Carrier Ethernet Service

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Contract	Contract for Data Services Contract for Leased Lines LTC

Content

1 Introduction

1. This service description describes the services offered by Swisscom in conjunction with the Carrier Ethernet Service (CES) and Carrier Ethernet Service MLF (both hereinafter referred to as CES).
2. The scope of services for CES LMF only includes the point-to-point connections listed under section 2 and section 3.

2 General Service conditions

1. CES is tested and certified in compliance with the Metro Ethernet Forum (MEF) Carrier Ethernet (CE) 2.0 standard.
2. The Carrier Ethernet Service (CES) is a VLAN-based Layer 2 Ethernet service that offers flexible service types, scalable bandwidths and high quality of service.
3. Swisscom implements CES as point-to-point and as multipoint services, as defined in Table 1 below.
4. CES is realized using optical fibre media. Swisscom will define the suitable realization medium, taking into account the quality parameters and the bandwidth.
5. CES is available throughout Switzerland based on Basic and Premium Service Level Agreements (SLAs).
6. CES Essential is offered exclusively via the Wholesale Portal, the API interfaces and, based on SLA Basic, as Direct Connect (DC) via the 1000Base-BX10 interface. CES Essential is available at locations throughout Switzerland with free fiber optics.

Point-to-point services	Multipoint services
– EPL (Ethernet Private Line) – Access-EPL (Access Ethernet Private Line)	– EVPL (Ethernet Virtual Private Line)
– EP-LAN (Ethernet Private Local Area Network) – EP-Tree (Ethernet Private Tree) – Access-EP-LAN (Access Ethernet Private Local Area Network)	– EVP-LAN (Ethernet Virtual Private Local Area Network) – EVP-Tree (Ethernet Virtual Private Tree)

Table 1: Available service types for CES

4. The service is provided between the two SAP's (service-action-point).
5. CES is generally implemented as follows:
   - CES Access: Physical connection between the Swisscom Network and the SAP of the PTS.
   - CES Connectivity: Logical connection between the Swisscom Network and the SAP of the PTS.
   - CES Service: Connects several CES Connectivity end points to an end-to-end VLAN service (SAP-to-SAP).

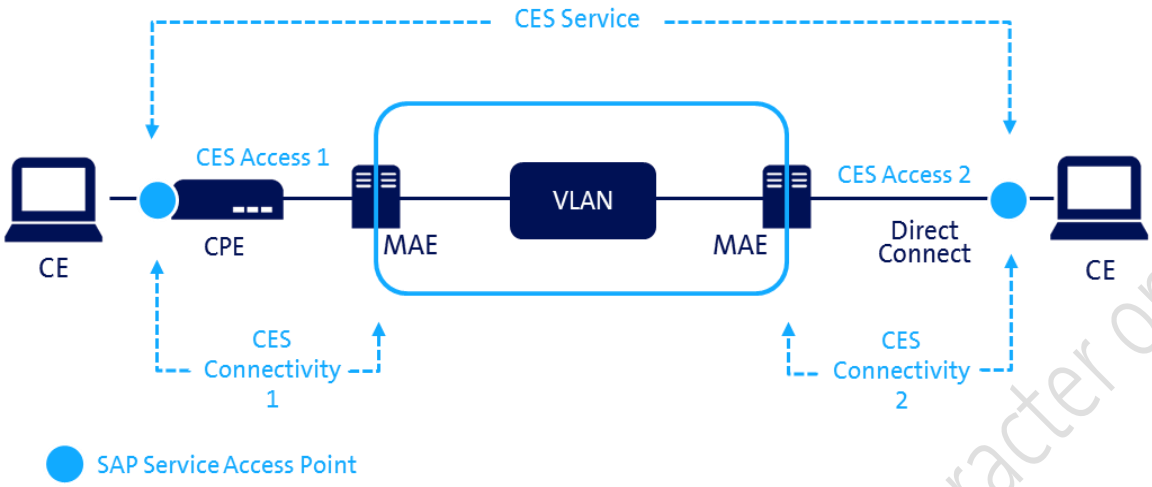

Figure 1: Graphical representation of the CES service

3 Quality of service

3.1 Overview

1. In order to meet the various business demands in terms of availability, redundancy, etc., Swisscom CES offering includes two access category types and tailored SLAs for every business requirement:

Service level	CES	CES Essential
Basic	Yes	Yes
Premium Silver	Yes	No
Premium Platinum Light	Yes	No
Premium Platinum	Yes	No

Table 2: Service categories and service levels

2. The Service Level Agreement (SLA) is agreed for each CES Connectivity end point. Several CES Connectivity end points can be implemented with different SLA types on the same CES Access.
4. The service level is defined by the CES connectivity type and termination of the service as Direct Connect (DC) or with Customer Premises Equipment (CPE).
5. An overview of the differences between the SLAs can be found in Table 3:

Parameter	Typical values	Guaranteed values	
	Basic	Premium Silver	Premium Platinum
Access type	Single Access	Single Access	Dual Access
End-to-end VLAN availability (annually)	99.90% CPE	99.95% CPE 99.93% DC	99.99% CPE 99.97% DC
Recovery time (TTR) per fault	≤ 6 h	≤ 4 h	≤ 2 h

Parameter	Typical values	Guaranteed values	
	Basic	Premium Silver	Premium Platinum
Max. number of faults (annually)	≤ 6	≤ 4	≤ 2
Fault rectification	24x7	24x7	24x7
Service monitoring	Reactive	Proactive	Proactive

Table 3: Service Level Agreements offered for CES

3.2 CES with SLA Basic and Premium Silver

1. CES Basic and Premium Silver services are implemented as “Single Access”.
2. A single fibre pair (one line) connects the customer site to the Swisscom network (Metro Access Element, MAE) The access is unprotected (no redundancy).

3.3 CES with SLA Premium Platinum Light

1. CES Premium Platinum Light service is implemented as “Dual Homing Light”. Dual Homing Light is only provided on medium fiber access.
2. Two fibre pairs (two lines) are used to connect the customer site to the Swisscom network. The two lines may share some sections of the same cable and therefore represent a single point of failure. All Swisscom CPE and the connections to the Swisscom network are designed for full redundancy.
3. The same annual availability applies for the Premium Platinum Light service as for the Premium Platinum service. Service interruptions caused by the single point of failure in the access (as described in section 3.4/2) are considered as suspended times and are not included in the SLA calculation.

3.4 CES with SLA Premium Platinum

1. CES Premium Platinum service is implemented as “Dual Homing”.
2. Two fibre pairs (two lines) are used to connect the customer site to the Swisscom network. Each connection is fed into separate cabling. Any Swisscom CPE and the connections to the Swisscom network have a completely redundant design. There is no single point of failure.
3. The PTS may use both connections of a CES Premium Platinum service. It is important to note that Swisscom only guarantees the capacity of one connection.
4. A CES Premium Platinum is only deemed to be not available if both connections fail simultaneously.
5. During planned maintenance work it is ensured that at least one connection is always in operation.

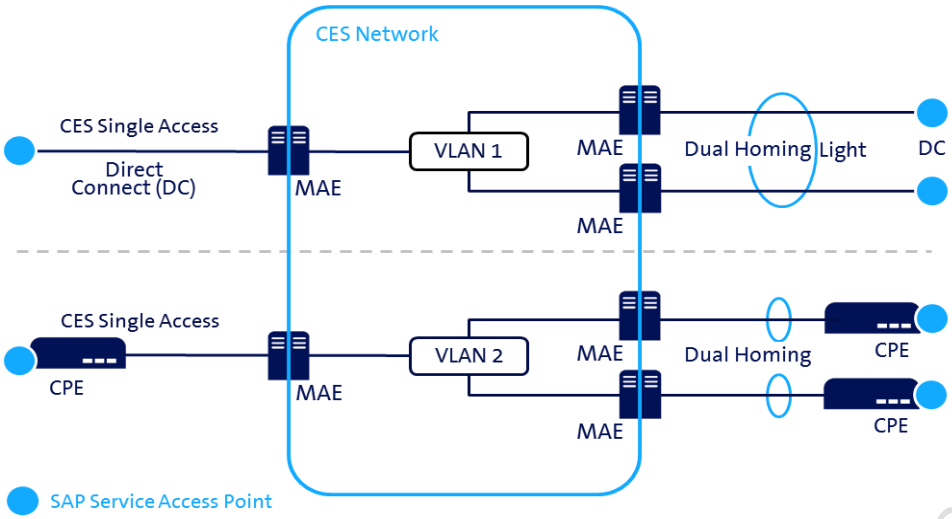

Figure 2: Overview of all CES access types

4 Service features

4.1 Service type and port type

1. Different port types can be allocated for each service type, depending on customer requirements.
2. CES supports the following service and port types:

	Service Type	Description	Port type(s)
Point-to-point	EPL	Port-based point-to-point service (UNI-UNI[1]).	"Tunnel-Tunnel"
	Access EPL	Port-based point-to-point service (UNI-ENNI[2]).	"Tunnel-ENNI"
	EVPL	VLAN-based point-to-point service (UNI-UNI).	"Trunking" or "No trunking"
Multipoint	EP-LAN	Port-based multipoint (any-to-any) service (UNI-UNI).	"Tunnel-Tunnel"
	Access EP-LAN	Port-based multipoint (any-to-any) service (UNI-ENNI).	"Tunnel-ENNI"
	EP-Tree	Port-based multipoint (rooted multipoint) service with tree topology (UNI-UNI).	"Tunnel-Tunnel"
	EVP-Tree	VLAN-based multipoint (rooted multipoint) service with tree topology (UNI-UNI).	"Trunking" or "No trunking"
	EVP-LAN	VLAN-based multipoint (any-to-any) service (UNI-UNI).	"Trunking" or "No trunking"

Table 4: Possible service and port types for CES

[4] User Network Interface (UNI)
[5] External Network-Network Interface (ENNI)

3. CES access type can terminate all service types, as long as sufficient physical resources are available. EVPL, EVP-LAN and EVP-Tree service types can be multiplexed over at the same “Trunking” port. EVPx and EPx service types cannot be implemented over the same port type, since “Tunnel” port types cannot be multiplexed with other service types.

4.2 Available transmission capacities and interfaces

1. The CES Connectivity determines the transmission capacity (bandwidth).
2. The bandwidth profiles are applied to the Ethernet frames. The PTS can allocate a CES Connectivity bandwidth (Committed Access Rate, CAR) for each VLAN.
3. The following transmission capacities are available:

CES

2 Mbit/s	4 Mbit/s	6 Mbit/s	8 Mbit/s	10 Mbit/s
20 Mbit/s	30 Mbit/s	50 Mbit/s	70 Mbit/s	100 Mbit/s
200 Mbit/s	300 Mbit/s	500 Mbit/s	100 Mbit/s	1Gbit/s
2 Gbit/s	3 Gbit/s	5 Gbit/s	7 Gbit/s	10 Gbit/s

CES Essential

2 Mbit/s (can only be used as a VLAN for management of the customer CPE)[3]			
10 Mbit/s	20 Mbit/s	50 Mbit/s	100 Mbit/s
	200 Mbit/s	500 Mbit/s	1 Gbit/s

4.3 Customer Premises Equipment (CPE)

1. CES can be offered with two (2) variants:
   - **Direct Connect (DC)**: Swisscom does not install any CPE. The PTS installs and uses its own customer equipment and is responsible for the operation and monitoring of this equipment.
   - **With Customer Premises Equipment (CPE):** Swisscom installs, operates and monitors the CPE. This option is not available for CES Essential.
2. The SAP is located
   - In the case of Direct Connect: On the patch panel that terminates the incoming fibre lines. In the case of Dual Homing or Dual Homing Light, the PTS has two SAPs on the patch panel.
   - In the case of CPE: On the physical LAN-side Fast, Gigabit or 10 Gigabit Ethernet interface on the CPE.
3. The PTS can have multiple SAPs on the same CPE. The customer selects the interface via which the VLAN is handed over.

[3] The VLAN for CPE management is only available in combination with at least one additional VLAN (e.g. 10M) per CES Access.

5 Options for the CES service

5.1 CPE

1. CES is supplied without a Swisscom CPE by default.
2. Apart from CES Essential, the PTS may opt for a Low-end CPE (L-CPE), Mid-range CPE (M-CPE) or a High-end CPE (H-CPE).
3. By default, L-CPEs and M-CPEs are provided with Gigabit interfaces, the M-CPE with a Gigabit Interface and the H-CPE with a 10 Gigabit interface.
4. Optionally, it is possible to order a dual 48V DC power supply for M-CPE and H-CPE.

5.2 Class of service

1. The PTS can optionally select Class of Service (CoS) for the CES Service (whole VLAN service). CoS is applied to all CES Connectivity end points in the same CES service.
2. CES supports up to seven traffic classes: General, Best Effort, Priority, High Priority, Critical, Real-Time and Control.

5.3 Logical options

1. By default, 4,000 MAC addresses are accepted per CES Service[4]. Optionally, the PTS can add an additional block of 6,000 MAC addresses for a total of 10,000 MAC addresses per CES Service.
2. By default, the PTS can use the entire VLAN ID range[5] [2-4094] for its CES Connectivity. At the request of the PTS, Swisscom can allocate the VLAN ID.

5.4 Provision outside normal business hours

1. At the PTS request, Swisscom will arrange installation or modification of services in Customer Windows outside standard working hours.

5.5 Express provision

1. If the necessary resources are in place, the PTS may place an express order for CES 2MBit/s to 1GBit/s for the service level Basic and Premium Silver.

Prerequisites in customer access	Service level	Express target lead times
Cable and equipment available	Basic, Premium Silver	5 working days[11]

Table 5: Express provision of CES

[11]Dependent on location factors and personnel capacities of Swisscom