

ROMTELECOM
carrier services



Service Description
L2Connect



Romtelecom

Carrier Relations Corporate Group

Phone: +40 21 400 5001

Fax: +40 21 400 5009

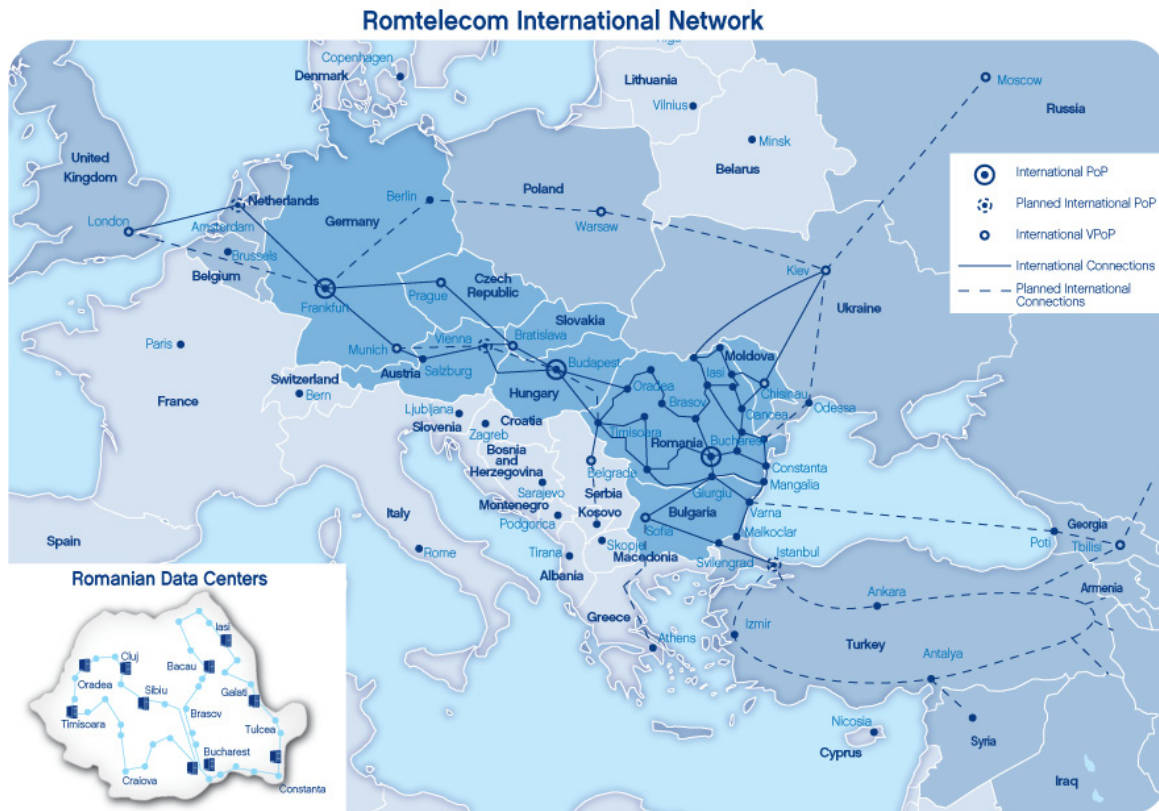
Email: carrierservices@romtelecom.ro

Web: www.romtelecom.ro/en/carrier-services

Address: Palatul Telefoanelor Building, 35-37 Victoriei St.,
Bucharest, Romania

Romtelecom Carrier Services

Romtelecom Carrier Services is the division dedicated to telecom operators and wholesale customers in Romania and abroad, offering a complex portfolio of data, internet, infrastructure, voice transit and termination. Acting on the local and regional market, with an extensive network, interconnections, and strategic partnerships with renowned global operators, Romtelecom is a reliable partner in Central and Eastern Europe.



L2Connect – service description

The L2Connect service provides a full range of Ethernet connectivity solutions, such as:

Carrier L2Connect – offers carrier-grade solutions to operators looking for off-net 'B' end Ethernet services in Romania or in a Romtelecom PoP abroad for their end customers. Through Carrier L2Connect, the carriers can rapidly increase their service portfolio with extensive connectivity solutions beyond their network boundaries, by aggregating Romtelecom network services into their end customers' services.

Customer L2Connect - a service targeting Romtelecom customers ('A' end model) looking for global Ethernet services. Implemented over the Romtelecom MPLS network, enabled with state of the art technology, and benefitting from interconnections with a key selection of global partners, L2Connect provides worldwide coverage, offering consistent features on a global basis.

