Business Requirements and Use Cases for Access E-Line Service Control

July, 2018

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1 List of Contributing Members

The following members of the MEF participated in the development of this document and have requested to be included in this list.

This list will be completed before letter ballot. Members who have commented in at least one CfC are eligible to be included.

2 Abstract

This specification defines business requirements and use cases for Access E-Line Service Control. Access E-Line services are defined in MEF 51 [4]. The purpose of service control is to be able to modify Access E-Line service attributes on-demand without going thru service order and re-provisioning the OVC from scratch.

Access E-Line service can be a segment of end-to-end E-Line service. This specification covers business requirements and use cases for E-Line services end-to-end between on-net and off-net locations of a service provider, in order to properly define requirements for Access E-Line services.

3 Compliance Level

The requirements that apply to the functionality of this document are specified in the following sections. Items that are REQUIRED (contain the words MUST or MUST NOT) will be labeled as [R_]. Items that are RECOMMENDED (contain the words SHOULD or SHOULD NOT) will be labeled as [D_]. Items that are OPTIONAL (contain the words MAY or OPTIONAL) will be labeled as [O_].

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in RFC 2119. All key words use upper case, bold text to distinguish them from other uses of the words. Any use of these key words (e.g., may and optional) without [R_], [D_] or [O_] is not normative.

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196 4 Terminology

197 This section defines the terms used in this document. In many cases, the normative
198 definitions to terms are found in other documents. In these cases, the third column is
199 used to provide the reference that is controlling. In cases of conflict with other
200 documents, the controlling document is that shown in the reference column.

201

Term	Definition	Reference
$CBS_{elastic}$		This document
CBS_{lb}		This document
$CBS_{elastic}$	CBS value after on-demand modification	This document
CBS_{ub}	Upper bound (i.e. maximum value) for CBS values.	This document
CBS_{lb}	Lower bound (i.e. minimum value) for CBS values.	This document
$CBS_{increment}$	CBS granularity which is the minimum incremental value for CBS	This document
$CIR_{elastic}$	CIR value after on-demand modification	This document
CIR_{lb}	Lower bound (i.e. minimum value) for CIR values.	This document
CIR_{ub}	Upper bound (i.e. maximum value) for CIR values.	This document
$CIR_{increment}$	CIR granularity which is the minimum incremental value for CIR	This document
$EIR_{elastic}$	EIR value after on-demand modification	This document
EIR_{ub}	Upper bound (i.e. maximum value) for EIR values.	This document
EIR_{lb}	Lower bound (i.e. minimum value) for EIR values.	This document
$EIR_{increment}$	EIR granularity which is the minimum incremental value for EIR	This document
$EBS_{elastic}$	EBS value after on-demand modification	This document
EBS_{lb}	Lower bound (i.e. minimum value) for EBS values.	This document
EBS_{ub}	Upper bound (i.e. maximum value) for EBS values.	This document
$EBS_{increment}$	EBS granularity which is the minimum incremental value for EBS	This document
Elastic	An adjective used to indicate the capability to modify an active service (e.g., “elastic service”) by changing the value of one or more service attributes (e.g., “elastic service attribute”).	MEF 47[1]
Elastic Ethernet Service	An Ethernet Service that supports on-demand modifications of its attributes without an ordering process	This document
NID	Network Interface Device	MEF 12.2 [7]
TAR	The total number of modification requests accepted for an elastic service instance during a measurement interval.	MEF 47 [1]
TFR	The total number of modification requests fulfilled for an elastic service instance during a measurement	MEF 47 [1]

Term	Definition	Reference
	interval.	
TVR	The total number of valid modification requests received for an elastic service instance during a measurement interval.	MEF 47 [1]
$T_{sp\text{-}cust}$	Time intervals for on-demand modification of Elastic E-Line attributes immediately between SP and customer.	This document
$T_{sp\text{-}part}$	Time intervals for on-demand modification of Elastic E-Line attributes immediately between SP and PART.	This document
On-net Location	A location with an access to SP network	This document
Off-net Location	A location without an access to SP network	This document
Partner		[2]
Service Provider	The organization providing Ethernet Service(s).	[3]
SLO	Service Level Objective	[2]
UNI	User Network Interface	[3]
VLAN	Virtual LAN.	

202 **Table 1: Terminology and Definitions Table**

5 Introduction

The service elasticity concept for EPL and EVPL are defined in MEF 47 [2], however, elasticity for E-Access EPL and EVPL were out of scope. MEF 51 [4] replaced E-Access EPL and EVPL with Access E-Line.

Access E-Line service can be a segment of end-to-end E-Line service. In that case, Access E-Line service order and provisioning are inseparable from E-Line services.

In order to address use cases and business requirements of Access E-Line services properly, this specification identifies use cases and business requirements for Access E-Line services along with E-Line services between on-net and off-net locations of a service provider. Furthermore, this document introduces additional terminology and attributes that have not been covered in other MEF specifications.

6 Reference Architecture

E-Line Services can be EPL or EVPL, as depicted in Figure 1 and Figure 2. Ethernet Access Provider segment of the EPL or EVPL [6] is called Access EPL or Access EVPL [5] or Access E-Line [4], respectively.

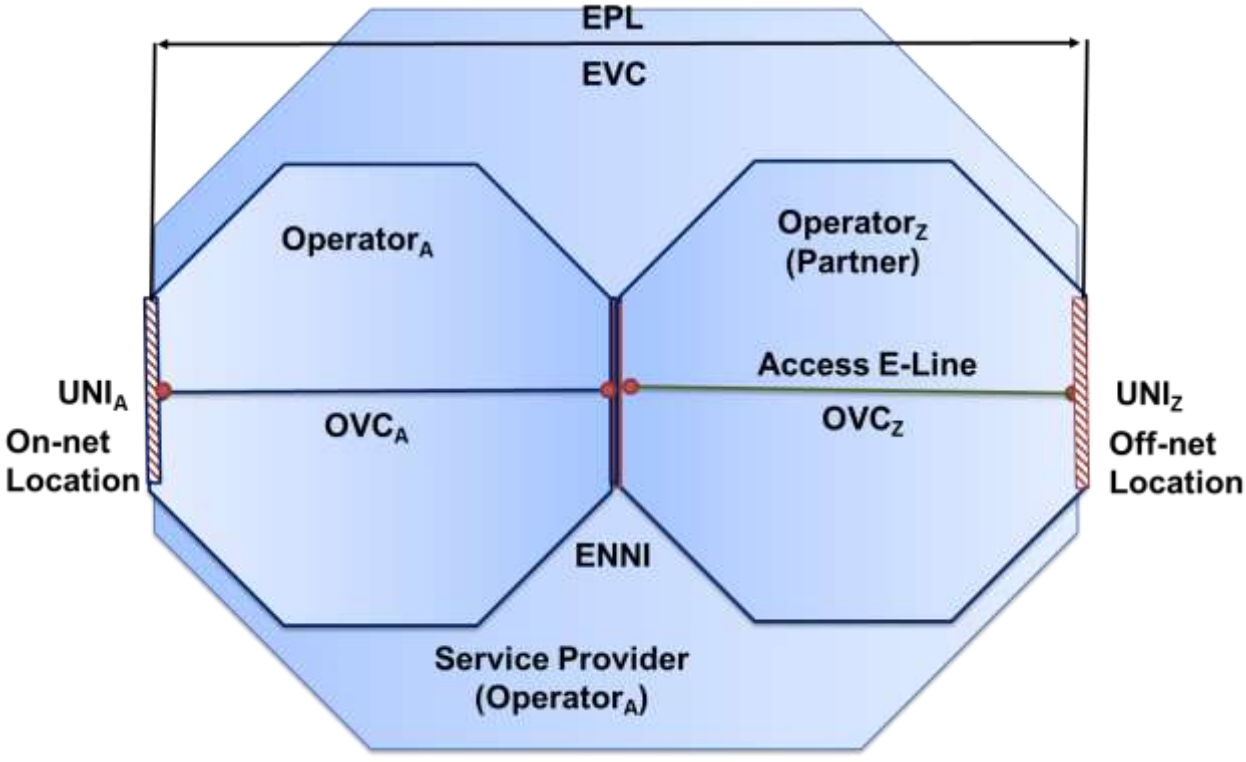

Figure 1 : EPL crossing networks of two Operators

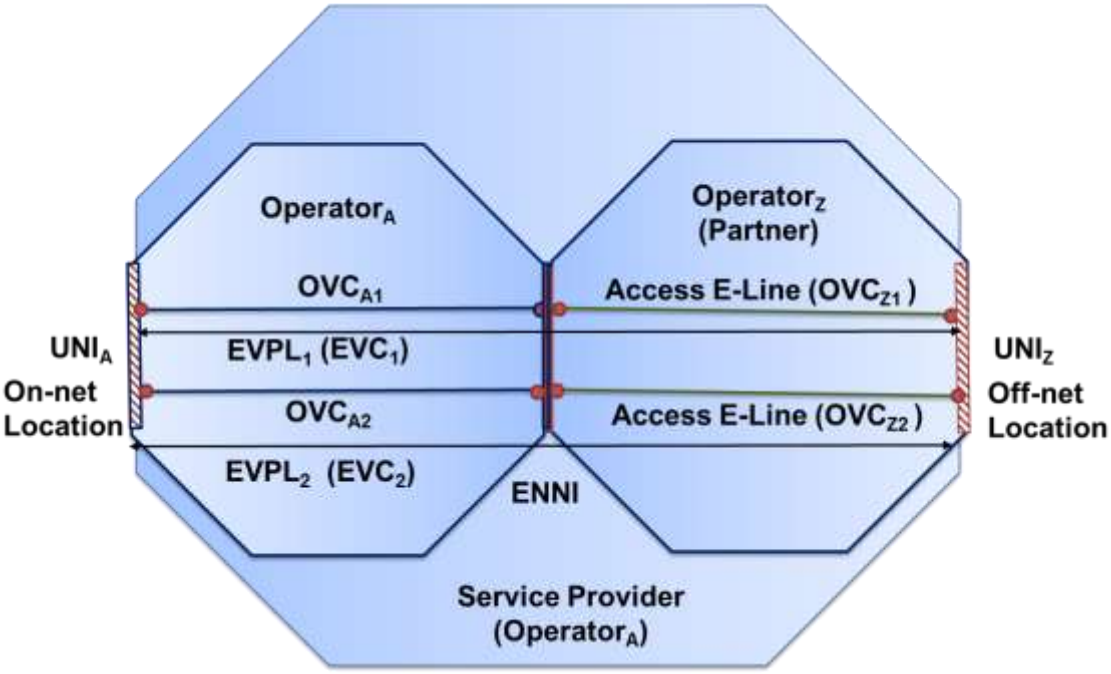

Figure 2 : EVPL crossing networks of two Operators

LSO reference architecture in Figure 3 is used as the operational architecture in modifying attributes of the EVC (i.e. OVCs)

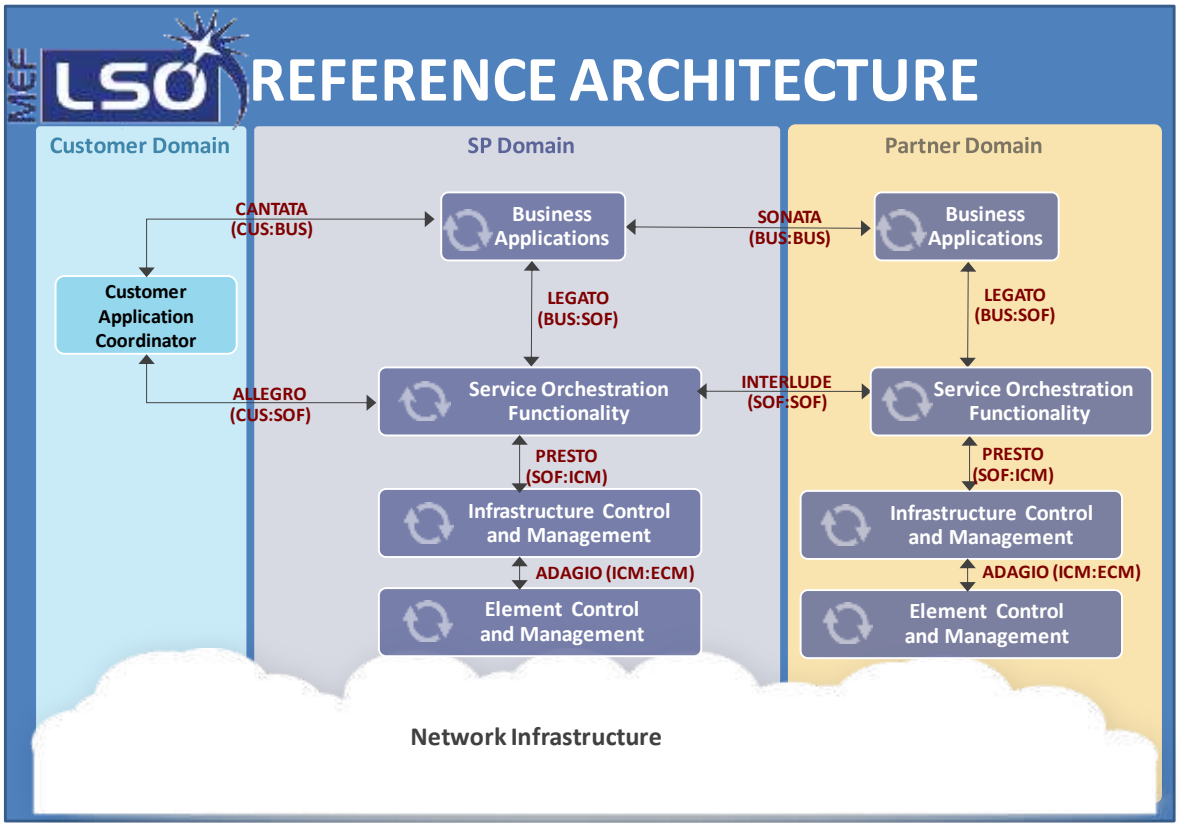

Figure 3 LSO Reference Architecture **[2]**

236 This specification assumes that Access E-Line between a Service Provider and Partner
237 is ordered over Sonata and configured over Interlude prior to the on-demand
238 modifications of its attributes.

7 Business Requirements

Service Providers need to interact with other Operators and establish business relationships to provide services at locations that are not within their foot prints, which are called off-net locations. It is possible that the Service Provider may need to interact with more than one Ethernet Access Provider (i.e. Operator or Partner) to provide the service at a given off-net location. In this section, we will cover only the case where there is one Ethernet Access Provider to interact.

Business level pre-requisites to be captured as data elements for Access E-Line Services are:

1. Establishing ENNI between two operators
2. Whether SP NID is to be placed at off-net customer[1] location in addition to Partner's NID or not
3. Identifying off-net location (s) to be served
4. Identifying service type (s) to be offered at off-net location (s)
5. Identifying attributes and their value ranges to be supported for each service type
6. Identifying elastic service attributes that can be modified on-demand
7. Identifying SLAs for elasticity
8. Identifying charges for elastic service attribute values

Note that Transit E-Line service where SP NID is located behind Partner's NID at an off-net location is out of scope.

Pre-requisites to be established as part of the SP – Customer contract negotiation are:

1. Identifying service type (s) available at off-net locations
2. Identifying service (s) and their attributes that can be changed on demand
3. Identifying charges for elastic service attribute values
4. Identifying SLAs for elasticity

[1] In this document, customer and subscriber terms are used synonymously. Furthermore, customer term is widely used in the industry for use cases that are described in this document, despite of slight differences in their definitions.

8 Use Cases

This section describes use cases and process flows for each use case. The uses cases that are considered in this section are:

1. On-demand modifications of CIR parameter of ingress bandwidth profiles of an EVC provided by the SP and implemented using an Operator which provides a segment of EVC (i.e. OVC) via an Access E-Line service. The ingress bandwidth profiles of the OVC are those associated with OVC End Point at the UNI and at the ENNI.
2. On-demand modifications of CBS parameter of an ingress bandwidth profiles of an EVC provided by the SP and implemented using an Operator which provides a segment of EVC (i.e. OVC) via Access E-Line services. The ingress bandwidth profiles are those associated with OVC End Point Per UNI and Per ENNI.
3. On-demand modifications of EIR parameter of an ingress bandwidth profiles of an EVC crossing provided by the SP and implemented using an Operator which provides a segment of EVC (i.e. OVC) via Access E-Line services. The ingress bandwidth profiles are those associated with OVC End Point Per UNI and Per ENNI.
4. On-demand modifications of EBS parameter of an ingress bandwidth profile of an EVC provided by the SP and implemented using an Operator which provides a segment of EVC (i.e. OVC) via Access E-Line services. The ingress bandwidth profiles are those associated with OVC End Point Per UNI and Per ENNI.
5. On-demand modifications of CE-VLAN ID parameter of UNI of an EVC provoded by the SP and implemented using an Operator which provides a segment of EVC (i.e. OVC) via Access E-Line services.
6. On-demand modifications of an on-net or off-net UNI PHY of an EVC provided by the SP and implemented using an Operator which provides a segment of EVC (i.e. OVC) via Access E-Line services.
7. On-demand activation or deactivation of an EVC provided by the SP and implemented using an Operator which provides a segment of EVC (i.e. OVC) via Access E-Line services.

8.1. On-demand Modifications of Committed Information Rate (CIR) for EPL

Prior to allowing an on-demand request of a subscriber for modifying CIR of an E-Line (i.e. CIR parameter of ingress bandwidth profile flow), ENNI, UNIs and EVC between off-net and on-net locations of SP are established for this E-Line based on a contract between SP and its Partner.

Overall CIR modification process can be summarized as follows:

1. Customer can modify bandwidth up to UNI PHY rate for E-Line without going thru a negotiation process with the SP, although this may not be feasible for EVPL.

2. Customer modifies E-Line bandwidth with going thru a negotiation process with the SP. Customer via user portal requests change within CIR bounds for CIR per bandwidth profile flow , <CIR_{lb} , CIR_{ub}[2] > for EVC End Point

    a. Immediately

        i. With no end time for new CIR, $CIR_{elastic}$, where $CIR_{elastic}$ = CIR_{lb} +N$xCIR_{increment}$ and N is an integer between 1 and $N_{max,CIR}$ or <one of CIR rates available in SP list>[3].

        ii. With end time for new CIR, $CIR_{elastic}$, where $CIR_{elastic}$ = CIR_{lb} +N$xCIR_{increment}$. where N is an integer between 1 and $N_{max,CIR}$. or <one of CIR rates available in SP list>. After end time elapses, the rate becomes CIR_{lb}.

    b. At certain time and day in the future

        i. With no end time for new CIR, $CIR_{elastic}$, where $CIR_{elastic}$ = CIR_{lb} +N$xCIR_{increment}$ or <one of CIR rates available in SP list> where N is an integer between 1 and N_{max},

        ii. With end time for new CIR , $CIR_{elastic}$ where $CIR_{elastic}$ = CIR_{lb} +N$xCIR_{increment}$ or <one of CIR rates available in SP list> where N is an integer between 1 and $N_{max,CIR}$. After end time elapses, the rate becomes CIR_{lb}

3. Time intervals for on-demand modification of CIR immediately can be defined in the contract between SP and customer ($T_{sp\text{-}cust}$)[4], and SP and PART[5] ($T_{sp\text{-}part}$)[6]. The time interval for PART is expected to be smaller than the time interval for the SP. For example if $T_{sp\text{-}cust}$ is 15 minutes, $T_{sp\text{-}part}$ could be 10 minutes.

    a. The time interval for fulfillment between SP and customer can be recorded. In the customer contract, there can be a penalty associated with the requests that are not fulfilled within $T_{sp\text{-}cust}$.
    b. The time interval for fulfillment between SP and PART can be recorded. There can be a penalty associated with the requests that are not fulfilled within $T_{sp\text{-}part}$.
    c. If the customer request is not fulfilled within $T_{sp\text{-}cust}$, the customer can cancel the request. The cancelation may be counted for penalty per the contract.
    d. The customer may request from user portal a monthly history report consisting of $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$.

[2] CIR_{ub} is different than CIR_{max} defined in MEF 6.2 and 10.3. CIR_{max} defines the total CIR tokens for the envelope while CIR_{ub} defines the maximum CIR for a given EVC based on the subscriber-service provider contract. Similarly, CIR_{lb} is the minimum CIR value for a given EVC, defined in the subscriber-service provider contract. If EVC consists of multiple bandwidth profile flows, then the contract needs to define CIR_{ub} and CIR_{lb} for each bandwidth profile flow. In this document, we consider the case where there is one bandwidth profile flow in the EVC. If there are multiple flows in the EVC, the same guidelines apply to each bandwidth profile.

[3] Allowable CIR rates are defined in Table 7 of MEF 51 [4] and Table 5 of MEF 33 [5].

[4] Tsp-cust is expected to be the same for all on-demand attributes.

[5] In this document, SP is used to represent Service Provider and PART is used to represent Partner.

[6] Tsp-part is expected to be the same for all on-demand attributes.

4. $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$ may apply to on-demand modification of CIR at certain date and time in the future. The SP choses to perform the request prior to the scheduled time and have the service ready at the time of the scheduled time.

5. CIR changes can performed automatically by SP and PART based on network events with or without customer involvement, based on customer-SP contract and SP-PART contract. This approach is out of scope for this specification.

The details of Option 2 are depicted in Figure 4. Steps in Figure 4 are as follows:

- S1[ALLEGRO or CANTATA+LEGATO]: User requests EVC CIR[7] change either from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and SP LEGATO interface of SP SOF

  - *CIR change may take place automatically (i.e. without a customer request or the customer request takes place after an SP notification indicating the need for a CIR change). Changing the CIR automatically is out of scope.*

- S2: SP SOF validates customer, the EPL service between location A and location Z, and if the CIR is within bounds (i.e. N and $CIR_{increment}$ are valid) or is one of the values within SP CIR list, and whether there is enough capacity in the SP network and/or Partner network if SP SOF is capable of tracking available network capacity. Furthermore, if some of the information such as services and locations that belong to the customer defined in the contract is not in SOF, but in OSS/BSS (BA), then SOF requests the information from OSS/BSS (BA) using LEGATO interface.

  SP SOF will make a decision for the next step after evaluating inputs from OSS/BSS (BA) and its own verification. Giving customer enters his/her CIR change request from customer Portal, it is possible to send contract related information directly to OSS/BSS (BA) over CANTATA interface and the rest directly to SP SOF over ALLEGRO interface from the SP Portal.

  - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back to user with "Invalid Request" if user credentials are invalid or "Unavailable Resources and Please try it Later" if resources are unavailable or "Request is accepted and in progress"

  - *If customer requests pass user authentication at S2, per agreement between SP and PART, SP SOF waits for a confirmation from PART SOF (i.e. results of S4c, S5, S7a) before accepting or denying a customer request based on its own verification that the request is invalid and there is not enough capacity to support the request.*

  - *If customer requests pass user authentication at S2, it is up to SP SOF to wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and S7a) before denying a customer request based on its own verification that*

[7] CIR is a parameter of an ingress or egress bandwidth profile flow [3]. .

request is invalid and/or there is not enough capacity to support the request.

- *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S4 [PRESTO]: Based on S2, if user credentials are valid and either capacity is available or SP SOF has no capacity information, SP SOF sends a request to SP ICM to change CIR at SP side of ENNI, on-net UNI, and on-net I-NNIs.

- S4a [INTERLUDE]: Based on S2, if user credentials are valid and either capacity is available or SP SOF has no capacity information, SP SOF sends a request to Partner SOF to change CIR at Partner side of ENNI, off-net UNI, and off-net I-NNIs.

1. *S4 and S4a can take place at the same time in order to reduce response time to user, or*

2. *S4a can take place after SP completes S8.*

The CIR and $CIR_{increment}$ values for PART OVC are expected to be as same as the CIR and $CIR_{increment}$ values for SP OVC per contract between two operators. If there are differences, this might cause packet loss and is not recommended.

N, $CIR_{increment}$,CIR_{lb} and CIR_{ub} attributes may not need to be passed to PART SOF over Interlude. SP may only pass requested CIR value, $CIR_{elastic}$, to PART SOF.

- S4c[INTERLUDE]: PART SOF validates the request by checking if the service is being supported at the off-net location and there is adequate capacity to support the change.

In S2, SP SOF checks validity of the customer and service, and may verify resource availability end-to-end. It is up to the PART SOF to re-validate the service and resource availability for the requested off-net location. The revalidation should reduce possible errors during the process.

- S4d [INTERLUDE]: If validation in S4c fails, PART SOF sends either the message "Invalid Request" or " Unavailable Resources" to SP SOF. In turn, SP SOF sends the message "Invalid Request" or "Unavailable Resources, please try it later" to the customer.

- S4b [PRESTO]: If validation in S4c is successful, Partner SOF requests Partner ICM to change CIR at Partner side of ENNI, off-net UNI and off-net I-NNIs.

- S5:

1. SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and there is enough capacity at these interfaces to support the requested CIR.

418 2. Similarly, Partner ICM validates if the EVC belongs to ENNI, UNI and I-NNIs
419 within Partner network and there is enough capacity at these interfaces to
420 support the requested CIR.

421 • S6:

422 1. [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if
423 there is not enough capacity at on-net UNI, ENNI or I-NNIs within SP
424 network, SP SOF responds to customer with “Unavailable Resources and
425 Please try it Later”.

426 2. [PRESTO+INTERLUDE+ALLEGRO or
427 PRESTO+INTERLUDE+CANTATA+LEGATO] Similarly, if there is not
428 enough capacity at off-net UNI, ENNI or I-NNIs of Partner network, Partner
429 SOF send a message to SP SOF indicating that there is not enough capacity
430 to support the change. SP SOF responds to customer with “Unavailable
431 Resources and Please try it Later”.

432 • S7 [PRESTO]:

433 1. Based on S5, if there is enough capacity at on-net UNI, ENNI and I-NNIs of
434 SP network, SP ICM requests SP ECM to modify the CIR to the customer
435 requested value at on-net UNI and EVC End Point on the on-net UNI”.

436 2. Similarly, if there is enough capacity at off-net UNI, ENNI and I-NNIs of
437 Partner network, Partner ICM requests Partner ECM to modify the CIR to the
438 customer requested value at off-net UNI and EVC End Point on the off-net
439 UNI”.

440 Customer request will be accepted if both (1) and (2) are successful as
441 described in S8a and S8b.

442 • S7a [ADAGIO]:

443 1. SP ECM validates if there is enough capacity at on-net UNI and OVC End
444 Point to support new CIR.

445 2. Similarly, PART ECM validates if there is enough capacity at off-net UNI
446 and off-net OVC End Point to support new CIR.

447 • S8:

448 1. [ADAGIO+PRESTO]After SP ECM validates CIR Change request at on-net
449 UNI and associated OVC End Point, SP ECM sends a confirmation or denial
450 message to SP ICM for the CIR Change. In turn, SP ICM sends a
451 confirmation or denial message to SP SOF for CIR change at on-net UNI and
452 on-net OVC End Point.
453 2. [ADAGIO+PRESTO] Similarly, after PART ECM validates CIR Change
454 request at off-net UNI and associated OVC End Point, PART ECM sends a
455 confirmation or denial message to PART ICM for the CIR Change. In turn,
456 PART ICM sends a confirmation or denial message to PART SOF for CIR
457 change at off-net UNI and off-net OVC End Point.

- S8a [ALLEGRO or CANTATA+LEGATO]: At S8, if CIR change has been successful, SP SOF sends the message “CIR for service is changed” to customer.

- S8b [ALLEGRO or CANTATA+LEGATO]: At S8, if CIR change has been unsuccessful, SP SOF sends the message “Unavailable resources, please try it later” to customer.

- S9 [PRESTO+ADAGIO]: After S8, optionally, SP SOF and PART SOF run tests on their segments of EVC (i.e. SP OVC and Partner OVC) to verify the CIR change, by requesting ICM and ECM to test the new CIR at associated interfaces and endpoints. .

- S10:

  1.[ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM confirms availability of new CIR to SP ICM and in turn SP ICM confirms availability of new CIR to SP SOF.

  2.[ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner OVC, Partner ECM confirms availability of new CIR to Partner ICM and in turn Partner ICM confirms availability of new CIR to Partner SOF.

  3.[INTERLUDE] Partner SOF confirms Availability of New CIR to SP SOF, “Confirmed Availability of New CIR for Partner OVC”.

- S11[ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer indicating “CIR for Service is Changed”.

- S12:

  1. [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for SP OVC, SP ECM confirms failure of new CIR testing to SP ICM and in turn SP ICM confirms failure of new CIR testing to SP SOF.

  2. [PRESTO+ADAGIO]Similarly, If tests at S9 are unsuccessful for Partner OVC, Partner ECM confirms failure of new CIR testing to Partner ICM and in turn Partner ICM confirms failure of new CIR testing to Partner SOF.

- S13[ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer indicating “Unavailable Resources, Please try it Later””.

- S14[PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without SP and Partner test their OVCs), optionally, SP SOF runs and end-to-end EVC test.

- S15

  1. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP SOF informs customer indicating that “Unavailable Resources, Please try it Later”.

2. [ALLEGRO or CANTATA+LEGATO]if testing is successful, SP SOF informs customer that “CIR for Service is Changed”.

3. [LEGATO] if testing is successful, to initiate new billing procedure, SP SOF also informs OSS/BSS (BA) that “CIR for Service is Changed”.

- S16 [LEGATO]:
  1. a) At S8a and S11, per contract between SP and Ethernet Access Operator (PART), PART SOF informs PART OSS/BSS (BA) that CIR change is confirmed so that SLO between SP and PART, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR), can be updated.
     b) At S8a and S11,SP chooses to confirm CIR change without an end-to-end testing of EVC and informs OSS/BSS (BA) to initiate the billing and update on-demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).
  2. a) At S15, if testing is successful, SP SOF informs OSS/BSS (BA) to initiate new billing procedure for the new CIR and update on demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).

     b) At S15, if testing is successful, SP SOF also informs PART SOF that the testing is successful. In turn, PART SOF informs PART OSS/BSS (BA) that CIR change is successful so that PART OSS/BSS (BA) can update its SLOs.
- S17 [LEGATO]:
  1. At S3, If there is a way to identify the fact that the request is considered to be invalid despite of the fact that it is a valid request, in order to calculate on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP SOF informs SP OSS/BSS (BA) that a valid request was considered to be invalid and rejected.
  2. At S3,S4e, S6.1, S8b, S13 and S15, if there is not enough resources to support CIR change, SP SOF informs OSS/BSS (BA) to update its SLO for on-demand CIR change, **percent of accepted requests fulfilled (TFR/TAR)**.
  3. At S4d, S6.2, S8b, S11 and S15, if there is not enough resources to support CIR change, PART SOF informs OSS/BSS (BA) to update its SLO for on-demand CIR change, percent of accepted requests fulfilled (TFR/TAR).
  4. At S15, if testing is unsuccessful, SP SOF informs PART SOF about not being able to honor the customer request so that PART SOF requests PART OSS/BSS (BA) to update on demand SLO parameters.

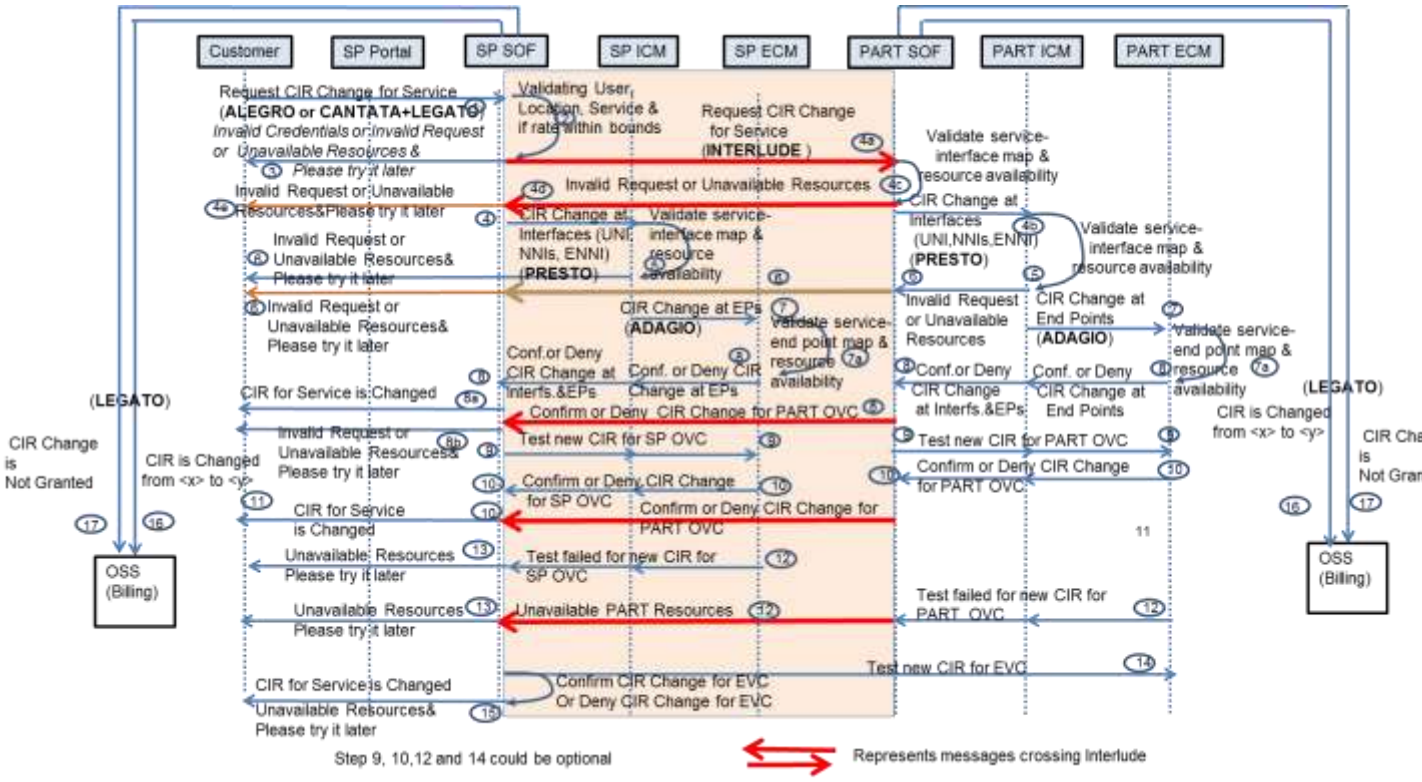

Figure 4 CIR Modification Process Flow for Access E-Line

The steps above are summarized in two use cases below.

