

OTE WLL Ethernet



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Wholesale Ethernet Leased Lines

Introduction

General Information for Wholesale Ethernet Leased Lines

Wholesale Leased Line Ethernet Services offer reliable and secure data transfer at high speeds. OTE's ever growing Ethernet network, tailored to the specific needs and client requirements of Telecommunications Service Providers (TSPs), enables them to design and implement their own architecture.

Application

- Network Development - TSPs provide enhanced commercial activities in new Points of Presence (PoP), limiting their investment and operating cost.
- Connection to Physical Colocation (PC) –Traffic is carried to and from TSP's proprietary DSLAM nodes, enabling broadband services provision.
- Connection to Clients - Integrated services supporting large amounts of data transfer to and from TSP's End-customer PoP as well as the provision of intranet / extranet data networks and services (ie Internet access, VPN, cloud, IP telephony, integrated solutions).

General Information for Wholesale Ethernet Leased Lines

Ethernet Access

Available in the context of the Terminating Segment Wholesale Leased Line Market, fulfilling the TSP's access and other relevant connectivity requirements.

- Permanent connectivity to the Ethernet network via optical fiber, wireless infrastructure, SHDSL and Symmetric DSL technology.
- Provision and maintenance of terminal equipment by OTE.
- High availability via additional protection services

Ethernet Circuits

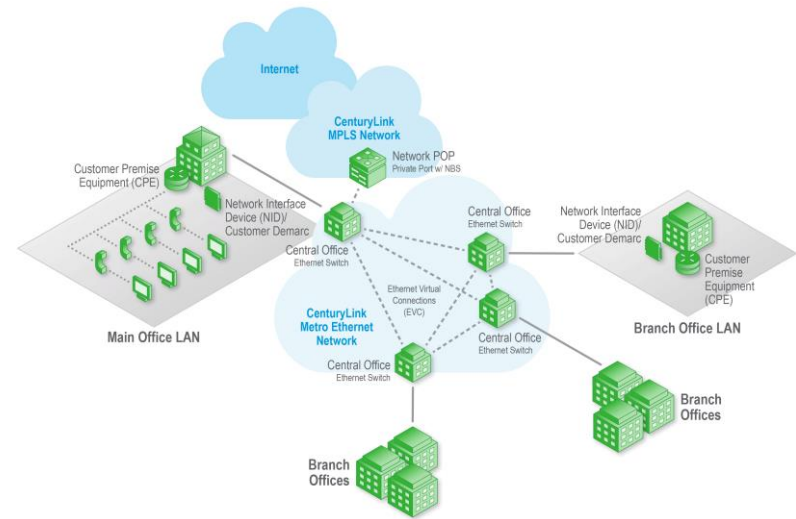
Available in the context of the Trunk Segment Wholesale Leased Line Market and providing permanent connectivity between two TSP's PoPs.

- Dedicated, symmetric capacity on the access and core network.
- Transparent data transmission, without modification or processing by OTE.
- High availability via dynamic routing protocols.

Terms of Service

Ethernet Leased Line Services are provided according to the terms and conditions of the Reference Offer for Wholesale Leased Lines (EETT Decision 1000/02, Government Gazette 3776/13-08-2021), with official publication date 16-08-2021).

For more information, please contact OTE Wholesale or directly your Key Account Manager.



“Each TSP may design and implement their own architecture, tailored to their specific needs and client requirements.”

Basic Principles & Services Description

Description of basic concepts and
services of the Wholesale Ethernet
Leased Lines

Basic Principles

Ethernet Leased Lines

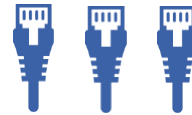
Ethernet technology services developed by OTE in the context of the Trunk and Terminating Segment Wholesale Leased Line Market.

Ethernet Circuit

The nationwide Ethernet technology network implemented by OTE for the interconnection of the L/E (Local Exchanges) and the provision of data services

Ethernet Hub

The location or the L/E (Local Exchange) with connection functionality to the Ethernet Network.



Physical Colocation

The specially configured and allocated space in the OTE L/E with all the facilities provided to the TSPs to install their equipment (easy access, fire detection, air conditioning, safety).

TSP Ethernet Equipment

The equipment installed by the TSP's at their own or at their End Customer's PoP in order to connect to the Ethernet network.



