE / EDGE node and a port on it. The channel will be used to interconnect this port and customer device: it won't be possible to use it to connect any equipment co-located in the CORE / BACKBONE / EDGE PoP.

In the case of different needs, TOP-IX can evaluate the use of other physical access standards on a project basis. The possibility of adopting a different standard depends on the capability and port availability of the node network equipment.

For multi-port links on the same node, it is possible to implement the link in LACP mode.

In case of Transport service port (therefore excluding Peering or Marketplace services) it is possible to request the setup of QinQ tunnel in order to allow the free use of a single VLAN tag by the end user.

The backbone does not implement any QoS (Quality of Service) management mechanisms.

3. SERVICES AND ACCESS PORT

TOP-IX platform allow different types of services that can share (is necessary) the same access port:

- Peering: basing function of an IXP to allow bilateral (so with direct BGP sessions) or multilateral (through Route Servers) peering sessions; peering is also available also through remote access with IXPs partners or other selected resellers;

- Marketplace: the ability to sell or buy services (IP Transit, Direct Access to the Cloud, Security, etc.);

- Transport: the ability to deploy point to point private connectivity (within ports of the same member) for Backhaul usage or other;

- Transport (point to point): the ability to have point to point connectivity on dedicated ports;

- Remote Peering IXP Partner: access to peering platforms of partner IXPs

Based on the services, ports belong to the following categories:

- Peering Ports. Ports reserved exclusively for the Peering service and possibly for remote peering services towards IXP partner peering infrastructures.

- Marketplace (SELL) Ports. Ports dedicated to the sale of services via TOP-IX infrastructure. Only "Marketplace" type services can be configured on these ports and terminated on remote ports of the "Marketplace BUY" or "Transport" category requested by other participants. They can only be requested by service sellers authorized by TOP-IX after analyzing the technical requirements.

- Marketplace (BUY) Ports. Ports dedicated to the acquisition of services provided by other participants and to peering services. On these ports it is possible to configure only "Marketplace" services terminated on remote ports of the "Marketplace SELL" or "Transport" category requested by other participants. Each member may request a maximum of one port of this type.

- Transport Poirts. Ports on which it is possible to request one or more services among those available, i.e. Peering and/or Marketplace and/or Transport.

- Transport (point to point) Ports. Ports dedicated to the single point-to-point transport service on which it is not possible to request further services.

- Reselling Ports. Ports that can be requested exclusively by TOP-IX partners who have signed a specific agreement for the resale to third parties of the access service to the consortium's public peering platform. The Reselling ports can be of the "Standard" type (delivery of the TOP-IX public peering on a single VLAN TAG common to all remote peers) or "Advanced" (delivery of the TOP-IX public peering via a different VLAN TAG for each of the remote peers).

- IXP Interconnection Ports: Ports that can be requested exclusively by IXP partners who have signed a specific agreement with TOP-IX for the extension of mutual public peering infrastructures.

The following table defines the compatibility between service types and port types:

Port	Peering Services	Marketplace Services	Transport Services	Remote Peering Services
Peering	X	-	-	X
Marketplace (SELL)	-	X[1]	-	-
Marketplace (BUY)	X	X[2]	-	X
Transport	X	**X**	X	X
Transport (point to point)	-	-	X[3]	-
Reselling	X	-	-	-
IXP Interconnection	X	-	-	-

The following table highlights available capacity for every type of ports.

Port	100 Mbps	1 Gbps	10 Gbps	100 Gbps
Peering	-	-	X	X
Marketplace (SELL)	-	-	X	X
Marketplace (BUY)	-	-	X	-
Transport	-	X	X	X
Transport (point to point)	-	-	X	X[4]
Reselling	-	-	X	X
IXP Interconnection	-	-	X	X

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[1] Only marketplace services can be configured on Marketplace SELL type ports with termination to remote ports of other "Marketplace BUY" or "Transport" category ports.

[2] Only marketplace services can be configured on Marketplace BUY ports with termination to remote ports of other "Marketplace SELL" category ports or peering services.

[3] Only a single Transport (point to point) type service can be configured on Transport (point to point) type ports.

[4] 100 Gbps ports for Transport services (point to point) are currently available only for connections terminated on "Core" type nodes, i.e. TO001, To002, MI001, Mi004.

3.1   PEERING SERVICE

TOP-IX offers its Members and Partners access to the Layer 2 distributed platform of Internet Exchange in order to implement Internet peering agreements towards other Bodies/Organizations/Companies connected directly or indirectly to its platform.