L2Connect e2e – provides a permanent and dedicated Layer 2 Ethernet connectivity, end-to-end, assuring a symmetrical bandwidth and payload transparency between two or more customer locations



Benefits:

- **Flexibility** - L2Connect is specially designed to tailor various requirements, easily allowing capacity increase, adding new locations, or choosing among different levels of service management;
- **Transparency** - L2Connect offers the same service features all across Romtelecom's network footprint, with no manipulations of partner CoS or PDUs, enabling seamless integration with the end customer intranets;
- **Reliability** - the service is built on a redundant and fault tolerant backbone based on Cisco carrier class routers and provided with congestion avoidance mechanisms. The network security architecture is built on multiple layers to provide maximum protection, while network uptime is the result of the MPLS fully meshed architecture;
- **Security** - L2Connect offers a level of security similar to the traditional Leased Lines as packets from one Virtual LAN will not inadvertently go to a different one;
- **Strong SLAs for QoS** - the service is complemented with two service levels, tailored to different clients' needs: Standard and Premium with an availability goal of 100%.

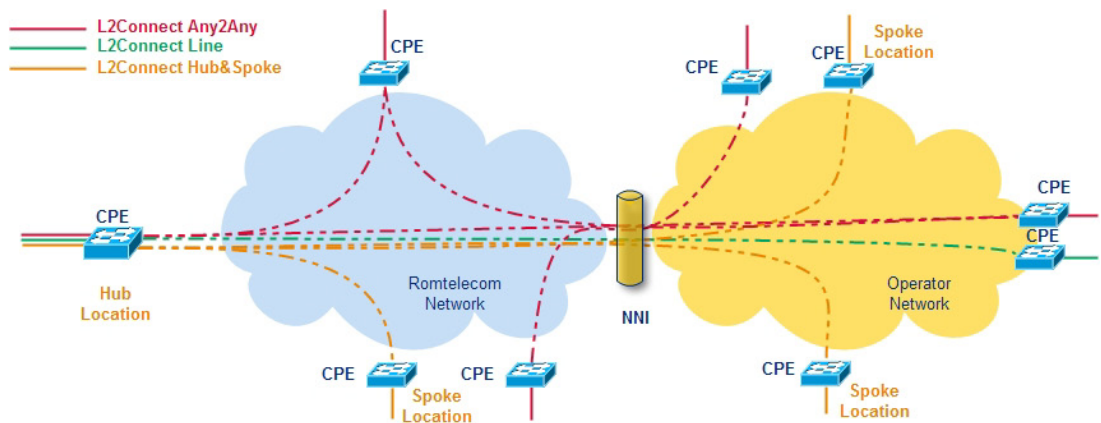


Figure 1: L2Connect service diagram

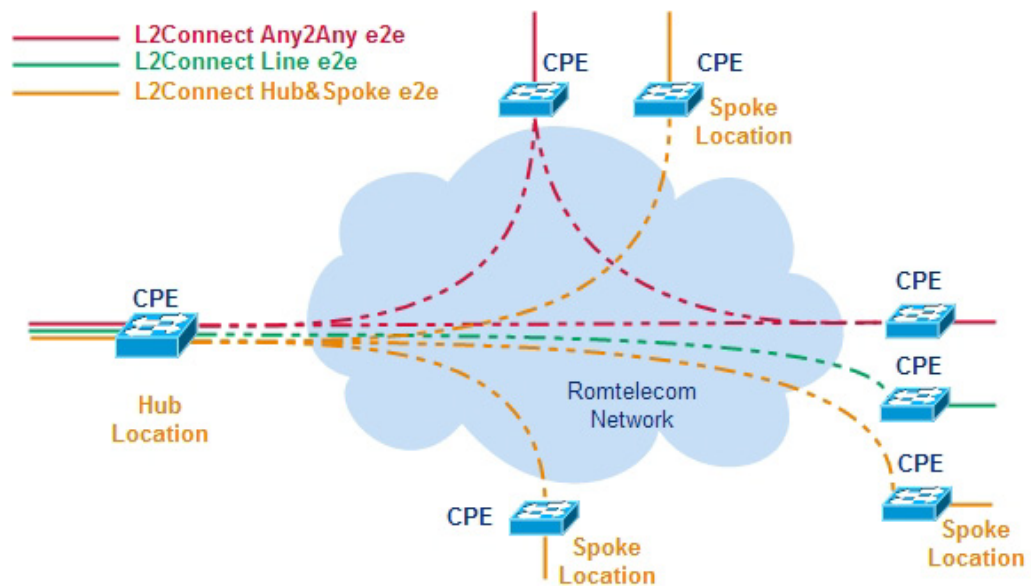


Figure 2: L2Connect e2e service diagram



L2Connect features

L2Connect provides Ethernet connectivity, with symmetrical bandwidth and payload transparency, between the NNI with the partner and the site(s) of its end customers, presenting a MPLS service interface in all the access points.