Ethernet Terminating Equipment

Active equipment which provided by OTE at the TSP's or their end-customer's PoP in order to provide Ethernet Services.

Remote Colocation

The installation of TSP's equipment, at the TSP's area of choice, which is not necessarily at a point that is connected to OTE property.

Ethernet Interface

The point of interconnection of the Terminal equipment with the TSP's Ethernet Equipment.

Urban Area Ethernet

The residential area, in the geographical boundaries of which Ethernet Leased Lines services are offered through one or more Ethernet nodes.

O.K.SY.A / SY.ME.FS DSLAM)

Interconnects the TSP's equipment with OTE's traffic transfer multiplex node, as per the OTE Wholesale Reference Offer for local access.

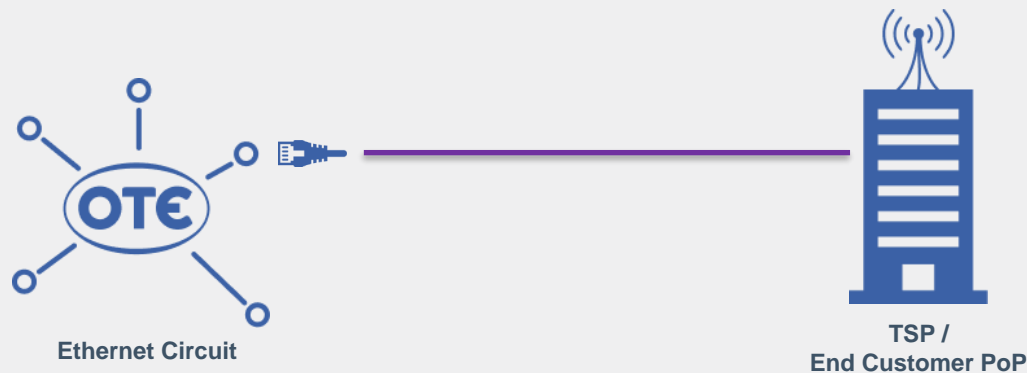
Telecommunication Service Provider Reception Manhole (TSPRM)

Standardized manhole built by OTE.

Services Description

ETHERNET OPTICAL ACCESS

Enables Ethernet connection via optical fiber and Ethernet terminal equipment (Carrier Ethernet NTE) provided by OTE.



Available in the Terminating Segment Wholesale Leased Line Market and can be used in conjunction with one or more Ethernet circuits, enabling:

- The connection of the TSP central node, as well as the concentration of traffic from other TSP PoP, End-customer PoP and Physical Colocation sites.
- The connection of a TSP peripheral node and the data transfer to a central node.
- The connection of an End-customer PoP and the data transfer to one or more of TSP PoP.

Services Description

ETHERNET OPTICAL ACCESS

Available Capacities

The TSP may choose the Optical Ethernet Access capacity that meets their requirements:

100 Mbps: for the connection of a peripheral PoP or End Customer PoP

1 Gbps: for the connection of a TSP central node or end-customer PoP with increased capacity requirements

10 Gbps: for the connection of a TSP central node concentrating high-capacity circuits

Service Duration

Optical Ethernet Access and additional protection services are provided with a minimum duration period of six (6) months. After the above minimum duration has elapsed, service duration becomes indefinite.

In case Double Routing protection and / or Double Entry protection is activated on an existing Optical Ethernet Access, the minimum duration is extended for another six (6) months.

Additional Protection Services

Optical Ethernet Access can be combined with additional protection services, ensuring high availability in case of access network failure:

Double Routing: for connecting to the Ethernet Hub via a second fiber optics pair.

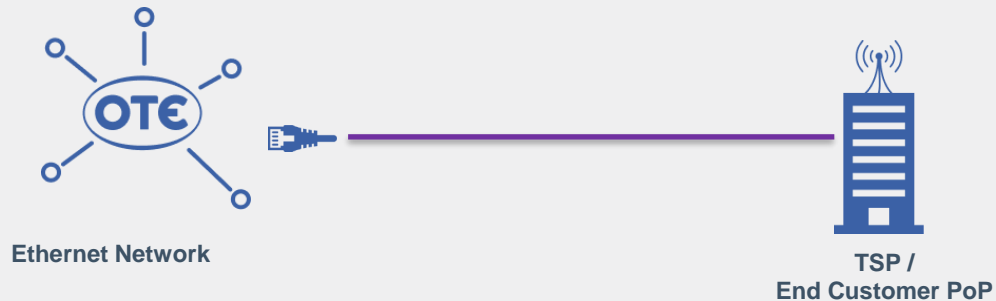
Double Entry: available at the TSP's PoP, provided that the building has the appropriate infrastructure. The Double Entry protection is only available in conjunction with the Double Routing protection.