Use Case Number	UC1
Use Case Name	CIR Change request Step1,2 and 3 (S1,S2 and S3)
Description	Customer initiates CIR change over CANTATA or ALLEGRO
Actor(s)	Customer, SP OSS/BSS (BA), SP SOF
Pre-Condition(s)	Customer has a contract for the Elastic Access E-Line Service, the Elastic Service has been ordered, configured, tested, and is ready to carry traffic.
Process Steps	1. Customer uses CANTATA or ALLEGRO interface to trigger a CIR change request 2. Customer provides all the mandatory data elements (i.e. N and $CIR_{increment}$ or a set of CIR values, immediately or certain time in the future) to the SP. 3. SP SOF performs customer authentication, and validates the service for this customer and integrity of the data elements. For service validation and integrity of data elements, SP SOF may need to collaborate with OSS-BS over LEGATO interface. Furthermore, SP SOF may validate if there is enough capacity within SP network or end-to-end to support the requested CIR change. 4. If the CIR change request is : a. Invalid (i.e. customer authentication fails, customer-service mapping fails, or CIR requested is not within contractual bounds), then SP SOF sends “invalid Request” to the customer.

	b. Valid, but there is not enough capacity to support the new CIR, SP SOF sends "Resources are Unavailable, Please try it later" to the customer. *It is recommended that If this step is repeated 3 times (e.g. as an example) in an SP selected time interval (e.g. 5 minutes), SP SOF sends "Please try it in <time interval in minutes>" to the customer. These messages will be displayed at the Portal. If requests continue, security procedures may take control of the user interface*. *SP SOF may choose to receive confirmation from SP ICM and SP ECM before denying the request, in addition to its own validation for customer-service mapping and capacity availability (i.e. S5 and S7a)* *Per agreement between SP and PART, SP SOF may choose to receive confirmation from PART SOF before denying the request (i.e S4c, S5, S7a)* c. Valid and there is enough capacity in the network to support this new CIR, then S4 will be initiated. d. If the request is invalid and rejected, or valid and rejected due to resource unavailability , SP SOF informs OSS/BSS (BA) to update the customer-SP SLOs over LEGATO. 5. $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$ are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA). This UC ends
Post Conditions	SP Customer Portal displays messages in 4a and 4b above or SP SOF initiates S4.
Alternate Paths	The portal does not display N and $CIR_{incerement}$ or a set of CIR values, and customer enters any CIR value into the system without indicating if the request is to be performed immediately or certain time in the future. In this case, all the steps from 2 to 15 are still valid.
Assumption(s)	
References	S1, S2,S3

542 Table 2: CIR use case description for Steps 1,2, and 3

543

Use Case Number	UC2
Use Case Name	CIR Change process, configuration, testing, acceptance or denial, billing initiation and SLO update by SP and PART
Description	SP SOF and PART SOF initiate, configure, and test CIR change over their own PRESTO and ADAGIO interfaces; accept or deny the CIR Change over CANTATA; initiate billing over LEGATO; and update their SLOs over LEGATO.
Actor(s)	SP SOF, SP ICM, SP ECM, PART SOF, PART ICM, PART ECM, SP OSS/BSS (BA), PART OSS/BSS (BA)
Pre-Condition(s)	Customer request has been validated by SP SOF and optionally by PART SOF.
Process Steps	1. SP SOF requests CIR change from PART SOF over INTERLUDE and requests CIR change from SP ICM over PRESTO. *It is a choice for SP to receive confirmation from its ICM and ECM for*

	the CIR change before sending a request to PART SOF. 2. SP ICM verifies validity of request and if there is adequate capacity at UNI, ENNI and NNIs. a. If the verification is successful, it requests CIR change from SP ECM over ADAGIO. b. If the verification is unsuccessful, SP ICM notifies SP SOF that the request is invalid or resources are unavailable. In turn, SP SOF sends "Invalid Request, or Unavailable Resources and Please try it later" to the customer 3. SP ECM validates the request and if there is enough capacity at on-net UNI and OVC End Point to support new CIR. After the SP ECM validation, SP ECM sends a confirmation or denial message to SP ICM for the CIR Change. In turn, SP ICM sends a confirmation or denial message to SP SOF for CIR change at SP ENNI GW, on-net UNI and on-net OVC End Point. 4. PART SOF verifies validity of request and if there is adequate capacity at PART ENNI GW, off-net UNI and off-net NNIs a. If the verification is successful, it requests CIR change from PART ICM. b. If the verification is unsuccessful, PART SOF notifies SP SOF that either request is invalid or PART resources are unavailable. In turn, SP SOF either sends "invalid Request" or "Resources are Unavailable, Please try it later" to the customer 5. PART ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and there is enough capacity at these interfaces to support the requested CIR. a. if there is not enough capacity at off-net UNI, ENNI or I-NNIs of Partner network, PART ICM notifies PART SOF about invalid request or unavailability of resources. In turn, PART SOF sends a message to SP SOF indicating that either the request is invalid or there is not enough capacity to support the change. SP SOF responds to customer with "Invalid Request or " or "Unavailable Resources and Please try it Later". b. If there is enough capacity at off-net UNI, ENNI or I-NNI, PART ICM requests PART ECM to change CIR. 6. PART ECM validates the request and if there is enough capacity at off-net UNI and PART OVC End Point to support new CIR. After the PART ECM validation, PART ECM sends a confirmation or denial message to PART ICM for the CIR Change. In turn, PART ICM sends a confirmation or denial message to PART SOF for CIR change at off-net UNI and off-net OVC End Point. For the request denial message, SP SOF responds customer with "Invalid Request, or Unavailable Resources and Please try it Later". 7. If SP SOF receives conformation from SP ICM, SP ECM and PART SOF, a. SP SOF confirms CIR change to customer without testing the EVC for new CIR, or b. SP SOF request testing of SP OVC for the new CIR from SP ICM and ECM c. PART SOF requests testing of PART OVC for the new CIR from PART ICM and ECM d. Based on test results from SP ICM, SP ECM and PART SOF, SP SOF sends either "CIR for Service is Changed" or "Unavailable resources, please try it later" to customer.

	8. If testing of SP OVC and PART OVC separately validates CIR change, SP SOF may decide to run an end-to-end EVC test before confirming or denying the CIR change. Based on the test results, SP SOF sends either "CIR for Service is Changed" or "Unavailable resources, please try it later" to customer. 9. SP SOF informs SP OSS/BSS (BA) for each denial or confirmation of CIR change request. Similarly, PART SOF informs PART OSS/BSS (BA). 10. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART. 11. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP. 12. Tsp-cust and Tsp-part are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA).
Post Conditions	Ready for passing traffic with new CIR.
Alternate Paths	
Assumption(s)	
References	S4-S17

544 Table 3: CIR use case description for Steps 4-17

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547

548 ### 8.1.1. Requirements

549 A requirement with its number starting with “O” is optional while a requirement with its
550 number starting with “R” is mandatory as indicated in Section 3.

551

O_ELASTIC_EVC_CIR_001	Elastic Ethernet Service should support on-demand modifications of CIR of a bandwidth profile flow or EVC envelope; and $CIR_{elastic}$, CIR_{lb}, CIR_{ub}, N, $N_{max,CIR}$ and $CIR_{increment}$ attributes.
Source	S1

552

O_ELASTIC_CIR_INTERLUDE_001	Interlude should support $CIR_{elastic}$, CIR_{lb}, CIR_{ub}, N, $N_{max,CIR}$ and $CIR_{increment}$ for the OVCElastic Ethernet Service. *Note that during CIR modifications,* CIR_{lb}, CIR_{ub}, N, $N_{max,CIR}$ and $CIR_{increment}$ attributes may not need to be exchanged directly over Interlude between SP SOF and PART SOF. However, both SP SOF and PART SOF must be aware of these attributes in order to validate a customer on-demand request. This will be accomplished during the first provisioning of Elastic Ethernet ServiceElastic Ethernet Service where SP communicates these attributes to PART SOF over Interlude.
Source	S1

553

O_ELASTIC_CIR_SONATA_001	SONATA should support $CIR_{elastic}$, CIR_{lb}, CIR_{ub}, N, $N_{max,CIR}$ and $CIR_{increment}$ for the OVC *The service attributes must be in the contract (or covered by business relationships) between SP and customer, and between SP and PART.*
Source	S1

554

O_ELASTIC_CIR_CANTATA_001	CANTATA should support $CIR_{elastic}$, CIR_{lb}, CIR_{ub}, N, $N_{max,CIR}$ and $CIR_{increment}$ for the Elastic Ethernet ServiceElastic Ethernet Service *The service attributes must be supported by API of CANTATA for user to enter the on-demand request* .

Source	S1

555

556

O_ELASTIC_CIR_ALLEGRO_001	ALLEGRO should support $CIR_{elastic}$, CIR_{lb}, CIR_{ub}, N, $N_{max,CIR}$ and $CIR_{increment}$ for the Elastic Ethernet ServiceElastic Ethernet Service *Note that the service attributes must be supported by API of ALLEGRO for user to enter the on-demand request.*
Source	S1

557

558

O_ELASTIC_CIR_LEGATO_001	LEGATO should support $CIR_{elastic}$, CIR_{lb}, CIR_{ub}, N, $N_{max,CIR}$ and $CIR_{increment}$ for Elastic Ethernet ServiceElastic Ethernet Service. *Note that the service attributes must be supported by LEGATO in its communications with SP SOF.*

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561

R_ELASTIC_EVC_SLO_001	Elastic E-Line Service MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CIR change [1].
Source	S1 [1]

562

R_ELASTIC_CIR_SONATA_SLO_001	SONATA MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CIR change for Elastic Ethernet ServiceElastic Ethernet Service. *Note that these SLOs must be in the contract (or business relationships) between SP and customer, and between SP and PART.*

Source	S1 [1]

563

R_ELASTIC_CIR_LEGATO_SLO_001	LEGATO MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CIR change for Elastic Ethernet ServiceElastic Ethernet Service. *Note that the SLO parameters must be supported by LEGATO API.*
Source	S1 [1]

564

R_ELASTIC_CIR_CANTATA_SLO_001	CANTATA MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CIR change for Elastic Ethernet ServiceElastic Ethernet Service. *Remark : The SLO parameters must be supported by CANTATA API.*
Source	S1 [1]

565

R_ELASTIC_CIR_ALLEGRO_SLO_001	ALLEGRO MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CIR change for Elastic Ethernet ServiceElastic Ethernet Service *Remark : The SLO parameters must be supported by ALLEGRO API.*
Source	S1 [1]

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567

R_ELASTIC_SCH_ALLEGRO_001	On-demand request for changing EVC CIR immediately or at certain day and time in the future should be supported from ALLEGRO interface of SP SOF.

568

R_ELASTIC_SCH_CANTATA_001	On-demand request for changing EVC CIR immediately or at certain day and time in the future should be supported from CANTATA interface.

R_ELASTIC_SCH_LEGATO_001	On-demand request for changing EVC CIR immediately or at certain day and time in the future should be supported from LEGATO interface.

569

O_ELASTIC_SCH_INTERLUD_001	On-demand changing of PART OVC CIR for Access E-Line services either immediately or at certain day and time in the future should be supported by INTERLUDE.
Source	S1

570

571

O_ELASTIC_SCH_SONATA_001	On-demand changing of PART OVC CIR for Access E-Line services either immediately or at certain day and time in the future should be supported by SONATA.
Source	S1

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573

O_USER_PORTAL_001	User Portal should be able to display CIR_{lb}, CIR_{ub}, and N, $N_{max,CIR}$ and $CIR_{increment}$ or list of CIR values supported for a given Elastic Ethernet ServiceElastic Ethernet Service.
Source	S1

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575

O_INTERLUDE_TEST_001	INTERLUDE should support OVC testing related messages exchanged between SP SOF and PART SOF for CIR change.
Source	S14

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577

O_PRESTO_TEST_001	PRESTO should support OVC testing for new CIR that is initiated by SOF, after the CIR change confirmation of ICM and ECM.

578

O_ADAGIO_TEST_001	ADAGIO should support OVC testing for new CIR

	that is initiated by SOF, after the CIR change confirmation of ICM and ECM.

579

580

R_SP_SOF_TIMING_001	SP SOF MUST be able to measure Tsp-cust and Tsp-part , report them to SP OSS/BSS (BA) for on-demand CIR change.
Source	
R_PART_SOF_TIMING_001	PART SOF MUST be able to measure Tsp-part and report it to PART OSS/BSS (BA) for on-demand CIR change.
Source	

581

R_LEGATO_TIMING_001	SP LEGATO API MUST be able to support Tsp-cust and Tsp-part for on-demand CIR change.
Source	
R_LEGATO_TIMING_002	PART LEGATO API MUST be able to support Tsp-part for on-demand CIR change.
Source	
Source	
R_SONATA_TIMING_001	SONATA API MUST be able to support Tsp-cust and Tsp-part for on-demand CIR change.
Source	

582

583 **Table 4:** Requirements for on-demand CIR change
584

8.2. On-demand Modification of EIR

Prior to an on-demand request for modifying EIR of an E-LINE, ENNI, UNIs and EVC between off-net and on-net locations of SP are established for this E-LINE: Overall EIR modification process can be summarized as follows:

1. Customer can modify EVC bandwidth up to UNI PHY rate for E-Line without going thru a negotiation process with the SP, although this may not be feasible for EVPL.

2. Customer via user portal requests change within EIR bounds for EIR per bandwidth profile flow , <EIR_{lb} , EIR_{ub} >[8] for EVC End Point

    a. Immediately

        i. With no end time for new EIR , $EIR_{elastic}$, where $EIR_{elastic}$ = EIR_{lb} +N$xEIR_{increment}$ where N is an integer between 1 and N_{max} or <one of EIR rates available in SP list>

        Note that $N_{max\ for}$ EIR could be different that N_{max} for CIR in section 7.1. Therefore, we call N_{max} as $N_{max,EIR}$.

        Furthermore, $EIR_{increment}$ is very likely to be the same as $CIR_{increment}$.

        ii. With end time for new EIR, $EIR_{elastic}$, where $EIR_{elastic}$ = EIR_{lb} +N$xEIR_{increment}$. or <one of EIR rates available in SP list> where N is an integer between 1 and $N_{max,EIR}$. After the end time elapses, the rate becomes EIR_{lb}

    b. At certain time and day in the future

        i. With no end time for new EIR , $EIR_{elastic}$, where $EIR_{elastic}$ = EIR_{lb} +N$xEIR_{increment}$ or <one of EIR rates available in SP list> where N is an integer between 1 and $N_{max,EIR.}$

        ii. With end time for new EIR , $EIR_{elastic}$ where $EIR_{elastic}$ = EIR_{lb} +N$xEIR_{increment}$ or <one of EIR rates available in SP list> where N is an integer between 1 and $N_{max,EIR.}$ After end time elapses, the rate becomes EIR_{lb}

3. Time intervals for on-demand modification of EIR immediately can be defined in the contract between SP and customer ($T_{sp\text{-}cust}$), and SP and PART ($T_{sp\text{-}part}$). The time interval for PART is expected to be smaller than the time interval for the SP. For example if $T_{sp\text{-}cust}$ is 15 minutes, $T_{sp\text{-}part}$ could be 10 minutes.

[8] EIR is an attribute of a bandwidth profile flow. EIR_{ub} is different than EIR_{max} defined in MEF 6.2 and 10.3. EIR_{max} defines the total EIR tokens for the envelope while EIR_{ub} defines the maximum excess token bucket for a given EVC based on the subscriber-service provider contract. Similarly, EIR_{lb} is the minimum EIR value for a given EVC, defined in the subscriber-service provider contract. In this document, single bandwidth profile in an EVC is assumed. If EVC consists of multiple bandwidth profile flows, then the contract needs to define EIR_{ub} and EIR_{lb} for each bandwidth profile flow.

a. The time interval for fulfillment between SP and customer can be recorded. In the customer contract, there can be a penalty associated with the requests that are not fulfilled within $T_{sp\text{-}cust}$.
b. The time interval for fulfillment between SP and PART can be recorded. There can be a penalty associated with the requests that are not fulfilled within $T_{sp\text{-}part}$.
c. If the customer request is not fulfilled within $T_{sp\text{-}cust}$, the customer can cancel the request. The cancelation may be counted for penalty per the contract.
d. The customer may request from user portal a monthly history report consisting of $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$.

4. $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$ may apply to on-demand modification of EIR at certain date and time in the future. The SP choses to perform the request prior to the scheduled time and have the service ready at the time of the scheduled time.

5. EIR changes can performed automatically by SP and PART based on network events with or without customer involvement, based on customer-SP contract and SP-PART contract. This approach is out of scope for this specification.

The details of Option 2 are depicted in Figure 5. Steps in Figure 5 are as follows:

- S1[ALLEGRO or CANTATA+LEGATO]: User requests EVC EIR change either from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and SP LEGATO interface of SP SOF

  - *EIR change may take place automatically (i.e. without a customer request or the customer request takes place after an SP notification indicating the need for EIR change). Changing the EIR automatically is out of scope.*

- S2: SP SOF validates customer, the E-LINE service between location A and location Z, and if the EIR is within bounds (i.e. N and $EIR_{increment}$ are valid) or is one of the values within SP EIR list, and whether there is enough capacity in the SP network and/or Partner network if SP SOF is capable of tracking available network capacity. Furthermore, if some of the information such as services and locations that belong to the customer is not in SOF, but in OSS, then SOF requests the information from OSS using LEGATO interface.

  - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back to user with "Invalid Request" if user credentials are invalid or "Unavailable Resources and Please try it Later" if resources are unavailable or "Request is accepted" and in progress".

  - *If customer requests pass user authentication at S2, per agreement between SP and PART, SP SOF waits for a confirmation from PART SOF (i.e. results of S4c, S5, S7a) before accepting or denying a customer request based on its own verification that the request is invalid and there is not enough capacity to support the request.*

- *If customer requests pass user authentication at S2, it is up to SP SOF to wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and S7a) before denying a customer request based on its own verification that request is invalid and/or there is not enough capacity to support the request.*
- *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S4 [PRESTO]: Based on S2, if user credentials are valid and either capacity is available or SP SOF has no capacity information, SP SOF sends a request to SP ICM to change EIR at SP side of ENNI, on-net UNI, and on-net I-NNIs.

- S4a [INTERLUDE]: Based on S2, if user credentials are valid and either capacity is available or SP SOF has no capacity information, SP SOF sends a request to Partner SOF to change EIR at Partner side of ENNI, off-net UNI, and off-net I-NNIs.

1. *S4 and S4a can take place at the same time in order to reduce response time to user, or*

2. *S4a can take place after SP completes S8.*

The EIR and $EIR_{increment}$ values for PART OVC are expected to be as same as the EIR and $EIR_{increment}$ values for SP OVC per contract between two operators. If there are differences, this might cause packet loss and is not recommended.

N, $EIR_{increment}$,EIR_{lb} and EIR_{ub} attributes may not need to be passed to PART SOF over Interlude. SP may only pass requested EIR value, $EIR_{elastic}$, to PART SOF.

- S4c[INTERLUDE]: PART SOF validates the request by checking if the service is being supported at the off-net location and there is adequate capacity to support the change.

In S2, SP SOF checks validity of the customer and service, and may verify resource availability end-to-end. It is up to the PART SOF to re-validate the service and resource availability for the requested off-net location. The revalidation should reduce possible errors during the process.

- S4d [INTERLUDE]: If validation in S4c fails, PART SOF sends either the message "Invalid Request" or " Unavailable Resources" to SP SOF. In turn, SP SOF sends the message "Invalid Request" or "Unavailable Resources, please try it later" to the customer.

If the validation in S4c passes, PART SOF simply continue to the process without sending a confirmation message to SP SOF since SP SOF might need re-validation at its own ICM and ECM layers.

- S4b [PRESTO]: If validation in S4c is successful, Partner SOF requests Partner ICM to change EIR at Partner side of ENNI, off-net UNI and off-net I-NNIs.

- S5:

    1. SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and there is enough capacity at these interfaces to support the requested EIR.

    2. Similarly, Partner ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within Partner network and there is enough capacity at these interfaces to support the requested EIR.

- S6:

    1. [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if there is not enough capacity at on-net UNI, ENNI or I-NNIs within SP network, SP SOF responds to customer with “Unavailable Resources and Please try it Later”.

    2. [PRESTO+INTERLUDE+ALLEGRO or PRESTO+INTERLUDE+CANTATA+LEGATO] Similarly, if there is not enough capacity at off-net UNI, ENNI or I-NNIs of Partner network, Partner SOF send a message to SP SOF indicating that there is not enough capacity to support the change. SP SOF responds to customer with “Unavailable Resources and Please try it Later”.

- S7 [PRESTO]:

    1. Based on S5, if there is enough capacity at on-net UNI, ENNI and I-NNIs of SP network, SP ICM requests SP ECM to modify the EIR to the customer requested value at on-net UNI and EVC End Point on the on-net UNI”.

    2. Similarly, if there is enough capacity at off-net UNI, ENNI and I-NNIs of Partner network, Partner ICM requests Partner ECM to modify the EIR to the customer requested value at off-net UNI and EVC End Point on the off-net UNI”.

- S7a [ADAGIO]:

    1. SP ECM validates if there is enough capacity at on-net UNI and OVC End Point to support new EIR.

    2. Similarly, PART ECM validates if there is enough capacity at off-net UNI and off-net OVC End Point to support new EIR.

- S8:

    1. [ADAGIO+PRESTO]After SP ECM validates EIR Change request at on-net UNI and associated OVC End Point, SP ECM sends a confirmation or denial message to SP ICM for the EIR Change. In turn, SP ICM sends a confirmation or denial message to SP SOF for EIR change at on-net UNI and on-net OVC End Point.
    2. [ADAGIO+PRESTO] Similarly, after PART ECM validates EIR Change request at off-net UNI and associated OVC End Point, PART ECM sends a

confirmation or denial message to PART ICM for the EIR Change. In turn, PART ICM sends a confirmation or denial message to PART SOF for EIR change at off-net UNI and off-net OVC End Point.

- S8a [ALLEGRO or CANTATA+LEGATO]: At S8, if EIR change has been successful, SP SOF sends the message “EIR for service is changed” to customer.

- S8b [ALLEGRO or CANTATA+LEGATO]: At S8, if EIR change has been unsuccessful, SP SOF sends the message “Unavailable resources, please try it later” to customer.

- S9 [PRESTO+ADAGIO]: After S8, optionally, SP SOF and PART SOF run tests on their segments of EVC (i.e. SP OVC and Partner OVC) to verify the EIR change, by requesting ICM and ECM to test the new EIR at associated interfaces and endpoints. .

- S10:

  1.[ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM confirms availability of new EIR to SP ICM and in turn SP ICM confirms availability of new EIR to SP SOF.

  2.[ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner OVC, Partner ECM confirms availability of new EIR to Partner ICM and in turn Partner ICM confirms availability of new EIR to Partner SOF.

  3.[INTERLUDE] Partner SOF confirms Availability of New EIR to SP SOF, “Confirmed Availability of New EIR for Partner OVC”.

- S11[ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer indicating “EIR for Service is Changed”.

- S12:

  1. [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for SP OVC, SP ECM confirms failure of new EIR testing to SP ICM and in turn SP ICM confirms failure of new EIR testing to SP SOF.

  2. [PRESTO+ADAGIO]Similarly, If tests at S9 are unsuccessful for Partner OVC, Partner ECM confirms failure of new EIR testing to Partner ICM and in turn Partner ICM confirms failure of new EIR testing to Partner SOF.

- S13[ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer indicating “Unavailable Resources, Please try it Later””.

- S14[PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without SP and Partner test their OVCs), optionally, SP SOF runs and end-to-end EVC test.

- S15

1. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP SOF informs customer indicating that “Unavailable Resources, Please try it Later”.

2. [ALLEGRO or CANTATA+LEGATO]if testing is successful, SP SOF informs customer that “EIR for Service is Changed”.

3. [LEGATO] if testing is successful, to initiate new billing procedure, SP SOF also informs OSS that “EIR for Service is Changed”.

- S16 [LEGATO]:
  1. a) At S8a and S11, per contract between SP and Ethernet Access Operator (PART), PART SOF informs PART OSS/BSS (BA) that EIR change is confirmed so that SLO between SP and PART, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR), can be updated.
     b) At S8a and S11,SP chooses to confirm EIR change without an end-to-end testing of EVC and informs OSS/BSS (BA) to initiate the billing and update on-demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).
  2. a) At S15, if testing is successful, SP SOF informs OSS to initiate new billing procedure for the new EIR and update on demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).

     b) At S15, if testing is successful, SP SOF also informs PART SOF that the testing is successful. In turn, PART SOF informs PART OSS/BSS (BA) that EIR change is successful so that PART OSS/BSS (BA) can update its SLOs.
- S17 [LEGATO]:
  1. At S3, If there is a way to identify the fact that the request is considered to be invalid despite of the fact that it is a valid request, in order to calculate on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP SOF informs SP OSS/BSS (BA) that a valid request was considered to be invalid and rejected.
  2. At S3,S4e, S6.1, S8b, S13 and S15, if there is not enough resources to support EIR change, SP SOF informs OSS to update its SLO for on-demand EIR change, **percent of accepted requests fulfilled (TFR/TAR)**.
  3. At S4d, S6.2, S8b, S11 and S15, if there is not enough resources to support EIR change, PART SOF informs OSS to update its SLO for on-demand EIR change, percent of accepted requests fulfilled (TFR/TAR).
  4. At S15, if testing is unsuccessful, SP SOF informs PART SOF about not being able to honor the customer request so that PART SOF requests PART OSS/BSS (BA) to update on demand SLO parameters.

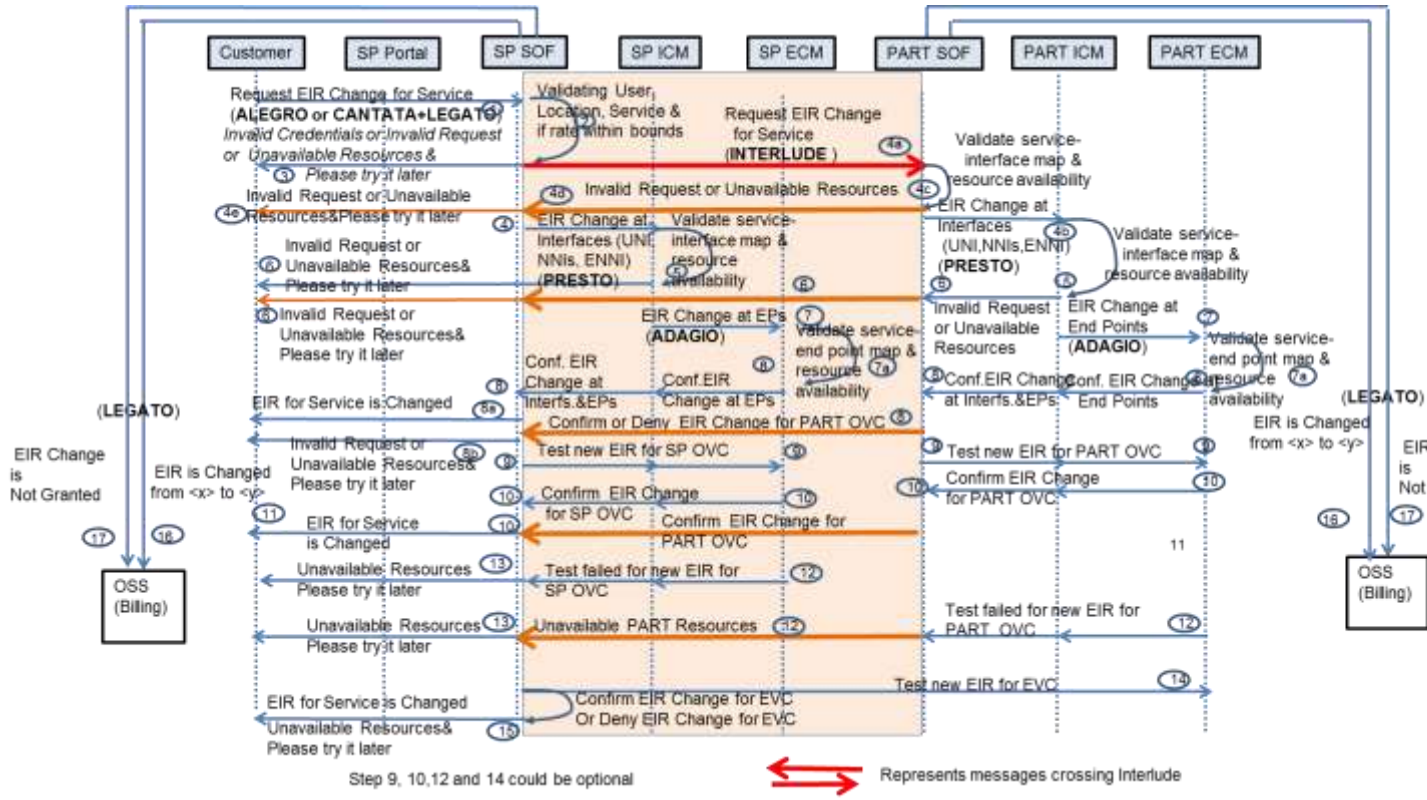

Figure 5 EIR Modification Process Flow for Access E-Line

The steps above are summarized in two use cases below.

Use Case Number	UC1
Use Case Name	EIR Change request Step1,2 and 3 (S1,S2 and S3)
Description	Customer initiates EIR change over CANTATA or ALLEGRO
Actor(s)	Customer, SP OSS/BSS (BA), SP SOF
Pre-Condition(s)	Customer has a contract for the Elastic Access E-Line Service, the Elastic Service has been ordered, configured, tested, and is ready to carry traffic.
Process Steps	1. Customer uses CANTATA or ALLEGRO interface to trigger a EIR change request 2. Customer provides all the mandatory data elements (i.e. N and $EIR_{increment}$ or a set of EIR values, immediately or certain time in the future) to the SP. 3. SP SOF performs customer authentication, and validates the service for this customer and integrity of the data elements. For service validation and integrity of data elements, SP SOF may need to collaborate with OSS-BS over LEGATO interface. Furthermore, SP SOF may validate if there is enough capacity within SP network or end-to-end to support the requested EIR change. 4. If the EIR change request is : a. Invalid (i.e. customer authentication fails, customer-service mapping fails, or EIR requested is not within contractual bounds), then SP SOF sends “invalid Request” to the

	customer. b. Valid, but there is not enough capacity to support the new EIR, SP SOF sends "Resources are Unavailable, Please try it later" to the customer. *It is recommended that If this step is repeated 3 times in an SP selected time interval (e.g. 5 minutes), SP SOF sends "Please try it in <time interval in minutes>" to the customer. These messages will be displayed at the Portal. If requests continue, security procedures may take control of the user interface*. *SP SOF may choose to receive confirmation from SP ICM and SP ECM before denying the request, in addition to its own validation for customer-service mapping and capacity availability (i.e. S5 and S7a)* *Per agreement between SP and PART, SP SOF may choose to receive confirmation from PART SOF before denying the request (i.e S4c, S5, S7a)* c. Valid and there is enough capacity in the network to support this new EIR, then S4 will be initiated. d. If the request is invalid and rejected, or valid and rejected due to resource unavailability , SP SOF informs OSS/BSS (BA) to update the customer-SP SLOs over LEGATO. 5. $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$ are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA). This UC ends
Post Conditions	SP Customer Portal displays messages in 4a and 4b above or SP SOF initiates S4.
Alternate Paths	The portal does not display N and $EIR_{incerement}$ or a set of EIR values, and customer enters any EIR value into the system without indicating if the request is to be performed immediately or certain time in the future. In this case, all the steps from 2 to 15 are still valid.
Assumption(s)	
References	S1, S2,S3

823 Table 5: EIR use case description for Steps 1,2, and 3

824

Use Case Number	UC2
Use Case Name	EIR Change process, configuration, testing, acceptance or denial, billing initiation and SLO update by SP and PART
Description	SP SOF and PART SOF initiate, configure, and test EIR change over their own PRESTO and ADAGIO interfaces; accept or deny the EIR Change over CANTATA; initiate billing over LEGATO; and update their SLOs over LEGATO.
Actor(s)	SP SOF, SP ICM, SP ECM, PART SOF, PART ICM, PART ECM, SP OSS/BSS (BA), PART OSS/BSS (BA)
Pre-Condition(s)	Customer request has been validated by SP SOF and optionally by PART SOF.
Process Steps	1. SP SOF requests EIR change from PART SOF over INTERLUDE and requests EIR change from SP ICM over PRESTO.