The peering service can only be used to implement BGP sessions of mutual visibility between Consortium Members/Partners. It is prohibited to use TOP-IX public peering platform for other functionalities such as transport, transit sale, etc.

3.1.1   ACCESS MODE

The peering service is available in the following three access modes:

- **Direct access;**
- **Remote access;**
- **Access from Partner IXPs.**

Direct Access

The direct access mode is used when the service user is directly connected to one or more ports active at nodes belonging to the TOP-IX platform.

Remote access

It is possible to access the public peering services offered by TOP-IX through a Partner (Reseller) chosen among those identified by TOP-IX. Resellers are Partners of TOP-IX who have signed a Reselling Agreement in order to provide third parties with remote access (remote peering) to the TOP-IX peering platform.

Any contractual relationship is directly managed by the user of the service and the Reseller. The extension of the peering service (Layer 2) between the platform of TOP-IX and that of the user of the service will be realized by the Reseller through its own network infrastructure.

The updated list of Partners that are offering remote access is available at page https://www.top-ix.org/en/remote-peering/

Access from Partner IXPs

The public peering platform of TOP-IX is also available through the Internet Exchanges interconnected to TOP-IX platform (VSIX, Lyon-IX and France-IX).

Members of these IXPs may request access to TOP-IX public peering from their IXP. The Partner IXP extends the TOP-IX Layer2 peering LAN to its Members.

The service is to be considered as Best Effort, and not subjected to the Quality Statements.

3.1.2   ACCESS REQUIREMENTS

Access to the public peering service offered by TOP-IX must be carried out in full respect of the following constraints and requirements.

Physical Layer: (applicable only to direct access)

The physical interfaces of the equipment connected to the TOP-IX platform must respect the interconnection requirements defined in paragraph 2.3 (any exceptions must be agreed with and must be explicitly authorised by TOP-IX).

MAC level and VLAN:

All frames sent to the access ports of TOP-IX public peering platform must have the same source MAC address, associated with the IP assigned by TOP-IX.

Any MAC address change must be reported to the TOP-IX NOC, which will update the ingress filters associated with the access port.

Public peering agreements are carried out on a single public VLAN, they are free of charge and cannot implement transit services.

The protocols allowed are: IPv4 (Ethertype 0x0800), ARP (Ethertype 0x0806) and IPv6 (Ethertype 0x86dd).

ARP, ICMPv6 and unknown-unicast traffic is policed.

All control plane Layer2 protocols (STP, bridging protocols) as well as Router Advertisement/Router Solicitation (RA/RS) will be filtered out.

IP layer:

All Layer 3 interfaces connected to TOP-IX public peering platform have IPv4 and/or IPv6 addresses assigned by TOP-IX (the use of addresses other than those assigned is not permitted).

In case of Direct Access the service includes the assignment of a single IPv4 and a single IPv6 address for each port and a maximum of two ports for direct interconnection can be required.

in case of Remote Access or with Partner IXP, the service includes only one ipv4 address and one IPv6 address for each remote connection.

Maximum MTU allowed is 1500 bytes.

Non-unicast packets are not allowed, with the exception of ARP and ICMPv6 Neighbor Advertisement/Solicitation (IPv4 multicast traffic is not allowed).

Routing:

Peering sessions established through TOP-IX public peering platform must use the BGP-4 protocol.

The AS numbers used in BGP sessions must be public and registered with a RIR (RIPE, etc.) in the name of the Member/Partner (the use of AS belonging to the reserved block for private use is not allowed).

Any IPv4/v6 address assigned by TOP-IX cannot be announced via BGP.

All routes announced in peering sessions must be registered with RIPE or any other public Routing Registry.

3.1.3 ROUTE SERVERS

In order to facilitate and encourage public peering on its platform, TOP-IX provides a redundant Route Server service that automates the management of peering between Members and Partners.

The Route Server does not perform traffic routing, but deals exclusively with the redistribution of routes (learned via BGP protocol) between the Members of the platform. Using a single BGP session with the Route Server is possible to receive the announcements generated by all the Autonomous Systems connected to the Route Server.

All information concerning the use of the Route Server systems are available at the address:

https://www.top-ix.org/it/ix/routeserver/

Given the importance of the role played by the Route Server function within the Internet Exchange service, the system is redundant; two BGP sessions toward two different and geographically diverse Route Servers must be configured for their correct use.

A Looking Glass service to verify the operation of the Route Server systems is available at the address:

https://lg.TOP-IX.org

The use of the TOP-IX Route Server systems is at the discretion of the individual Member, who may decide whether or not to use them.