Available bandwidths:

Service Name	Service Topology	Ethernet Type	Service	Transport Technology	Location Type	NNI Handover	Bandwidth
Dedicated L2Connect	Point -to- Point	E-LINE	EPL	EoSDH/ EoDWDM	Any	Aggregated	2/4/6/8/10 Mbps
						P2P/ Aggregated	50 Mbps, 100 Mbps
						P2P/ Aggregated	150 Mbps, 300 Mbps, 450 Mbps, 600 Mbps, 750 Mbps, 900 Mbps
L2Connect Line	Point -to- Point	E-LINE	EPL	EoMPLS	Any	P2P/ Aggregated	256 kbps/ 512 kbps
							1/ 2/ 4/ 6/ 8 Mbps
							10 - 50 Mbps granularity 10 Mbps
							100 Mbps, 150 Mbps, 200 Mbps – 1 Gbps granularity 100 Mbps
L2Connect Hub&Spoke	Point -to- Multipoint	E-LINE	EVPL	EoMPLS	Spoke	Aggregated	256 kbps/ 512 kbps
					Spoke		1/ 2/ 4/ 6/ 8 Mbps
					Spoke/ Hub		10 - 50 Mbps granularity 10 Mbps
					Hub		100 Mbps, 150 Mbps, 200 Mbps – 1 Gbps; granularity 100 Mbps
L2Connect Any2Any	Multipoint -to- Multipoint	E-LAN	EP-LAN	EoMPLS	Any	Aggregated	10 - 50 Mbps granularity 10 Mbps
							100 Mbps, 150 Mbps, 200 Mbps – 1 Gbps; granularity 100 Mbps

Other bandwidths can be accommodated upon request, subject to a feasibility study.

Service topology:

- **Point-to-Point topology** (EPL service type):
 - **L2Connect Line** - implemented over the EoMPLS technology, the service provides point-to-point connectivity, with symmetrical bandwidth and payload transparency.
 - **Dedicated L2Connect** - implemented over the SDH/DWDM transport technology, the service ranks as a premium product with similar QoS as the traditional Leased Lines, allowing customers a smooth migration from legacy to new generation networks.
- **Point-to-Multipoint topology** (EVPL service type):
 - **L2Connect Hub&Spoke** - delivers a point-to-multipoint infrastructure over Romtelecom's MPLS network (E-Line EVPL), providing multiple Ethernet Private Line (EPL) services for data transmission between a central location (such as a corporate headquarters or data processing centre) and satellite locations. The service is ideal for customers that request simultaneous access from multiple tail-end locations to the head-end site, without the need for direct connectivity among the tail-end locations.
- **Multipoint-to-Multipoint topology** (E-LAN service type):
 - **L2Connect Any2Any** - delivers a Layer 2 multipoint VPN, allowing end customer's multiple sites to be connected in a single bridged domain over Romtelecom's managed IP/MPLS network, using the VPLS technology.



Access Methods

- Access over copper – available for EoMPLS transport technology:
 - DSL (g.SHDSL, VDSL)
 - EFM (Ethernet in the First Mile)
- Access over FO – available for all transport technologies: EoMPLS, EoSDH, EoDWDM, EoFO:
 - Ethernet over FO

VLAN transparency

- for **L2 Connect Line**: available for end customer tagged traffic and delivered for Ethernet access technology;
- for **Dedicated L2 Connect**: provided over the SDH/DWDM transport technology, the customer's untagged/tagged traffic is transparently transported across Romtelecom's network, including the following customer traffic types: untagged traffic, simple tagged traffic, double tagged traffic;
- for **L2Connect Hub&Spoke**: different groups of end customer's VLANs span over the network between the central location and a two or more remote locations. Each group of end customer VLANs is delivered at the central location on a dedicated interface, where QinQ encapsulation applies. Separate point-to-point connections transport customer traffic between the central location and the satellite locations (EPL with VLAN transparency) for each group of end customer VLANs.

Service management

- Service Managed, CPE Management included
- Service Unmanaged, CPE Management excluded

Service coverage

- Romania: all over, within MAN, WAN
- Internationally: within Romtelecom's network footprint

Quality of Service (QoS)

- Real Time: real time applications, sensitive to jitter, highly interactive (e.g. VoIP, videoconference)
- Mission-Critical: business critical applications – transactional information, highly interactive, highly sensitive to delay (e.g. signaling, banking application)
- Standard: standard business applications (e.g. short transactions, SAP, ERP, Oracle, video streaming, network services requesting guaranteed bandwidth)
- Best Effort: E-mail, Intranet, Internet, other applications that can accommodate variable throughput delay

Service Level Agreement (SLA)

- Standard
- Premium

Reporting

- available online, via website for managed services and provides historical and real-time bandwidth reports



L2Connect supplementary services

Back-up

- different level of protection can be added upon request or as a result of high service performance parameters level requested by the end customer.

L2TP Transparency

- the L2Connect service allows the tunneling of the layer 2 PDU's, including STP, VTP, CDP. Exception: cases when the access line uses the g.SHDSL technology over copper.

CPE Rental

- Provision of a CPE compliant to the service features
- CPE installation and initial configuration
- Repairs and replacements, as necessary to deliver the contracted service
- CPE recovering at service termination date

CPE Management

- Fault Management
- Administration
- Security Management

Support Services

- "Engineering services" – service optimization or other configurations altering the service;
- "On-site interventions" – operations that require personnel displacement (e.g. physical resets, cable replacements at partner's locations);
- "Remote hands" operations that do not require personnel displacement (e.g. physical resets or cable replacements at Romtelecom PoPs supervised by specialized personnel, within business hours).