	It is a choice for SP to receive confirmation from its ICM and ECM for the EIR change before sending a request to PART SOF. 2. SP ICM verifies validity of request and if there is adequate capacity at UNI, ENNI and NNIs. a. If the verification is successful, it requests EIR change from SP ECM over ADAGIO. b. If the verification is unsuccessful, SP ICM notifies SP SOF that the request is invalid or resources are unavailable. In turn, SP SOF sends "Invalid Request, or Unavailable Resources and Please try it later" to the customer 3. SP ECM validates the request and if there is enough capacity at on-net UNI and OVC End Point to support new EIR. After the SP ECM validation, SP ECM sends a confirmation or denial message to SP ICM for the EIR Change. In turn, SP ICM sends a confirmation or denial message to SP SOF for EIR change at SP ENNI GW, on-net UNI and on-net OVC End Point. 4. PART SOF verifies validity of request and if there is adequate capacity at PART ENNI GW, off-net UNI and off-net NNIs a. If the verification is successful, it requests EIR change from PART ICM. b. If the verification is unsuccessful, PART SOF notifies SP SOF that either request is invalid or PART resources are unavailable. In turn, SP SOF either sends "invalid Request" or "Resources are Unavailable, Please try it later" to the customer 5. PART ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and there is enough capacity at these interfaces to support the requested EIR. a. if there is not enough capacity at off-net UNI, ENNI or I-NNIs of Partner network, PART ICM notifies PART SOF about invalid request or unavailability of resources. In turn, PART SOF sends a message to SP SOF indicating that either the request is invalid or there is not enough capacity to support the change. SP SOF responds to customer with "Invalid Request or " or "Unavailable Resources and Please try it Later". b. If there is enough capacity at off-net UNI, ENNI or I-NNI, PART ICM requests PART ECM to change EIR. 6. PART ECM validates the request and if there is enough capacity at off-net UNI and PART OVC End Point to support new EIR. After the PART ECM validation, PART ECM sends a confirmation or denial message to PART ICM for the EIR Change. In turn, PART ICM sends a confirmation or denial message to PART SOF for EIR change at off-net UNI and off-net OVC End Point. For the request denial message, SP SOF responds customer with "Invalid Request, or Unavailable Resources and Please try it Later". 7. If SP SOF receives conformation from SP ICM, SP ECM and PART SOF, a. SP SOF confirms EIR change to customer without testing the EVC for new EIR, or b. SP SOF request testing of SP OVC for the new EIR from SP ICM and ECM c. PART SOF requests testing of PART OVC for the new EIR from PART ICM and ECM d. Based on test results from SP ICM, SP ECM and PART SOF, SP SOF sends either "EIR for Service is Changed" or "Unavailable resources, please try it later" to

	customer. 8. If testing of SP OVC and PART OVC separately validates EIR change, SP SOF may decide to run an end-to-end EVC test before confirming or denying the EIR change. Based on the test results, SP SOF sends either "EIR for Service is Changed" or "Unavailable resources, please try it later" to customer. 9. SP SOF informs SP OSS/BSS (BA) for each denial or confirmation of EIR change request. Similarly, PART SOF informs PART OSS/BSS (BA). 10. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART. 11. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP. 12. Tsp-cust and Tsp-part are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA).
Post Conditions	Ready for passing traffic with new EIR.
Alternate Paths	
Assumption(s)	
References	S4-S17

825 Table 6: EIR use case description for Steps 4-17

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828

829 ### 8.2.1. Requirements

830

831

O_ELASTIC_EVC_EIR_001	Elastic Ethernet Service should support on-demand modifications of EIR of a bandwidth profile flow or EVC envelope; and $EIR_{elastic}$, EIR_{lb}, EIR_{ub}, N, $N_{max,EIR}$ and $EIR_{increment}$ attributes.
Source	S1

832

O_ELASTIC_EIR_INTERLUD_001	Interlude should support $EIR_{elastic}$, EIR_{lb}, EIR_{ub}, N, $N_{max,EIR}$ and $EIR_{increment}$ for the OVC Elastic Ethernet Service. *Note that during EIR modifications,* $EIR_{elastic}$, EIR_{lb}, EIR_{ub}, N, $N_{max,EIR}$ and $EIR_{increment}$ attributes may not need to be exchanged directly over Interlude between SP SOF and PART SOF. However, both SP SOF and PART SOF must be aware of these attributes in order to validate a customer on-demand request. This will be accomplished during the first provisioning of Elastic Ethernet ServiceElastic Ethernet Service where SP communicates these attributes to PART SOF over Interlude.
Source	S1

833

O_ELASTIC_EIR_SONATA_001	SONATA should support $EIR_{elastic}$, EIR_{lb}, EIR_{ub}, N, $N_{max,EIR}$ and $EIR_{increment}$ for the OVC supporting Elastic Ethernet Service *The service attributes must be in the contract (or covered by business relationships) between SP and customer, and between SP and PART.*
Source	S1

834

O_ELASTIC_EIR_CANTATA_001	CANTATA should support $EIR_{elastic}$, EIR_{lb}, EIR_{ub}, N, $N_{max,EIR}$ and $EIR_{increment}$ for the Elastic Ethernet ServiceElastic Ethernet Service *The service attributes must be supported by API of CANTATA for user to enter the on-demand request .*

Source	S1

835

836

O_ELASTIC_EIR_ALLEGRO_001	ALLEGRO should support $EIR_{elastic}$, EIR_{lb}, EIR_{ub}, N, $N_{max,EIR}$ and $EIR_{increment}$ for the Elastic Ethernet ServiceElastic Ethernet Service *Note that the service attributes must be supported by API of ALLEGRO for user to enter the on-demand request.*
Source	S1

837

838

O_ELASTIC_EIR_LEGATO_001	LEGATO should support $EIR_{elastic}$, EIR_{lb}, EIR_{ub}, N, $N_{max,EIR}$ and $EIR_{increment}$ for Elastic Ethernet ServiceElastic Ethernet Service. *Note that the service attributes must be supported by LEGATO in its communications with SP SOF.*

839

840

R_ELASTIC_EVC_SLO_002	Elastic E-Line Service MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for EIR change.
Source	S1 [1]

841

R_ELASTIC_EIR_SONATA_SLO_001	SONATA MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for EIR change for Elastic Ethernet ServiceElastic Ethernet Service. *Note that these SLOs must be in the contract (or business relationships) between SP and customer, and between SP and PART.*

Source	S1 [1]

842

R_ELASTIC_EIR_LEGATO_SLO_001	LEGATO MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for EIR change for Elastic Ethernet ServiceElastic Ethernet Service. *Note that the SLO parameters must be supported by LEGATO API.*
Source	S1 [1]

843

R_ELASTIC_EIR_CANTATA_SLO_001	CANTATA MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for EIR change for Elastic Ethernet ServiceElastic Ethernet Service. *Remark : The SLO parameters must be supported by CANTATA API.*
Source	S1 [1]

844

R_ELASTIC_EIR_ALLEGRO_SLO_001	ALLEGRO MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for EIR change for Elastic Ethernet ServiceElastic Ethernet Service *Note that the SLO parameters must be supported by ALLEGRO API.*
Source	S1 [1]

845

846

R_ELASTIC_SCH_ALLEGRO_002	On-demand request for changing EVC EIR immediately or at certain day and time in the future should be supported from ALLEGRO interface of SP SOF.

847

R_ELASTIC_SCH_CANTATA_002	On-demand request for changing EVC EIR immediately or at certain day and time in the future should be supported from CANTATA interface.

R_ELASTIC_SCH_LEGATO_002	On-demand request for changing EVC EIR immediately or at certain day and time in the future should be supported from LEGATO interface.

848

O_ELASTIC_SCH_INTERLUD_002	On-demand changing of PART OVC EIR for Access E-Line services either immediately or at certain day and time in the future should be supported by INTERLUDE.
Source	S1

849

850

O_ELASTIC_SCH_SONATA_002	On-demand changing of PART OVC EIR for Access E-Line services either immediately or at certain day and time in the future should be supported by SONATA.
Source	S1

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852

O_USER_PORTAL_002	User Portal should be able to display $EIR_{elastic}$, EIR_{lb}, EIR_{ub}, N, $N_{max,EIR}$ and $EIR_{increment}$ or list of EIR values supported for a given Elastic Ethernet ServiceElastic Ethernet Service.
Source	S1

853

854

O_INTERLUDE_TEST_002	INTERLUDE should support OVC testing related messages exchanged between SP SOF and PART SOF for EIR change.
Source	S14

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O_PRESTO_TEST_002	PRESTO should support OVC testing for new EIR that is initiated by SOF, after the EIR change confirmation of ICM and ECM.

857

O_ADAGIO_TEST_002	ADAGIO should support OVC testing for new EIR that is initiated by SOF, after the EIR change confirmation of ICM and ECM.

858

859

R_SP_SOF_TIMING_002	SP SOF MUST be able to measure Tsp-cust and Tsp-part , report them to SP OSS/BSS (BA) for on-demand EIR change.
Source	
R_PART_SOF_TIMING_002	PART SOF MUST be able to measure Tsp-part and report it to PART OSS/BSS (BA) for on-demand EIR change.
Source	

860

R_LEGATO_TIMING_003	SP LEGATO API MUST be able to support Tsp-cust and Tsp-part for on-demand EIR change.
Source	
R_LEGATO_TIMING_004	PART LEGATO API MUST be able to support Tsp-part for on-demand EIR change.
Source	
Source	
R_SONATA_TIMING_002	SONATA API MUST be able to support Tsp-cust and Tsp-part for on-demand EIR change.
Source	

861

862

863 **Table 7:** Requirements for on-demand EIR change

864

865 8.3. On-demand Modification of Committed Burst Size (CBS)

866 Prior to an on-demand request for modifying CBS of an E-LINE, ENNI, UNIs and EVC
867 between off-net and on-net locations of SP are established for this E-LINE: CBS is
868 expected to be set by SP, therefore, there could be no entry for the customer.

869 It is also possible for SP to offer multiple CBS values for a given CBR and allow user to
870 pick one of these CBS values. It is recommended that on-demand modifications of
871 $CIR_{elastic}$ and $CBS_{elastic}$ should take place at the same time.

872 Overall CBS modification process can be summarized as follows:

1. There is no CBS change for E-LINE. Customer can use CBS value set for the initial EVC configuration.

2. Customer via user portal requests changes within CBS bounds for CBS per bandwidth profile flow , <CBS_{lb} , CBS_{ub} >[9]

    a. Immediately

        i. With no end time for new CBS , $CBS_{elastic}$, where $CBS_{elastic}$ = CBS_{lb} +N$xCBS_{increment}$ or <one of CBS values available in SP list> where N is an integer between 1 and $N_{max,CBS}$. With end time for new CBS, $CBS_{elastic}$. = CBS_{lb} +N$xCBS_{increment}$ or <one of CBS values available in SP list> where N is an integer between 1 and $N_{max,CBS}$. After end time elapses, the burst size becomes CBS_{lb}

    b. At certain time and day in the future

        i. With no end time for new CBS , $CBS_{elastic}$ = CBS_{lb} +N$xCBS_{increment}$ or <one of CBS values available in SP list> where N is an integer between 1 and $N_{max,CBS}$.

        ii. With end time for new CBS , $CBS_{elastic}$ = CBS_{lb} +N$xCBS_{increment}$ or <one of CBS values available in SP list> where N is an integer between 1 and $N_{max,CBS}$ . . After end time elapses, the rate becomes CBS_{lb} .

3. CBS changes can be performed automatically by SP and PART based on network events with or without customer involvement, based on customer-SP contract and SP-PART contract. This approach is out of scope for this specification

4. Time intervals for on-demand modification of CBS immediately can be defined in the contract between SP and customer ($T_{sp\text{-}cust}$), and SP and PART ($T_{sp\text{-}part}$). The time interval for PART is expected to be smaller than the time interval for the SP. For example if $T_{sp\text{-}cust}$ is 15 minutes, $T_{sp\text{-}part}$ could be 10 minutes.

    a. The time interval for fulfillment between SP and customer can be recorded. In the customer contract, there can be a penalty associated with the requests that are not fulfilled within $T_{sp\text{-}cust}$.
    b. The time interval for fulfillment between SP and PART can be recorded. There can be a penalty associated with the requests that are not fulfilled within $T_{sp\text{-}part}$.
    c. If the customer request is not fulfilled within $T_{sp\text{-}cust}$, the customer can cancel the request. The cancelation may be counted for penalty per the contract.
    d. The customer may request a monthly history report from user portal consisting of $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$.

[9] CBS is an attribute of a bandwidth profile flow. CBS_{ub} defines the maximum CBS for a given EVC based on the subscriber-service provider contract. Similarly, CBS_{lb} is the minimum CBS value for a given EVC, defined in the subscriber-service provider contract. In this document, single bandwidth profile in an EVC is assumed. If EVC consists of multiple bandwidth profile flows, then the contract needs to define CBS_{ub} and CBS_{lb} for each bandwidth profile flow.

5. $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$ may apply to on-demand modification of CBS at certain date and time in the future. The SP choses to perform the request prior to the scheduled time and have the service ready at the time of the scheduled time.

6. CBS changes can performed automatically by SP and PART when CBS changes. This approach is out of scope for this specification.
7. CBS change request can be initiated together with the CIR change. This use case is also out-of-scope for this specification.

The details of Option 2 are depicted in Figure 4. Steps in Figure 4 are as follows:

- S1[ALLEGRO or CANTATA+LEGATO]: User requests EVC CBS change either from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and SP LEGATO interface of SP SOF

- S2: SP SOF validates customer, the E-LINE service between location A and location Z, and if the CBS is within bounds (i.e. N and $CBS_{increment}$ are valid) or is one of the values within SP CBS list, and whether there is enough capacity in the SP network and/or Partner network if SP SOF is capable of tracking available network capacity. Furthermore, if some of the information such as services and locations that belong to the customer is not in SOF, but in OSS, then SOF requests the information from OSS using LEGATO interface.

  - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back to user with "Invalid Request" if user credentials are invalid or "Unavailable Resources and Please try it Later" if resources are unavailable or "Request is accepted and in progress" .

  - *If customer requests pass user authentication at S2, per agreement between SP and PART, SP SOF waits for a confirmation from PART SOF (i.e. results of S4c, S5, S7a) before accepting or denying a customer request based on its own verification that the request is invalid and there is not enough capacity to support the request.*

  - *If customer requests pass user authentication at S2, it is up to SP SOF to wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and S7a) before denying a customer request based on its own verification that request is invalid and/or there is not enough capacity to support the request.*
  - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S4 [PRESTO]: Based on S2, if user credentials are valid and either capacity is available or SP SOF has no capacity information, SP SOF sends a request to SP ICM to change CIR at SP side of ENNI, on-net UNI, and on-net I-NNIs.

- S4a [INTERLUDE]: Based on S2, if user credentials are valid and either capacity is available or SP SOF has no capacity information, SP SOF sends a request to

Partner SOF to change CBS at Partner side of ENNI, off-net UNI, and off-net I-NNIs.

1. *S4 and S4a can take place at the same time in order to reduce response time to user, or*

2. *S4a can take place after SP completes S8.*

The CBS and $CBS_{increment}$ values for PART OVC are expected to be as same as the CBS and $CBS_{increment}$ values for SP OVC per contract between two operators. If there are differences, this might cause packet loss and is not recommended.

- S4c[INTERLUDE]: PART SOF validates the request by checking if the service is being supported at the off-net location and there is adequate capacity to support the change.

In S2, SP SOF checks validity of the customer and service, and may verify resource availability end-to-end. It is up to the PART SOF to re-validate the service and resource availability for the requested off-net location. The revalidation should reduce possible errors during the process.

- S4d [INTERLUDE]: If validation in S4c fails, PART SOF sends either the message “Invalid Request” or “ Unavailable Resources” to SP SOF. In turn, SP SOF sends the message “Invalid Request” or “Unavailable Resources, please try it later” to the customer.

- S4b [PRESTO]: If validation in S4c is successful, Partner SOF requests Partner ICM to change CBS at Partner side of ENNI, off-net UNI and off-net I-NNIs.

- S5:

3. SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and there is enough capacity at these interfaces to support the requested CBS.

4. Similarly, Partner ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within Partner network and there is enough capacity at these interfaces to support the requested CBS.

- S6:

1. [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if there is not enough capacity at on-net UNI, ENNI or I-NNIs within SP network, SP SOF responds to customer with “Unavailable Resources and Please try it Later”.

2. [PRESTO+INTERLUDE+ALLEGRO or PRESTO+INTERLUDE+CANTATA+LEGATO] Similarly, if there is not enough capacity at off-net UNI, ENNI or I-NNIs of Partner network, Partner SOF send a message to SP SOF indicating that there is not enough capacity

991 to support the change. SP SOF responds to customer with “Unavailable
992 Resources and Please try it Later”.

993 • S7 [PRESTO]:

994 3. Based on S5, if there is enough capacity at on-net UNI, ENNI and I-NNIs of
995 SP network, SP ICM requests SP ECM to modify the CBS to the customer
996 requested value at on-net UNI and EVC End Point on the on-net UNI”.

997 4. Similarly, if there is enough capacity at off-net UNI, ENNI and I-NNIs of
998 Partner network, Partner ICM requests Partner ECM to modify the CBS to
999 the customer requested value at off-net UNI and EVC End Point on the off-
1000 net UNI”.

1001 • S7a [ADAGIO]:

1002 1. SP ECM validates if there is enough capacity at on-net UNI and OVC End
1003 Point to support new CBS.

1004 2. Similarly, PART ECM validates if there is enough capacity at off-net UNI
1005 and off-net OVC End Point to support new CBS.

1006 • S8:

1007 1. [ADAGIO+PRESTO]After SP ECM validates CBS Change request at on-net
1008 UNI and associated OVC End Point, SP ECM sends a confirmation or denial
1009 message to SP ICM for the CBS Change. In turn, SP ICM sends a
1010 confirmation or denial message to SP SOF for CBS change at on-net UNI
1011 and on-net OVC End Point.
1012 2. [ADAGIO+PRESTO] Similarly, after PART ECM validates CBS Change
1013 request at off-net UNI and associated OVC End Point, PART ECM sends a
1014 confirmation or denial message to PART ICM for the CBS Change. In turn,
1015 PART ICM sends a confirmation or denial message to PART SOF for CBS
1016 change at off-net UNI and off-net OVC End Point.
1017
1018 • S8a [ALLEGRO or CANTATA+LEGATO]: At S8, if CBS change has been
1019 successful, SP SOF sends the message “CBS for service is changed” to
1020 customer.
1021
1022 • S8b [ALLEGRO or CANTATA+LEGATO]: At S8, if CBS change has been
1023 unsuccessful, SP SOF sends the message “Unavailable resources, please try it
1024 later” to customer.

1025 • S9 [PRESTO+ADAGIO]: After S8, optionally, SP SOF and PART SOF run tests
1026 on their segments of EVC (i.e. SP OVC and Partner OVC) to verify the CBS
1027 change, by requesting ICM and ECM to test the new CBS at associated
1028 interfaces and endpoints. .

1029 • S10:

1.[ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM confirms availability of new CBS to SP ICM and in turn SP ICM confirms availability of new CBS to SP SOF.

2.[ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner OVC, Partner ECM confirms availability of new CBS to Partner ICM and in turn Partner ICM confirms availability of new CBS to Partner SOF.

3.[INTERLUDE] Partner SOF confirms availability of new CBS to SP SOF, "Confirmed Availability of New CBS for Partner OVC".

- S11[ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer indicating "CBS for Service is Changed".

- S12:

3. [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for SP OVC, SP ECM confirms failure of new CBS testing to SP ICM and in turn SP ICM confirms failure of new CBS testing to SP SOF.

4. [PRESTO+ADAGIO]Similarly, If tests at S9 are unsuccessful for Partner OVC, Partner ECM confirms failure of new CBS testing to Partner ICM and in turn Partner ICM confirms failure of new CBS testing to Partner SOF.

- S13[ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer indicating "Unavailable Resources, Please try it Later"".

- S14[PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without SP and Partner test their OVCs), optionally, SP SOF runs and end-to-end EVC test.

- S15

4. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP SOF informs customer indicating that "Unavailable Resources, Please try it Later".

5. [ALLEGRO or CANTATA+LEGATO]if testing is successful, SP SOF informs customer that "CBS for Service is Changed".

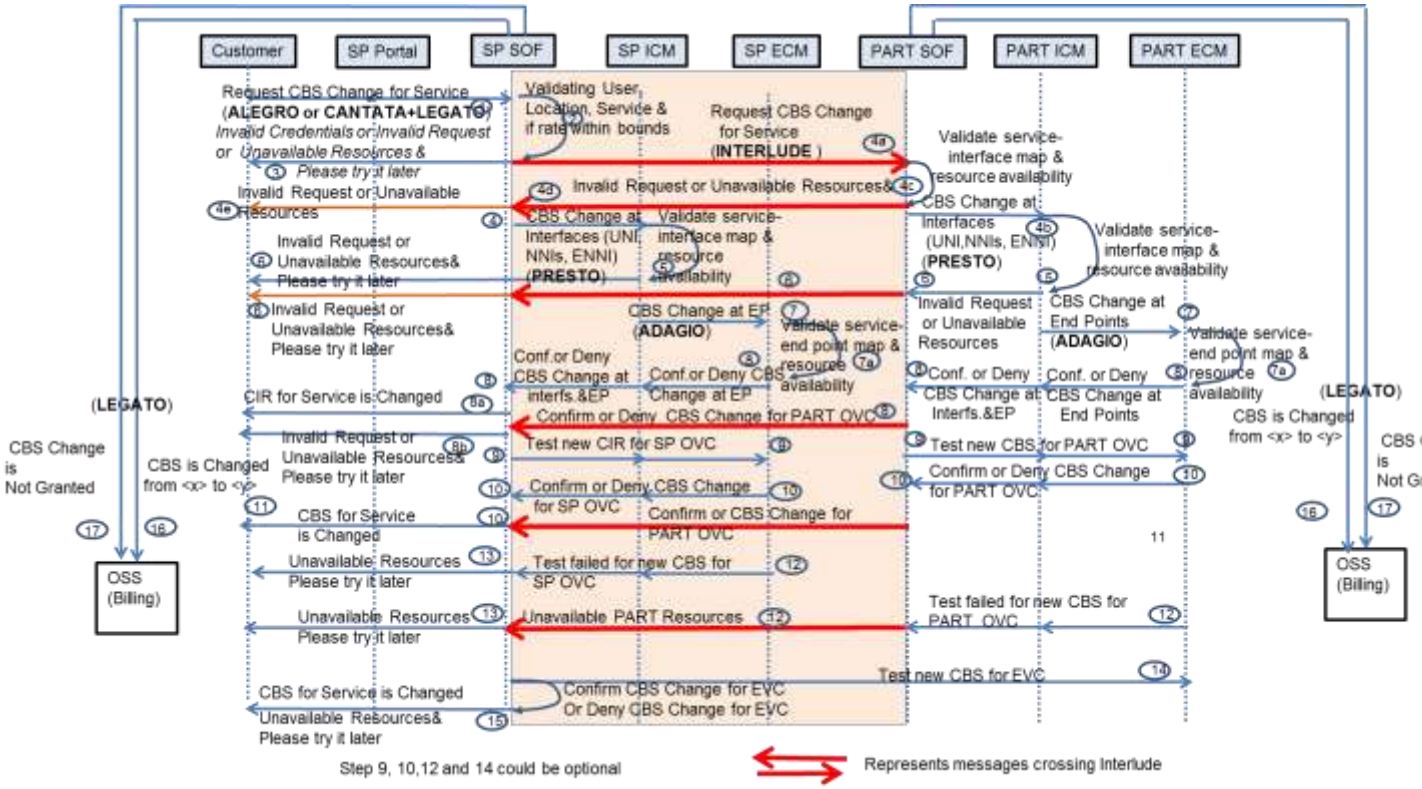
6. [LEGATO] if testing is successful, to initiate new billing procedure, SP SOF also informs OSS that "CBS for Service is Changed".

- S16 [LEGATO]:
  1. a) At S8a and S11, per contract between SP and Ethernet Access Operator (PART), PART SOF informs PART OSS/BSS (BA) that CBS change is confirmed so that SLO between SP and PART, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR), can be updated.
     b) At S8a and S11,SP chooses to confirm CBS change without an end-to-end testing of EVC and informs OSS/BSS (BA) to initiate the billing and update on-demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).

2. a) At S15, if testing is successful, SP SOF informs OSS to initiate new billing procedure for the new CBS and update on demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).

   b) At S15, if testing is successful, SP SOF also informs PART SOF that the testing is successful. In turn, PART SOF informs PART OSS/BSS (BA) that CBS change is successful so that PART OSS/BSS (BA) can update its SLOs.

- S17 [LEGATO]:
  1. At S3, If there is a way to identify the fact that the request is considered to be invalid despite of the fact that it is a valid request, in order to calculate on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP SOF informs SP OSS/BSS (BA) that a valid request was considered to be invalid and rejected.
  2. At S3,S4e, S6.1, S8b, S13 and S15, if there is not enough resources to support CBS change, SP SOF informs OSS to update its SLO for on-demand CBS change, **percent of accepted requests fulfilled (TFR/TAR)**.
  3. At S4d, S6.2, S8b, S11 and S15, if there is not enough resources to support CBS change, PART SOF informs OSS to update its SLO for on-demand CBS change, percent of accepted requests fulfilled (TFR/TAR).
  4. At S15, if testing is unsuccessful, SP SOF informs PART SOF about not being able to honor the customer request so that PART SOF requests PART OSS/BSS (BA) to update on demand SLO parameters.



1097 **Figure 6** CBS Change Process Flow for E-LINE

1098

Use Case Number	UC1
Use Case Name	CBS Change request Step1,2 and 3 (S1,S2 and S3)
Description	Customer initiates CBS change over CANTATA or ALLEGRO
Actor(s)	Customer, SP OSS/BSS (BA), SP SOF
Pre-Condition(s)	Customer has a contract for the Elastic Service, the Elastic Service has been ordered, configured, tested, and is ready to carry traffic.
Process Steps	1. Customer uses CANTATA or ALLEGRO interface to trigger a CBS change request 2. Customer provides all the mandatory data elements (i.e. N and $CBS_{increment}$ or a set of CBS values, immediately or certain time in the future) to the SP. 3. SP SOF performs customer authentication, and validates the service for this customer and integrity of the data elements. For service validation and integrity of data elements, SP SOF may need to collaborate with OSS-BS over LEGATO interface. Furthermore, SP SOF validates if there is enough capacity within SP network or end-to-end to support the requested CBS change. 4. If the CBS change request is : a. Invalid (i.e. customer authentication fails, customer-service mapping fails, or CBS requested is not within contractual bounds), then SP SOF sends "invalid Request" to the customer. b. Valid, but there is not enough capacity to support the new CBS, SP SOF sends "Resources are Unavailable, Please try it later" to the customer. *It is recommended that If this step is repeated 3 times in an SP selected time interval (e.g. 5 minutes), SP SOF sends "Please try it in <time interval in minutes>" to the customer. These messages will be displayed at the Portal. If requests continue, security procedures may take control of the user interface*. *SP SOF may choose to receive confirmation from SP ICM and SP ECM before denying the request, in addition to its own validation for customer-service mapping and capacity availability.* *Per agreement between SP and PART, SP SOF may choose to receive confirmation from PART SOF before denying the request.* c. Valid and there is enough capacity in the network to support this new CBS, then S4 will be initiated. d. If the request is invalid and rejected, or valid and rejected due to resource unavailability , SP SOF informs OSS/BSS (BA) to update the customer-SP SLOs 5. Tsp-cust and Tsp-part are measured by SP SOF and PART SOF, and reported to OSS/BSS (BA). This UC ends
Post Conditions	SP Customer Portal displays messages in 4a and 4b above or SP SOF initiates S4.

Alternate Paths	The portal does not display N and $CBS_{incerement}$ or a set of CBS values, and customer enters any CBS value into the system without indicating if the request is to be performed immediately or certain time in the future. In this case, all the steps from 2 to 15 are still valid.
Assumption(s)	
References	S1, S2, S3

1099 Table 8: CBS use case description for Steps 1,2, and 3

1100

Use Case Number	UC2
Use Case Name	CBS Change process, configuration, testing, accept or denial, billing initiation and SLO update by SP and PART
Description	SP SOF and PART SOF initiate, configure, and test CBS change over their own PRESTO and ADAGIO interfaces; accept or deny the CBS Change over CANTATA; initiate billing over LEGATO; and update their SLOs over LEGATO.
Actor(s)	SP SOF, SP ICM, SP ECM, PART SOF, PART ICM, PART ECM, SP OSS/BSS (BA), PART OSS/BSS (BA)
Pre-Condition(s)	Customer request has been validated by SP SOF
Process Steps	1. SP SOF requests CBS change from PART SOF over INTERLUDE and requests CBS change from SP ICM over PRESTO. *It is a choice for SP to receive confirmation from its ICM and ECM for the CBS change before sending a request to PART SOF*. 2. SP ICM verifies validity of request and if there is adequate capacity at UNI and NNIs. a. If the verification is successful, it requests CBS change from SP ECM over ADAGIO. b. If the verification is unsuccessful, SP ICM notifies SP SOF that the request is invalid or resources are unavailable. In turn, SP SOF sends "Invalid Request, or Unavailable Resources and Please try it later" to the customer 3. SP ECM validates the request and if there is enough capacity at on-net UNI and OVC End Point to support new CBS. After the SP ECM validation, SP ECM sends a confirmation or denial message to SP ICM for the CBS Change. In turn, SP ICM sends a confirmation or denial message to SP SOF for CBS change at on-net UNI and on-net OVC End Point. 4. PART SOF verifies validity of request and if there is adequate capacity at off-net UNI and off-net NNIs a. If the verification is successful, it requests CBS change from PART ICM. b. If the verification is unsuccessful, PART SOF notifies SP SOF that either request is invalid or PART resources are unavailable. In turn, SP SOF either sends "invalid Request" or "Resources are Unavailable, Please try it later" to the customer 5. PART ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and there is enough capacity at these interfaces to support the requested CBS. a. if there is not enough capacity at off-net UNI, ENNI or I-NNIs of Partner network, PART ICM notifies PART SOF about invalid request or unavailability of resources. In

	turn, PART SOF sends a message to SP SOF indicating that either the request is invalid or there is not enough capacity to support the change. SP SOF responds to customer with "Invalid Request or " or "Unavailable Resources and Please try it Later". b. If there is enough capacity at off-net UNI, ENNI or I-NNI, PART ICM requests PART ECM to change CBS. 6. PART ECM validates the request and if there is enough capacity at off-net UNI and PART OVC End Point to support new CBS. After the PART ECM validation, PART ECM sends a confirmation or denial message to PART ICM for the CBS Change. In turn, PART ICM sends a confirmation or denial message to PART SOF for CBS change at off-net UNI and off-net OVC End Point. For the request denial message, SP SOF responds customer with "Invalid Request, or Unavailable Resources and Please try it Later". 7. If SP SOF receives conformation from SP ICM, SP ECM and PART SOF, a. SP SOF confirms CBS change to customer without testing the EVC for new CBS, or b. SP SOF request testing of SP OVC for the new CBS from SP ICM and ECM c. PART SOF requests testing of PART OVC for the new CIR from PART ICM and ECM d. Based on test results from SP ICM, SP ECM and PART SOF, SP SOF sends either "CBS for Service is Changed" or "Unavailable resources, please try it later" to customer. 8. If testing of SP OVC and PART OVC separately validates CBS change, SP SOF may decide to run an end-to-end EVC test before confirming or denying the CBS change. Based on the test results, SP SOF sends either "CBS for Service is Changed" or "Unavailable resources, please try it later" to customer. 9. SP SOF informs SP OSS/BSS (BA) for each denial or confirmation of CBS change request. Similarly, PART SOF informs PART OSS/BSS (BA). 10. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART. 11. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.
Post Conditions	Billing is initiated if the request is confirmed. SLOs for Elastic Service are being updated by SP OSS/BSS (BA) and PART OSS/BSS (BA).
Alternate Paths	
Assumption(s)	
References	S4-S17

Table 9: CBS use case description for Steps 4-17

8.3.1. Requirements

	Elastic Ethernet Service should support on-demand modifications of CIR of a bandwidth profile flow

O_ELASTIC_EVC_CBS_001	or EVC envelope; and $CBS_{elastic}$, CBS_{lb}, CBS_{ub}, N, $N_{max, CBS}$ and $CBS_{increment}$ attributes.
Source	S1

1105

O_ELASTIC_CBS_INTERLUD_001	Interlude should support $CBS_{elastic}$, CBS_{lb}, CBS_{ub}, N, $N_{max, CBS}$ and $CBS_{increment}$ for the OVC supporting Elastic Ethernet Service. *Note that during CBS modifications,* $CBS_{elastic}$, CBS_{lb}, CBS_{ub}, N, $N_{max, CBS}$ and $CBS_{increment}$ attributes may not need to be exchanged directly over Interlude between SP SOF and PART SOF. However, both SP SOF and PART SOF must be aware of these attributes in order to validate a customer on-demand request. This will be accomplished during the first provisioning of Elastic Ethernet Service where SP communicates these attributes to PART SOF over Interlude.
Source	S1

1106

O_ELASTIC_CBS_SONATA_001	SONATA should support $CBS_{elastic}$, CBS_{lb}, CBS_{ub}, N, $N_{max, CBS}$ and $CBS_{increment}$ for the OVC supporting Elastic Ethernet Service *The service attributes must be in the contract (or covered by business relationships) between SP and customer, and between SP and PART.*
Source	S1

1107

O_ELASTIC_CBS_CANTATA_001	CANTATA should support $CBS_{elastic}$, CBS_{lb}, CBS_{ub}, N, $N_{max, CBS}$ and $CBS_{increment}$ for the Elastic Ethernet Service *The service attributes must be supported by API of CANTATA for user to enter the on-demand request* .
Source	S1

1108

1109

	ALLEGRO should support $CBS_{elastic}$, CBS_{lb}, CBS_{ub}, N, $N_{max, CBS}$ and $CBS_{increment}$ for the Elastic

O_ELASTIC_CBS_ALLEGRO_001	Ethernet Service *Note that the service attributes must be supported by API of ALLEGRO for user to enter the on-demand request.*
Source	S1

1110

1111

O_ELASTIC_CBS_LEGATO_001	LEGATO should support $CBS_{elastic}$, CBS_{lb}, CBS_{ub}, N, $N_{max, CBS}$ and $CBS_{increment}$ for Elastic Ethernet Service. *Note that the service attributes must be supported by LEGATO in its communications with SP SOF.*

1112

1113

R_ELASTIC_EVC_SLO_003	Elastic E-Line Service MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CBS change.
Source	S1 [1]

1114

R_ELASTIC_CBS_SONATA_001	SONATA MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CBS change for Elastic Ethernet Service. *Note that these SLOs must be in the contract (or business relationships) between SP and customer, and between SP and PART.*
Source	S1 [1]

1115

R_ELASTIC_CBS_LEGATO_SLO_001	LEGATO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CBS change for Elastic Ethernet Service. *Note that the SLO parameters must be supported by LEGATO API.*

Source	S1 [1]

1116

O_ELASTIC_CBS_CANTATA_SLO_001	CANTATA shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CBS change for Elastic Ethernet Service. *Note that the SLO parameters must be supported by CANTATA API.*
Source	S1 [1]

1117

R_ELASTIC_CBS_ALLEGRO_SLO_001	ALLEGRO MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CBS change for Elastic Ethernet Service *Note that the SLO parameters must be supported by ALLEGRO API.*
Source	S1 [1]

1118

1119

R_ELASTIC_SCH_ALLEGRO_003	On-demand request for changing EVC CBS immediately or at certain day and time in the future should be supported from ALLEGRO interface of SP SOF.

1120

R_ELASTIC_SCH_CANTATA_003	On-demand request for changing EVC CBS immediately or at certain day and time in the future should be supported from CANTATA interface.
R_ELASTIC_SCH_LEGATO_003	On-demand request for changing EVC CBS immediately or at certain day and time in the future should be supported from LEGATO interface.

1121

O_ELASTIC_SCH_INTERLUD_003	On-demand changing of PART OVC CBS for Access E-Line services either immediately or at certain day and time in the future should be supported by INTERLUDE.

Source	S1

1122

1123

O_ELASTIC_SCH_SONATA_003	On-demand changing of PART OVC CBS for Access E-Line services either immediately or at certain day and time in the future should be supported by SONATA.
Source	S1

1124

1125

O_USER_PORTAL_003	User Portal should be able to display $CBS_{elastic}$, CBS_{lb}, CBS_{ub}, N, $N_{max, CBS}$ and $CBS_{increment}$ or list of CBS values supported for a given Elastic Ethernet Service.
Source	S1

1126

1127

O_INTERLUDE_TEST_003	INTERLUDE should support OVC testing related messages exchanged between SP SOF and PART SOF for CBS change.
Source	S14

1128

1129

O_PRESTO_TEST_003	PRESTO should support OVC testing for new CBS that is initiated by SOF, after the CBS change confirmation of ICM and ECM.

1130

O_ADAGIO_TEST_003	ADAGIO should support OVC testing for new CBS that is initiated by SOF, after the CBS change confirmation of ICM and ECM.

1131

1132

R_SP_SOF_TIMING_003	SP SOF MUST be able to measure Tsp-cust and Tsp-part , report them to SP OSS/BSS (BA) for on-demand CBS change.
Source	

R_PART_SOF_TIMING_003	PART SOF MUST be able to measure Tsp-part and report it to PART OSS/BSS (BA) for on-demand CBS change.
Source	

1133

R_LEGATO_TIMING_005	SP LEGATO API shall be able to support Tsp-cust and Tsp-part for on-demand CBS change.
Source	
R_LEGATO_TIMING_006	PART LEGATO API shall be able to support Tsp-part for on-demand CBS change.
Source	
Source	
R_SONATA_TIMING_003	SONATA API shall be able to support Tsp-cust and Tsp-part for on-demand CBS change.
Source	

1134

1135 **Table 10:** Requirements for on-demand CBS change

1136

1137

1138 7.5. On-demand Modification of EBS

1139 Prior to an on-demand request for modifying EBS of an E-LINE, ENNI, UNIs and EVC
1140 between off-net and on-net locations of SP are established for this E-LINE: EBS is
1141 expected to be set by SP, therefore, there could be no entry for the customer.