Services Description

SHDSL ETHERNET ACCESS

Enables the connection of a TSP or an End Customer PoP with the Ethernet network via existing copper infrastructure and the installed OTE DSLAM.

It is available in the context of the Terminating Segment Wholesale Leased Line Market and is provided in combination with one Ethernet circuit with capacity of up to 4 Mbps.



Available Capacities

The TSP may choose the overall SHDSL Ethernet Access capacity that covers their specific requirements:

- **2 Mbps:** used for the connection of the TSP PoP or their End-Customer PoP via a circuit of capacity of 1 or 2 Mbps
- **4 Mbps:** used for the connection of the TSP PoP or their End-Customer PoP via a circuit of capacity of up to 4 Mbps using two pairs of copper.

Service Duration

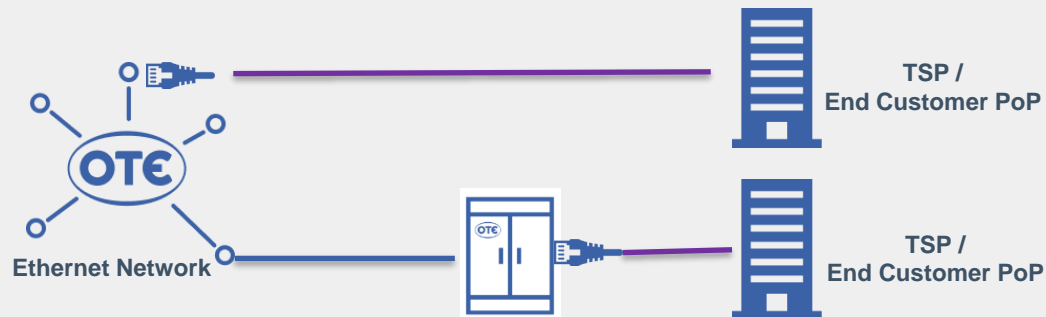
The SHDSL Ethernet Access is provided with a minimum duration period of six (6) months. After the above minimum duration has elapsed, service duration becomes indefinite.

Services Description

SYMMETRIC-DSL AK/KV ETHERNET ACCESS

Enables the connection of a TSP or an End Customer PoP with the Ethernet network via existing copper infrastructure and the installed OTE DSLAM.

It is available in the context of the Terminating Segment Wholesale Leased Line Market and is provided in combination with one Ethernet circuit with capacity up to 15 Mbps.



Service Duration

The SHDSL Ethernet Access is provided with a minimum duration period of six (6) months. After the above minimum duration has elapsed, service duration becomes indefinite.

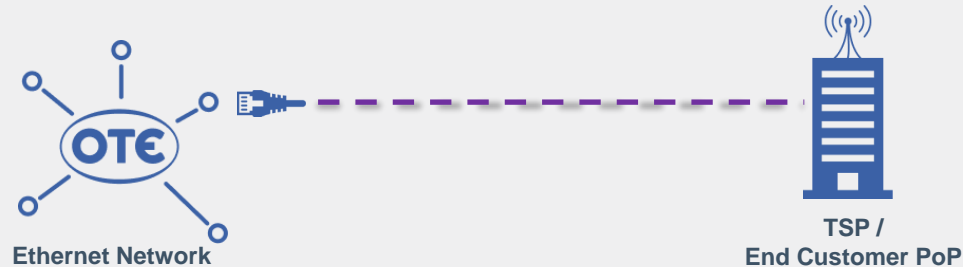
Available Capacities

Symmetric-DSL AK/KV Ethernet Access capacity is defined by the active capacity of the terminating circuit.

Services Description

WIRELESS ETHERNET ACCESS

Enables the TSP or End Customer PoP connection with the Ethernet network via wireless OTE infrastructure. It is available in the context of the Terminating Wholesale Leased Line Market and can be used in combination with one to four Ethernet circuits.