3.1.4 PEERING AGREEMENTS

The interaction between the Members takes place in peer-to-peer mode using the BGP-4 protocol (Border Gateway Protocol - version 4) or BGP-4+ (for the IPv6 protocol) without any technical or economic interference from TOP-IX.

A public VLAN is made available on which the interested Members can enter into peering agreements of mutual visibility (transit BGP sessions are excluded).

3.1.5 ANCILLARY SERVICES

The service explained in the previous paragraphs also includes:

- One IPv4 and one IPv6 address belonging to the Autonomous System of TOP-IX (depending on the service required), used to implement peering interconnection agreements with other Members.

- Access to statistics related to the volume of traffic exchanged through the Member ports on TOP-IX platform;

- An operational mailing list service;

- Support for configuration updates on ports;

- Support for fault management and troubleshooting on TOP-IX platform affecting the Member service.

The services provided by TOP-IX do NOT include

- housing costs;

- cross connect costs;

- interconnection costs between the Member premises and the TOP-IX platform nodes;
- configuration of the Member equipment.

3.2 MARKETPLACE SERVICES

The Marketplace services are dedicated to allow the sale of services (IP Transit, Dedicated Cloud Access, Ethernet, Security, etc.) between Members directly connected to the TOP-IX platform.

The service exclusively includes Layer 2 interconnection between the requesting party and another Member. The services provided on top of the Marketplace Service are subject to direct agreements between the two Members/Partners involved.

Marketplace services may only be requested between ports of two different Members directly connected to the TOP-IX platform. Marketplace services are not allowed between more than two Members.

3.2.1 ACCESS MODE

Marketplace services are only available in direct access mode to the TOP-IX platform.

3.2.2 ACCESS REQUIREMENTS

Access to the services must be made in full compliance with the following constraints and requirements.

Physical Layer:

> The physical interfaces of the equipment connected to the TOP-IX platform shall comply with the interconnection requirements defined in section 2.3 (any exceptions must be agreed with and must be explicitly authorised by TOP-IX).

MAC level and VLAN:

> Service agreements (IP Transit, Dedicated Cloud Access, etc.) are negotiated directly between Consortium Members/Partners without any interference from TOP-IX.

IP layer:

> All Layer 3 interfaces connected to the platform and dedicated to Marketplace Services that impose the use of BGP sessions must use IPv4/IPv6 addresses assigned by TOP-IX (use of addresses other than those assigned is not permitted).
>
> Maximum MTU allowed is 9008 bytes.

Routing:

> Any IPv4/v6 address assigned by TOP-IX cannot be announced via BGP.

3.2.3 ANCILLARY SERVICES

The service explained in the previous paragraphs also includes:

- One or more IPv4/IPv6 address and an IPv6 address belonging to the Autonomous System of TOP-IX (depending on the service required), used to implement peering interconnection agreements with other Members.

- One VLANs towards other Members/Partners of TOP-IX (each single VLAN may be propagated exclusively between two Members/Partners).

- Access to statistics related to the volume of traffic exchanged through the Member ports on TOP-IX platform;

- An operational mailing list service;

- Support for configuration updates on ports;

- Support for fault management and troubleshooting on TOP-IX platform affecting the Member service.

The services provided by TOP-IX do NOT include

- housing costs;

- cross connect costs;

- interconnection costs between the Member premises and the TOP-IX platform nodes;

- configuration of the Member equipment.

3.3 TRANSPORT SERVICES

The Transport services allow the implementation of a Layer 2 transport between ports assigned to a single Member.

3.3.1 SERVICE ACCESS MODES

Transport services are available exclusively in direct access mode to the TOP-IX platform and can be provided only on "Transport" type ports.

3.3.2 SERVICE ACCESS REQUIREMENTS

Access to the services must be performed in full compliance with the following constraints and requirements.

Physical Layer:

The physical interfaces of the equipment connected to the TOP-IX platform must comply with the interconnection requirements defined in paragraph 2.3 (any exceptions must be agreed with TOP-IX and must be explicitly authorised by the latter.

MAC level and VLAN:

The service is intended to allow connectivity between Layer 3 equipment of the requesting Consortium Member.

Maximum MTU allowed is 9008 bytes

3.3.3 ANCILLARY SERVICES

The service explained in the previous paragraphs also includes:

- Access to statistics related to the volume of traffic exchanged through the Member ports on TOP-IX platform;
- An operational mailing list service;
- Support for configuration updates on ports;
- Support for fault management and troubleshooting on TOP-IX platform affecting the Member service.

The services provided by TOP-IX do NOT include

- housing costs;
- cross connect costs;
- interconnection costs between the Member premises and the TOP-IX platform nodes;
- configuration of the Member equipment.