1142 It is also possible for SP to offer multiple EBS values for a given EBS and allow user to
1143 pick one of these EBS values. It is recommended that on-demand modifications of
1144 $EIR_{elastic}$ and $EBS_{elastic}$ should take place at the same time.

1145 Overall EBS modification process can be summarized as follows:

1146 1. There is no EBS change for E-LINE. Customer can use EBS value set for the
1147 initial EVC configuration.

1148 2. Customer via user portal requests changes within EBS bounds for EBS per
1149 bandwidth profile flow , $<EBS_{lb}$, $EBS_{ub}>$[10]

[10] EBS is an attribute of a bandwidth profile flow. EBS_{ub} defines the maximum EBS for a given EVC based on the subscriber-service provider contract. Similarly, EBS_{lb} is the minimum EBS value for a given EVC, defined in the subscriber-service provider contract. In this document, single bandwidth profile in an EVC is assumed. If EVC consists of multiple bandwidth profile flows, then the contract needs to define EBS_{ub} and EBS_{lb} for each bandwidth profile flow.

a. Immediately
   i. With no end time for new EBS , $EBS_{elastic}$, where $EBS_{elastic} = EBS_{lb} + NxEBS_{increment}$ or <one of EBS values available in SP list> where N is an integer between 1 and $N_{max,EBS}$.

Note that $N_{max\ for}$ EBS could be different that N_{max} for EBS in section 7.4. Therefore, we call N_{max} as $N_{max,EBS}$.

Furthermore, $EBS_{increment}$ is very likely to be the same as $CBS_{increment}$.

   ii. With end time for new EBS, $EBS_{elastic}$. = $EBS_{lb} + NxEBS_{increment}$ or <one of EBS values available in SP list> where N is an integer between 1 and $N_{max,EBS}$ . . After end time elapses, the burst size becomes EBS_{lb}

b. At certain time and day in the future

   i. With no end time for new EBS , $EBS_{elastic} = EBS_{lb} + NxEBS_{increment}$ or <one of EBS values available in SP list> where N is an integer between 1 and $N_{max,EBS}$.

   ii. With end time for new EBS , $EBS_{elastic} = EBS_{lb} + NxEBS_{increment}$ or <one of EBS values available in SP list> where N is an integer between 1 and $N_{max,EBS}$. After end time elapses, the rate becomes EBS_{lb}

3. EBS changes can be performed automatically by SP and PART based on network events with or without customer involvement, based on customer-SP contract and SP-PART contract. This approach is out of scope for this specification

4. Time intervals for on-demand modification of EBS immediately can be defined in the contract between SP and customer ($T_{sp\text{-}cust}$), and SP and PART ($T_{sp\text{-}part}$). The time interval for PART is expected to be smaller than the time interval for the SP. For example if $T_{sp\text{-}cust}$ is 15 minutes, $T_{sp\text{-}part}$ could be 10 minutes.

   e. The time interval for fulfillment between SP and customer can be recorded. In the customer contract, there can be a penalty associated with the requests that are not fulfilled within $T_{sp\text{-}cust}$.
   f. The time interval for fulfillment between SP and PART can be recorded. There can be a penalty associated with the requests that are not fulfilled within $T_{sp\text{-}part}$.
   g. If the customer request is not fulfilled within $T_{sp\text{-}cust}$, the customer can cancel the request. The cancelation may be counted for penalty per the contract.
   h. The customer may request a monthly history report from user portal consisting of $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$.

5. $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$ may apply to on-demand modification of EBS at certain date and time in the future. The SP choses to perform the request prior to the scheduled time and have the service ready at the time of the scheduled time.

6. EBS changes can performed automatically by SP and PART when EIR changes. This approach is out of scope for this specification.
7. EBS change request can be initiated together with the CIR change. This use case is also out-of-scope for this specification.

The details of Option 2 are depicted in **Figure 7**. Steps in **Figure 7** are as follows:

- S1[ALLEGRO or CANTATA+LEGATO]: User requests EVC EBS change either from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and SP LEGATO interface of SP SOF

- S2: SP SOF validates customer, the E-LINE service between location A and location Z, and if the EBS is within bounds (i.e. N and $EBS_{increment}$ are valid) or is one of the values within SP EBS list, and whether there is enough capacity in the SP network and/or Partner network if SP SOF is capable of tracking available network capacity. Furthermore, if some of the information such as services and locations that belong to the customer is not in SOF, but in OSS, then SOF requests the information from OSS using LEGATO interface.

    - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back to user with "Invalid Request" if user credentials are invalid or "Unavailable Resources and Please try it Later" if resources are unavailable or "Request is accepted and in progress" .

    - *If customer requests pass user authentication at S2, per agreement between SP and PART, SP SOF waits for a confirmation from PART SOF (i.e. results of S4c, S5, S7a) before accepting or denying a customer request based on its own verification that the request is invalid and there is not enough capacity to support the request.*

    - *If customer requests pass user authentication at S2, it is up to SP SOF to wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and S7a) before denying a customer request based on its own verification that request is invalid and/or there is not enough capacity to support the request.*
    - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S4 [PRESTO]: Based on S2, if user credentials are valid and either capacity is available or SP SOF has no capacity information, SP SOF sends a request to SP ICM to change CIR at SP side of ENNI, on-net UNI, and on-net I-NNIs.

- S4a [INTERLUDE]: Based on S2, if user credentials are valid and either capacity is available or SP SOF has no capacity information, SP SOF sends a request to

Partner SOF to change EBS at Partner side of ENNI, off-net UNI, and off-net I-NNIs.

1. *S4 and S4a can take place at the same time in order to reduce response time to user, or*

2. *S4a can take place after SP completes S8.*

The EBS and $EBS_{increment}$ values for PART OVC are expected to be as same as the EBS and $EBS_{increment}$ values for SP OVC per contract between two operators. If there are differences, this might cause packet loss and is not recommended.

- S4c[INTERLUDE]: PART SOF validates the request by checking if the service is being supported at the off-net location and there is adequate capacity to support the change.

In S2, SP SOF checks validity of the customer and service, and may verify resource availability end-to-end. It is up to the PART SOF to re-validate the service and resource availability for the requested off-net location. The revalidation should reduce possible errors during the process.

- S4d [INTERLUDE]: If validation in S4c fails, PART SOF sends either the message “Invalid Request” or “ Unavailable Resources” to SP SOF. In turn, SP SOF sends the message “Invalid Request” or “Unavailable Resources, please try it later” to the customer.

- S4b [PRESTO]: If validation in S4c is successful, Partner SOF requests Partner ICM to change EBS at Partner side of ENNI, off-net UNI and off-net I-NNIs.

- S5:

5. SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and there is enough capacity at these interfaces to support the requested EBS.

6. Similarly, Partner ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within Partner network and there is enough capacity at these interfaces to support the requested EBS.

- S6:

3. [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if there is not enough capacity at on-net UNI, ENNI or I-NNIs within SP network, SP SOF responds to customer with “Unavailable Resources and Please try it Later”.

4. [PRESTO+INTERLUDE+ALLEGRO or PRESTO+INTERLUDE+CANTATA+LEGATO] Similarly, if there is not enough capacity at off-net UNI, ENNI or I-NNIs of Partner network, Partner SOF send a message to SP SOF indicating that there is not enough capacity

to support the change. SP SOF responds to customer with “Unavailable Resources and Please try it Later”.

- S7 [PRESTO]:

5. Based on S5, if there is enough capacity at on-net UNI, ENNI and I-NNIs of SP network, SP ICM requests SP ECM to modify the EBS to the customer requested value at on-net UNI and EVC End Point on the on-net UNI”.

6. Similarly, if there is enough capacity at off-net UNI, ENNI and I-NNIs of Partner network, Partner ICM requests Partner ECM to modify the EBS to the customer requested value at off-net UNI and EVC End Point on the off-net UNI”.

- S7a [ADAGIO]:

1. SP ECM validates if there is enough capacity at on-net UNI and OVC End Point to support new EBS.

2. Similarly, PART ECM validates if there is enough capacity at off-net UNI and off-net OVC End Point to support new EBS.

- S8:

3. [ADAGIO+PRESTO]After SP ECM validates EBS Change request at on-net UNI and associated OVC End Point, SP ECM sends a confirmation or denial message to SP ICM for the EBS Change. In turn, SP ICM sends a confirmation or denial message to SP SOF for EBS change at on-net UNI and on-net OVC End Point.
4. [ADAGIO+PRESTO] Similarly, after PART ECM validates EBS Change request at off-net UNI and associated OVC End Point, PART ECM sends a confirmation or denial message to PART ICM for the EBS Change. In turn, PART ICM sends a confirmation or denial message to PART SOF for EBS change at off-net UNI and off-net OVC End Point.

- S8a [ALLEGRO or CANTATA+LEGATO]: At S8, if EBS change has been successful, SP SOF sends the message “EBS for service is changed” to customer.

- S8b [ALLEGRO or CANTATA+LEGATO]: At S8, if EBS change has been unsuccessful, SP SOF sends the message “Unavailable resources, please try it later” to customer.

- S9 [PRESTO+ADAGIO]: After S8, optionally, SP SOF and PART SOF run tests on their segments of EVC (i.e. SP OVC and Partner OVC) to verify the EBS change, by requesting ICM and ECM to test the new EBS at associated interfaces and endpoints. .

- S10:

1.[ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM confirms availability of new EBS to SP ICM and in turn SP ICM confirms availability of new EBS to SP SOF.

2.[ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner OVC, Partner ECM confirms availability of new EBS to Partner ICM and in turn Partner ICM confirms availability of new EBS to Partner SOF.

3.[INTERLUDE] Partner SOF confirms availability of new EBS to SP SOF, "Confirmed Availability of New EBS for Partner OVC".

- S11[ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer indicating "EBS for Service is Changed".

- S12:

5. [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for SP OVC, SP ECM confirms failure of new EBS testing to SP ICM and in turn SP ICM confirms failure of new EBS testing to SP SOF.

6. [PRESTO+ADAGIO]Similarly, If tests at S9 are unsuccessful for Partner OVC, Partner ECM confirms failure of new EBS testing to Partner ICM and in turn Partner ICM confirms failure of new EBS testing to Partner SOF.

- S13[ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer indicating "Unavailable Resources, Please try it Later"".

- S14[PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without SP and Partner test their OVCs), optionally, SP SOF runs and end-to-end EVC test.

- S15

7. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP SOF informs customer indicating that "Unavailable Resources, Please try it Later".

8. [ALLEGRO or CANTATA+LEGATO]if testing is successful, SP SOF informs customer that "EBS for Service is Changed".

9. [LEGATO] if testing is successful, to initiate new billing procedure, SP SOF also informs OSS that "EBS for Service is Changed".

- S16 [LEGATO]:
    1. a) At S8a and S11, per contract between SP and Ethernet Access Operator (PART), PART SOF informs PART OSS/BSS (BA) that EBS change is confirmed so that SLO between SP and PART, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR), can be updated.
    b) At S8a and S11,SP chooses to confirm EBS change without an end-to-end testing of EVC and informs OSS/BSS (BA) to initiate the billing and update on-demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).

2. a) At S15, if testing is successful, SP SOF informs OSS to initiate new billing procedure for the new EBS and update on demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).

   b) At S15, if testing is successful, SP SOF also informs PART SOF that the testing is successful. In turn, PART SOF informs PART OSS/BSS (BA) that EBS change is successful so that PART OSS/BSS (BA) can update its SLOs.

- S17 [LEGATO]:
  1. At S3, If there is a way to identify the fact that the request is considered to be invalid despite of the fact that it is a valid request, in order to calculate on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP SOF informs SP OSS/BSS (BA) that a valid request was considered to be invalid and rejected.
  2. At S3,S4e, S6.1, S8b, S13 and S15, if there is not enough resources to support EBS change, SP SOF informs OSS to update its SLO for on-demand EBS change, **percent of accepted requests fulfilled (TFR/TAR)**.
  3. At S4d, S6.2, S8b, S11 and S15, if there is not enough resources to support EBS change, PART SOF informs OSS to update its SLO for on-demand EBS change, percent of accepted requests fulfilled (TFR/TAR).
  4. At S15, if testing is unsuccessful, SP SOF informs PART SOF about not being able to honor the customer request so that PART SOF requests PART OSS/BSS (BA) to update on demand SLO parameters.

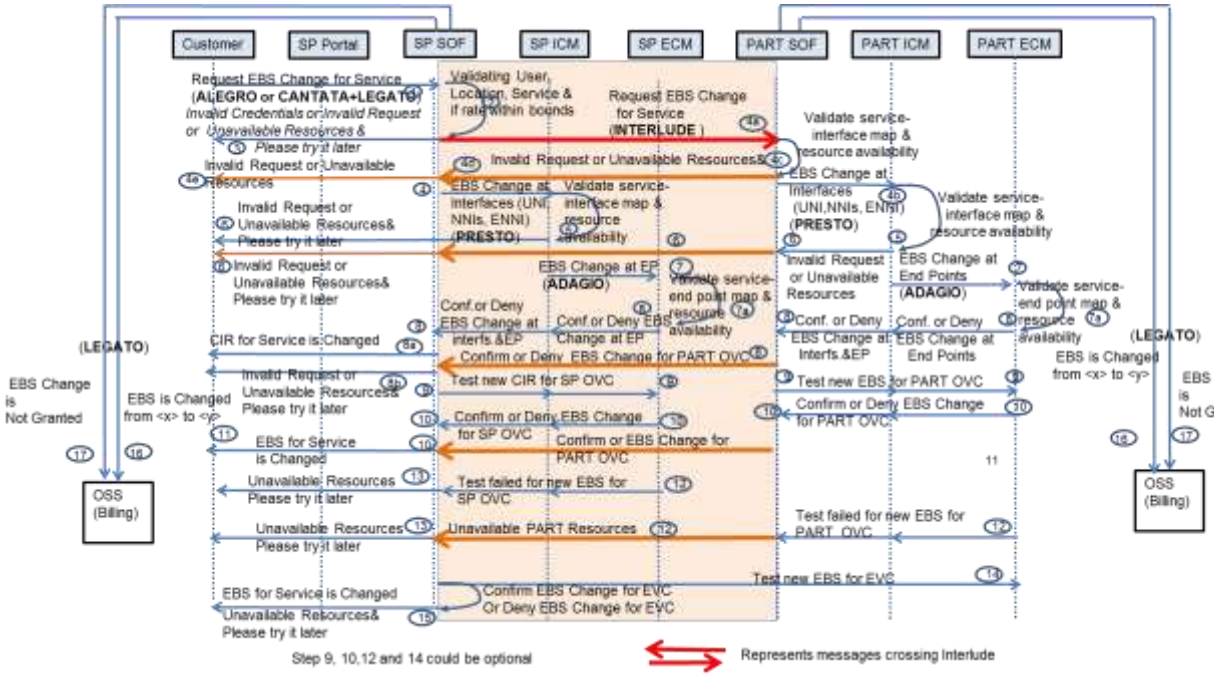


Figure 7 EBS Change Process Flow for E-LINE

1379

Use Case Number	UC1
Use Case Name	EBS Change request Step1,2 and 3 (S1,S2 and S3)
Description	Customer initiates EBS change over CANTATA or ALLEGRO
Actor(s)	Customer, SP OSS/BSS (BA), SP SOF
Pre-Condition(s)	Customer has a contract for the Elastic Service, the Elastic Service has been ordered, configured, tested, and is ready to carry traffic.
Process Steps	1. Customer uses CANTATA or ALLEGRO interface to trigger a EBS change request 2. Customer provides all the mandatory data elements (i.e. N and $EBS_{increment}$ or a set of EBS values, immediately or certain time in the future) to the SP. 3. SP SOF performs customer authentication, and validates the service for this customer and integrity of the data elements. For service validation and integrity of data elements, SP SOF may need to collaborate with OSS-BS over LEGATO interface. Furthermore, SP SOF validates if there is enough capacity within SP network or end-to-end to support the requested EBS change. 4. If the EBS change request is : a. Invalid (i.e. customer authentication fails, customer-service mapping fails, or EBS requested is not within contractual bounds), then SP SOF sends "invalid Request" to the customer. b. Valid, but there is not enough capacity to support the new EBS, SP SOF sends "Resources are Unavailable, Please try it later" to the customer. *It is recommended that If this step is repeated 3 times in an SP selected time interval (e.g. 5 minutes), SP SOF sends "Please try it in <time interval in minutes>" to the customer. These messages will be displayed at the Portal. If requests continue, security procedures may take control of the user interface*. *SP SOF may choose to receive confirmation from SP ICM and SP ECM before denying the request, in addition to its own validation for customer-service mapping and capacity availability.* *Per agreement between SP and PART, SP SOF may choose to receive confirmation from PART SOF before denying the request.* c. Valid and there is enough capacity in the network to support this new EBS, then S4 will be initiated. d. If the request is invalid and rejected, or valid and rejected due to resource unavailability , SP SOF informs OSS/BSS (BA) to update the customer-SP SLOs 5. Tsp-cust and Tsp-part are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA). This UC ends
Post Conditions	SP Customer Portal displays messages in 4a and 4b above or SP SOF initiates S4.
Alternate Paths	The portal does not display N and $EBS_{incerement}$ or a set of EBS values, and customer enters any EBS value into the system without indicating if the

	request is to be performed immediately or certain time in the future. In this case, all the steps from 2 to 15 are still valid.
Assumption(s)	
References	S1, S2,S3

1380 Table 11: EBS use case description for Steps 1,2, and 3

1381

Use Case Number	UC2
Use Case Name	EBS Change process, configuration, testing, accept or denial, billing initiation and SLO update by SP and PART
Description	SP SOF and PART SOF initiate, configure, and test EBS change over their own PRESTO and ADAGIO interfaces; accept or deny the EBS Change over CANTATA; initiate billing over LEGATO; and update their SLOs over LEGATO.
Actor(s)	SP SOF, SP ICM, SP ECM, PART SOF, PART ICM, PART ECM, SP OSS/BSS (BA), PART OSS/BSS (BA)
Pre-Condition(s)	Customer request has been validated by SP SOF
Process Steps	1. SP SOF requests EBS change from PART SOF over INTERLUDE and requests EBS change from SP ICM over PRESTO. *It is a choice for SP to receive confirmation from its ICM and ECM for the EBS change before sending a request to PART SOF*. 2. SP ICM verifies validity of request and if there is adequate capacity at UNI and NNIs. a. If the verification is successful, it requests EBS change from SP ECM over ADAGIO. b. If the verification is unsuccessful, SP ICM notifies SP SOF that the request is invalid or resources are unavailable. In turn, SP SOF sends "Invalid Request, or Unavailable Resources and Please try it later" to the customer 3. SP ECM validates the request and if there is enough capacity at on-net UNI and OVC End Point to support new EBS. After the SP ECM validation, SP ECM sends a confirmation or denial message to SP ICM for the EBS Change. In turn, SP ICM sends a confirmation or denial message to SP SOF for EBS change at on-net UNI and on-net OVC End Point. 4. PART SOF verifies validity of request and if there is adequate capacity at off-net UNI and off-net NNIs a. If the verification is successful, it requests EBS change from PART ICM. b. If the verification is unsuccessful, PART SOF notifies SP SOF that either request is invalid or PART resources are unavailable. In turn, SP SOF either sends "invalid Request" or "Resources are Unavailable, Please try it later" to the customer 5. PART ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and there is enough capacity at these interfaces to support the requested EBS. a. if there is not enough capacity at off-net UNI, ENNI or I-NNIs of Partner network, PART ICM notifies PART SOF about invalid request or unavailability of resources. In turn, PART SOF sends a message to SP SOF indicating that either the request is invalid or there is not enough

	capacity to support the change. SP SOF responds to customer with "Invalid Request or " or "Unavailable Resources and Please try it Later". b. If there is enough capacity at off-net UNI, ENNI or I-NNI, PART ICM requests PART ECM to change EBS. 6. PART ECM validates the request and if there is enough capacity at off-net UNI and PART OVC End Point to support new EBS. After the PART ECM validation, PART ECM sends a confirmation or denial message to PART ICM for the EBS Change. In turn, PART ICM sends a confirmation or denial message to PART SOF for EBS change at off-net UNI and off-net OVC End Point. For the request denial message, SP SOF responds customer with "Invalid Request, or Unavailable Resources and Please try it Later". 7. If SP SOF receives conformation from SP ICM, SP ECM and PART SOF, a. SP SOF confirms EBS change to customer without testing the EVC for new EBS, or b. SP SOF request testing of SP OVC for the new EBS from SP ICM and ECM c. PART SOF requests testing of PART OVC for the new EBS from PART ICM and ECM d. Based on test results from SP ICM, SP ECM and PART SOF, SP SOF sends either "EBS for Service is Changed" or "Unavailable resources, please try it later" to customer. 8. If testing of SP OVC and PART OVC separately validates EBS change, SP SOF may decide to run an end-to-end EVC test before confirming or denying the EBS change. Based on the test results, SP SOF sends either "EBS for Service is Changed" or "Unavailable resources, please try it later" to customer. 9. SP SOF informs SP OSS/BSS (BA) for each denial or confirmation of CIR change request. Similarly, PART SOF informs PART OSS/BSS (BA). 10. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART. 11. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.
Post Conditions	Billing is initiated if the request is confirmed. SLOs for Elastic Service are being updated by SP OSS/BSS (BA) and PART OSS/BSS (BA).
Alternate Paths	.
Assumption(s)	
References	S4-S17

Table 12: EBS use case description for Steps 4-17

8.3.2. Requirements

O_ELASTIC_EVC_EBS_001	Elastic Ethernet Service should support on-demand modifications of EBS of a bandwidth profile flow or EVC envelope; and $EBS_{elastic}$, EBS_{lb}, EBS_{ub}, N, $N_{max, EBS}$ and $EBS_{increment}$ attributes.

Source	S1

1386

O_ELASTIC_EBS_INTERLUDE_001	Interlude should support $EBS_{elastic}$, EBS_{lb}, EBS_{ub}, N, $N_{max, EBS}$ and $EBS_{increment}$ for the OVC supporting Elastic Ethernet Service. *Note that during EBS modifications*, $EBS_{elastic}$, EBS_{lb}, EBS_{ub}, N, $N_{max, EBS}$ and $EBS_{increment}$ attributes may not need to be exchanged directly over Interlude between SP SOF and PART SOF. However, both SP SOF and PART SOF must be aware of these attributes in order to validate a customer on-demand request. This will be accomplished during the first provisioning of Elastic Ethernet Service where SP communicates these attributes to PART SOF over Interlude.
Source	S1

1387

O_ELASTIC_EBS_SONATA_001	SONATA should support $EBS_{elastic}$, EBS_{lb}, EBS_{ub}, N, $N_{max, EBS}$ and $EBS_{increment}$ for the OVC supporting Elastic Ethernet Service *The service attributes must be in the contract (or covered by business relationships) between SP and customer, and between SP and PART.*
Source	S1

1388

O_ELASTIC_EBS_CANTATA_001	CANTATA should support $EBS_{elastic}$, EBS_{lb}, EBS_{ub}, N, $N_{max, EBS}$ and $EBS_{increment}$ for the Elastic Ethernet Service *The service attributes must be supported by API of CANTATA for user to enter the on-demand request* .
Source	S1

1389

1390

O_ELASTIC_EBS_ALLEGRO_001	ALLEGRO should support $EBS_{elastic}$, EBS_{lb}, EBS_{ub}, N, $N_{max, EBS}$ and $EBS_{increment}$ for the Elastic Ethernet Service *Note that the service attributes must be supported by API of ALLEGRO for user to enter the on-*

	demand request.
Source	S1

1391

1392

O_ELASTIC_EBS_LEGATO_001	LEGATO should support $EBS_{elastic}$, EBS_{lb}, EBS_{ub}, N, $N_{max, EBS}$ and $EBS_{increment}$ for Elastic Ethernet Service. *Note that the service attributes must be supported by LEGATO in its communications with SP SOF.*

1393

1394

R_ELASTIC_EBS_EVC_SLO_001	Elastic E-Line Service MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for EBS change for Elastic Ethernet Service.
Source	S1 [1]

1395

R_ELASTIC_CoS_SONATA_SLO_001	SONATA MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for EBS change for Elastic Ethernet Service. *Note that these SLOs must be in the contract (or business relationships) between SP and customer, and between SP and PART.*
Source	S1 [1]

1396

R_ELASTIC_CoS_LEGATO_SLO_001	LEGATO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for EBS change for Elastic Ethernet Service. *Note that the SLO parameters must be supported by LEGATO API.*
Source	S1 [1]

1397

R_ELASTIC_EBS_CANTATA_SLO_001	CANTATA shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for EBS change for Elastic Ethernet Service. *Note that the SLO parameters must be supported by CANTATA API.*
Source	S1 [1]

1398

R_ELASTIC_EBS_ALLEGRO_SLO_001	ALLEGRO MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for EBS change for Elastic Ethernet Service *Note that the SLO parameters must be supported by ALLEGRO API.*
Source	S1 [1]

1399

1400

R_ELASTIC_SCH_ALLEGRO_004	On-demand request for changing EVC EBS immediately or at certain day and time in the future should be supported from ALLEGRO interface of SP SOF.

1401

R_ELASTIC_SCH_CANTATA_004	On-demand request for changing EVC EBS immediately or at certain day and time in the future should be supported from CANTATA interface.
R_ELASTIC_SCH_LEGATO_004	On-demand request for changing EVC EBS immediately or at certain day and time in the future should be supported from LEGATO interface.

1402

O_ELASTIC_SCH_INTERLUD_004	On-demand changing of PART OVC EBS for Access E-Line services either immediately or at certain day and time in the future should be supported by INTERLUDE.
Source	S1

1403

1404

O_ELASTIC_SCH_SONATA_004	On-demand changing of PART OVC EBS for Access E-Line services either immediately or at certain day and time in the future should be supported by SONATA.
Source	S1

1405

1406

O_USER_PORTAL_004	User Portal should be able to display $EBS_{elastic}$, EBS_{lb}, EBS_{ub}, N, $N_{max, EBS}$ and $EBS_{increment}$ or list of EBS values supported for a given Elastic Ethernet Service.
Source	S1

1407

1408

O_INTERLUDE_TEST_004	INTERLUDE should support OVC testing related messages exchanged between SP SOF and PART SOF for EBS change.
Source	S14

1409

1410

O_PRESTO_TEST_004	PRESTO should support OVC testing for new EBS that is initiated by SOF, after the EBS change confirmation of ICM and ECM.

1411

O_ADAGIO_TEST_004	ADAGIO should support OVC testing for new EBS that is initiated by SOF, after the EBS change confirmation of ICM and ECM.

1412

1413

R_SP_SOF_TIMING_004	SP SOF MUST be able to measure Tsp-cust and Tsp-part , report them to SP OSS/BSS (BA) for on-demand EBS change.
Source	
R_PART_SOF_TIMING_004	PART SOF MUST be able to measure Tsp-part and report it to PART OSS/BSS (BA) for on-demand EBS change.
Source	

1414

R_LEGATO_TIMING_007	SP LEGATO API shall be able to support Tsp-cust and Tsp-part for on-demand EBS change.
Source	
R_LEGATO_TIMING_008	PART LEGATO API shall be able to support Tsp-part for on-demand EBS change.
Source	
Source	
R_SONATA_TIMING_004	SONATA API shall be able to support Tsp-cust and Tsp-part for on-demand EBS change.
Source	

1415

1416

1417

1418

	SP SOF shall be able to measure Tsp-cust and Tsp-part , report them to SP OSS/BSS (BA) for on-demand EBS change.
Source	

1419

Source	
R_PART_SOF_TIMING_005	PART SOF shall be able to measure Tsp-part and report it to PART OSS/BSS (BA) for on-demand EBS change.
Source	

1420

R_LEGATO_TIMING_009	SP LEGATO API shall be able to support Tsp-cust and Tsp-part for on-demand EBS change.
Source	
R_LEGATO_TIMING_0010	PART LEGATO API shall be able to support Tsp-part for on-demand EBS change.
Source	
R_SONATA_TIMING_005	SONATA API shall be able to support Tsp-cust and Tsp-part for on-demand EBS change.
Source	

1421

Table 13: Requirements for on-demand EBS change

7.6. On-demand Modification of CoS

Prior to an on-demand request for activating an E-LINE, ENNI, UNIs and EVC between off-net and on-net locations of SP are established for this E-LINE. Overall CoS Change process can be summarized as follows:

1. Customer via user portal requests CoS change: CoS Name (e.g. Gold, Bronze, Silver) or MEF CoS_i Label (i.e. H, M, L)
    a. Immediately
        i. With no end time for new CoS, $CoS_{elastic}$
        ii. With end time for new CoS, $CoS_{elastic}$ After end time elapses, the $CoS_{elastic}$ becomes previous CoS.
    b. At certain time and day in the future
        i. With no end time for new CoS, $CoS_{elastic}$
        ii. With end time for new CoS, $CoS_{elastic}$. After end time elapses, the $CoS_{elastic}$ becomes previous CoS.
2. Time intervals for on-demand modification of CoS immediately can be defined in the contract between SP and customer ($T_{sp\text{-}cust}$), and SP and PART ($T_{sp\text{-}part}$). The time interval for PART is expected to be smaller than the time interval for the SP. For example if $T_{sp\text{-}cust}$ is 15 minutes, $T_{sp\text{-}part}$ could be 10 minutes.
    a. The time interval for fulfillment between SP and customer can be recorded. In the customer contract, there can be a penalty associated with the requests that are not fulfilled within $T_{sp\text{-}cust}$.
    b. The time interval for fulfillment between SP and PART can be recorded. There can be a penalty associated with the requests that are not fulfilled within $T_{sp\text{-}part}$.
    c. If the customer request is not fulfilled within $T_{sp\text{-}cust}$, the customer can cancel the request. The cancelation may be counted for penalty per the contract.
    d. The customer may request a monthly history report from user portal consisting of $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$.
3. $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$ may apply to on-demand modification of CoS at certain date and time in the future. The SP choses to perform the request prior to the scheduled time and have the service ready at the time of the scheduled time.

The details are depicted in **Figure 8**. Steps in **Figure 8** are as follows:

- S1[ALLEGRO or CANTATA+LEGATO]: User requests CoS change either from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and SP LEGATO interface of SP SOF

- S2: SP SOF validates customer, the E-LINE service between location A and location Z, and whether there is enough capacity in the SP network and/or Partner network if SP SOF is capable of tracking available network capacity. Furthermore, if some of the information such as services and locations that belong to the customer is not in SOF, but in OSS, then SOF requests the information from OSS using LEGATO interface.

  - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back to user with "Invalid Request" if user credentials are invalid or "Unavailable Resources and Please try it Later" if resources are unavailable or "Request is accepted and in progress" .

  - *If customer requests pass user authentication at S2, per agreement between SP and PART, SP SOF waits for a confirmation from PART SOF (i.e. results of S4c, S5, S7a) before accepting or denying a customer request based on its own verification that the request is invalid and there is not enough capacity to support the request.*

  - *If customer requests pass user authentication at S2, it is up to SP SOF to wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and S7a) before denying a customer request based on its own verification that request is invalid and/or there is not enough capacity to support the request.*
  - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S4 [PRESTO]: Based on S2, if user credentials are valid and either capacity is available or SP SOF has no capacity information, SP SOF sends a request to SP ICM to change CoS at SP side of ENNI, on-net UNI, and on-net I-NNIs.

- S4a [INTERLUDE]: Based on S2, if user credentials are valid and either capacity is available or SP SOF has no capacity information, SP SOF sends a request to Partner SOF to change CoS at Partner side of ENNI, off-net UNI, and off-net I-NNIs.

  - *S4 and S4a can take place at the same time in order to reduce response time to user, or*

  - *S4a can take place after SP completes S8.*

  The CoS performance objectives for PART OVC are expected to be assame as the CoS performance objectives for SP OVC per contract between two operators. If there are differences, this might cause packet loss and is not recommended.

- S4c[INTERLUDE]: PART SOF validates the request by checking if the service is being supported at the off-net location and there is adequate capacity to support the change.

In S2, SP SOF checks validity of the customer and service, and may verify resource availability end-to-end. It is up to the PART SOF to re-validate the service and resource availability for the requested off-net location. The revalidation should reduce possible errors during the process.

- S4d [INTERLUDE]: If validation in S4c fails, PART SOF sends either the message “Invalid Request” or “ Unavailable Resources” to SP SOF. In turn, SP SOF sends the message “Invalid Request” or “Unavailable Resources, please try it later” to the customer.

- S4b [PRESTO]: If validation in S4c is successful, Partner SOF requests Partner ICM to change CoS at Partner side of ENNI, off-net UNI and off-net I-NNIs.

- S5:

  1. SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and there is enough capacity at these interfaces to support the requested CoS.

  2. Similarly, Partner ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within Partner network and there is enough capacity at these interfaces to support the requested CoS.

- S6:

  1. [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if there is not enough capacity at on-net UNI, ENNI or I-NNIs within SP network, SP SOF responds to customer with “Unavailable Resources and Please try it Later”.

  2. [PRESTO+INTERLUDE+CANTATA+LEGATO] Similarly, if there is not enough capacity at off-net UNI, ENNI or I-NNIs of Partner network, Partner SOF send a message to SP SOF indicating that there is not enough capacity to support the change. SP SOF responds to customer with “Unavailable Resources and Please try it Later”.

- S7 [PRESTO]:

  7. Based on S5, if there is enough capacity at on-net UNI, ENNI and I-NNIs of SP network, SP ICM requests SP ECM to modify the CoS to the customer requested value at on-net UNI and EVC End Point on the on-net UNI”.

  8. Similarly, if there is enough capacity at off-net UNI, ENNI and I-NNIs of Partner network, Partner ICM requests Partner ECM to modify the CoS to the customer requested value at off-net UNI and EVC End Point on the off-net UNI”.

- S7a [ADAGIO]:

  1. SP ECM validates if there is enough capacity at on-net UNI and OVC End Point to support new CoS.

2. Similarly, PART ECM validates if there is enough capacity at off-net UNI and off-net OVC End Point to support new CoS.

- S8:

5. [ADAGIO+PRESTO]After SP ECM validates CoS Change request at on-net UNI and associated OVC End Point, SP ECM sends a confirmation or denial message to SP ICM for the CoS Change. In turn, SP ICM sends a confirmation or denial message to SP SOF for CoS change at on-net UNI and on-net OVC End Point.
6. [ADAGIO+PRESTO] Similarly, after PART ECM validates CoS Change request at off-net UNI and associated OVC End Point, PART ECM sends a confirmation or denial message to PART ICM for the CoS Change. In turn, PART ICM sends a confirmation or denial message to PART SOF for CoS change at off-net UNI and off-net OVC End Point.