Available Capacities

Wireless Ethernet Access capacity is defined by the aggregated, active capacity of all circuits it contains. The three pricing categories, depending on this aggregated, active capacity, are the following:

- Active Capacity 1: **1 Mbps** up to (including) **2 Mbps**
- Active Capacity 2: **3 Mbps** up to (including) **100 Mbps**
- Active Capacity 3: **101 Mbps** up to (including) **1000 Mbps**

Service Duration

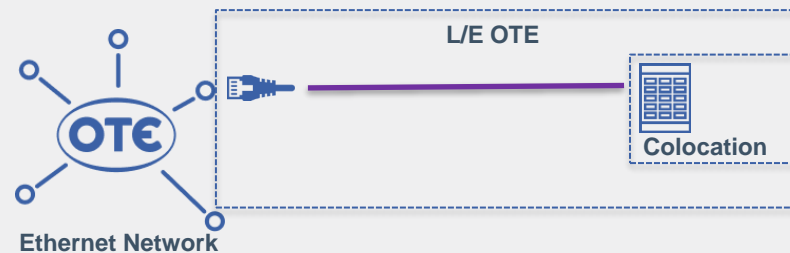
Wireless Ethernet Access, as well as the circuits it contains, is provided with a minimum duration period of twenty-four (24) months. After the above minimum duration has elapsed, service duration becomes indefinite.

Services Description

ETHERNET ACCESS IN PHYSICAL COLOCATION (PC)

Enables the connection of the TSP's equipment inside the Physical Colocation (PC) with the Ethernet network, via a pair of optical fibers.

It can be used in combination with an Ethernet circuit for data transfer at the TSP central node, as part of OTE's obligation to meet the TSP's needs for backhaul links.



Available Capacities

Ethernet Access in PC is available in the capacities of 1 and 10 Gbps.

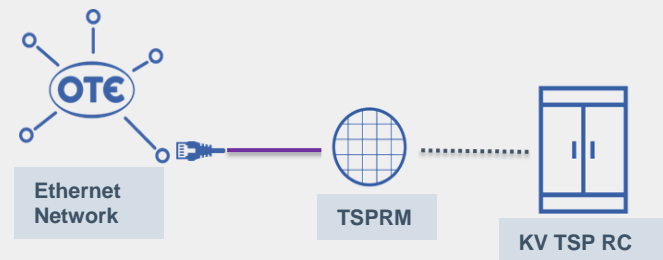
Service Duration

Ethernet access in PC is provided with a minimum duration period of six (6) months. After the above minimum duration has elapsed, service duration becomes indefinite.

Services Description

ETHERNET ACCESS IN TSP RECEPTION MANHOLE (TSPRM)

Enables the connection of the TSP's Ethernet technology equipment within the Remote Colocation, especially in urban areas of more than 5,000 subscribers, with the relevant Ethernet Node, through the Telecommunication Service Provider Manhole (TSPM). Provided in conjunction with an Ethernet Circuit.



Available Capacities

TSPRM Ethernet Access is available in the capacities of 1 and 10 Gbps.

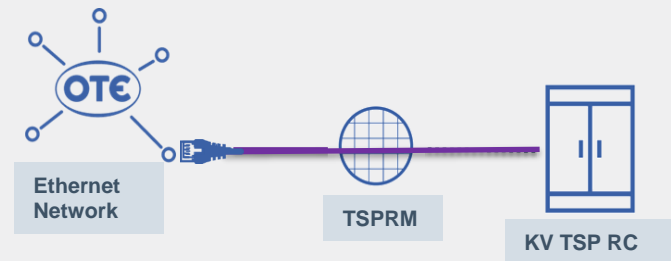
Service Duration

TSPRM Ethernet Access is provided with a minimum duration period of six (6) months. After the above minimum duration has elapsed, service duration becomes indefinite.

Services Description

ETHERNET ACCESS IN REMOTE COLOCATION CABIN (RC)

Enables the connection of the TSP's Ethernet technology equipment within the Remote Colocation (RC) Cabin, especially in urban areas of less than 5,000 subscribers, with the relevant Ethernet Node through the Telecommunication Provider Reception Manhole. Ethernet access in Remote Colocation is provided in conjunction with an Ethernet Circuit.



