

# Elisa Operator NNI Services

## General

Elisa’s services based on the Ethernet technology (Ethernet Hub and Spoke Service, Operator Broadband Services and services implemented with the Ethernet technology) are delivered to the ordering operator from the interconnection interface for Ethernet networks. This service is entitled Elisa Operator NNI Service. Elisa Operator NNI Service includes one or more NNI ports. NNI ports are implemented at a speed of 1 Gbit/s, 10 Gbit/s or 100Gbit/s between the devices of Elisa and the operator customer. The Ethernet port (10GBASE-LR, 1000BASE-LX or 100GBase-LR4) of Elisa’s backbone device acts as the physical handover point. Elisa’s backbone devices are located in network nodes, and there are many devices in each service area. The capacity, number and location of NNI ports in Elisa Operator NNI Service depend on the ordered service and its service level.

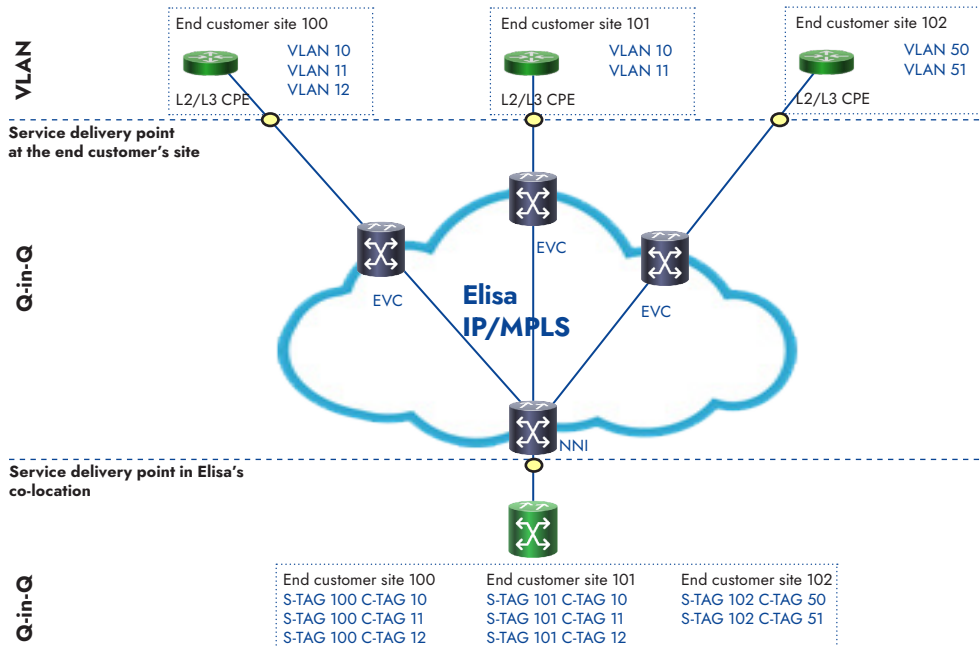
## Purpose of use of a NNI

In Elisa Operator NNI Service, the interface type

can be selected according to the purpose of use of the ordered the services. An interface selected for a single purpose of use is optimised for the use of a specific service. A multi-interface service is ideal for the simultaneous delivery of several different types of services through a single Elisa Operator NNI Service. All operator services can be ordered for a multi-interface: Ethernet Hub and Spoke Service, Operator Broadband Services , mobile L2 transfer connections implemented with the Ethernet technology and Ethernet IP MPLS connections implemented with the Ethernet technology.

## Subscription technology

Elisa’s operator services are delivered to customers as L2 connections (IEEE 802.3-2008). In Elisa Operator NNI Service, customers have access to VLAN tags 2–4,094. The implementation of Elisa Operator NNI Service enables the use of two internal VLAN tags (QinQ). The higher VLAN tag (S-Tag) is used in the service to identify remote subscriptions. The lower VLAN tag (C-Tag) is part of the customer’s traffic and can be selected freely.



In Elisa Operator NNI Service, specific VLAN tags (S-Tag) are assigned to testing. Options for the Ethernet frame (ethertype) in Elisa Operator NNI Service are 0x88A8 (default) and 0x8100 (to be used upon separate agreement).

The number of connections in a single service can be limited (the number of NNI ports and the amount of capacity available, as well as the number of VLAN tags used). At most, a single service can have 1,000 VLAN tags (S-Tag).