- S8a [ALLEGRO or CANTATA+LEGATO]: At S8, if CoS change has been successful, SP SOF sends the message “CoS for service is changed” to customer.

- S8b [ALLEGRO or CANTATA+LEGATO]: At S8, if CoS change has been unsuccessful, SP SOF sends the message “Unavailable resources, please try it later” to customer.

- S9 [PRESTO+ADAGIO]: After S8, optionally, SP SOF and PART SOF run tests on their segments of EVC (i.e. SP OVC and Partner OVC) to verify the CoS change, by requesting ICM and ECM to test the new CoS at associated interfaces and endpoints.

- S10:

1.[ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM confirms availability of new CoS to SP ICM and in turn SP ICM confirms availability of new CoS to SP SOF.

2.[ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner OVC, Partner ECM confirms availability of new CoS to Partner ICM and in turn Partner ICM confirms availability of new CoS to Partner SOF.

3.[INTERLUDE] Partner SOF confirms availability of new CoS to SP SOF, “Confirmed Availability of New CoS for Partner OVC”.

- S11[ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer indicating “CoS for Service is Changed”.

- S12:

1. [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for SP OVC, SP ECM confirms failure of new CoS testing to SP ICM and in turn SP ICM confirms failure of new CoS testing to SP SOF.

2. [PRESTO+ADAGIO]Similarly, If tests at S9 are unsuccessful for Partner OVC, Partner ECM confirms failure of new CoS testing to Partner ICM and in turn Partner ICM confirms failure of new CoS testing to Partner SOF.

- S13[ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer indicating “Unavailable Resources, Please try it Later””.

- S14[PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without SP and Partner test their OVCs), optionally, SP SOF runs and end-to-end EVC test.

- S15

1. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP SOF informs customer indicating that “Unavailable Resources, Please try it Later”.

2. [ALLEGRO or CANTATA+LEGATO]if testing is successful, SP SOF informs customer that “CoS for Service is Changed”.

3. [LEGATO] if testing is successful, to initiate new billing procedure, SP SOF also informs OSS that “CoS for Service is Changed”.

- S16 [LEGATO]:
  1. a) At S8a and S11, per contract between SP and Ethernet Access Operator (PART), PART SOF informs PART OSS/BSS (BA) that CoS change is confirmed so that SLO between SP and PART, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR), can be updated.
     b) At S8a and S11,SP chooses to confirm CoS change without an end-to-end testing of EVC and informs OSS/BSS (BA) to initiate the billing and update on-demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).
  2. a) At S15, if testing is successful, SP SOF informs OSS to initiate new billing procedure for the new CoS and update on demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).

     b) At S15, if testing is successful, SP SOF also informs PART SOF that the testing is successful. In turn, PART SOF informs PART OSS/BSS (BA) that CoS change is successful so that PART OSS/BSS (BA) can update its SLOs.
     c) At S15, if testing is unsuccessful, SP SOF informs SP OSS to update on demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).

- S17 [LEGATO]:
  1. At S3, If there is a way to identify the fact that the request is considered to be invalid despite of the fact that it is a valid request, in order to calculate on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP SOF informs SP OSS/BSS (BA) that a valid request was considered to be invalid and rejected.

2. At S3, S4e, S6.1, S8b, S13 and S15, if there is not enough resources to support CoS change, SP SOF informs OSS to update its SLO for on-demand CoS change, **percent of accepted requests fulfilled (TFR/TAR)**.
3. At S4d, S6.2, S8b, S10 and S15, if there is not enough resources to support CoS change, PART SOF informs OSS to update its SLO for on-demand CoS change, percent of accepted requests fulfilled (TFR/TAR).
4. At S15, if testing is unsuccessful, SP SOF informs PART SOF about not being able to honor the customer request so that PART SOF requests PART OSS/BSS (BA) to update on demand SLO parameters.

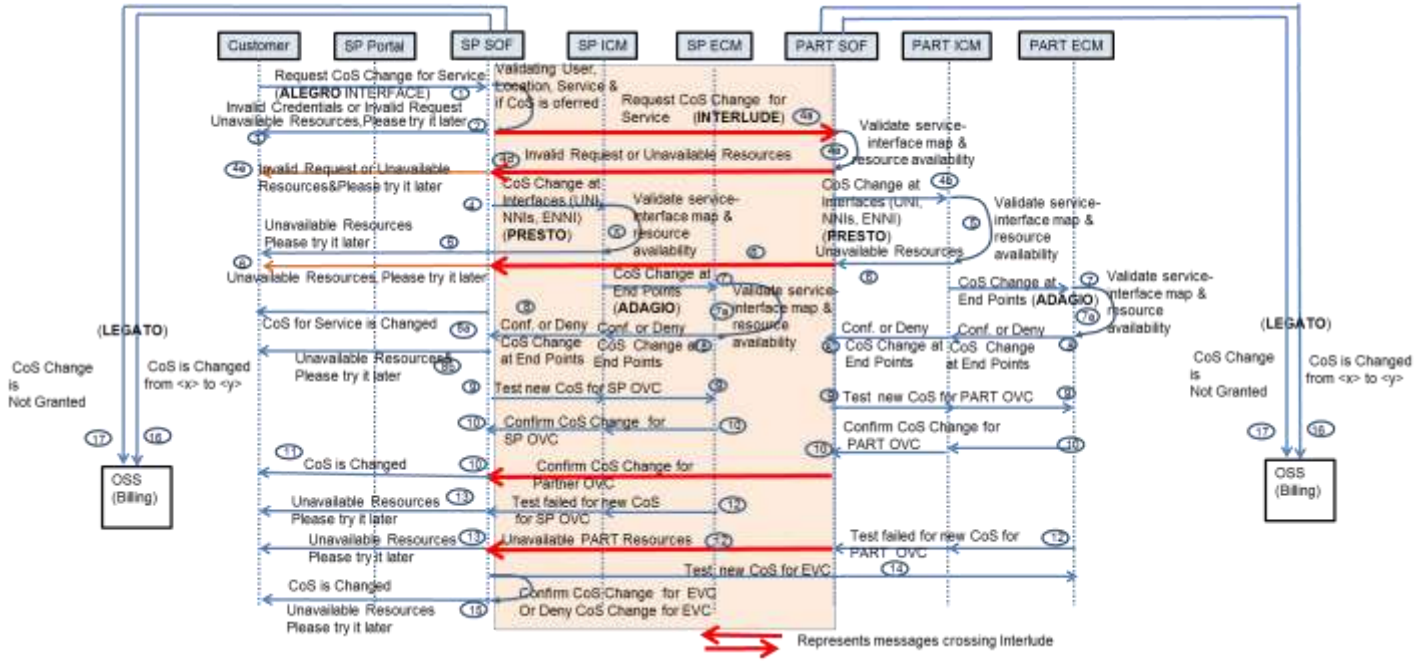


Figure 8 CoS Change Process Flow for E-LINE

Use Case Number	UC1
Use Case Name	CoS Change request Step1 & 2 (S1 and S2)
Description	Customer initiates CoS change over CANTATA or ALLEGRO
Actor(s)	Customer, SP OSS/BSS (BA), SP SOF
Pre-Condition(s)	Customer has a contract for the Elastic Access E-Line Service, the Elastic Service has been ordered, configured, tested, and is ready to carry traffic.
Process Steps	1. Customer uses CANTATA or ALLEGRO interface to trigger a CoS change request 2. Customer provides CoS name and indicates whether the request is

	immediate or certain time in the future . 3. SP SOF performs customer authentication, and validates the service for this customer and integrity of the data elements. For this, SP SOF may need to collaborate with OSS-BS over LEGATO interface. Furthermore, SP SOF validates if there is enough capacity within SP network or end-to-end to support the requested CoS change. 4. If the CoS change request is : a. Invalid (i.e. customer authentication fails, customer-service mapping fails, or CoS requested is not within contractual bounds), then SP SOF sends "invalid Request" to the customer. b. Valid, but there is not enough capacity to support the new CoS, SP SOF sends "Resources are Unavailable, Please try it later" to the customer. *It is recommended that If this step is repeated 3 times in an SP selected time interval (e.g. 5 minutes), SP SOF sends "Please try it in <time interval in minutes>" to the customer. These messages will be displayed at the Portal. If requests continue, security procedures may take control of the user interface*. *SP SOF may choose to receive confirmation from SP ICM and SP ECM before denying the request, in addition to its own validation for customer-service mapping and capacity availability.* *Per agreement between SP and PART, SP SOF may choose to receive confirmation from PART SOF before denying the request.* c. Valid and there is enough capacity in the network to support this new CoS, then S4 will be initiated. d. If the request is invalid and rejected, or valid and rejected due to resource unavailability , SP SOF informs OSS/BSS (BA) to update the customer-SP SLOs 5. Tsp-cust and Tsp-part are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA). This UC ends
Post Conditions	SP Customer Portal displays messages in 4a and 4b above or SP SOF initiates S4.
Alternate Paths	The customer enters any CoS value into the system at any time without indicating if the request is to be performed immediately or certain time in the future. In this case, all the steps from 2 to 15 are still valid.
Assumption(s)	
References	S1, S2

1643 Table 14: CoS use case description (S1,S2 and S3)

1644

Use Case Number	UC2
Use Case Name	CoS Change process, configuration, testing, accept or denial, billing initiation and SLO update by SP and PART
Description	SP SOF and PART SOF initiate, configure, and test CoS change over their own PRESTO and ADAGIO interfaces; accept or deny the CoS Change

	over CANTATA; initiate billing over LEGATO; and update their SLOs over LEGATO.
Actor(s)	SP SOF, SP ICM, SP ECM, PART SOF, PART ICM, PART ECM, SP OSS/BSS (BA), PART OSS/BSS (BA)
Pre-Condition(s)	Customer request has been validated by SP SOF
Process Steps	1. SP SOF requests CoS change from PART SOF over INTERLUDE and requests CoS change from SP ICM over PRESTO. *It is a choice for SP to receive confirmation from its ICM and ECM for the CoS change before sending a request to PART SOF*. 2. SP ICM verifies validity of request and if there is adequate capacity at UNI and NNIs. a. If the verification is successful, it requests CoS change from SP ECM over ADAGIO. b. If the verification is unsuccessful, SP ICM notifies SP SOF that the request is invalid or resources are unavailable. In turn, SP SOF sends "Invalid Request, or Unavailable Resources and Please try it later" to the customer 3. SP ECM validates the request and if there is enough capacity at on-net UNI and OVC End Point to support new CoS. After the SP ECM validation, SP ECM sends a confirmation or denial message to SP ICM for the CoS Change. In turn, SP ICM sends a confirmation or denial message to SP SOF for CoS change at on-net UNI and on-net OVC End Point. 4. PART SOF verifies validity of request and if there is adequate capacity at off-net UNI and off-net NNIs a. If the verification is successful, it requests CoS change from PART ICM. b. If the verification is unsuccessful, PART SOF notifies SP SOF that either request is invalid or PART resources are unavailable. In turn, SP SOF either sends "invalid Request" or "Resources are Unavailable, Please try it later" to the customer 5. PART ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and there is enough capacity at these interfaces to support the requested CoS. a. if there is not enough capacity at off-net UNI, ENNI or I-NNIs of Partner network, PART ICM notifies PART SOF about invalid request or unavailability of resources. In turn, PART SOF sends a message to SP SOF indicating that either the request is invalid or there is not enough capacity to support the change. SP SOF responds to customer with "Invalid Request " or "Unavailable Resources and Please try it Later". b. If there is enough capacity at off-net UNI, ENNI or I-NNI, PART ICM requests PART ECM to change CoS. 6. PART ECM validates the request and if there is enough capacity at off-net UNI and PART OVC End Point to support new CoS. After the PART ECM validation, PART ECM sends a confirmation or denial message to PART ICM for the CoS Change. In turn, PART ICM sends a confirmation or denial message to PART SOF for CoS change at off-net UNI and off-net OVC End Point. For the request denial message, SP SOF responds customer with "Invalid Request, or Unavailable Resources and Please try it Later". 7. If SP SOF receives conformation from SP ICM, SP ECM and PART SOF,

	a. SP SOF confirms CoS change to customer without testing the EVC for new CoS, or b. SP SOF request testing of SP OVC for the new CoS from SP ICM and ECM c. PART SOF requests testing of PART OVC for the new CoS from PART ICM and ECM d. Based on test results from SP ICM, SP ECM and PART SOF, SP SOF sends either "CoS for Service is Changed" or "Unavailable resources, please try it later" to customer. 8. If testing of SP OVC and PART OVC separately validates CoS change, SP SOF may decide to run an end-to-end EVC test before confirming or denying the CoS change. Based on the test results, SP SOF sends either "CoS for Service is Changed" or "Unavailable resources, please try it later" to customer. 9. SP SOF informs SP OSS/BSS (BA) for each denial or confirmation of CoS change request. Similarly, PART SOF informs PART OSS/BSS (BA). 10. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART. 11. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.
Post Conditions	Billing is initiated if the request is conformed. SLOs for Elastic Service are being updated by SP OSS/BSS (BA) and PART OSS/BSS (BA).
Alternate Paths	.
Assumption(s)	
References	S3-S17

Table 15: CoS use case description for Steps 4-17

7.10.1 Requirements

R_ELASTIC_EVC_CoS_001	Elastic EVC shall support on-demand modifications of CoS of a bandwidth profile flow or EVC envelope; and $CoS_{elastic}$ with CoS objectives defined in MEF 10.3 [3].
Source	S1

R_ELASTIC_CoS_EVC_SLO_001	Elastic E-Line Service MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CoS change for Elastic Ethernet Service.
Source	S1 [1]

R_ELASTIC_CoS_SONATA_SLO_001	SONATA MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CoS change for Elastic Ethernet Service. *Note that these SLOs must be in the contract (or business relationships) between SP and customer, and between SP and PART.*
Source	S1 [1]

1651

R_ELASTIC_CoS_LEGATO_SLO_001	LEGATO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CoS change for Elastic Ethernet Service. *Note that the SLO parameters must be supported by LEGATO API.*
Source	S1 [1]

1652

R_ELASTIC_CoS_CANTATA_001	CANTATA shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CoS change for Elastic Ethernet Service. *Note that the SLO parameters must be supported by CANTATA API.*
Source	S1 [1]

1653

R_ELASTIC_CoS_ALLEGRO_SLO_001	ALLEGRO MUST support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CoS change for Elastic Ethernet Service *Note that the SLO parameters must be supported by ALLEGRO API.*
Source	S1 [1]

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R_ELASTIC_SCH_ALLEGRO_005	On-demand request for changing EVC CoS immediately or at certain day and time in the future should be supported from ALLEGRO interface of SP SOF.

1659

R_ELASTIC_SCH_CANTATA_005	On-demand request for changing EVC CoS immediately or at certain day and time in the future should be supported from CANTATA interface.
R_ELASTIC_SCH_LEGATO_005	On-demand request for changing EVC CoS immediately or at certain day and time in the future should be supported from LEGATO interface.

1660

O_ELASTIC_SCH_INTERLUD_005	On-demand changing of PART OVC CoS for Access E-Line services either immediately or at certain day and time in the future should be supported by INTERLUDE.
Source	S1

1661

1662

O_ELASTIC_SCH_SONATA_005	On-demand changing of PART OVC CoS for Access E-Line services either immediately or at certain day and time in the future should be supported by SONATA.
Source	S1

1663

O_USER_PORTAL_005	User Portal should be able to display CoS names supported for a given Elastic Ethernet Service.
Source	S1

1664

O_SP_SOF_TEST_001	SP SOF should be able to initiate SP OVC testing for new CoS after the CoS change confirmation of SP ICM and SP ECM. Remark 1: This requirement applies to PRESTO and ADAGIO. Their APIs must be able to receive testing requests and respond accordingly.
Source	S9

O_SP_SOF_TEST_002	SP SOF shall be able to initiate end-to-end EVC testing for new CoS after the CoS change confirmation of SP SOF and PART SOF. Remark 1: This requirement applies to INTERLUDE. The INTERLUDE API must support testing..
Source	S14

1665

O_SP_SOF_TEST_003	PART SOF shall be able to initiate PART OVC testing for new CoS after the CoS change confirmation of PART ICM and PART ECM.
Source	S9
R_ELASTIC_COS_SPSOF_TRACK_00	SP SOF shall be able to keep track of current and previous $CoS_{elastic}$ values.
Source	

1666

R_ELASTIC_COS_PSOF_TRACK_001	PART SOF shall be able to keep track of current and previous $CoS_{elastic}$ values.
Source	

1667

1668

R_SP_SOF_TIMING_005	SP SOF MUST be able to measure Tsp-cust and Tsp-part , report them to SP OSS/BSS (BA) for on-demand CoS change.
Source	
R_PART_SOF_TIMING_006	PART SOF MUST be able to measure Tsp-part and report it to PART OSS/BSS (BA) for on-demand CoS change.
Source	

1669

R_LEGATO_TIMING_0011	SP LEGATO API shall be able to support Tsp-cust and Tsp-part for on-demand CoS change.
Source	
R_SONATA_TIMING_006	SONATA API shall be able to support Tsp-cust and Tsp-part for on-demand CoS change.
Source	

1670

1671 Table 16: Requirements for on-demand CoS change

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1673

1674 ## 7.11. On-demand Modification of CE-VLAN ID[11]

1675 Prior to an on-demand request for assigning CE-VLAN ID to untagged frames or
1676 changing CE-VLAN ID, ENNI, UNIs and EVC between off-net and on-net locations of
1677 SP are established for this E-LINE: Overall CE-VLAN ID Change process can be
1678 summarized as follows:

1679 1 Customer via user portal requests CE-VLAN ID change

1680 a. Immediately

1681 i. With no end time for new CE-VLAN ID, CE-VLAN $ID_{elastic}$
1682 ii. With end time for new CE-VLAN ID, CE-VLAN $ID_{elastic}$. After end
1683 time elapses, the CE-VLAN $ID_{elastic}$ becomes previous CE-VLAN
1684 ID

1685 b. At certain time and day in the future
1686 iii. With no end time for new CE-VLAN ID, CE-VLAN $ID_{elastic}$,
1687 iv. With end time for new CE-VLAN ID. CE-VLAN $ID_{elastic}$. After end
1688 time elapses, the CE-VLAN $ID_{elastic}$ becomes previous CE-VLAN
1689 ID

1690 2. Time intervals for on-demand modification of CE-VLAN ID immediately can be
1691 defined in the contract between SP and customer ($T_{sp\text{-}cust}$), and SP and PART
1692 ($T_{sp\text{-}part}$). The time interval for PART is expected to be smaller than the time
1693 interval for the SP. For example if $T_{sp\text{-}cust}$ is 15 minutes, $T_{sp\text{-}part}$ could be 10
1694 minutes.

1695 a. The time interval for fulfillment between SP and customer can be
1696 recorded. In the customer contract, there can be a penalty associated
1697 with the requests that are not fulfilled within $T_{sp\text{-}cust}$.
1698 b. The time interval for fulfillment between SP and PART can be
1699 recorded. There can be a penalty associated with the requests that
1700 are not fulfilled within $T_{sp\text{-}part}$.
1701 c. If the customer request is not fulfilled within $T_{sp\text{-}cust}$, the customer can
1702 cancel the request. The cancelation may be counted for penalty per
1703 the contract.
1704 d. The customer may request a monthly history report from user portal
1705 consisting of $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$.

1706 3. $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$ may apply to on-demand modification of CE-V:AN ID at
1707 certain date and time in the future. The SP choses to perform the request prior
1708 to the scheduled time and have the service ready at the time of the scheduled
1709 time.
1710

[11] CE-VLAN ID is the EVC End Point Map attribute of OVC End Point per UNI as defined in MEF 51 [4].

7.11.1 CE-VLAN ID Change at On-net Location A

The details are depicted in **Figure 9**. Steps in **Figure 9** are as follows:

- S1[ALLEGRO or CANTATA+LEGATO]: User requests CE-VLAN ID Change either from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and SP LEGATO interface of SP SOF

- S2: SP SOF validates customer, the E-LINE service configuration between location A and location Z, and whether requested CE-VLAN ID is available within SP if SP SOF is capable of tracking available PHYs. Furthermore, if some of the information such as services and locations that belong to the customer is not in SOF, but in OSS/BSS (BA), then SOF requests the information from the OSS/BSS (BA) using LEGATO interface.

  - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back to user with "Invalid Request" if user credentials are invalid or "Unavailable Resources and Please try it Later" if CE-VLAN ID is unavailable or "Request is accepted and in progress" .

  - *If customer requests pass user authentication at S2, it is up to SP SOF to wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and S7a) before accepting or denying a customer request based on its own verification that request is invalid and/or the PHY requested is unavailable.*
  - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S4 [PRESTO]: Based on S2, if user credentials are valid and either CE-VLAN ID is available or SP SOF has no CE-VLAN ID information, SP SOF sends a request to SP ICM to change CE-VLAN ID at on-net UNI.

- S5: SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and requested CE-VLAN ID is available at UNI to Change CE-VLAN ID.

- S6: [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if PHY is not available at on-net UNI, SP SOF responds to customer with "Unavailable Resources and Please try it Later".

- S7: [PRESTO+ADAGIO] Based on S5, if CE-VLAN ID is available at on-net UNI, SP ICM changes PHY at UNI, sends a message to SP SOF "Confirm PHY Change ", and requests SP ECM to change the CE-V:AN ID of End Point on the on-net UNI".

- S7a [ADAGIO] SP ECM validates if requested PHY is available at on-net UNI and OVC End Point.

- S8: [ADAGIO+PRESTO] After SP ECM changes CE-VLAN ID at on-net UNI and associated EVC End Point, SP ECM sends a confirmation or denial message to SP ICM for the PHY change. In turn, SP ICM sends a confirmation or denial message to SP SOF indicating the CE-VLAN ID change at on-net UNI and EVC End Point.

- S8a [ALLEGRO or CANTATA+LEGATO] At S8, if CE-VLAN ID change is successful, SP SOF sends the message "PHY is changed" to customer.

- S8b [ALLEGRO or CANTATA+LEGATO] At S8, if CE-VLAN ID change is unsuccessful, SP SOF sends the message "Unavailable resources, please try it later" to customer.

- S9 [PRESTO+ADAGIO]: After S8, optionally, SP SOF runs tests on SP OVC to verify the new CE-VLAN ID, by requesting ICM and ECM to test the new CE-VLAN ID at UNI and endpoint.

- S10: [ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM confirms the CE-VLAN ID change to SP ICM and in turn SP ICM confirms the CE-VLAN ID change to SP SOF.

- S11 [ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer indicating "CE-VLAN ID is Changed".

- S12: [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for SP OVC, SP ECM confirms failure of SP OVC testing to SP ICM and in turn SP ICM confirms failure of new PHY testing to SP SOF.

- S13: [ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer indicating "Unavailable Resources, Please try it later"".
- S14 [LEGATO]: After S11, SP SOF informs OSS that PHY is changed, to initiate billing and update SLO between SP and PART, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR), can be updated.
- S15 [LEGATO]:
    1. After S3, If there is a way to identify the fact that the request is considered to be invalid despite of the fat that it is a valid request, in order to calculate on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP SOF informs SP OSS/BSS (BA) that a valid request was considered to be invalid and rejected.
    2. After S3,S6, S8b and S13, if the CE-VLAN ID change is not supported, SP SOF informs OSS to update its SLO for on-demand changes, **percent of accepted requests fulfilled (TFR/TAR)**.

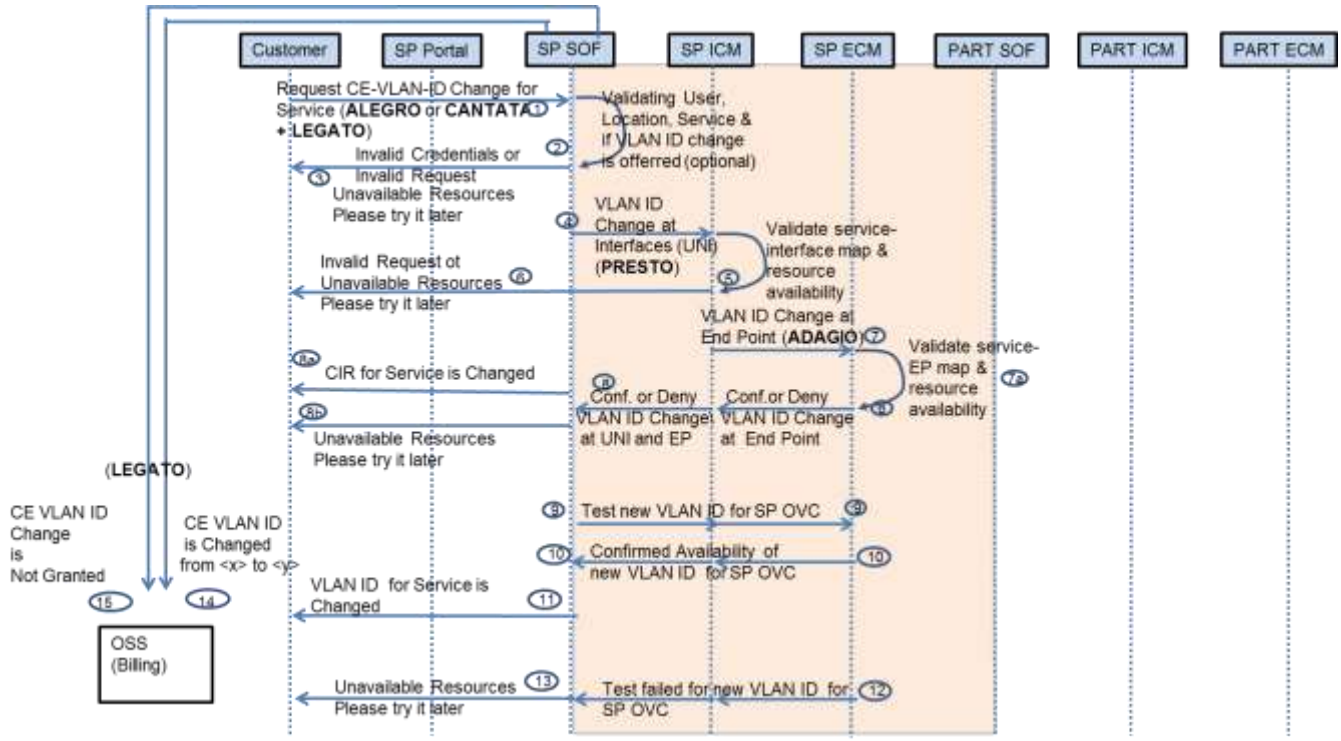

Figure 9 CE VLAN-ID Change Process Flow: Change at On-net Location A

Use Case Number	UC1
Use Case Name	CE-VLAN ID Change at On-net Location A (S1 and S2)
Description	Customer initiates CE-VLAN ID change over CANTATA or ALLEGRO
Actor(s)	Customer, SP OSS/BSS (BA), SP SOF
Pre-Condition(s)	Customer has a contract for the Elastic Access E-Line Service and the Elastic Service has been ordered, configured, tested, and is ready to carry traffic.
Process Steps	1. Customer uses CANTATA or ALLEGRO interface to trigger a CE-VLAN ID change request 2. Customer enters all the mandatory data elements displayed on the portal (i.e. CE-VLAN ID value, immediately or certain time in the future) 3. SP SOF performs customer authentication, and validates the service for this customer and integrity of the data elements and whether the requested CE-VLAN ID value is available within SP network. For this, SP SOF may need to collaborate with OSS-BS over LEGATO interface. 4. If the CE-VLAN ID change request is : a. Invalid (i.e. customer authentication fails, customer-service mapping fails, or CE-VLAN ID requested is not within contractual bounds), then SP SOF sends "invalid Request" to the customer. This message will be displayed at Customer Portal. b. Valid, but the requested CE-VLAN ID value is not

	available, SP SOF sends "Resources are Unavailable, Please try it later" to the customer. . *It is recommended that If this step is repeated 3 times in an SP selected time interval (e.g. 5 minutes), SP SOF sends "Please try it in <time interval in minutes>" to the customer. These messages will be displayed at the Portal. If requests continue, security procedures may take control of the user interface*. *SP SOF may choose to receive confirmation from SP ICM and SP ECM before denying the request, in addition to its own validation for customer-service mapping and CE-VLAN ID availability.* c. Valid and the requested CE-VLAN ID is available in the network , then S4 will be initiated. d. If the request is invalid and rejected, or valid and rejected due to resource unavailability , SP SOF informs OSS/BSS (BA) to update the customer-SP SLOs 5. Tsp-cust is measured by SP SOF, an reported to OSS/BSS (BA). a. This UC ends
Post Conditions	SP Customer Portal displays messages in 4a and 4b above or SP SOF initiates S4.
Alternate Paths	
Assumption(s)	
References	S1, S2

Table 17: Use case description for CE-VLAN ID Change at On-net Location A

Use Case Number	UC2
Use Case Name	CE-VLAN ID Change process, configuration, testing, accept or denial, billing initiation and SLO update by SP
Description	SP SOF initiates, configures, and tests CE-VLAN ID change over SP PRESTO and ADAGIO interfaces; accept or deny the CE-VLAN ID Change over CANTATA; initiate billing over LEGATO; and update thee SLO over LEGATO.
Actor(s)	SP SOF, SP ICM, SP ECM, SP OSS/BSS (BA)
Pre-Condition(s)	Customer request has been validated by SP SOF
Process Steps	1. SP SOF requests CE-VLAN ID change from SP ICM over PRESTO. 2. SP ICM verifies validity of request and if CE-VLAN ID is available at on-net UNI and I-NNIs. a. If the verification is successful, it requests CE-VLAN ID change from SP ECM over ADAGIO. b. If the verification is unsuccessful, SP ICM notifies SP SOF that the request is invalid or resources are unavailable. In turn, SP SOF sends "Invalid Request, or Unavailable Resources and Please try it later" to the customer 3. SP ECM validates the request and if CE-VLAN ID is available at on-net UNI and OVC End Point to support new CE-VLAN ID. After the SP

	ECM validation, SP ECM sends a confirmation or denial message to SP ICM for the CE-VLAN ID Change. In turn, SP ICM sends a confirmation or denial message to SP SOF for CE-VLAN ID change at on-net UNI and on-net OVC End Point. 4. If SP SOF receives conformation from SP ICM, a. SP SOF confirms CE-VLAN ID change to customer without testing the EVC for new CE-VLAN ID, or b. SP SOF request testing of SP OVC for the new CE-VLAN ID from SP ICM and ECM c. Based on test results from SP ICM and SP ECM, SP SOF sends either "CE-VLAN ID for Service is Changed" or "Unavailable resources, please try it later" to customer. 5. SP SOF informs SP OSS/BSS (BA) for each denial or confirmation of CE-VKLAN ID change request. 6. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.
Post Conditions	Billing is initiated if the request is conformed. SLOs for Elastic Service are being updated by SP OSS/BSS (BA).
Alternate Paths	.
Assumption(s)	
References	S4-S17

Table 18: "CE-VLAN ID Change at on-net location A" use case description for Steps 4-17

1799

1800 ### 7.11.1. Requirements

1801

1802

1803

R_ELASTIC_EVC_CEVLANID_001	Elastic Ethernet Service shall support CE-VLAN ID change for on-net UNI.
Source	S1

1804

R_ELASTIC_CEVLANID_CANTATA_001	CANTATA shall support CE-VLAN ID change for on-net UNI.
Source	S1

1805

R_ELASTIC_CEVLANID_ALLEGRO_001	ALLEGRO shall support CE-VLAN ID change for on-net UNI.
Source	S1

1806

R_ELASTIC_CEVLANID_PRESTO_001	PRESTO shall support CE-VLAN ID change for on-net UNI.
Source	S1

1807

R_ELASTIC_CEVLANID_ADAGIO_001	ADAGIO shall support CE-VLAN ID change for on-net UNI.
Source	S1

1808

R_ELASTIC_CDEVLANID_LEGATO_001	LEGATO shall support CE-VLAN ID change for on-net UNI.
Source	S1

1809

1810

1811

1812

R_ELASTIC_VLAN_CANTATA_SLO_001	CANTATA shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CE-VLAN ID change for on-net UNI .
Source	S1, [1]

1813

R_ELASTIC_VLAN_ALLEGRO_SLO_001	ALLEGRO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CE-VLAN ID change for on-net UNI.
Source	S1, [1]

1814

R_ELASTIC_VLAN_LEGATO_SLO_001	LEGATO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CE-VLAN ID change for on-net UNI.
Source	S1, [1]

1815

R_ELASTIC_VLAN_SPSOF_TRACK_001	SP SOF shall be able to keep track of current and previous CE-VLANID$_{elastic}$ values.
Source	

1816

R_ELASTIC_VLAN_PSOF_TRACK_001	PART SOF shall be able to keep track of current and previous CE-VLANID$_{elastic}$ values.
Source	

1817

R_SP_SOF_TIMING_003	SP SOF shall be able to measure $T_{sp\text{-}cust}$ and report it to SP OSS/BSS (BA) for on-demand CE-VLAN ID change for on-net UNI.
Source	

1818

R_LEGATO_TIMING_0012	SP LEGATO API shall be able to support Tsp-cust for on-demand CE-VLAN ID change for on-net UNI.
Source	

1819

R_ELASTIC_SCH_ALLEGRO_001	On-demand request for changing CE-VLAN ID for on-net UNI immediately or at certain day and time in the future should be supported from ALLEGRO interface of SP SOF.
Source	S1

1820

R_ELASTIC_SCH_LEGATO_001	On-demand request for changing CE-VLAN ID for on-net UNI immediately or at certain day and time in the future should be supported from LEGATO interface.
Source	S1

1821

R_ELASTIC_SCH_CANTATA_001	On-demand request for changing CE-VLAN ID for on-net UNI immediately or at certain day and time in the future should be supported from CANTATA interface.
Source	S1

1822

1823

O_PRESTO_TEST_005	PRESTO should support OVC testing for new CE-VLAN ID that is initiated by SOF, after the CE-VLAN ID change for on-net UNI confirmation of ICM and ECM.

1824

O_ADAGIO_TEST_005	ADAGIO should support OVC testing for new CE-VLAN ID for on-net UNI that is initiated by SOF, after the CE-VLAN ID change confirmation of ECM.

1825

1826 Table 19: Requirements for on-demand CE-VLAN ID change at on-net location

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1828
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7.11.2 CE-VLAN ID Change at On-net Location A with CE-VLAN ID Preservation

The details are depicted in **Figure 10**. Steps in **Figure 10** are as follows:

- S1[ALLEGRO or CANTATA+LEGATO]: User requests CE-VLAN ID Change either from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and SP LEGATO interface of SP SOF

- S2: SP SOF validates customer, the E-LINE service configuration between location A and location Z, and whether requested CE-VLAN ID is available within SP and PART network to support the new CE-VLAN ID if SP SOF is capable of tracking available CE-VLAN IDs. Furthermore, if some of the information such as services and locations that belong to the customer is not in SOF, but in OSS/BSS (BA), then SOF requests the information from the OSS/BSS (BA) using LEGATO interface.

  - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back to user with "Invalid Request" if user credentials are invalid or "Unavailable Resources and Please try it Later" if CE-VLAN ID is unavailable or "Request is accepted and in progress" .

  - *If customer requests pass user authentication at S2, per agreement between SP and PART, SP SOF waits for a confirmation from PART SOF (i.e. results of S4c, S5, S7a) before accepting or denying a customer request based on its own verification that the request is invalid and/or the requested CE-VLAN ID is unavailable.*

  - *If customer requests pass user authentication at S2, it is up to SP SOF to wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and S7a) before denying a customer request based on its own verification that request is invalid and/or the requested CE-VLAN ID is unavailable.*
  - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S4 [PRESTO]: Based on S2, if user credentials are valid and either CE-VLAN ID is available or SP SOF has no CE-VLAN ID information, SP SOF sends a request to SP ICM to change CE-VLAN ID at SP side of ENNI, on-net I-NNIs, and on-net UNI.

- S4a [INTERLUDE]: Based on S2, if user credentials are valid and either CE-VLAN ID is available or SP SOF has no CE-VLAN ID information, SP SOF sends a request to Partner SOF to Change CE-VLAN ID at Partner side of ENNI, off-net UNI, and off-net I-NNIs. S4 and S4a can take place at the same time in order to reduce response time to user or S4a can take place after SP completes S8.

- S4b [PRESTO]: Partner SOF requests Partner ICM to Change CE-VLAN ID at Partner side of ENNI, off-net UNI and off-net I-NNIs.

- S5 [PRESTO]:

  1. SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and requested CE-VLAN ID is available at UNI to Change CE-VLAN ID.

  2. Similarly, Partner ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and requested CE-VLAN ID is available at UNI to Change CE-VLAN ID.

- S6:

  1. [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if CE-VLAN ID is not available at on-net UNI, ENNI or I-NNI within SP network, SP SOF responds to customer with “Unavailable Resources and Please try it later”.

  2. [PRESTO+INTERLUDE+CANTATA+LEGATO] Similarly, if CE-VLAN ID is not supported at off-net UNI, ENNI or I-NNIs of Partner network, Partner SOF send a message to SP SOF indicating “Unavailable Resources”. SP SOF responds to customer with “Unavailable Resources and Please try it later”.

- S7: [PRESTO+ADAGIO]

  1. Based on S5, if CE-VLAN ID is available at on-net UNI,ENNI and I-NNIs, SP ICM changes CE-VLAN ID at UNI and requests SP ECM to change the CE-VLAN ID of End Point on the on-net UNI”.

  2. Similarly, if CE-VLAN ID can be supported at off-net UNI, ENNI and I-NNIs of Partner network, Partner ICM changes CE-VLAN ID at ENNI and I-NNIs and requests Partner ECM to change the CE-VLAN ID of the End Point on off-net UNI”.

- S8: [ADAGIO+PRESTO]

  1. After SP ECM changes CE-VLAN ID at on-net UNI and associated EVC End Point, SP ECM sends a confirmation message to SP ICM. In turn, SP ICM sends a confirmation message to SP SOF indicating the CE-VLAN ID change at on-net UNI and EVC End Point.

  2. Similarly, after Partner ECM changes CE-VLAN ID at off-net UNI and associated EVC End Point, Partner ECM sends a confirmation message to Partner ICM. In turn, Partner ICM sends a confirmation message to Partner SOF indicating CE-VLAN ID change at off-net UNI and associated EVC End Point.

- S8a [ALLEGRO or CANTATA+LEGATO] At S8, if CE-VLAN ID change is successful, SP SOF sends the message “CE-VLAN ID is changed” to customer.

- S8b [ALLEGRO or CANTATA+LEGATO] At S8, if CE-VLAN ID change is unsuccessful, SP SOF sends the message “Unavailable resources, please try it later” to customer.

- S9 [PRESTO+ADAGIO]: After S8, optionally, SP SOF runs tests on SP OVC to verify the new CE-VLAN ID, by requesting ICM and ECM to test the new CE-VLAN ID at UNI and endpoint. PART SOF runs tests on PART OVC to verify the new CE-VLAN ID, by requesting ICM and ECM to test the new CE-VLAN ID at off-net UNI and endpoint. .

- S10:

    1. [ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM confirms the CE-VLAN ID change to SP ICM and in turn SP ICM confirms the CE-VLAN ID change to SP SOF.

    2. [ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner OVC, Partner ECM confirms CE-VLAN ID change to Partner ICM and in turn Partner ICM confirms CE-VLAN ID change to Partner SOF.

    3. [INTERLUDE] Partner SOF confirms CE-VLAN ID change to SP SOF, “Confirm Availability of new CE-VLAN ID for PART OVC”.

- S11 [ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer indicating “CE-VLAN ID is Changed”.

- S12: [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for SP OVC, SP ECM confirms failure of SP OVC testing to SP ICM and in turn SP ICM confirms failure of new CE-VLAN ID testing to SP SOF.

- S13: [ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer indicating “Unavailable Resources, Please try it Later””.
- S14 [PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without SP and Partner test their OVCs), optionally, SP SOF runs an end-to-end EVC test for new CE-VLAN ID reservation at on-net location A.

- S15

    1. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP SOF informs customer indicating that “Unavailable Resources, Please try it Later”.

    2. [ALLEGRO or CANTATA+LEGATO]if testing is successful, SP SOF informs customer that “CE-VLAN ID for Service is Changed”.
- S16 [LEGATO]:
    1. a) After S8a and S11, per contract between SP and Ethernet Access Operator (PART), PART SOF informs PART OSS/BSS (BA) that CE-VLAN ID change is confirmed so that SLO between SP and PART, **percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR),** can be updated.

1948 b) After S8 and S11,SP chooses to confirm CE-VLAN ID change without
1949 an end-to-end testing of EVC and informs OSS/BSS (BA) to initiate the
1950 billing and update on-demand SLO parameters**, percent of valid**
1951 **requests accepted (TAR/TVR) and percent of accepted requests**
1952 **fulfilled (TFR/TAR).**
1953 2. After S14, if testing is successful, SP SOF informs OSS to initiate new
1954 billing procedure for the new CE-VLAN ID and update on demand SLO
1955 parameters, **percent of valid requests accepted (TAR/TVR) and**
1956 **percent of accepted requests fulfilled (TFR/TAR).**
1957 3. a) After S14, if testing is unsuccessful, PART SOF informs SP OSS to
1958 update on demand SLO parameters, percent of valid requests accepted
1959 (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).
1960 b)After S14, if testing is unsuccessful, SP SOF informs SP OSS to update
1961 on demand SLO parameters, percent of valid requests accepted
1962 (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).
1963 c) After S14, whether testing successful or unsuccessful, SP SOF informs
1964 PART SOF about the outcome so that PART SOF can inform SP OSS for
1965 the SLO update.
1966 • S17 [LEGATO]:
1967 1. At S3, If there is a way to identify the fact that the request is considered to
1968 be invalid despite of the fat that it is a valid request, in order to calculate
1969 on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP
1970 SOF informs SP OSS/BSS (BA) that a valid request was considered to be
1971 invalid and rejected.
1972 2. After S3,S6.1&2, S8b, S13 and S15, if CE-VLAN ID is not available to
1973 support CE-VLAN ID change, SP SOF informs OSS to update its SLO for
1974 on-demand CE-VLAN ID change, **percent of accepted requests**
1975 **fulfilled (TFR/TAR)**.

1976

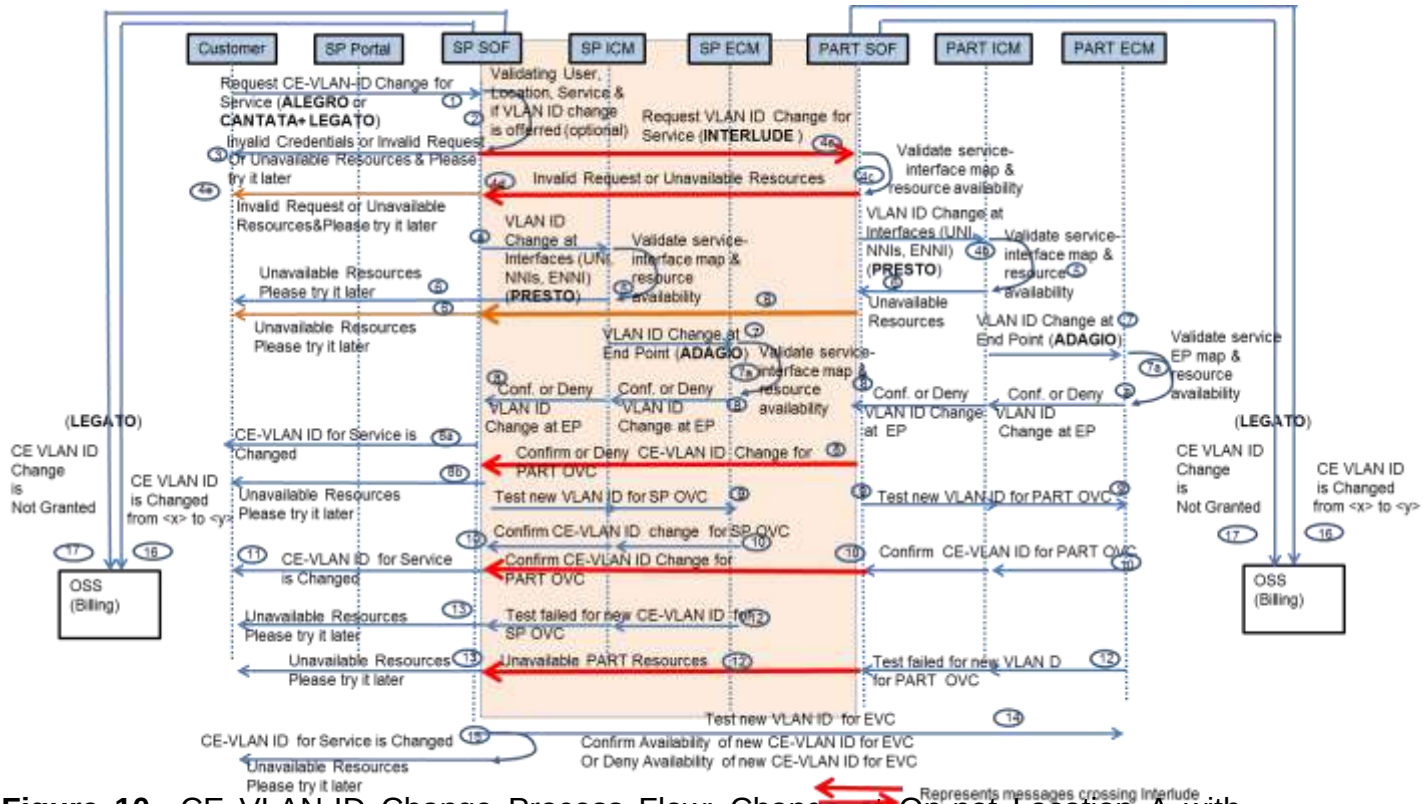

Figure 10 CE VLAN-ID Change Process Flow: Change at On-net Location A with CE-VLAN ID Preservation

Use Case Number	UCx
Use Case Name	CE-VLAN ID Change at On-net Location A with CE-VLAN ID Preservation.
Description	Customer requests a change of CE-VLAN ID for E-LINE at the Customer Portal
Actor(s)	Customer, SP OSS/BSS (BA), SP SOF
Pre-Condition(s)	Service has been ordered and configured.
Process Steps	1. Customer uses CANTATA or ALLEGRO interface to trigger a CE-VLAN ID change request 2. Customer enters all the mandatory data elements displayed on the portal (i.e. CE-VLAN ID value, immediately or certain time in the future) 3. SP SOF performs customer authentication, and validates the service for this customer and integrity of the data elements and whether the requested CE-VLAN ID value is available within SP network. For this, SP SOF may need to collaborate with OSS-BS over LEGATO interface. 4. If the CE-VLAN ID request is : a. Invalid (i.e. customer authentication fails, customer-service mapping fails, or change of CE-VLAN ID is not within contractual bounds), then SP SOF sends “invalid Request” to the customer. This message will be displayed at the Customer Portal. b. Valid, but the requested CE-VLAN ID value is not available, SP SOF sends “Resources are Unavailable, Please try it later” to the customer. If this step is repeated 3 times in an SP selected time

	interval (e.g. 5 minutes), SP SOF sends "Please try it in <time interval in minutes>" to the customer. These messages will be displayed at the Customer Portal. *SP SOF may choose to receive confirmation from SP ICM and SP ECM before denying the request, in addition to its own validation for customer-service mapping and CE-VLAN ID availability*. *Per agreement between SP and PART, SP SOF may choose to receive confirmation from PART SOF before denying the request*. c. Valid and the requested CE-VLAN ID value is available in the network to support the CE-VLAN ID change, then S4 (Step 4) will be initiated. d. If the request is invalid and rejected, or valid and rejected due to resource unavailability , SP SOF informs SP OSS/BSS (BA) to update the customer-SP SLOs. Similarly, PART SOF informs PART OSS/BSS (BA) to update the customer-SP SLOs. 5. Tsp-cust and Tsp-part are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA). 6. This UC ends
Post-Conditions	Customer Portal displays messages in 4a and 4b above or SP SOF initiates the CE-VLAN ID change.
Alternative Path	
Assumption(s)	
References	

Table 20: Use case description for CE-VLAN ID Change at On-net Location with CE-VLAN ID Preservation (S1,2,and 3)

Use Case Number	UC2
Use Case Name	CE-VLAN ID Change process, configuration, testing, accept or denial, billing initiation and SLO update by SP and PART
Description	SP SOF and PART SOF initiate, configure, and test CE-VKLAN ID change over their own PRESTO and ADAGIO interfaces; accept or deny the CE-VLAN ID Change over CANTATA; initiate billing over LEGATO; and update their SLOs over LEGATO.
Actor(s)	SP SOF, SP ICM, SP ECM, PART SOF, PART ICM, PART ECM, SP OSS/BSS (BA), PART OSS/BSS (BA)
Pre-Condition(s)	Customer request has been validated by SP SOF
Process Steps	1. SP SOF requests CE-VLAN ID change from PART SOF over INTERLUDE and requests CE-VLAN ID change from SP ICM over PRESTO. *It is a choice for SP to receive confirmation from its ICM and ECM for the CE-VLAN ID change before sending a request to PART SOF*.

	2. SP ICM verifies validity of request and if CE-VLAN ID is available at on-net UNI and I-NNIs. a. If the verification is successful, it requests CE-VLAN ID change from SP ECM over ADAGIO. b. If the verification is unsuccessful, SP ICM notifies SP SOF that the request is invalid or CE-VLAN ID is unavailable. In turn, SP SOF sends "Invalid Request, or Unavailable Resources and Please try it later" to the customer 3. SP ECM validates the request and if CE-VLAN ID is available at on-net UNI and OVC End Point. After the SP ECM validation, SP ECM sends a confirmation or denial message to SP ICM for the CE-VLAN ID Change. In turn, SP ICM sends a confirmation or denial message to SP SOF for CE-VLAN ID change at on-net UNI and on-net OVC End Point. 4. PART SOF verifies validity of request and if CE-VLAN ID is available at off-net UNI and off-net NNIs a. If the verification is successful, it requests CE-VLAN ID change from PART ICM. b. If the verification is unsuccessful, PART SOF notifies SP SOF that either request is invalid or PART resources are unavailable. In turn, SP SOF either sends "invalid Request" or "Resources are Unavailable, Please try it later" to the customer 5. PART ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and CE-VLAN ID is available at these interfaces to support the requested CE-VLAN ID. a. if CE-VLAN ID is unavailable at off-net UNI, ENNI or I-NNIs of Partner network, PART ICM notifies PART SOF about invalid request or unavailability of CE-VLAN ID. In turn, PART SOF sends a message to SP SOF indicating that either the request is invalid or there is not enough capacity to support the change. SP SOF responds to customer with "Invalid Request " or "Unavailable Resources and Please try it Later". b. If CE-VLAN ID is available at off-net UNI, ENNI or I-NNI, PART ICM requests PART ECM to change CE-VLAN ID. 6. PART ECM validates the request and if CE-VLAN ID is available at off-net UNI and PART OVC End Point to support new CE-VLAN ID. After the PART ECM validation, PART ECM sends a confirmation or denial message to PART ICM for the CE-VLAN ID Change. In turn, PART ICM sends a confirmation or denial message to PART SOF for CE-VLAN ID change at off-net UNI and off-net OVC End Point. For the request denial message, SP SOF responds customer with "Invalid Request, or Unavailable Resources and Please try it Later". 7. If SP SOF receives conformation from SP ICM, SP ECM and PART SOF, a. SP SOF confirms CE-VLAN ID change to customer without testing the EVC for new CE-VLAN ID, or b. SP SOF request testing of SP OVC for the new CE-VLAN ID from SP ICM and ECM c. PART SOF requests testing of PART OVC for the new CE-VLAN ID from PART ICM and ECM d. Based on test results from SP ICM, SP ECM and PART SOF, SP SOF sends either "CE-VLAN ID for Service is Changed" or "Unavailable resources, please try it later" to customer. 8. If testing of SP OVC and PART OVC separately validates CE-VLAN ID

	change, SP SOF may decide to run an end-to-end EVC test before confirming or denying the CE-VLAN ID change. Based on the test results, SP SOF sends either "CE-VLAN ID for Service is Changed" or "Unavailable resources, please try it later" to customer. 9. SP SOF informs SP OSS/BSS (BA) for each denial or confirmation of CE-VLAN ID change request. Similarly, PART SOF informs PART OSS/BSS (BA). 10. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART. 11. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.
Post Conditions	Billing is initiated if the request is conformed. SLOs for Elastic Service are being updated by SP OSS/BSS (BA) and PART OSS/BSS (BA).
Alternate Paths	.
Assumption(s)	
References	S4-S17

Table 21: Use case description for CE-VLAN ID Change at On-net Location with CE-VLAN ID Preservation (S4-17)

7.11.2.1 Requirements

R_ELASTIC_EVC_CEVLANID_002	Elastic Ethernet Service shall support CE-VLAN ID change with CE-VLAN ID preservation for on-net UNI.
Source	S1

R_ELASTIC_CEVLANID_CANTATA_002	CANTATA shall support CE-VLAN ID change with CE-VLAN ID preservation for on-net UNI.
Source	S1

R_ELASTIC_CEVLANID_ALLEGRO_002	ALLEGRO shall support CE-VLAN ID change with CE-VLAN ID preservation for on-net UNI.
Source	S1

	PRESTO shall support CE-VLAN ID change with CE-VLAN ID preservation for on-net UNI.

R_ELASTIC_CEVLANID_PRESTO_002	
Source	S1

1994

R_ELASTIC_CEVLANID_ADAGIO_002	ADAGIO shall support CE-VLAN ID change with CE-VLAN ID preservation for on-net UNI.
Source	S1

1995

R_ELASTIC_CEVLANID_INTERLU_001	SONATA shall support CE-VLAN ID change with CE-VLAN ID preservation for on-net UNI.
Source	S1

1996

R_ELASTIC_CEVLANID_INTERLU_001	INTERLUDE shall support CE-VLAN ID change with CE-VLAN ID preservation for on-net UNI.
Source	S1

1997

1998

R_ELASTIC_VLAN_CANTATA_SLO_002	CANTATA shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CE-VLAN ID change with CE-VLAN ID preservation for on-net UNI .
Source	S1, [1]

1999

R_ELASTIC_VLAN_ALLEGRO_SLO_002	ALLEGRO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CE-VLAN ID change with CE-VLAN ID preservation for on-net UNI.
Source	S1, [1]

2000

	LEGATO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled

R_ELASTIC_VLAN_LEGATO_SLO_002	(TFR/TAR) per month for CE-VLAN ID change with CE-VLAN ID preservation for on-net UNI.
Source	S1, [1]

2001

R_ELASTIC_VLAN_SONATA_SLO_001	SONATA shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CE-VLAN ID change with CE-VLAN ID preservation for on-net UNI.
Source	S1, [1]

2002

R_ELASTIC_VLAN_INTERLU_SLO_001	INTERLUDE shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CE-VLAN ID change with CE-VLAN ID preservation for on-net UNI.
Source	S1, [1]

2003

2004

R_ELASTIC_SCH_ALLEGRO_002	On-demand request for changing CE-VLAN ID with CE-VLAN ID preservation for on-net UNI immediately or at certain day and time in the future should be supported from ALLEGRO interface of SP SOF.
Source	S1

2005

R_ELASTIC_SCH_LEGATO_002	On-demand request for changing CE-VLAN ID with CE-VLAN ID preservation for on-net UNI immediately or at certain day and time in the future should be supported from LEGATO interface.
Source	S1

2006

R_ELASTIC_SCH_CANTATA_002	On-demand request for changing CE-VLAN ID with CE-VLAN ID preservation for on-net UNI immediately or at certain day and time in the future should be supported from

	CANTATA interface.
Source	S1

2007

R_ELASTIC_SCH_SONATA_001	On-demand request for changing CE-VLAN ID with CE-VLAN ID preservation for on-net UNI immediately or at certain day and time in the future should be supported from SONATA interface.
Source	S1

2008

R_ELASTIC_SCH_INTERLUDE_001	On-demand request for changing CE-VLAN ID with CE-VLAN ID preservation for on-net UNI immediately or at certain day and time in the future should be supported from INTERLUDE interface.
Source	S1

2009

2010

O_PRESTO_TEST_006	PRESTO should support OVC testing for new CE-VLAN ID with CE-VLAN ID preservation that is initiated by SOF, after the CE-VLAN ID change for on-net UNI confirmation of ICM and ECM.

2011

O_ADAGIO_TEST_006	ADAGIO should support OVC testing for new CE-VLAN ID with CE-VLAN ID preservation for on-net UNI that is initiated by SOF, after the CE-VLAN ID change confirmation of ECM.

2012

2013

O_SP_SOF_TEST_004	SP SOF shall be able to initiate SP OVC testing for new CE-VLAN ID with CE-VLAN ID preservation after the VLAN ID change confirmation of SP ICM and SP ECM.
Source	S9
O_SP_SOF_TEST_001	SP SOF shall be able to initiate end-to-end EVC testing for new CE-VLAN ID with CE-VLAN ID preservation after the CE-VLAN ID change confirmation of SP SOF and PART SOF.
Source	S14

2014

O_INTERLUDE_TEST_001	INTERLUDE should support end-to-end EVC testing of SP SOF for new CE-VLAN ID with CE-VLAN ID preservation after the CE-VLAN ID change confirmation of SP SOF and PART SOF.
Source	S14

2015

2016

R_SP_SOF_TIMING_004	SP SOF shall be able to measure Tsp-cust and Tsp-part, and report them to SP OSS/BSS (BA) for on-demand CE-VLAN ID change with CE-VLAN ID preservation for on-net UNI.
Source	

2017

R_PART_SOF_TIMING_007	PART SOF MUST be able to measure Tsp-part and report it to PART OSS/BSS (BA) for on-demand CE-VLAN ID change with CE-VLAN ID preservation change.
Source	

2018

2019

R_LEGATO_TIMING_0013	SP LEGATO API shall be able to support Tsp-cust and Tsp-part for on-demand CE-VLAN ID change with CE-VLAN ID preservation.
Source	
R_SONATA_TIMING_007	SONATA API shall be able to support Tsp-cust and Tsp-part for on-demand CE-VLAN ID change with CE-VLAN ID preservation.
Source	

2020

2021

2022 Table 22: Requirements for on-demand CE-VLAN ID change with CE-VLAN ID
2023 preservation at on-net location

2024 ### 7.11.3 CE-VLAN ID Change at Off-net Location Z

2025 The details are depicted in **Figure 11**. Steps in **Figure 11** are as follows:

- S1[ALLEGRO or CANTATA+LEGATO]: User requests CE-VLAN ID Change either from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and SP LEGATO interface of SP SOF

- S2: SP SOF validates customer, the E-LINE service configuration between location A and location Z, and whether requested CE-VLAN ID is available within PART network to support the new CE-VLAN ID if SP SOF is capable of tracking available CE-VLAN IDs. Furthermore, if some of the information such as services and locations that belong to the customer is not in SOF, but in OSS/BSS (BA), then SOF requests the information from the OSS/BSS (BA) using LEGATO interface.

  - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back to user with "Invalid Request" if user credentials are invalid or "Unavailable Resources and Please try it Later" if CE-VLAN ID is unavailable or "Request is accepted and in progress" .

  - *If customer requests pass user authentication at S2, per agreement between SP and PART, SP SOF waits for a confirmation from PART SOF (i.e. results of S4c, S5, S7a) before accepting or denying a customer request based on its own verification that the request is invalid and/or the requested CE-VLAN ID is unavailable.*

  - *If customer requests pass user authentication at S2, it is up to SP SOF to wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and S7a) before denying a customer request based on its own verification that request is invalid and/or the requested CE-VLAN ID is unavailable.*

  - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S4a [INTERLUDE]: Based on S2, if user credentials are valid and either CE-VLAN ID is available or SP SOF has no CE-VLAN ID information, SP SOF sends a request to Partner SOF to Change CE-VLAN ID at off-net UNI.

- S4b [PRESTO]: PART SOF requests PART ICM to Change CE-VLAN ID at off-net UNI.

- S5: PART ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and requested CE-VLAN ID is available at UNI to Change CE-VLAN ID.

- S6: [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if CE-VLAN ID is not available at off-net UNI, PART SOF sends message "Unavailable Resources and Please try it Later" to SP SOF. In turn, SP SOF sends message "Unavailable Resources and Please try it Later" to customer.

- S7: [PRESTO+ADAGIO] If CE-VLAN ID can be supported at off-net UNI, Partner ICM changes CE-VLAN ID at off-net UNI and requests Partner ECM to change the CE-VLAN ID of the End Point on off-net UNI".

- S8: [ADAGIO+PRESTO] After Partner ECM changes CE-VLAN ID at off-net UNI and associated EVC End Point, Partner ECM sends a confirmation message to Partner ICM. In turn, Partner ICM sends a confirmation message to Partner SOF indicating CE-VLAN ID change at off-net UNI and associated EVC End Point.

- S8a [ALLEGRO or CANTATA+LEGATO] At S8, if CE-VLAN ID change is successful, SP SOF sends the message "CE-VLAN ID is changed" to customer.

- S8b [ALLEGRO or CANTATA+LEGATO] At S8, if CE-VLAN ID change is unsuccessful, SP SOF sends the message "Unavailable resources, please try it later" to customer.

- S9 [PRESTO+ADAGIO]: After S8, optionally, PART SOF runs tests on PART OVC to verify the new CE-VLAN ID, by requesting ICM and ECM to test the new CE-VLAN ID at off-net UNI and OVC endpoint. .

- S10:

    1. [ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner OVC, Partner ECM confirms CE-VLAN ID change to Partner ICM and in turn Partner ICM confirms CE-VLAN ID change to Partner SOF.

    2. [INTERLUDE] Partner SOF confirms CE-VLAN ID change to SP SOF, "Confirm Availability of new CE-VLAN ID for PART OVC".

- S11 [ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer indicating "CE-VLAN ID is Changed".

- S12: [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for PART OVC, PART ECM confirms failure of PART OVC testing to PART ICM and in turn PART ICM confirms failure of new CE-VLAN ID testing to PART SOF. After that, PART SOF sends message "Unavailable Resources" to SP SOF.

- S13: [ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer indicating "Unavailable Resources, Please try it Later"".
- S14 [PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without Partner test its OVC), optionally, SP SOF runs and end-to-end EVC test.

- S15

    1. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP SOF informs customer indicating that "Unavailable Resources, Please try it Later".

    2. [ALLEGRO or CANTATA+LEGATO] If testing is successful, SP SOF informs customer that "CE-VLAN ID for Service is Changed".

3. [LEGATO] if testing is successful, to initiate new billing procedure, SP SOF also informs SP OSS that “CE-VLAN ID is Changed”.

- S16 [LEGATO]:
  1. a) After S8a and S11, per contract between SP and PART, PART SOF informs PART OSS/BSS (BA) that CE-VLAN ID change is confirmed so that SLO between SP and PART, **percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR),** can be updated.
     b) After S8a and S11,SP chooses to confirm CE-VLAN ID change without an end-to-end testing of EVC and informs OSS/BSS (BA) to initiate the billing and update on-demand SLO parameters**, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).**
  2. After S14, if testing is successful, SP SOF informs OSS to initiate new billing procedure for the new CE-VLAN ID and update on demand SLO parameters, **percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).**
  3. a) After S14, if testing is unsuccessful, PART SOF informs OSS to update on demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).
     b)After S14, if testing is unsuccessful, SP SOF informs OSS to update on demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).
     c) After S14, whether testing successful or unsuccessful, SP SOF informs PART SOF about the outcome so that PART SOF can inform SP OSS for the SLO update.
     c) After S14, whether testing successful or unsuccessful, SP SOF informs PART SOF about the outcome so that PART SOF can inform SP OSS for the SLO update.

- S17 [LEGATO]:
  1. After S2, If there is a way to identify the fact that the request is considered to be invalid despite of the fact that it is a valid request, in order to calculate on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP SOF informs SP OSS/BSS (BA) that a valid request was considered to be invalid and rejected.
  2. After S2,S6, S8b, S13 and S15, if CE-VLAN ID is not available to support CE-VLAN ID change, SP SOF informs OSS to update its SLO for on-demand CE-VLAN ID change, **percent of accepted requests fulfilled (TFR/TAR)**.

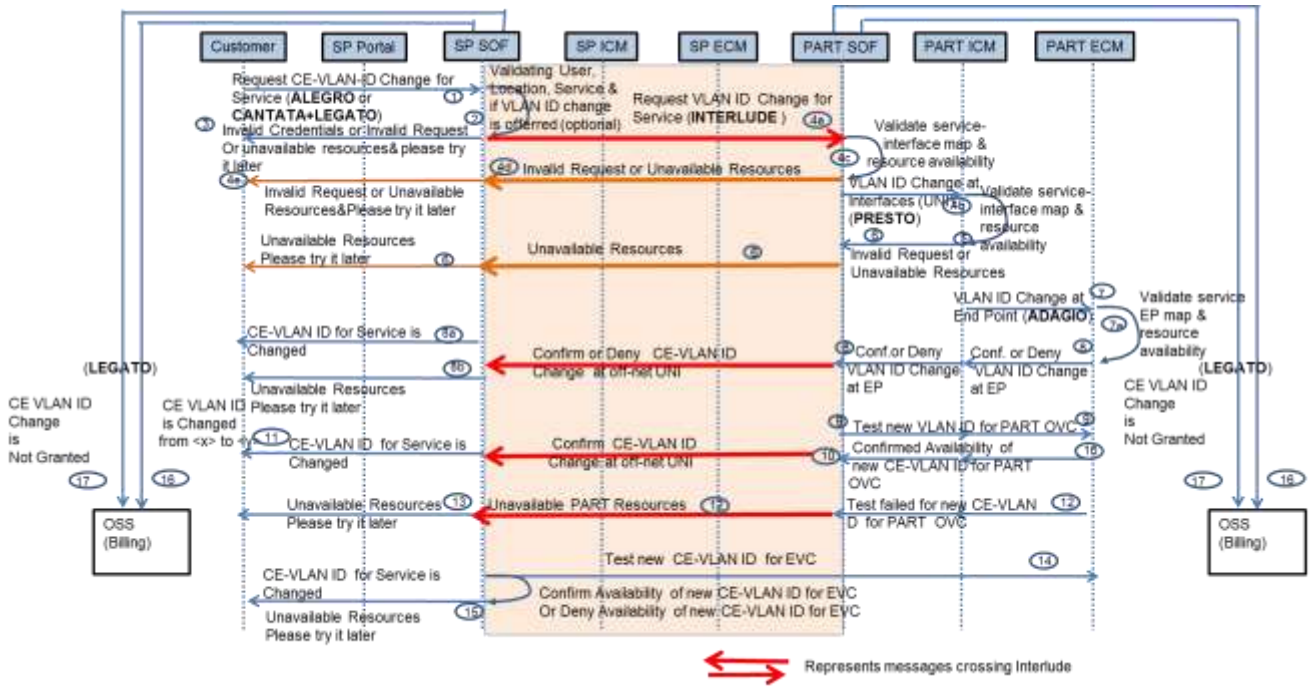

Figure 11: CE VLAN-ID Change Process Flow: Change at Off-net Location Z

Use Case Number	UC1
Use Case Name	CE-VLAN ID Change at Off-net Location Z
Description	Customer requests a change of CE-VLAN ID for E-LINE at the Customer Portal
Actor(s)	Customer, Customer Portal, SP OSS/BSS (BA), SP SOF, PART SOF
Pre-Condition(s)	Service has been ordered and configured.
Process Steps	1. Customer uses the Customer Portal to request the change of CE-VLAN ID. 2. Customer enters all the mandatory data elements displayed on the portal (i.e. CE-VLAN ID value, immediately or certain time in the future) 3. Customer Portal, SP OSS/BSS (BA), and SP SOF perform customer authentication and validates the service for this customer, integrity of the data elements, and whether the requested CE-VLAN ID value is available within SP and PART Network. For this, SP SOF may need to collaborate with SP OSS/BSS (BA) over LEGATO interface. 4. If the CE-VLAN ID request is : a. Invalid (i.e. customer authentication fails, customer-service mapping fails, or change of CE-VLAN ID is not within contractual bounds), then SP SOF sends “invalid Request” to the customer. This message will be displayed at the Customer Portal. b. Valid, but the requested CE-VLAN ID value is not available at off-net UNI, PART SOF sends message “Unavailable Resources and Please try it later” to the SP SOF. In turn SP SOF sends message “Unavailable Resources are, Please try it later” to the Customer.