3.4 TRANSPORT (POINT TO POINT) SERVICES

Transport services (point to point) allow the implementation of a point-to-point Layer 2 transport on dedicated ports (not usable for other services).

3.4.1 ACCESS TO THE SERVICES

Transport services are available exclusively in direct access mode to the TOP-IX platform and exclusively at the nodes detailed below.

Point to Point GEO Transport TORINO-MILANO (Not protected)

The two service termination ports can be requested exclusively on nodes MI001, MI004, TO001 and TO002.

Point to Point METRO Transport (Only TORINO e MILANO – Protected)

The two service termination ports can be requested exclusively on nodes in the Turin metropolitan area (TO001, TO002, TO003, TO006) or on nodes in the Milan metropolitan area (MI001, MI002, MI003 and MI004).

Point to Point WI-PIE Transport (Only Protected)

The two service termination ports can be requested exclusively on "Core" or "Backbone" type nodes, i.e.: AL001, AT001, BI001, CN001, FOS01, MI001, MI002, MI004, NO001, TO001, TO002, TO003, TO006, VB001, VC001.

3.4.2 ACCESS REQUIREMENTS

Access to the services must be carried out in full compliance with the following constraints and requirements.

Physical Layer:

The physical interfaces of the equipment connected to the TOP-IX platform must comply with the interconnection requirements defined in paragraph 2.3 (any exceptions must be agreed with TOP-IX and must be explicitly authorized by the latter.

MAC Layer:

The service is intended to allow connectivity between Consortium members' devices.

The MTU must be 9008 bytes.

3.4.3 ADDITIONAL SERVICES INCLUDED

The service also includes:

- Access to statistics, managed by TOP-IX, relating to the volume of traffic developed through its active port on the Consortium's backbone;
- Participation in the TOP-IX mailing lists;
- System support for port configuration updates;
- System support for faults within the TOP-IX platform that compromise its functioning.

The services provided by the Consortium DO NOT include:

- housing costs;
- costs for cross connect within the Data Center;
- connection costs between the Consortium member's headquarters and the TOP-IX headquarters;
- the configuration of the Consortium's equipment.

3.5 REMOTE PEERING TO PARTNER IXPS

Through the TOP-IX platform it is possible to access the public peering platforms of Partner IXPs interconnected to TOP-IX platform.

It is possible to request access to the public peering services of the following IXPs:

- VSIX (Padua);
- LYON-IX (Lyon);
- FRANCE-IX (Paris).

The service offered by TOP-IX provides for the extension of the public peering VLAN of the Partner IXP to the requesting port.

4. Service Provisioning Process

The following sections describe the operational procedures and contact points for provisioning (port and service activation/capacity expansion/termination), management (changes in configurations) and maintenance processes (fault management and troubleshooting).

4.1 Provisioning

Requests related to activating/deactivating/modifying ports and/or services by Consortium Members/Partners should be made by filling in the form available from TOP-IX website

https://www.top-ix.org

under the Internet Exchange/Subscription and Fees section.

Request forms should be sent by e-mail to the following address:

amministrazione@top-ix.org

The POINT-POINT transport service is subject to a technical feasibility check therefore requests must be sent to the following address::

sales@top-ix.org

During the request phase, the Member/Partner is required to indicate the technical person responsible for coordinating activities on behalf of the Member/Partner.

Requests will be carried out in the manner and timing foreseen in the "Quality Statements" section of this document.

In the case of requests involving contractual changes, please refer to TOP-IX website at https://www.TOP-IX (Internet Exchange/Subscription and Fees section) for current financial terms and conditions.

Requests for service activation and/or upgrade will not be carried out in case of pending or outstanding administrative case.

4.2 Management

The operations management service offered by TOP-IX includes the implementation of any configuration modifications requested by the Members/Partners that do not affect the service contract agreement, or require hardware/software updates to TOP-IX backbone platform.

Operations do not include actions involving activation of new ports, capacity changes, discontinuation of existing services – activities to be carried as described in the "Provisioning" section.

Requests to modify the configurations may be requested:

- by email to **networking@top-ix.org** (available only during normal business hours, from Monday to Friday, 9:00-13:00 and 14:00-18:00, public holidays excluded).

Requests involving this type of activity must be submitted with all the necessary technical information in order to implement changes correctly.

The minimum amount of information required in order to deal with the request is as follows:

- details of the technical staff in charge of coordinating the activity;
- detailed technical description of the request;
- any potential impact on other Members/Partners on the TOP-IX platform, and the staff contact of the latter.