## Traffic categories

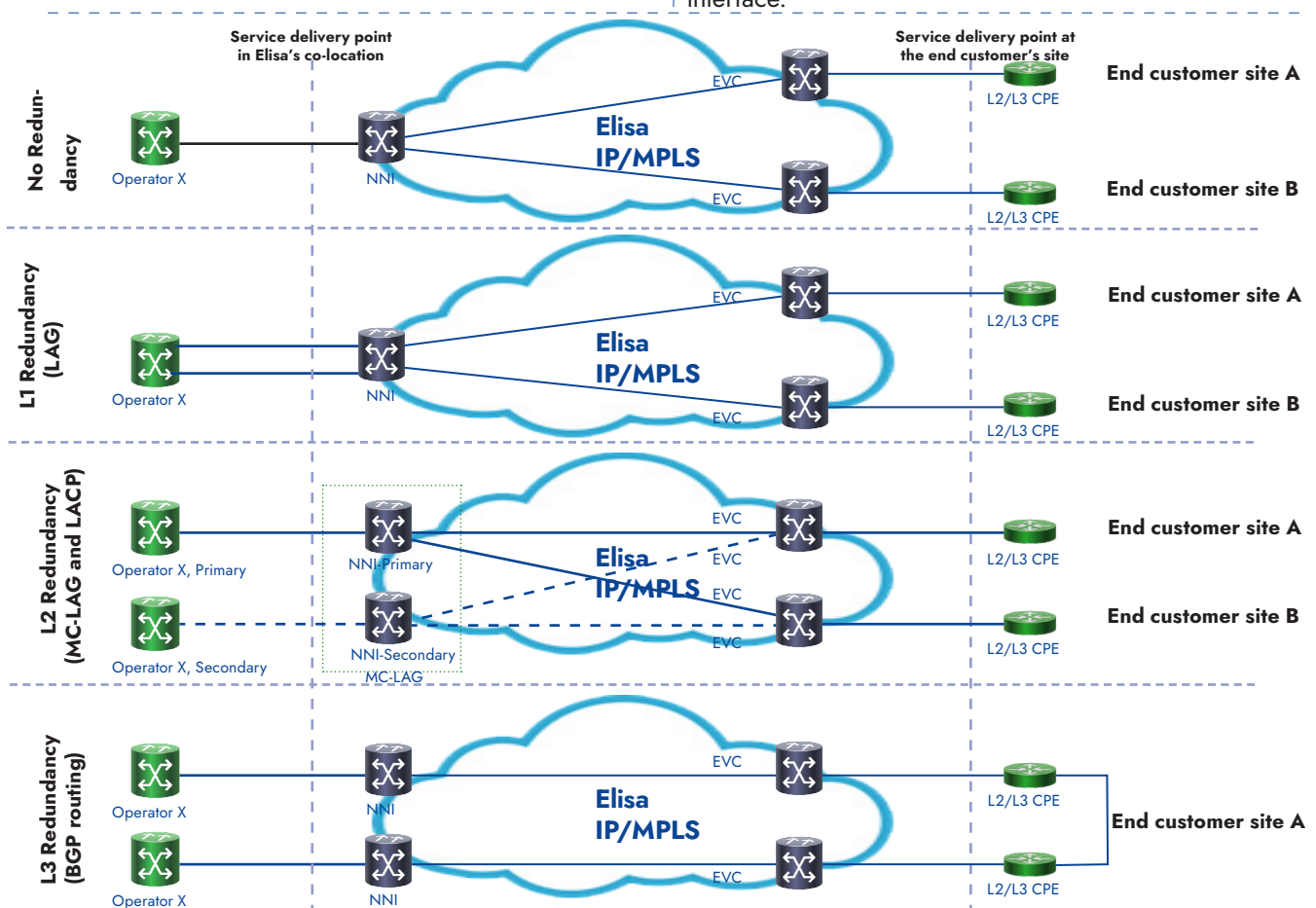
As additional services, separate contractual Class of Service (CoS) and Quality of Service (QoS) parameters can be added to subscriptions implemented using the Ethernet technology in Elisa Operator NNI Service. By default, traffic will be of the Best Effort type.

## Redundant NNI Service

Using the redundant NNI Service, customers can make the interface (NNI port) between their network and Elisa's network redundant and, in this way, increase the availability of the services purchased from Elisa's network. The redundant NNI Service can be implemented at L1, L2 and/or L3 levels on the basis of the requests of the ordering operator and the services ordered for the interface.