	It is recommended that If this step is repeated 3 times in an SP selected time interval (e.g. 5 minutes), SP SOF sends "Please try it in <time interval in minutes>" to the customer. These messages will be displayed at the Customer Portal. *Per agreement between SP and PART, SP SOF may choose to receive confirmation from PART SOF before denying the request*. c. Valid and the requested CE-VLAN ID value is available in the off-net UNI to support the CE-VLAN ID change, then S4 (Step 4) will be initiated. d. If the request is invalid and rejected, or valid and rejected due to resource unavailability , SP SOF informs SP OSS/BSS (BA) to update the customer-SP SLOs. Similarly, PART SOF informs PART OSS/BSS (BA) to update the customer-SP SLOs. 5. Tsp-cust and Tsp-part are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA). 6. This UC ends
Post-Conditions	Customer Portal displays messages in 4a and 4b above or SP SOF initiates the CE-VLAN ID change.
Alternative Path	
Assumption(s)	
References	

2147

2148 **Table 23:** Use case description for CE-VLAN ID Change at Off-net Location Z (S1-S3)

2149

Use Case Number	UC2
Use Case Name	CE-VLAN ID Change process, configuration, testing, accept or denial, billing initiation and SLO update by SP and PART
Description	SP SOF and PART SOF initiate, configure, and test CE-VLAN ID change over their own PRESTO and ADAGIO interfaces; accept or deny the CE-VLAN ID Change over CANTATA; initiate billing over LEGATO; and update their SLOs over LEGATO.
Actor(s)	SP SOF, SP ICM, SP ECM, PART SOF, PART ICM, PART ECM, SP OSS/BSS (BA), PART OSS/BSS (BA)
Pre-Condition(s)	Customer request has been validated by SP SOF
Process Steps	1. SP SOF requests CE-VLAN ID change from PART SOF over INTERLUDE and requests CE-VLAN ID change from SP ICM over PRESTO. *It is a choice for SP to receive confirmation from its ICM and ECM for the CE-VLAN ID change before sending a request to PART SOF*. 2. SP ICM verifies validity of request and if there is adequate capacity at UNI and NNIs. a. If the verification is successful, it requests CE-VLAN ID change from SP ECM over ADAGIO. b. If the verification is unsuccessful, SP ICM notifies SP SOF that the request is invalid or resources are

	unavailable. In turn, SP SOF sends "Invalid Request, or Unavailable Resources and Please try it later" to the customer 3. SP ECM validates the request and if there is enough capacity at on-net UNI and OVC End Point to support new CE-VLAN ID. After the SP ECM validation, SP ECM sends a confirmation or denial message to SP ICM for the CE-VLAN ID Change. In turn, SP ICM sends a confirmation or denial message to SP SOF for CE-VLAN ID change at on-net UNI and on-net OVC End Point. 4. PART SOF verifies validity of request and if there is adequate capacity at off-net UNI and off-net NNIs a. If the verification is successful, it requests CE-VLAN ID change from PART ICM. b. If the verification is unsuccessful, PART SOF notifies SP SOF that either request is invalid or PART resources are unavailable. In turn, SP SOF either sends "invalid Request" or "Resources are Unavailable, Please try it later" to the customer 5. PART ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and there is enough capacity at these interfaces to support the requested CE-VLAN ID. a. if CE-VLAN ID is unavailable at off-net UNI, ENNI or I-NNIs of Partner network, PART ICM notifies PART SOF about invalid request or unavailability of resources. In turn, PART SOF sends a message to SP SOF indicating that either the request is invalid or CE-VLAN ID is unavailable to support the change. SP SOF responds to customer with "Invalid Request " or "Unavailable Resources and Please try it Later". b. If CE-VLAN ID is available at off-net UNI, ENNI or I-NNI, PART ICM requests PART ECM to change CE-VLAN ID. 6. PART ECM validates the request and if CE-VLAN ID is available at off-net UNI and PART OVC End Point to support new CE-VLAN ID. After the PART ECM validation, PART ECM sends a confirmation or denial message to PART ICM for the CE-VLAN ID Change. In turn, PART ICM sends a confirmation or denial message to PART SOF for CE-VLAN ID change at off-net UNI and off-net OVC End Point. For the request denial message, SP SOF responds customer with "Invalid Request, or Unavailable Resources and Please try it Later". 7. If SP SOF receives conformation from SP ICM, SP ECM and PART SOF, a. SP SOF confirms CE-VLAN ID change to customer without testing the EVC for new CE-VLAN ID, or b. SP SOF request testing of SP OVC for the new CE-VLAN ID from SP ICM and ECM c. PART SOF requests testing of PART OVC for the new CE-VLAN ID from PART ICM and ECM d. Based on test results from SP ICM, SP ECM and PART SOF, SP SOF sends either "CE-VLAN ID for Service is Changed" or "Unavailable resources, please try it later" to customer. 8. If testing of SP OVC and PART OVC separately validates CE-VLAN ID change, SP SOF may decide to run an end-to-end EVC test before confirming or denying the CE-VLAN ID change. Based on the test results, SP SOF sends either "CE-VLAN ID for Service is Changed" or "Unavailable resources, please try it later" to customer. 9. SP SOF informs SP OSS/BSS (BA) for each denial or confirmation of CE-VLAN ID change request. Similarly, PART SOF informs PART

	OSS/BSS (BA). 10. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART. 11. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.
Post Conditions	Billing is initiated if the request is conformed. SLOs for Elastic Service are being updated by SP OSS/BSS (BA) and PART OSS/BSS (BA).
Alternate Paths	.
Assumption(s)	
References	S4-S17

Table 24: Use case description for CE-VLAN ID Change at Off-net Location Z (S4-S17)

7.11.3.1 Requirements

R_ELASTIC_EVC_CEVLANID_003	Elastic Ethernet Service shall support CE-VLAN ID change for off-net UNI.
Source	S1

R_ELASTIC_CEVLANID_CANTATA_003	CANTATA shall support CE-VLAN ID change for off-net UNI.
Source	S1

R_ELASTIC_CEVLANID_ALLEGRO_003	ALLEGRO shall support CE-VLAN ID change for off-net UNI.
Source	S1

R_ELASTIC_CEVLANID_PRESTO_003	PRESTO shall support CE-VLAN ID change for off-net UNI.
Source	S1

R_ELASTIC_CEVLANID_ADAGIO_003	ADAGIO shall support CE-VLAN ID change for off-net UNI.
Source	S1

2159

R_ELASTIC_CEVLANID_SONATA_001	SONATA shall support CE-VLAN ID change for off-net UNI.
Source	S1

2160

R_ELASTIC_CEVLANID_INTERLU_002	INTERLUDE shall support CE-VLAN ID change for off-net UNI.
Source	S1

2161

2162

R_ELASTIC_VLAN_CANTATA_SLO_003	CANTATA shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CE-VLAN ID change for off-net UNI.
Source	S1, [1]

2163

R_ELASTIC_VLAN_ALLEGRO_SLO_003	ALLEGRO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CE-VLAN ID change for off-net UNI.
Source	S1, [1]

2164

R_ELASTIC_VLAN_LEGATO_SLO_003	LEGATO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CE-VLAN ID change for off-net UNI.
Source	S1, [1]

2165

	SONATA shall support percent of valid requests accepted (TAR/TVR) per month and

R_ELASTIC_VLAN_SONATA_SLO_002	percent of accepted requests fulfilled (TFR/TAR) per month for CE-VLAN ID change for off-net UNI.
Source	S1, [1]

2166

R_ELASTIC_VLAN_INTERLU_SLO_002	INTERLUDE shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CE-VLAN ID change for off-net UNI.
Source	S1, [1]

2167

R_ELASTIC_SCH_ALLEGRO_003	On-demand request for changing CE-VLAN ID for off-net UNI immediately or at certain day and time in the future should be supported from ALLEGRO interface of SP SOF.
Source	S1

2168

R_ELASTIC_SCH_LEGATO_003	On-demand request for changing CE-VLAN ID for off-net UNI immediately or at certain day and time in the future should be supported from LEGATO interface.
Source	S1

2169

R_ELASTIC_SCH_CANTATA_003	On-demand request for changing CE-VLAN ID for off-net UNI immediately or at certain day and time in the future should be supported from CANTATA interface.
Source	S1

2170

R_ELASTIC_SCH_SONATA_002	On-demand request for changing CE-VLAN ID for off-net UNI immediately or at certain day and time in the future should be supported from SONATA interface.
Source	S1

2171

R_ELASTIC_SCH_INTERLUDE_002	On-demand request for changing CE-VLAN ID for off-net UNI immediately or at certain day and time in the future should be supported

	from INTERLUDE interface.
Source	S1

2172

2173

O_PRESTO_TEST_007	PRESTO should support OVC testing for new CE-VLAN ID that is initiated by SOF, after the CE-VLAN ID change for off-net UNI confirmation of ICM and ECM.

2174

O_ADAGIO_TEST_007	ADAGIO should support OVC testing for new CE-VLAN ID for off-net UNI that is initiated by SOF, after the CE-VLAN ID change confirmation of ECM.

2175

2176

O_SP_SOF_TEST_005	SP SOF shall be able to initiate SP OVC testing for new CE-VLAN ID for off-net UNI after the VLAN ID change confirmation of SP ICM and SP ECM.
Source	S9
O_SP_SOF_TEST_002	SP SOF shall be able to initiate end-to-end EVC testing for new CE-VLAN ID for off-net UNI after the CE-VLAN ID change confirmation of SP SOF and PART SOF.
Source	S14

2177

O_INTERLUDE_TEST_001	INTERLUDE should support end-to-end EVC testing of SP SOF for new CE-VLAN ID after the CE-VLAN ID change for off-net UNI confirmation of SP SOF and PART SOF.
Source	S14

2178

2179

O_PART_SOF_TEST_001	PART SOF shall be able to initiate PART OVC testing for new CE-VLAN ID after the CE-VLAN ID change confirmation of PART ICM and PART ECM for off-net UNI.
Source	S9

2180

2181

2182

R_SP_SOF_TIMING_005	SP SOF shall be able to measure Tsp-cust and Tsp-part , report them to SP OSS/BSS (BA) for on-demand CE-VLAN ID change.
Source	

2183

2184

R_PART_SOF_TIMING_008	PART SOF shall be able to measure Tsp-part and report it to PART OSS/BSS (BA) for on-demand CE-VLAN ID change for off-net UNI.
Source	

2185

R_LEGATO_TIMING_0014	SP LEGATO API shall be able to support Tsp-cust and Tsp-part for on-demand CE-VLAN ID change for off-net UNI.
Source	
R_LEGATO_TIMING_0015	PART LEGATO API shall be able to support Tsp-part for on-demand CE-VLAN ID change for off-net UNI.
Source	
R_SONATA_TIMING_008	SONATA API shall be able to support Tsp-cust and Tsp-part for on-demand CE-VLAN ID change for off-net UNI.
Source	

2186

2187 Table 25: Requirements for on-demand CE-VLAN ID change at off-net location Z

2188
2189

2190 7.11.4 CE-VLAN ID Change at Off-net Location Z with CE-VLAN ID 2191 Preservation

2192 The details are depicted in **Figure 12**. Steps in **Figure 12** are as follows:

2193 • S1[ALLEGRO or CANTATA+LEGATO]: User requests CE-VLAN ID Change
2194 either from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and
2195 SP LEGATO interface of SP SOF

2196 • S2: SP SOF validates customer, the E-LINE service configuration between
2197 location A and location Z, and whether requested CE-VLAN ID is available within

SP and PART network to support the new CE-VLAN ID if SP SOF is capable of tracking available CE-VLAN IDs. Furthermore, if some of the information such as services and locations that belong to the customer is not in SOF, but in OSS/BSS (BA), then SOF requests the information from the OSS/BSS (BA) using LEGATO interface.

- *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back to user with "Invalid Request" if user credentials are invalid or "Unavailable Resources and Please try it Later" if CE-VLAN ID is unavailable or "Request is accepted and in progress" .

  - *If customer requests pass user authentication at S2, per agreement between SP and PART, SP SOF waits for a confirmation from PART SOF (i.e. results of S4c, S5, S7a) before accepting or denying a customer request based on its own verification that the request is invalid and/or the requested CE-VLAN ID is unavailable.*

  - *If customer requests pass user authentication at S2, it is up to SP SOF to wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and S7a) before denying a customer request based on its own verification that request is invalid and/or the requested CE-VLAN ID is unavailable.*

  - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S4 [PRESTO]: Based on S2, if user credentials are valid and either CE-VLAN ID is available or SP SOF has no CE-VLAN ID information, SP SOF sends a request to SP ICM to change CE-VLAN ID at SP side of ENNI, on-net I-NNIs and on-net UNI.

- S4a [INTERLUDE]: Based on S2, if user credentials are valid and either CE-VLAN ID is available or SP SOF has no CE-VLAN ID information, SP SOF sends a request to Partner SOF to Change CE-VLAN ID at Partner side of ENNI, off-net UNI, and off-net I-NNIs. S4 and S4a can take place at the same time in order to reduce response time to user or S4a can take place after SP completes S8.

- S4b [PRESTO]: Partner SOF requests Partner ICM to Change CE-VLAN ID at Partner side of ENNI, off-net UNI and off-net I-NNIs.

- S5 [PRESTO]:

  1. SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and requested CE-VLAN ID is available at on-net UNI to Change CE-VLAN ID.
  2. Similarly, PART ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within PART network and requested CE-VLAN ID is available at off-net UNI to Change CE-VLAN ID.

- S6:

    1. [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if CE-VLAN ID is not available at on-net UNI, SP SOF responds to customer with “Unavailable Resources and Please try it Later”.

    2. [PRESTO+INTERLUDE+ALLEGRO or PRESTO+INTERLUDE+CANTATA+LEGATO] Similarly, if CE-VLAN ID is not supported at off-net UNI, ENNI or I-NNIs of Partner network, Partner SOF send a message to SP SOF indicating “Unavailable Resources”. SP SOF responds to customer with “Unavailable Resources and Please try it Later”.

- S7: [PRESTO+ADAGIO]

    1. Based on S5, if CE-VLAN ID is available at on-net UNI, SP ICM changes CE-VLAN ID at UNI and requests SP ECM to change the CE-VLAN ID of End Point on the on-net UNI”.

    2. Similarly, if CE-VLAN ID can be supported at off-net UNI, ENNI and I-NNIs of Partner network, Partner ICM changes CE-VLAN ID at ENNI and I-NNIs and requests Partner ECM to change the CE-VLAN ID of the End Point on off-net UNI”.

- S8: [ADAGIO+PRESTO]

    1. After SP ECM changes CE-VLAN ID at on-net UNI and associated EVC End Point, SP ECM sends a confirmation message to SP ICM. In turn, SP ICM sends a confirmation message to SP SOF indicating the CE-VLAN ID change at on-net UNI and EVC End Point.

    2. Similarly, after Partner ECM changes CE-VLAN ID at off-net UNI and associated EVC End Point, Partner ECM sends a confirmation message to Partner ICM. In turn, Partner ICM sends a confirmation message to Partner SOF indicating CE-VLAN ID change at off-net UNI and associated EVC End Point.

- S8a [ALLEGRO or CANTATA+LEGATO] At S8, if CE-VLAN ID change is successful, SP SOF sends the message “CE-VLAN ID is changed” to customer.

- S8b [ALLEGRO or CANTATA+LEGATO] At S8, if CE-VLAN ID change is unsuccessful, SP SOF sends the message “Unavailable resources, please try it later” to customer.

- S9 [PRESTO+ADAGIO]: After S8, optionally, SP SOF runs tests on SP OVC to verify the new CE-VLAN ID, by requesting ICM and ECM to test the new CE-VLAN ID at UNI and endpoint. PART SOF runs tests on PART OVC to verify the new CE-VLAN ID, by requesting ICM and ECM to test the new CE-VLAN ID at off-net UNI and endpoint. .

- S10:

2278 1. [ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM
2279 confirms the CE-VLAN ID change to SP ICM and in turn SP ICM confirms
2280 the CE-VLAN ID change to SP SOF.

2281 2. [ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner
2282 OVC, Partner ECM confirms CE-VLAN ID change to Partner ICM and in
2283 turn Partner ICM confirms CE-VLAN ID change to Partner SOF.

2284 3. [INTERLUDE] Partner SOF confirms CE-VLAN ID change to SP SOF,
2285 "Confirm Availability of new CE-VLAN ID for PART OVC".

2286 • S11 [ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer
2287 indicating "CE-VLAN ID is Changed".

2288 • S12: [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for SP OVC, SP ECM
2289 confirms failure of SP OVC testing to SP ICM and in turn SP ICM confirms
2290 failure of new CE-VLAN ID testing to SP SOF.

2291 • S13: [ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer
2292 indicating "Unavailable Resources, Please try it Later"".
2293 • S14 [PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without SP and
2294 Partner test their OVCs), optionally, SP SOF runs and end-to-end EVC test.

2295 • S15

2296 1. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP
2297 SOF informs customer indicating that "Unavailable Resources, Please try it
2298 Later".

2299 2. [ALLEGRO or CANTATA+LEGATO]if testing is successful, SP SOF informs
2300 customer that "CE-VLAN ID for Service is Changed".
2301 • S16 [LEGATO]:
2302 1. a) After S8a and S11, per contract between SP and Ethernet Access
2303 Operator (PART), PART SOF informs PART OSS/BSS (BA) that CE-
2304 VLAN ID change is confirmed so that SLO between SP and PART,
2305 **percent of valid requests accepted (TAR/TVR) and percent of**
2306 **accepted requests fulfilled (TFR/TAR),** can be updated.
2307 b) After S8 and S11,SP chooses to confirm CE-VLAN ID change without
2308 an end-to-end testing of EVC and informs OSS/BSS (BA) to initiate the
2309 billing and update on-demand SLO parameters**, percent of valid**
2310 **requests accepted (TAR/TVR) and percent of accepted requests**
2311 **fulfilled (TFR/TAR).**
2312 2. After S14, if testing is successful, SP SOF informs OSS to initiate new
2313 billing procedure for the new CE-VLAN ID and update on demand SLO
2314 parameters, **percent of valid requests accepted (TAR/TVR) and**
2315 **percent of accepted requests fulfilled (TFR/TAR).**
2316 3. a) After S14, if testing is unsuccessful, PART SOF informs OSS to update
2317 on demand SLO parameters, percent of valid requests accepted
2318 (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).

b)After S14, if testing is unsuccessful, SP SOF informs OSS to update on demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).
c) After S14, whether testing successful or unsuccessful, SP SOF informs PART SOF about the outcome so that PART SOF can inform SP OSS for the SLO update.

- S17 [LEGATO]:
  1. At S3, If there is a way to identify the fact that the request is considered to be invalid despite of the fat that it is a valid request, in order to calculate on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP SOF informs SP OSS/BSS (BA) that a valid request was considered to be invalid and rejected.
  2. After S3,S6.1&2, S8b, S13 and S15, if CE-VLAN ID is not available to support CE-VLAN ID change, SP SOF informs OSS to update its SLO for on-demand CE-VLAN ID change, **percent of accepted requests fulfilled (TFR/TAR)**.

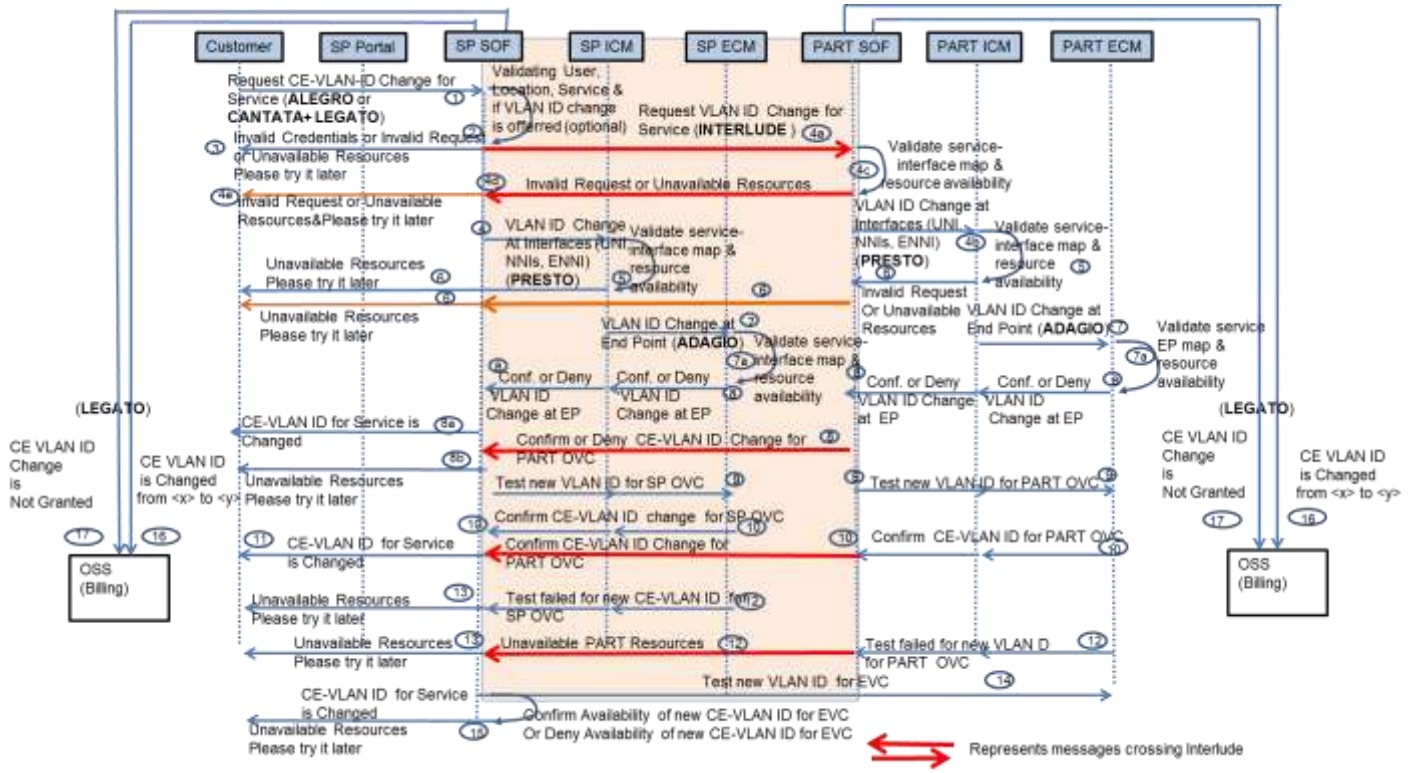

Figure 12: CE VLAN-ID Change Process Flow: Change at Off-net Location Z with CE-VLAN ID Preservation

Use Case Number	UCx
Use Case Name	CE-VLAN ID Change at Off-net Location Z
Description	Customer requests a change of CE-VLAN ID for E-LINE at the Customer

	Portal
Actor(s)	Customer, Customer Portal, SP OSS/BSS (BA), SP SOF, PART SOF
Pre-Condition(s)	Service has been ordered and configured.
Process Steps	1. Customer uses the Customer Portal to request the change of CE-VLAN ID. 2. Customer enters all the mandatory data elements displayed on the portal (i.e. CE-VLAN ID value, immediately or certain time in the future) 3. Customer Portal, SP OSS/BSS (BA), and SP SOF perform customer authentication and validates the service for this customer, integrity of the data elements, and whether the requested CE-VLAN ID value is available within SP and PART Network. For this, SP SOF may need to collaborate with SP OSS/BSS (BA) over LEGATO interface. 4. If the CE-VLAN ID request is : a. Invalid (i.e. customer authentication fails, customer-service mapping fails, or change of CE-VLAN ID is not within contractual bounds), then SP SOF sends "invalid Request" to the customer. This message will be displayed at the Customer Portal. b. Valid, but the requested CE-VLAN ID value is not available at off-net UNI, PART SOF sends message "Unavailable Resources and Please try it later" to the SP SOF. In turn SP SOF sends message "Unavailable Resources are, Please try it later" to the Customer. *It is recommended that If this step is repeated 3 times in an SP selected time interval (e.g. 5 minutes), SP SOF sends "Please try it in <time interval in minutes>" to the customer. These messages will be displayed at the Customer Portal.* *Per agreement between SP and PART, SP SOF may choose to receive confirmation from PART SOF before denying the request*. c. Valid and the requested CE-VLAN ID value is available in the off-net UNI to support the CE-VLAN ID change, then S4 (Step 4) will be initiated. d. If the request is invalid and rejected, or valid and rejected due to resource unavailability , SP SOF informs SP OSS/BSS (BA) to update the customer-SP SLOs. Similarly, PART SOF informs PART OSS/BSS (BA) to update the customer-SP SLOs. 5. Tsp-cust and Tsp-part are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA). 6. This UC ends
Post-Conditions	Customer Portal displays messages in 4a and 4b above or SP SOF initiates the CE-VLAN ID change.
Alternative Path	
Assumption(s)	
References	

2342 **Table 26:** Use case description for CE-VLAN ID Change at Off-net Location Z with
2343 CE-VLAN ID Preservation (Step 1,2,and 3)

2344

Use Case Number	UC2
Use Case Name	CE-VLAN ID Change process, configuration, testing, accept or denial, billing initiation and SLO update by SP and PART
Description	SP SOF and PART SOF initiate, configure, and test CE-VLAN ID change over their own PRESTO and ADAGIO interfaces; accept or deny the CE-VLAN ID Change over CANTATA; initiate billing over LEGATO; and update their SLOs over LEGATO.
Actor(s)	SP SOF, SP ICM, SP ECM, PART SOF, PART ICM, PART ECM, SP OSS/BSS (BA), PART OSS/BSS (BA)
Pre-Condition(s)	Customer request has been validated by SP SOF
Process Steps	1. SP SOF requests CE-VLAN ID change with CE-VLAN ID preservation at off-net location Z from PART SOF over INTERLUDE and requests CE-VLAN ID change from SP ICM over PRESTO. *It is a choice for SP to receive confirmation from its ICM and ECM for the CE-VLAN ID change before sending a request to PART SOF*. 2. SP ICM verifies validity of request and if CE-VLAN ID is available at off-net UNI and I-NNIs. a. If the verification is successful, it requests CE-VLAN ID change from SP ECM over ADAGIO. b. If the verification is unsuccessful, SP ICM notifies SP SOF that the request is invalid or CE-VLAN ID is unavailable. In turn, SP SOF sends "Invalid Request, or Unavailable Resources and Please try it later" to the customer 3. SP ECM validates the request and if CE-VLAN ID is available at on-net UNI and OVC End Point. After the SP ECM validation, SP ECM sends a confirmation or denial message to SP ICM for the CE-VLAN ID Change. In turn, SP ICM sends a confirmation or denial message to SP SOF for CE-VLAN ID change at on-net UNI and on-net OVC End Point. 4. PART SOF verifies validity of request and if CE-VLAN ID is available at off-net UNI and off-net NNIs a. If the verification is successful, it requests CE-VLAN ID change from PART ICM. b. If the verification is unsuccessful, PART SOF notifies SP SOF that either request is invalid or PART resources are unavailable. In turn, SP SOF either sends "invalid Request" or "Resources are Unavailable, Please try it later" to the customer 5. PART ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and CE-VLAN ID is available at these interfaces to support the requested CE-VLAN ID. a. if CE-VLAN ID is unavailable at off-net UNI, ENNI or I-NNIs of Partner network, PART ICM notifies PART SOF about invalid request or unavailability of CE-VLAN ID. In turn, PART SOF sends a message to SP SOF indicating that either the request is invalid or CE-VLAN ID is unavailable to support the change. SP SOF responds to customer with "Invalid Request " or "Unavailable Resources and Please try it Later".

	b. If CE-VLAN ID is available at off-net UNI, ENNI or I-NNI, PART ICM requests PART ECM to change CE-VLAN ID. 6. PART ECM validates the request and if CE-VLAN ID is available at off-net UNI and PART OVC End Point to support new CE-VLAN ID. After the PART ECM validation, PART ECM sends a confirmation or denial message to PART ICM for the CE-VLAN ID Change. In turn, PART ICM sends a confirmation or denial message to PART SOF for CE-VLAN ID change at off-net UNI and off-net OVC End Point. For the request denial message, SP SOF responds customer with "Invalid Request, or Unavailable Resources and Please try it Later". 7. If SP SOF receives conformation from SP ICM, SP ECM and PART SOF, a. SP SOF confirms CE-VLAN ID change to customer without testing the EVC for new CE-VLAN ID, or b. SP SOF request testing of SP OVC for the new CE-VLAN ID from SP ICM and ECM c. PART SOF requests testing of PART OVC for the new CE-VLAN ID from PART ICM and ECM d. Based on test results from SP ICM, SP ECM and PART SOF, SP SOF sends either "CE-VLAN ID for Service is Changed" or "Unavailable resources, please try it later" to customer. 8. If testing of SP OVC and PART OVC separately validates CE-VLAN ID change, SP SOF may decide to run an end-to-end EVC test before confirming or denying the CE-VLAN ID change. Based on the test results, SP SOF sends either "CE-VLAN ID for Service is Changed" or "Unavailable resources, please try it later" to customer. 9. SP SOF informs SP OSS/BSS (BA) for each denial or confirmation of CE-VLAN ID change request. Similarly, PART SOF informs PART OSS/BSS (BA). 10. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART. 11. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.
Post Conditions	Billing is initiated if the request is conformed. SLOs for Elastic Service are being updated by SP OSS/BSS (BA) and PART OSS/BSS (BA).
Alternate Paths	.
Assumption(s)	
References	S4-S17

Table 27: Use case description for CE-VLAN ID Change at Off-net Location Z with CE-VLAN ID Preservation (Steps 4-17)

7.11.4.1 Requirements

R_ELASTIC_EVC_CEVLANID_004	Elastic Ethernet Service shall support CE-VLAN ID change with CE-VLAN ID preservation for off-net UNI.

Source	S1

2351

R_ELASTIC_CEVLANID_CANTATA_004	CANTATA shall support CE-VLAN ID change with CE-VLAN ID preservation for off-net UNI.
Source	S1

2352

R_ELASTIC_CEVLANID_ALLEGRO_004	ALLEGRO shall support CE-VLAN ID change with CE-VLAN ID preservation for off-net UNI.
Source	S1

2353

R_ELASTIC_CEVLANID_PRESTO_004	PRESTO shall support CE-VLAN ID change with CE-VLAN ID preservation for off-net UNI.
Source	S1

2354

R_ELASTIC_CEVLANID_ADAGIO_004	ADAGIO shall support CE-VLAN ID change with CE-VLAN ID preservation for off-net UNI.
Source	S1

2355

R_ELASTIC_CEVLANID_SONATA_002	SONATA shall support CE-VLAN ID change with CE-VLAN ID preservation for off-net UNI.
Source	S1

2356

R_ELASTIC_CEVLANID_INTERLU_003	INTERLUDE shall support CE-VLAN ID change with CE-VLAN ID preservation for off-net UNI.
Source	S1

2357

2358

	CANTATA shall support percent of valid requests

R_ELASTIC_VLAN_CANTATA_SLO_004	accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CE-VLAN ID change with CE-VLAN ID preservation for off-net UNI.
Source	S1, [1]

2359

R_ELASTIC_VLAN_ALLEGRO_SLO_004	ALLEGRO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CE-VLAN ID change with CE-VLAN ID preservation for off-net UNI.
Source	S1, [1]

2360

R_ELASTIC_VLAN_LEGATO_SLO_004	LEGATO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CE-VLAN ID change with CE-VLAN ID preservation for off-net UNI.
Source	S1, [1]

2361

R_ELASTIC_VLAN_SONATA_SLO_003	SONATA shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CE-VLAN ID change with CE-VLAN ID preservation for off-net UNI.
Source	S1, [1]

2362

R_ELASTIC_VLAN_INTERLU_SLO_003	INTERLUDE shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for CE-VLAN ID change with CE-VLAN ID preservation for off-net UNI.
Source	S1, [1]

2363

R_ELASTIC_SCH_ALLEGRO_004	On-demand request for changing CE-VLAN ID with CE-VLAN ID preservation for off-net UNI immediately or at certain day and

	time in the future should be supported from ALLEGRO interface of SP SOF.
Source	S1

2364

R_ELASTIC_SCH_LEGATO_004	On-demand request for changing CE-VLAN ID with CE-VLAN ID preservation for off-net UNI immediately or at certain day and time in the future should be supported from LEGATO interface.
Source	S1

2365

R_ELASTIC_SCH_CANTATA_004	On-demand request for changing CE-VLAN ID with CE-VLAN ID preservation for off-net UNI immediately or at certain day and time in the future should be supported from CANTATA interface.
Source	S1

2366

R_ELASTIC_SCH_SONATA_003	On-demand request for changing CE-VLAN ID with CE-VLAN ID preservation for off-net UNI immediately or at certain day and time in the future should be supported from SONATA interface.
Source	S1

2367

R_ELASTIC_SCH_INTERLUDE_003	On-demand request for changing CE-VLAN ID with CE-VLAN ID preservation for off-net UNI immediately or at certain day and time in the future should be supported from INTERLUDE interface.
Source	S1

2368

2369

O_PRESTO_TEST_008	PRESTO should support OVC testing for new CE-VLAN ID with CE-VLAN ID preservation that is initiated by SOF, after the CE-VLAN ID change for off-net UNI confirmation of ICM and ECM.

2370

O_ADAGIO_TEST_008	ADAGIO should support OVC testing for new CE-

	VLAN ID with CE-VLAN ID preservation for off-net UNI that is initiated by SOF, after the CE-VLAN ID change confirmation of ECM.

2371

2372

O_SP_SOF_TEST_006	SP SOF shall be able to initiate SP OVC testing for new CE-VLAN ID with CE-VLAN ID preservation for off-net UNI after the VLAN ID change confirmation of SP ICM and SP ECM.
Source	S9
O_SP_SOF_TEST_003	SP SOF shall be able to initiate end-to-end EVC testing for new CE-VLAN ID with CE-VLAN ID preservation for off-net UNI after the CE-VLAN ID change confirmation of SP SOF and PART SOF.
Source	S14

2373

O_INTERLUDE_TEST_002	INTERLUDE should support end-to-end EVC testing of SP SOF for new CE-VLAN ID with CE-VLAN ID preservation after the CE-VLAN ID change for off-net UNI confirmation of SP SOF and PART SOF.
Source	S14

2374

2375

O_PART_SOF_TEST_002	PART SOF shall be able to initiate PART OVC testing for new CE-VLAN ID with CE-VLAN ID preservation after the CE-VLAN ID change confirmation of PART ICM and PART ECM for off-net UNI.
Source	S9

2376

2377

2378

R_SP_SOF_TIMING_006	SP SOF shall be able to measure Tsp-cust and Tsp-part , report them to SP OSS/BSS (BA) for on-demand CE-VLAN ID change with CE-VLAN ID preservation for-off-net UNI .
Source	

2379

2380

R_PART_SOF_TIMING_009	PART SOF shall be able to measure Tsp-part and report it to PART OSS/BSS (BA) for on-demand CE-VLAN ID change with CE-VLAN ID preservation for off-net UNI.
Source	

2381

R_LEGATO_TIMING_0016	SP LEGATO API shall be able to support Tsp-cust and Tsp-part for on-demand CE-VLAN ID change with CE-VLAN ID preservation for off-net UNI.
Source	
R_LEGATO_TIMING_0017	PART LEGATO API shall be able to support Tsp-part for on-demand CE-VLAN ID change with CE-VLAN ID preservation for off-net UNI.
Source	
R_SONATA_TIMING_009	SONATA API shall be able to support Tsp-cust and Tsp-part for on-demand CE-VLAN ID change with CE-VLAN ID preservation for off-net UNI.
Source	

2382

2383 Table 28: Requirements for on-demand CE-VLAN ID change with CE-VLAN ID
2384 preservation at off-net location Z

2385

2386 7.12. On-demand Modification of UNI PHY

2387 Prior to an on-demand PHY request, ENNI, UNIs and EVC between off-net and on-net
2388 locations of a SP is established for Access E-LINE. Overall PHY Change process can
2389 be summarized as follows:

2390 1 Customer via user portal requests Ethernet PHY change of single UNI (i.e. rate
2391 change of single UNI port) within offered elastic UNI PHYs (i.e. rates), <UNI
2392 $PHY_{elastic-1}$, UNI $PHY_{elastic-2}$,.., UNI $PHY_{elastic-N}$ >
2393 a. At certain time and day in the future
2394 i. With no end time for new UNI PHY, UNI $PHY_{elastic-i}$
2395 ii. With end time for new UNI PHY, UNI $PHY_{elastic-i}$
2396 • After end time elapses, the PHY becomes the
2397 previous UNI PHY, UNI $PHY_{elastic-k}$
2398 2 Customer via user portal requests PHY changes of multiple UNIs, UNI_A and
2399 UNI_Z
2400 a. At certain time and day in the future
2401 i. With no end time for new UNI PHYs, <UNI $PHY_{A-elastic-i}$, UNI
2402 $PHY_{Z-elastic-j}$ >
2403 ii. With end time for new UNI PHY

- After end time elapses, the rate becomes the previous UNI PHY, <UNI $PHY_{A\text{-}elastic\text{-}k}$, UNI $PHY_{Z\text{-}elastic\text{-}m}$ >

3. Time intervals for on-demand modification of PHY immediately can be defined in the contract between SP and customer ($T_{sp\text{-}cust}$), and SP and PART ($T_{sp\text{-}part}$). The time interval for PART is expected to be smaller than the time interval for the SP. For example if $T_{sp\text{-}cust}$ is 6 hours, $T_{sp\text{-}part}$ could be 4 hours.

    a. The time interval for fulfillment between SP and customer can be recorded. In the customer contract, there can be a penalty associated with the requests that are not fulfilled within $T_{sp\text{-}cust}$.
    b. The time interval for fulfillment between SP and PART can be recorded. There can be a penalty associated with the requests that are not fulfilled within $T_{sp\text{-}part}$.
    c. If the customer request is not fulfilled within $T_{sp\text{-}cust}$, the customer can cancel the request. The cancelation may be counted for penalty per the contract.
    d. The customer may request a monthly history report from user portal consisting of $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$.