Available Capacities

Ethernet access in RC is available in the capacities of 1 and 10 Gbps.

Service Duration

Ethernet access in RC is provided with a minimum duration period of six (6) months. After the above minimum duration has elapsed, service duration becomes indefinite.

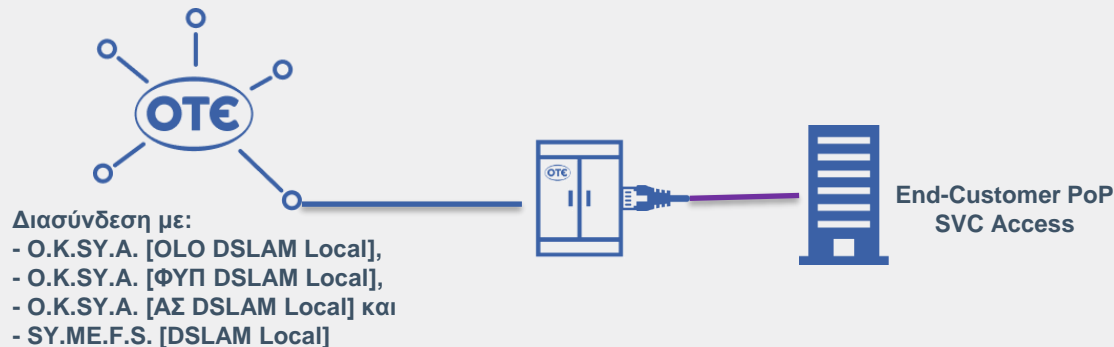
Services Description

SYMMETRIC VIRTUAL COPPER ETHERNET ACCESS (SVC)

Enables the connection between an end-customer PoP and the active equipment (DSLAM) installed exclusively in an outdoor OTE cabin (KV), via the existing copper infrastructure. OTE transfers each TSP's traffic to and from the active equipment located inside the KV to the corresponding OTE L/E.

Symmetrical Virtual Copper Ethernet Access (SVC) includes the provision of a symmetric connection between the end-customer PoP and the DSLAM traffic aggregation node located inside the OTE L/E.

SVC is combined with backhaul services O.K.S.Y.A [OLO DSLAM Local], O.K.SY.A. [TSPRM DSLAM Local], O.K.SY.A. [Remote Access DSLAM Local] and SY.ME.F.S. [Local DSLAM], enabling the connection and traffic transfer between the end-customer PoP and the TSP's Network.



Services Description

SYMMETRIC VIRTUAL COPPER ETHERNET ACCESS (SVC)

Service Duration

SVC is provided with a minimum duration period of six (6) months. After the above minimum stay period has elapsed, service duration becomes indefinite.

Available Capacities

SVC capacity is provided as follows:

Type of Service	SVC Access Capacity (down / up)
SVC Access 25 Mbps	Up to 25 Mbps / Up to 25 Mbps
SVC Access 50 Mbps	Up to 50 Mbps / Up to 50 Mbps
SVC Access 100 Mbps	Up to 100 Mbps / Up to 100 Mbps

Services Description

SYMMETRIC VIRTUAL COPPER ETHERNET ACCESS (SVC)

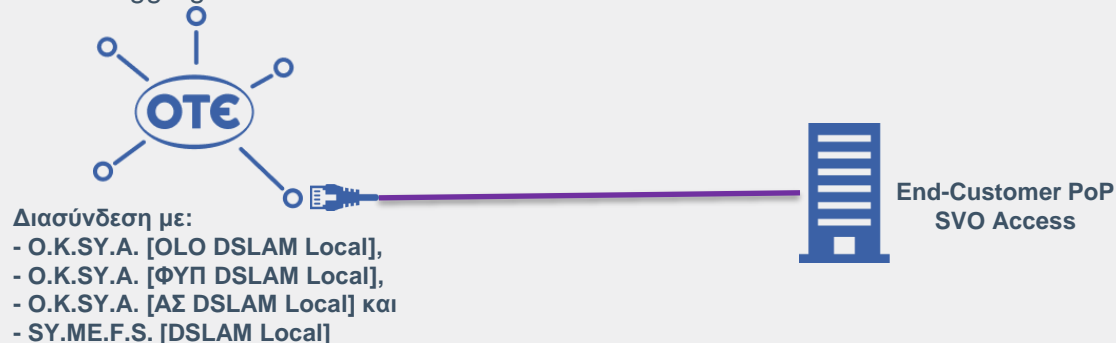
Enables the connection between an end-customer PoP and the corresponding OTE L/E, via the existing optical infrastructure. OTE transfers each TSP's traffic to and from the active equipment located inside the KV.