Usually, a redundant NNI Service is implemented with the MC-LAG + LACP technology (Ethernet L2 interface, operator broadband interface, mobile transfer connection interface implemented with the Ethernet technology or multi-interface) or with the Dual Homed PGP technology (Ethernet IP MPLS hub). In a redundant interface of the L2 level, the different NNI ports of the service are used in LACP-signalled LAG mode where there is one or more ports in the LAG group on a single device. The active NNI interface is selected according to the LACP status data conveyed by MC-LAG on the terminal devices in the customer network.

The member ports of a single LAG group may be located on different physical devices. The LAG ports of MC-LAG are only active on one device at a time. In bidirectional Elisa Operator NNI Service and upon separate agreement, Elisa can also act as the terminating party (MC-LAG) for the redundant interface.



## Service areas

Elisa Operator NNI Service covers the whole of Finland. Operator services that can be ordered for Elisa Operator NNI Service can be service area-specific in full or in part, and their areas of availability can be limited on the basis of the location of the interface. If the ordered service and Elisa Operator NNI Service are located in different service areas, and the service can be delivered from one service area to another, Elisa will have the right to collect a separate charge for conveying traffic from one service area to another. Boundaries of service areas (see service area map).

## Special service levels (SLA)

By default, Elisa's basic service level is the maintenance level of Elisa Operator NNI Service. However, higher service levels can be selected for Elisa Operator NNI Service. The selected service level has an impact, for example, on the fault repair time and the response time for starting repairs. Higher service level are services subject to an extra charge.

## Ordering and delivery time

Orders are placed through the Elisa Carrier Services Online order and delivery system. Minimum delivery time is about 6 weeks. Estimated delivery time will be confirmed in an order confirmation. Elisa and the customer may also agree about longer delivery time.

## Elisa's network maintenance and change work timetable

Elisa will perform scheduled network maintenance and change work on the second and fourth Wednesday each month at 00:30 a.m.–05:30 a.m. Elisa reserves the right to perform network maintenance and change work as needed. The maintenance and change work are attempted to announce in advance and to minimize outage and downtime of the services.

## User support

Elisa's technical support provides assistance in technical issues and case of faults in the service. Fault notifications should be made through the Elisa Carrier Services Online order and delivery system or by phone to the Service Desk (24h), service in English tel. +358 10 26 096, service in Finnish tel. +358 10 804 400.

## Data protection

Personal data is processed in the service, such as installation address and contact details for the onsite persons. The personal data is processed for service implementation. Concerning the personal data processed in the service, the telecommunications operator is the personal data controller stated in the data protection legislation and Elisa is the processor.

Personal data processed in the service can be processed outside the EU / EEA area. Elisa ensures that in a country where personal data is processed, the level of data protection is adequate and in accordance with the European Commission's decision, or alternatively, that the transfer is subject to a legally appropriate safeguard measure such as a data transfer agreement in accordance with the EU standard contractual clauses on the transfer of personal data outside the EEA.

Elisa has the right to use subcontractors in the provision of services and in the processing of personal data.

## Terms of agreement

Elisa's General Terms for Operator products will be applied to the agreement. The service description is valid from 1 April 2020.

## Concepts and abbreviations used in the service description

**Best Effort:** Default traffic class, a basic level without any privileges

**COS:** Class of Service, connection's traffic class

**C-Tag/C-VLAN:** Inner VLAN tag in the Q-in-Q frame type that is used to identify different subscription VLANs from one another

**Ethertype:** A field in the Ethernet frame that defines the type of the frame payload

**EVC:** Ethernet Virtual Connection, a virtual Ethernet connection across Elisa's backbone network

**MC-LAG:** A technology to form a single logical loop from a number of physical devices

**LACP:** A technology to control traffic in several physical or logical loops

**NNI Service:** A service consisting of one or more NNIs to interconnect the networks of Elisa and the ordering operator

**NNI:** A port on Elisa's backbone device to which the ordering operator connects its network (Network-to-Network interface)

**S-Tag/S-VLAN:** Outer VLAN tag in the Q-in-Q frame type that is used to identify different subscriptions

**QOS:** Quality of Service; a concept that represents traffic classification and prioritisation

**Q-in-Q:** An Ethernet frame type, allowing to convey two VLAN tags one inside the other

**VLAN:** A technology to divide a physical data network into virtual networks