This service is active Mondays to Fridays, 09:00-13:00 and 14:00-18:00 (public holidays excluded).

4.3 MAINTENANCE

Maintenance services offered by TOP-IX allow services to be restored in the event of TOP-IX platform malfunction.

Any faults or malfunction that interfere with the correct running of platform operations and, consequently the supply of services to Members/Partners, can be reported using the following methods:

- by email to **networking@top-ix.org** (available only during normal business hours, from Monday to Friday, 9: 00-13: 00 and 14: 00-18: 00, public holidays excluded);
- by telephone **+39 011 0883150** (available 24/7/365).

The point of contact reported above are in use solely to report anomalies involving the TOP-IX platform. The contact numbers do not respond to issues regarding management activities (configuration modification, capacity expansion, etc.) or the Members/Partners network devices beyond the TOP-IX service demarcation point (Layer 2 port on TOP-IX node).

It is also necessary to supply all relevant information in order to facilitate initial remote fault troubleshooting:

- name of the Member/Partner affected by the fault or malfunction;
- details of the technical staff in charge of coordinating the activity;
- number of service demarcation points on the TOP-IX platform and related configuration;
- detailed description of the technical problem reported;
- any impact of the fault on other platform Members/Partners (if known).

Maintenance service coverage as described above is active 24/7 and 365 days/year.

4.4 OPERATIONAL COMMUNICATIONS

In addition to the above, the mailing list

operations@TOP-IX.org

is available to:

- communicate planned maintenance to the platform carried out by TOP-IX;
- report any malfunction or unexpected events that may impact on the services provided by TOP-IX.

The same mailing moderated by TOP-IX staff can be used by Members and Partners to:

- report activities and changes that can affect the public peering service on the platform (BGP update, changes, maintenance, etc).

5. QUALITY STATEMENTS

The Quality Statements described below - concerning the implementation, maintenance and management components of the services - are intended as TOP-IX objective to guarantee an adequate level of quality to the user of the platform.

TOP-IX will monitor the actual compliance with the defined target parameters, and in case of deviations from the defined target performance values will take the necessary action to ensure compliance.

5.1 PROVISIONING

Service activation time is subject to whether the type of port required is available on the platform and on the interested physical node device.

The following list describes the implementation times required following a request for the activities:

- port activation/capacity expansion requiring no hardware update: within 5 working days.
- port activation/capacity expansion requiring hardware update: to be defined (TOP-IX shall assess the actions required for platform expansion and will provide an estimated time of activation).
- port activation/capacity expansion on a custom project design: subjected to the project design and constraints.
- Access port discontinuation: within 3 working days.

5.2 MANAGEMENT

Configuration management is carried within 3 working days from the reception of the management request, providing that all details are correctly reported in the request.

5.3 MAINTENANCE

5.3.1 AVAILABILITY

TOP-IX has set an annual minimum service availability target for each individual service port of **99.95%**.

Actual availability for each individual port is calculated as follows:

$$Availability = \frac{Reference.period - \sum Downtime}{Reference.period}$$

Where:

Availability: The availability of the relative port, measured during the reference period.

Reference period: The reference period during which any downtime is measured, i.e. one year.

∑ Downtime: The sum of all port downtime measured during the reference period.

Analysis does not include scheduled maintenance and platform update activities, which are carried out to improve performance and reliability.

These activities are managed on a per-project basis and planned in order to minimize any impact on services. Service users are notified in the following way:

- by e-mail with 10 working days' notice for activities with a significant impact on the services provided;
- by e-mail with 5 working days' notice for activities with a limited impact on the services provided.

5.3.2 RECOVERY TIME

The target times set for service restoration in the event of a failure on the platform are:

- 10 hours from reporting the malfunction in 95% of cases;
- 24 hours from reporting the malfunction in 100% of cases.

5.4 PERFORMANCE MONITORING

TOP-IX monitors traffic levels on its network platform in order to guarantee the network service levels and expand capacity when needed.

Platform monitoring is mainly focused on:

- backbone links, in order to ensure adequate capacity between service nodes;
- user service ports, in order to identify and notify user of possible access bottleneck and capacity upgrade.

The monitoring system provides the following web-based information:

- analysis of aggregated total traffic level on the TOP-IX platform (publicly available on TOP-IX website);
- analysis of traffic for each individual user port (privately available on the Members Area).

5.5 ACCESS TO TRAFFIC STATISTICS

Access to information regarding allocated resources, active services, and traffic on the single ports is available to Members and Partners through the Members Area of the TOP-IX website, available at:

https://membersarea.top-ix.org