Symmetrical Virtual Optical Ethernet Access (SVO) includes the provision of a symmetric connection between the end-customer PoP and the traffic aggregation node located inside the Local Exchange.

The connection between the terminal equipment installed in the end-customer PoP and the optical network termination node (Optical Line Termination – OLT) is realized via appropriate optical interfaces and each OLT node is then connected to the aggregation node.

It is combined with backhaul services such as O.K.S.Y.A [OLO DSLAM Local], O.K.SY.A. [TSPRM DSLAM Local], O.K.SY.A. [Remote Access DSLAM Local] and SY.ME.F.S. [Local DSLAM], allowing the connection and traffic transfer between the End Customer's PoP and the TSP's Network.

optical interfaces to the aggregation node.



Services Description

SYMMETRIC VIRTUAL COPPER ETHERNET ACCESS (SVC)

Service Duration

SVO is provided with a minimum duration period of six (6) months. After the above minimum stay period has elapsed, service duration becomes indefinite.

Available Capacities

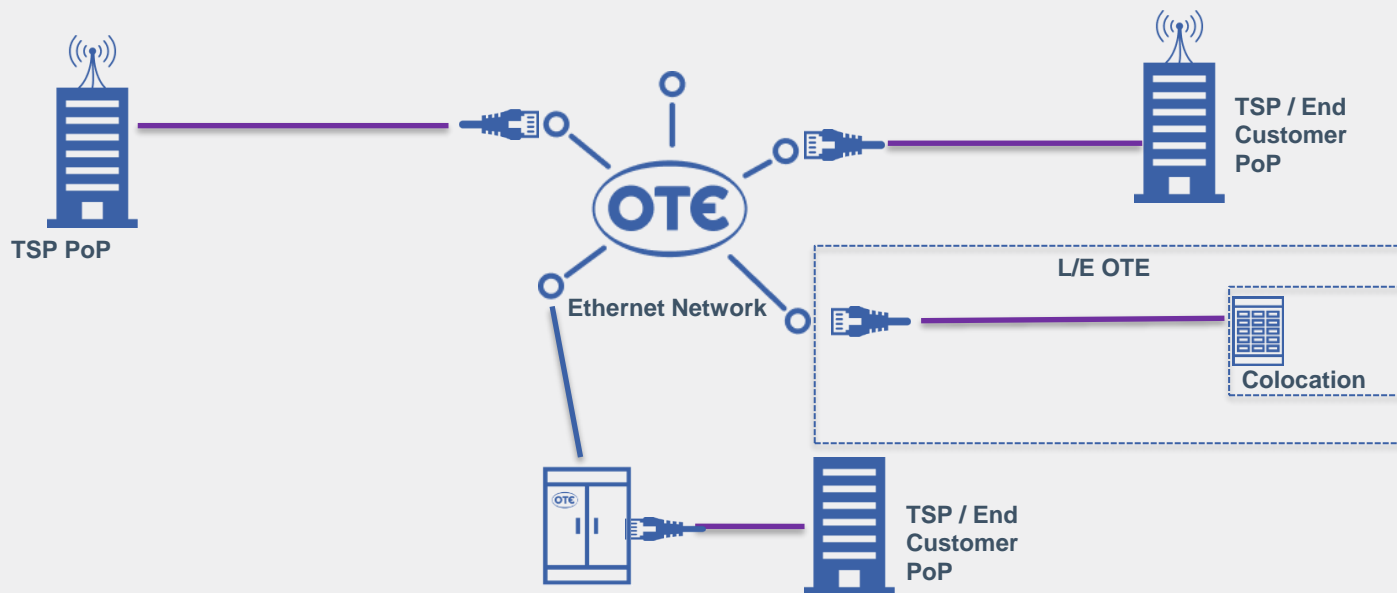
SVO Capacity is provided as follows:

Type of Service	SVO Access Capacity (down / up)
SVO Access 25 Mbps	25 Mbps / 25 Mbps
SVO Access 50 Mbps	50 Mbps / 50 Mbps
SVO Access 100 Mbps	100 Mbps / 100 Mbps
SVO Access 150 Mbps	150 Mbps / 150 Mbps
SVO Access 200 Mbps	200 Mbps / 200 Mbps
SVO Access 250 Mbps	250 Mbps / 250 Mbps
SVO Access 300 Mbps	300 Mbps / 300 Mbps

Services Description

ETHERNET CIRCUIT

Enables the connection of two PoP via dedicated, symmetric capacity in the Ethernet network.



It is provided in the context of OTE's obligations for the Wholesale Leased Lines Market and is combined with Ethernet access services for the transparent transmission of data between one TSP PoP and another PoP or an end-customer's PoP or the Physical Colocation.

Services Description

ETHERNET CIRCUIT

Available Capacities

TSPs may select the Ethernet circuit capacity that meets their needs:

1, 2, 4, 6, 8, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 800, 1.000, 1.500, 2.000, 2.500, 3.000, 4.000, 5.000, 7.000, 10.000 Mbps

Service Duration

Ethernet circuits are provided with a minimum duration period of six (6) months, with the following exceptions:

- An Ethernet circuit with at least one Wireless Ethernet Access, with a minimum duration of twenty-four (24) months
- An Ethernet circuit with capacity of 1.500 up to 10.000 Mbps, with a minimum of twelve (12) months.

After the above minimum duration has elapsed, service duration becomes indefinite.

Circuit Types & Charging Zones

Ethernet circuits are characterized as:

Urban: Connecting two PoPs under the same Ethernet Hub or under two Ethernet Hubs assigned to the same Ethernet Urban Area.

Interurban (long-distance): Connecting two PoPs under two Ethernet Hubs assigned to different Ethernet Urban Areas.

Interurban Ethernet Circuits are charged based on distance, according to the following Zones:

Zone 1 up to 50 km

Zone 2 over 50 km and up to 100 km

Zone 3 over 100 km and up to 200 km

Zone 4 over 200 km

The billing Zone is calculated by OTE, based on the straight-line distance (in km) between Ethernet Hubs.

Appendix

Technical Service Specifications

OPTICAL ETHERNET ACCESS

OTE installs Ethernet terminal equipment (Carrier Ethernet NTE) whenever deemed necessary, conforming to the following technical characteristics:

Physical medium NNI	IEEE 802.3z, 802.3ae
Power Supply	100-250 VAC, 50-60 Hz
Operating Conditions	Air-conditioned area (21-27 °C)
Number of Circuits	Up to 24

Each Ethernet circuit is delivered to a separate Ethernet interface on the terminal equipment, conforming to the following the technical characteristics :

Physical medium NNI	IEEE 802.3 PHY, 802.3ab, 802.3z
Capacity UNI	10 Mbps, 100 Mbps, 1 Gbps, 10 Gbps
Duplex Mode	Auto Negotiation (Default), Full Duplex
VLAN (IEEE 802.1Q)	Yes
L2CP	Yes

SHDSL ETHERNET ACCESS

OTE installs Ethernet terminal equipment (Carrier Ethernet NTE) whenever deemed necessary, conforming to the following technical characteristics:

Physical medium NNI	ITU G.991.2 (G.SHDSL.bis)
Power Supply	100-250 VAC, 50-60 Hz
Operating Conditions	Air-conditioned area (21-27 oC)
Number of Circuits	1

The Ethernet circuit is delivered to an Ethernet interface, conforming to the following technical characteristics:

Physical medium NNI	IEEE 802.3 PHY
Capacity UNI	10 Mbps, 100 Mbps
Duplex Mode	Auto Negotiation (Default), Full Duplex
VLAN (IEEE 802.1Q)	No
L2CP	Upon request and depending on the capabilities of each infrastructure

Appendix

Technical Service Specifications

SYMMETRIC-DSL AK/KV ETHERNET ACCESS

OTE installs Ethernet terminal equipment (Carrier Ethernet NTE) whenever deemed necessary, conforming to the following technical characteristics:

Physical medium NNI	ITU G.993.2 (VDSL2), ITU G.993.5 (Vectoring) ITU G.998.2 (G.Bond)
Power Supply	100-250 VAC, 50-60 Hz
Operating Conditions	Air-conditioned area (21-27 oC)
Number of Circuits	1

The Ethernet circuit is delivered to an Ethernet interface, conforming to the following technical characteristics:

Physical medium NNI	IEEE 802.3 PHY
Capacity UNI	10 Mbps, 100 Mbps
Duplex Mode	Auto Negotiation (Default), Full Duplex
VLAN (IEEE 802.1Q)	No
L2CP	Upon request and depending on the capabilities of each infrastructure

WIRELESS ETHERNET ACCESS

OTE installs wireless access terminal equipment (Carrier Ethernet NTE) whenever deemed necessary, conforming to the following technical characteristics:

Physical Medium NNIRadio Frequencies	Radio Frequencies for bi-point and multipoint fixed systems radio links, according to EETT Regulations
Power Supply	220V AC or alternatively 48V DC
Operating Conditions	Air-conditioned area
Number of circuits	Up to 4

Each Ethernet circuit is delivered to the Ethernet Wireless Access equipment, conforming to the following technical characteristics:

Physical Medium UNI	IEEE802.3 PHY, IEEE 802.3ab, IEEE 802.3z
Duplex Mode	Auto Negotiation (Preselection), Full
MAC Level	Ethernet II, IEEE 802.3, and IEEE 802.1q/p
Incoming traffic profile	Committed Access Rate
L2CP	Following customer request and drawing up techno-economic offer.

Appendix

Technical Service Specifications

ETHERNET ACCESS IN PC, TSPRM AND RC

The service is delivered conforming to the following technical characteristics:

Physical Medium	IEEE 802.3z
Number of Circuits	1
Capacity	1 Gbps, 10 Gbps
Duplex Mode	Auto Negotiation (Default), Full Duplex
VLAN (IEEE 802.1Q)	Yes
L2CP	Upon request, depending on the capabilities of each infrastructure

ETHERNET CIRCUIT

The Ethernet Circuit is implemented via an EVC, in accordance to the Metro Ethernet Forum standards:

Service Type	Ethernet Private Line (EPL)
Network Architecture	EoMPLS, EoSDH, Metro Ethernet
Concentration Reason	1 : 1 (dedicated capacity)

TSP's data is transparently transmitted over the Ethernet network without any alterations or modifications by OTE:

Frame Types	Unicast, Multicast, Broadcast
MAC Addresses	Unlimited
Max. Frame Size (MTU)	1588 Bytes
VLAN (IEEE 802.1Q)	Yes (are not supported in an SHDSL access)
L2CP	YES (not supported on SHDSL access or access to Physical Colocation)
Latency (Round-trip)	< 40 msec in urban circuit <80 msec in an interurban circuit
Frame Loss Ratio	< 1%
Jitter (Round-trip)	< 10 msec msec in urban circuit < 20 msec in an interurban circuit

Appendix

Technical Service Specifications

SVC ETHERNET ACCESS

In order to provide SVC Access, OTE installs terminal Ethernet equipment (NTE) at the End Customer PoP, with the following technical specifications:

Physical Medium	ITU G.993.2 (VDSL2), ITU G.993.5 (Vectoring), ITU G.998.2 (G.Bond)
Power Supply	100-250 VAC, 50-60 Hz
Operating Conditions	Air-conditioned area (21-27 °C)

The NTE provides 1 Gbps Ethernet interface to connect the End Customer's equipment (Router).

SVO ETHERNET ACCESS

In order to provide SVO Access, OTE installs terminal Ethernet equipment (NTE) at the End Customer PoP, with the following technical specifications:

Physical Medium NNI	ITU G.984.1, ITU G.984.2, ITU G.984.3, ITU G.984.4, ITU G.984.5 και ITU G.988
Power Supply	100-250 VAC, 50-60 Hz
Operating Conditions	Air-conditioned area (21-27 °C)

The NTE provides 1 Gbps Ethernet interface to connect the customer's equipment (Router).

SVC - SVO access traffic is aggregated and forwarded via O.K.SY.A./SY.ME.F.S. DSLAM type services, according to the OTE Wholesale Local Access Reference Offer.