4. $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$ may apply to on-demand modification of PHY at certain date and time in the future. The SP choses to perform the request prior to the scheduled time and have the service ready at the time of the scheduled time.

7.12.1. On-net PHY Change Process Flow

The details are depicted in **Figure 13**. Steps in **Figure 13** are as follows:

- S1[ALLEGRO or CANTATA+LEGATO]: User requests PHY Change either from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and SP LEGATO interface of SP SOF

- S2: SP SOF validates customer, the E-LINE service configuration between location A and location Z, and whether requested PHY is available within SP if SP SOF is capable of tracking available PHYs. Furthermore, if some of the information such as services and locations that belong to the customer is not in SOF, but in OSS/BSS (BA), then SOF requests the information from the OSS/BSS (BA) using LEGATO interface.

    - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back to user with "Invalid Request" if user credentials are invalid or "Unavailable Resources and Please try it Later" if PHY is unavailable or "Request is accepted and in progress" .

- *If customer requests pass user authentication at S2, it is up to SP SOF to wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and S7a) before accepting or denying a customer request based on its own verification that request is invalid and/or the PHY requested is unavailable.*
- *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S4 [PRESTO]: Based on S2, if user credentials are valid and either PHY is available or SP SOF has no PHY information, SP SOF sends a request to SP ICM to change PHY at on-net UNI.

- S5: SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and requested CE-VLAN ID is available at UNI to Change PHY.

- S6: [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if PHY is not available at on-net UNI, SP SOF responds to customer with "Unavailable Resources and Please try it Later".

- S7: [PRESTO+ADAGIO] Based on S5, if PHY is available at on-net UNI, SP ICM changes PHY at UNI, sends a message to SP SOF "Confirm PHY Change ", and requests SP ECM to change the PHY of End Point on the on-net UNI".

- S7a [ADAGIO] SP ECM validates if requested PHY is available at on-net UNI and OVC End Point.

- S8: [ADAGIO+PRESTO]

    1. After SP ECM changes PHY at on-net UNI and associated EVC End Point, SP ECM sends a confirmation or denial message to SP ICM for the PHY change. In turn, SP ICM sends a confirmation or denial message to SP SOF indicating the CE-VLAN ID change at on-net UNI and EVC End Point.

- S8a [ALLEGRO or CANTATA+LEGATO] At S8, if PHY change is successful, SP SOF sends the message "PHY is changed" to customer.

- S8b [ALLEGRO or CANTATA+LEGATO] At S8, if PHY change is unsuccessful, SP SOF sends the message "Unavailable resources, please try it later" to customer.

- S9 [PRESTO+ADAGIO]: After S8, optionally, SP SOF runs tests on SP OVC to verify the new PHY, by requesting ICM and ECM to test the new PHY at UNI and endpoint.

- S10: [ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM confirms the PHY change to SP ICM and in turn SP ICM confirms the PHY change to SP SOF.

- S11 [ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer indicating "PHY is Changed".

- S12: [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for SP OVC, SP ECM confirms failure of SP OVC testing to SP ICM and in turn SP ICM confirms failure of new PHY testing to SP SOF.

- S13: [ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer indicating “Unavailable Resources, Please try it later””.
- S14 [LEGATO]: After S11, SP SOF informs OSS that PHY is changed, to initiate billing and update SLO between SP and PART, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR), can be updated.
- S15 [LEGATO]:
    1. After S3, If there is a way to identify the fact that the request is considered to be invalid despite of the fat that it is a valid request, in order to calculate on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP SOF informs SP OSS/BSS (BA) that a valid request was considered to be invalid and rejected.
    2. After S3,S6, S8b and S13, if the PHY change is not supported, SP SOF informs OSS to update its SLO for on-demand changes, **percent of accepted requests fulfilled (TFR/TAR)**.

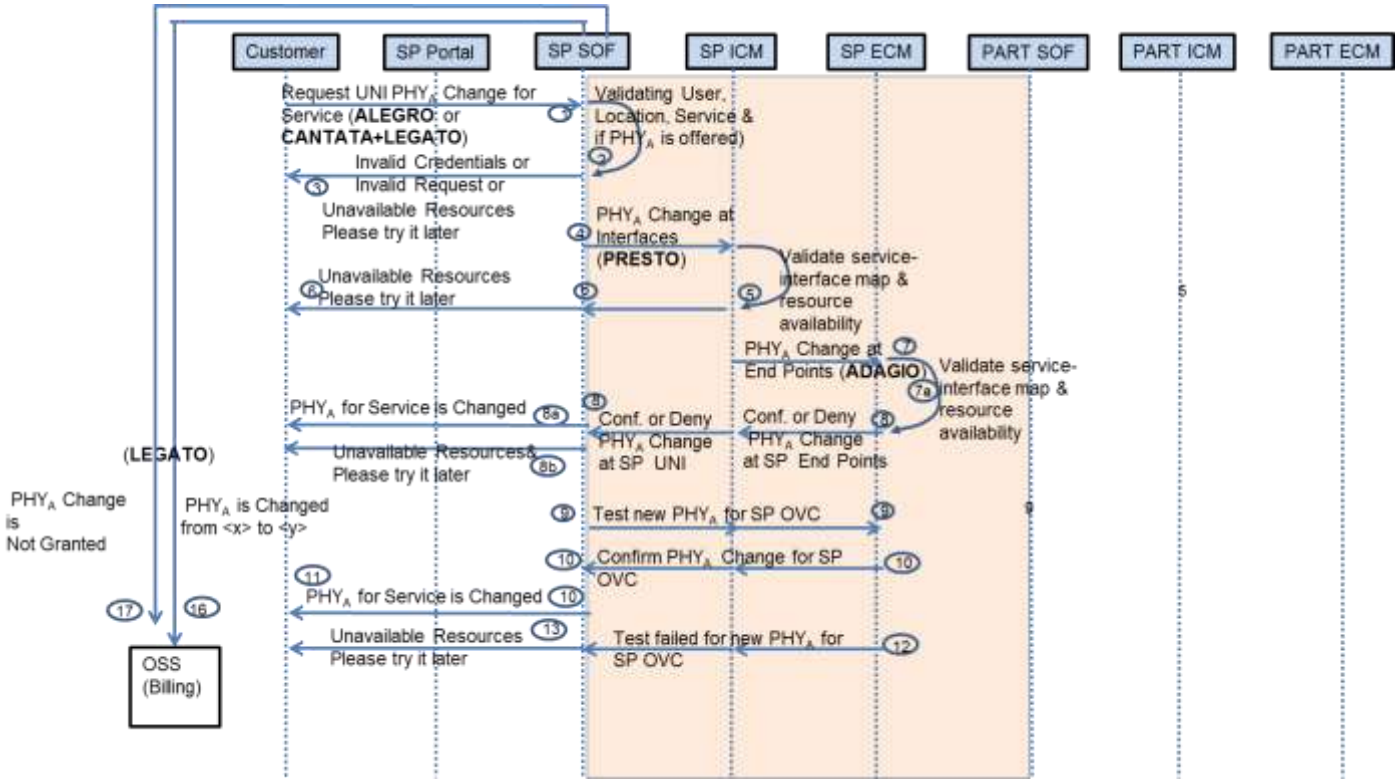

Figure 13: On-net PHY Change Process

Use Case Number	UC1

Use Case Name	PHY Change at On-net Location A (S1 and S2)
Description	Customer initiates PHY change over CANTATA or ALLEGRO
Actor(s)	Customer, SP OSS/BSS (BA), SP SOF
Pre-Condition(s)	Customer has a contract for the Elastic Access E-Line Service and the Elastic Service has been ordered, configured, tested, and is ready to carry traffic.
Process Steps	6. Customer uses CANTATA or ALLEGRO interface to trigger a PHY change request 7. Customer enters all the mandatory data elements displayed on the portal (i.e. PHY value, certain day and time in the future) 8. SP SOF performs customer authentication, and validates the service for this customer and integrity of the data elements and whether the requested PHY value is available within SP network. For this, SP SOF may need to collaborate with OSS-BS over LEGATO interface. 9. If the CE-VLAN ID change request is : a. Invalid (i.e. customer authentication fails, customer-service mapping fails, or PHY requested is not within contractual bounds), then SP SOF sends "invalid Request" to the customer. This message will be displayed at Customer Portal. b. Valid, but the requested PHY value is not available, SP SOF sends "Resources are Unavailable, Please try it later" to the customer. *It is recommended that If this step is repeated 3 times in an SP selected time interval (e.g. 5 minutes), SP SOF sends "Please try it in <time interval in minutes>" to the customer. These messages will be displayed at the Portal. If requests continue, security procedures may take control of the user interface*. *SP SOF may choose to receive confirmation from SP ICM and SP ECM before denying the request, in addition to its own validation for customer-service mapping and PHY availability.* c. Valid and the requested PHY is available in the network , then S4 will be initiated. d. If the request is invalid and rejected, or valid and rejected due to resource unavailability , SP SOF informs OSS/BSS (BA) to update the customer-SP SLOs 10. Tsp-cust is measured by SP SOF, an reported to OSS/BSS (BA). This UC ends
Post Conditions	SP Customer Portal displays messages in 4a and 4b above or SP SOF initiates S4.
Alternate Paths	
Assumption(s)	
References	S1, S2

Table 29: Use case description for PHY Change at On-net Location A

Use Case Number	UC2
Use Case Name	PHY Change process, configuration, testing, accept or denial, billing initiation and SLO update by SP
Description	SP SOF initiates, configures, and tests PHY change over SP PRESTO and ADAGIO interfaces; accept or deny the PHY Change over CANTATA; initiate billing over LEGATO; and update thee SLO over LEGATO.
Actor(s)	SP SOF, SP ICM, SP ECM, SP OSS/BSS (BA)
Pre-Condition(s)	Customer request has been validated by SP SOF
Process Steps	7. SP SOF requests PHY change from SP ICM over PRESTO. 8. SP ICM verifies validity of request and if PHY is available at on-net UNI and I-NNIs. a. If the verification is successful, it requests PHY change from SP ECM over ADAGIO. b. If the verification is unsuccessful, SP ICM notifies SP SOF that the request is invalid or resources are unavailable. In turn, SP SOF sends "Invalid Request, or Unavailable Resources and Please try it later" to the customer 9. SP ECM validates the request and if PHY is available at on-net UNI and OVC End Point to support new PHY. After the SP ECM validation, SP ECM sends a confirmation or denial message to SP ICM for the PHY Change. In turn, SP ICM sends a confirmation or denial message to SP SOF for CE-VLAN ID change at on-net UNI and on-net OVC End Point. 10. If SP SOF receives conformation from SP ICM, a. SP SOF confirms PHY change to customer without testing the EVC for new PHY, or b. SP SOF request testing of SP OVC for the new PHY from SP ICM and ECM c. Based on test results from SP ICM and SP ECM, SP SOF sends either "PHY for Service is Changed" or "Unavailable resources, please try it later" to customer. 11. SP SOF informs SP OSS/BSS (BA) for each denial or confirmation of PHY change request. 12. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.
Post Conditions	Billing is initiated if the request is conformed. SLOs for Elastic Service are being updated by SP OSS/BSS (BA).
Alternate Paths	.
Assumption(s)	
References	S4-S17

2511 **Table 30:** "PHY Change at on-net location A" use case description for Steps 4-17
2512

2513

2514 ### 7.12.1.1. Requirements

2515

2516

R_ELASTIC_UNI_PHY_001	Elastic Ethernet Service shall support PHY change for on-net UNI.
Source	S1

2517

R_ELASTIC_UNI_CANTATA_001	CANTATA shall support PHY change for on-net UNI.
Source	S1

2518

R_ELASTIC_UNI_ALLEGRO_001	ALLEGRO shall support PHY change for on-net UNI.
Source	S1

2519

R_ELASTIC_UNI_PRESTO_001	PRESTO shall support PHY change for on-net UNI.
Source	S1

2520

R_ELASTIC_UNI_ADAGIO_001	ADAGIO shall support PHY change for on-net UNI.
Source	S1
R_ELASTIC_UNI_LEGATO_001	LEGATO shall support PHY change for on-net UNI.
Source	S1

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R_ELASTIC_UNI_CANATAT_SLO_001	CANTATA shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for PHY change for on-net UNI .
Source	S1, [1]

2530

R_ELASTIC_UNI_ALLEGRO_SLO_001	ALLEGRO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for PHY change for on-net UNI.
Source	S1, [1]

2531

R_ELASTIC_UNI_LEGATO_SLO_001	LEGATO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for PHY change for on-net UNI.
Source	S1, [1]

2532

R_ELASTIC_UNI_SPSOF_TRACK_001	SP SOF shall be able to keep track of current and previous $UNI_{elastic}$ values.
Source	

2533

2534

2535

R_SP_SOF_TIMING_007	SP SOF shall be able to measure $T_{sp\text{-}cust}$ and report it to SP OSS/BSS (BA) for on-demand PHY change for on-net UNI.
Source	

2536

R_LEGATO_TIMING_0018	SP LEGATO API shall be able to support $T_{sp\text{-}cust}$ for on-demand PHY change for on-net UNI.

Source	

2537

R_ELASTIC_SCH_ALLEGRO_005	On-demand request for changing PHY for on-net UNI immediately or at certain day and time in the future should be supported from ALLEGRO interface of SP SOF.
Source	S1

2538

R_ELASTIC_SCH_LEGATO_005	On-demand request for changing PHY for on-net UNI immediately or at certain day and time in the future should be supported from LEGATO interface.
Source	S1

2539

R_ELASTIC_SCH_CANTATA_005	On-demand request for changing PHY for on-net UNI immediately or at certain day and time in the future should be supported from CANTATA interface.
Source	S1

2540

2541

O_PRESTO_TEST_009	PRESTO should support OVC testing for new PHY that is initiated by SOF, after the PHY change for on-net UNI confirmation of ICM and ECM.

2542

O_ADAGIO_TEST_009	ADAGIO should support OVC testing for new PHY for on-net UNI that is initiated by SOF, after the PHY change confirmation of ECM.

2543 Table 31: Requirements for on-demand PHY change at on-net location A

2544

2545 ### 7.12.2. Off-net PHY Change Process Flow

2546 The details are depicted in **Figure 14**. Steps in **Figure 14** are as follows:

2547 • S1[ALLEGRO or CANTATA+LEGATO]: User requests CE-VLAN ID Change
2548 either from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and
2549 SP LEGATO interface of SP SOF

- S2: SP SOF validates customer, the E-LINE service configuration between location A and location Z, and whether requested PHY is available within PART network to support the new PHY if SP SOF is capable of tracking available PHYs. Furthermore, if some of the information such as services and locations that belong to the customer is not in SOF, but in OSS/BSS (BA), then SOF requests the information from the OSS/BSS (BA) using LEGATO interface.

  - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back to user with "Invalid Request" if user credentials are invalid or "Unavailable Resources and Please try it Later" if PHY is unavailable or "Request is accepted and in progress" .

  - *If customer requests pass user authentication at S2, per agreement between SP and PART, SP SOF waits for a confirmation from PART SOF (i.e. results of S4c, S5, S7a) before accepting or denying a customer request based on its own verification that the request is invalid and/or the requested CE-VLAN ID is unavailable.*

  - *If customer requests pass user authentication at S2, it is up to SP SOF to wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and S7a) before denying a customer request based on its own verification that request is invalid and/or the requested PHY is unavailable.*

  - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S4a [INTERLUDE]: Based on S2, if user credentials are valid and either PHY is available or SP SOF has no PHY information, SP SOF sends a request to Partner SOF to Change PHY at off-net UNI.

- S4b [PRESTO]: PART SOF requests PART ICM to Change PHY at off-net UNI.

- S5: PART ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and requested PHY is available at UNI to Change PHY.

- S6: [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if PHY is not available at off-net UNI, PART SOF sends message "Unavailable Resources and Please try it Later" to SP SOF. In turn, SP SOF sends message "Unavailable Resources and Please try it Later" to customer.

- S7: [PRESTO+ADAGIO] If PHY can be supported at off-net UNI, Partner ICM changes PHY at off-net UNI and requests Partner ECM to change the PHY of the End Point on off-net UNI".

- S8: [ADAGIO+PRESTO] After Partner ECM changes PHY at off-net UNI and associated EVC End Point, Partner ECM sends a confirmation message to Partner ICM. In turn, Partner ICM sends a confirmation message to Partner SOF indicating PHY change at off-net UNI and associated EVC End Point.

- S8a [ALLEGRO or CANTATA+LEGATO] At S8, if PHY change is successful, SP SOF sends the message “PHY is changed” to customer.

- S8b [ALLEGRO or CANTATA+LEGATO] At S8, if PHY change is unsuccessful, SP SOF sends the message “Unavailable resources, please try it later” to customer.

- S9 [PRESTO+ADAGIO]: After S8, optionally, PART SOF runs tests on PART OVC to verify the new PHY, by requesting ICM and ECM to test the new PHY at off-net UNI and OVC endpoint. .

- S10:

    1. [ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner OVC, Partner ECM confirms PHY change to Partner ICM and in turn Partner ICM confirms PHY change to Partner SOF.

    2. [INTERLUDE] Partner SOF confirms PHY change to SP SOF, “Confirm Availability of new CE-VLAN ID for PART OVC”.

- S11 [ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer indicating “CE-VLAN ID is Changed”.

- S12: [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for PART OVC, PART ECM confirms failure of PART OVC testing to PART ICM and in turn PART ICM confirms failure of new PHY testing to PART SOF. After that, PART SOF sends message “Unavailable Resources” to SP SOF.

- S13: [ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer indicating “Unavailable Resources, Please try it Later””.
- S14 [PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without Partner test its OVC), optionally, SP SOF runs and end-to-end EVC test.

- S15

    4. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP SOF informs customer indicating that “Unavailable Resources, Please try it Later”.

    5. [ALLEGRO or CANTATA+LEGATO] If testing is successful, SP SOF informs customer that “PHY for Service is Changed”.
    6. [LEGATO] if testing is successful, to initiate new billing procedure, SP SOF also informs SP OSS that “PHY is Changed”.
- S16 [LEGATO]:
    1. a) After S8a and S11, per contract between SP and PART, PART SOF informs PART OSS/BSS (BA) that PHY change is confirmed so that SLO between SP and PART, **percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR),** can be updated.
    b) After S8a and S11,SP chooses to confirm PHY change without an end-to-end testing of EVC and informs OSS/BSS (BA) to initiate the

billing and update on-demand SLO parameters**, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).**

2. After S14, if testing is successful, SP SOF informs OSS to initiate new billing procedure for the new PHY and update on demand SLO parameters, **percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).**
3. a) After S14, if testing is unsuccessful, PART SOF informs OSS to update on demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).
   b)After S14, if testing is unsuccessful, SP SOF informs OSS to update on demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).
   c) After S14, whether testing successful or unsuccessful, SP SOF informs PART SOF about the outcome so that PART SOF can inform SP OSS for the SLO update.
   c) After S14, whether testing successful or unsuccessful, SP SOF informs PART SOF about the outcome so that PART SOF can inform SP OSS for the SLO update.

- S17 [LEGATO]:
  1. After S2, If there is a way to identify the fact that the request is considered to be invalid despite of the fact that it is a valid request, in order to calculate on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP SOF informs SP OSS/BSS (BA) that a valid request was considered to be invalid and rejected.
  2. After S2,S6, S8b, S13 and S15, if PHY is not available to support PHY change, SP SOF informs OSS to update its SLO for on-demand PHY change, **percent of accepted requests fulfilled (TFR/TAR)**.

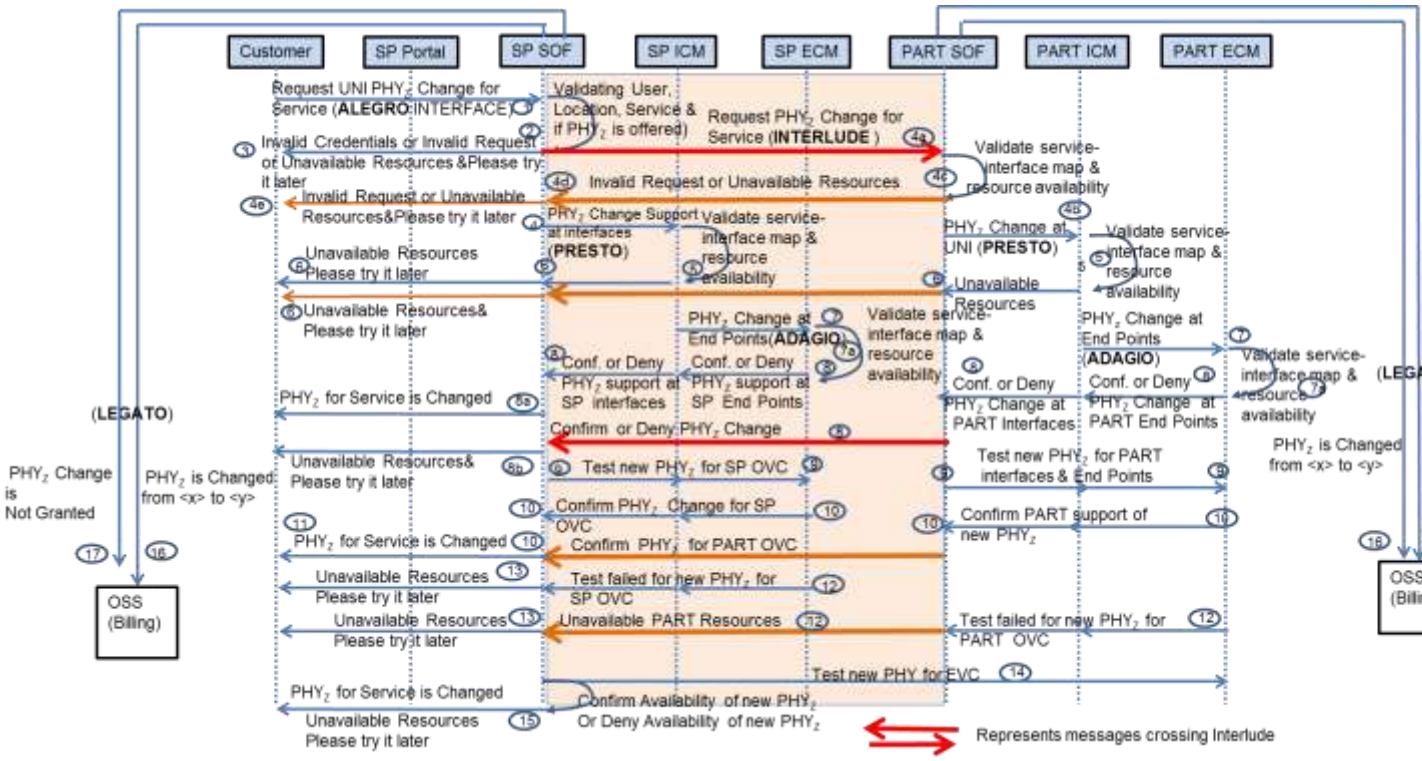

Figure 14: Off-net PHY Change Process

Use Case Number	UC1
Use Case Name	PHY Change at Off-net Location Z
Description	Customer requests a change of PHY for E-LINE at the Customer Portal
Actor(s)	Customer, Customer Portal, SP OSS/BSS (BA), SP SOF, PART SOF
Pre-Condition(s)	Service has been ordered and configured.
Process Steps	1. Customer uses the Customer Portal to request the change of PHY. 2. Customer enters all the mandatory data elements displayed on the portal (i.e. PHY value, certain time in the future) 3. Customer Portal, SP OSS/BSS (BA), and SP SOF perform customer authentication and validates the service for this customer, integrity of the data elements, and whether the requested PHY value is available within SP and PART Network. For this, SP SOF may need to collaborate with SP OSS/BSS (BA) over LEGATO interface. 4. If the PHY request is : a. Invalid (i.e. customer authentication fails, customer-service mapping fails, or change of PHY is not within contractual bounds), then SP SOF sends “invalid Request” to the customer. This message will be displayed at the Customer Portal. b. Valid, but the requested PHY value is not available at off-net UNI, PART SOF sends message “Unavailable Resources and Please try it later” to the SP SOF. In turn

	SP SOF sends message "Unavailable Resources are, Please try it later" to the Customer. *It is recommended that If this step is repeated 3 times in an SP selected time interval (e.g. 5 minutes), SP SOF sends "Please try it in <time interval in minutes>" to the customer. These messages will be displayed at the Customer Portal.* *Per agreement between SP and PART, SP SOF may choose to receive confirmation from PART SOF before denying the request*. c. Valid and the requested PHY value is available in the off-net UNI to support the PHY change, then S4 (Step 4) will be initiated. d. If the request is invalid and rejected, or valid and rejected due to resource unavailability , SP SOF informs SP OSS/BSS (BA) to update the customer-SP SLOs. Similarly, PART SOF informs PART OSS/BSS (BA) to update the customer-SP SLOs. 5. Tsp-cust and Tsp-part are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA). 6. This UC ends
Post-Conditions	Customer Portal displays messages in 4a and 4b above or SP SOF initiates the PHY change.
Alternative Path	
Assumption(s)	
References	

Table 32: Use case description for PHY Change at Off-net Location Z (S1-S3)

Use Case Number	UC2
Use Case Name	PHY Change process, configuration, testing, accept or denial, billing initiation and SLO update by SP and PART
Description	SP SOF and PART SOF initiate, configure, and test PHY change over their own PRESTO and ADAGIO interfaces; accept or deny the PHY Change over CANTATA; initiate billing over LEGATO; and update their SLOs over LEGATO.
Actor(s)	SP SOF, SP ICM, SP ECM, PART SOF, PART ICM, PART ECM, SP OSS/BSS (BA), PART OSS/BSS (BA)
Pre-Condition(s)	Customer request has been validated by SP SOF
Process Steps	1. SP SOF PHY change from PART SOF over INTERLUDE and requests CE-VLAN ID change from SP ICM over PRESTO. *It is a choice for SP to receive confirmation from its ICM and ECM for the PHY change before sending a request to PART SOF*. 2. SP ICM verifies validity of request and if there is adequate capacity at UNI and NNIs. a. If the verification is successful, it requests PHY change from SP ECM over ADAGIO. b. If the verification is unsuccessful, SP ICM notifies SP

	SOF that the request is invalid or resources are unavailable. In turn, SP SOF sends "Invalid Request, or Unavailable Resources and Please try it later" to the customer 3. SP ECM validates the request and if there is adequate resources at on-net UNI and OVC End Point to support new PHY. After the SP ECM validation, SP ECM sends a confirmation or denial message to SP ICM for the PHY Change. In turn, SP ICM sends a confirmation or denial message to SP SOF for PHY change at on-net UNI and on-net OVC End Point. 4. PART SOF verifies validity of request and if there is adequate capacity at off-net UNI and off-net NNIs a. If the verification is successful, it requests PHY change from PART ICM. b. If the verification is unsuccessful, PART SOF notifies SP SOF that either request is invalid or PART resources are unavailable. In turn, SP SOF either sends "invalid Request" or "Resources are Unavailable, Please try it later" to the customer 5. PART ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and there is enough capacity at these interfaces to support the requested PHY. a. if PHY is unavailable at off-net UNI, ENNI or I-NNIs of Partner network, PART ICM notifies PART SOF about invalid request or unavailability of resources. In turn, PART SOF sends a message to SP SOF indicating that either the request is invalid or PHY is unavailable to support the change. SP SOF responds to customer with "Invalid Request " or "Unavailable Resources and Please try it Later". b. If PHY is available at off-net UNI, ENNI or I-NNI, PART ICM requests PART ECM to change PHY. 6. PART ECM validates the request and if PHY is available at off-net UNI and PART OVC End Point to support new PHY. After the PART ECM validation, PART ECM sends a confirmation or denial message to PART ICM for the PHY Change. In turn, PART ICM sends a confirmation or denial message to PART SOF for PHY change at off-net UNI and off-net OVC End Point. For the request denial message, SP SOF responds customer with "Invalid Request, or Unavailable Resources and Please try it Later". 7. If SP SOF receives conformation from SP ICM, SP ECM and PART SOF, a. SP SOF confirms PHY change to customer without testing the EVC for new PHY, or b. SP SOF request testing of SP OVC for the new PHY from SP ICM and ECM c. PART SOF requests testing of PART OVC for the new PHY from PART ICM and ECM d. Based on test results from SP ICM, SP ECM and PART SOF, SP SOF sends either "PHY for Service is Changed" or "Unavailable resources, please try it later" to customer. 8. If testing of SP OVC and PART OVC separately validates PHY change, SP SOF may decide to run an end-to-end EVC test before confirming or denying the PHY change. Based on the test results, SP SOF sends either "PHY for Service is Changed" or "Unavailable resources, please try it later" to customer. 9. SP SOF informs SP OSS/BSS (BA) for each denial or confirmation of

	PHY change request. Similarly, PART SOF informs PART OSS/BSS (BA). 10. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART. 11. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.
Post Conditions	Billing is initiated if the request is conformed. SLOs for Elastic Service are being updated by SP OSS/BSS (BA) and PART OSS/BSS (BA).
Alternate Paths	.
Assumption(s)	
References	S4-S17

Table 33: Use case description for PHY Change at Off-net Location Z (S4-S17)

7.12.2.1. Requirements

R_ELASTIC_UNI_PHY_001	Elastic Ethernet Service shall support PHY change for off-net UNI.
Source	S1

R_ELASTIC_UNI_CANTATA_001	CANTATA shall support PHY change for off-net UNI.
Source	S1

R_ELASTIC_ACT_EVC_ALLEGRO_001	ALLEGRO shall support PHY change for off-net UNI.
Source	S1

R_ELASTIC_UNI_PRESTO_001	PRESTO shall support PHY change for off-net UNI.
Source	S1

R_ELASTIC_UNI_ADAGIO_001	ADAGIO shall support PHY change for off-net UNI.
Source	S1

R_ELASTIC_UNI_SONATA_001	SONATA shall support PHY change for off-net UNI.
Source	S1

2679

R_ELASTIC_UNI_INTEELUDE_001	INTERLUDE shall support PHY change for off-net UNI.
Source	S1

2680

2681

2682

2683

R_ELASTIC_UNI_CANTATA_SLO_001	CANTATA shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for PHY change for off-net UNI.
Source	S1, [1]

2684

R_ELASTIC_UNI_ALLEGRO_SLO_001	ALLEGRO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for PHY change for off-net UNI.
Source	S1, [1]

2685

R_ELASTIC_UNI_LEGATO_SLO_001	LEGATO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for PHY change for off-net UNI.
Source	S1, [1]

2686

R_ELASTIC_UNI_SONATA_SLO_001	SONATA shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for PHY change for off-net UNI.

Source	S1, [1]

2687

R_ELASTIC_UNI_INTERLUD_SLO_001	INTERLUDE shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for PHY change for off-net UNI.
Source	S1, [1]

2688

R_ELASTIC_SCH_ALLEGRO_006	On-demand request for changing PHY for off-net UNI immediately or at certain day and time in the future should be supported from ALLEGRO interface of SP SOF.
Source	S1

2689

R_ELASTIC_SCH_LEGATO_006	On-demand request for changing PHY for off-net UNI immediately or at certain day and time in the future should be supported from LEGATO interface.
Source	S1

2690

R_ELASTIC_SCH_CANTATA_006	On-demand request for changing PHY for off-net UNI immediately or at certain day and time in the future should be supported from CANTATA interface.
Source	S1

2691

R_ELASTIC_SCH_SONATA_004	On-demand request for changing PHY for off-net UNI immediately or at certain day and time in the future should be supported from SONATA interface.
Source	S1

2692

R_ELASTIC_SCH_INTERLUDE_004	On-demand request for changing PHY for off-net UNI immediately or at certain day and time in the future should be supported from INTERLUDE interface.
Source	S1

2693

2694

O_PRESTO_TEST_0010	PRESTO should support OVC testing for new PHY that is initiated by SOF, after the PHY change for off-net UNI confirmation of ICM and ECM.

2695

O_ADAGIO_TEST_0010	ADAGIO should support OVC testing for new PHY for off-net UNI that is initiated by SOF, after the PHY change confirmation of ECM.

2696

2697

O_SP_SOF_TEST_007	SP SOF shall be able to initiate SP OVC testing for new PHY for off-net UNI after the PHY change confirmation of SP ICM and SP ECM.
Source	S9
O_SP_SOF_TEST_004	SP SOF shall be able to initiate end-to-end EVC testing for new PHY for off-net UNI after the PHY change confirmation of SP SOF and PART SOF.
Source	S14

2698

O_INTERLUDE_TEST_003	INTERLUDE should support end-to-end EVC testing of SP SOF for new PHY after the PHY change for off-net UNI confirmation of SP SOF and PART SOF.
Source	S14

2699

2700

O_PART_SOF_TEST_003	PART SOF shall be able to initiate PART OVC testing for new PHY after the PHY change confirmation of PART ICM and PART ECM for off-net UNI.
Source	S9

2701

R_ELASTIC_UNI_PSOF_TRACK_001	PART SOF shall be able to keep track of current and previous $UNI_{elastic}$ values.
Source	

2702

2703

R_SP_SOF_TIMING_008	SP SOF shall be able to measure Tsp-cust and Tsp-part , report them to SP OSS/BSS (BA) for on-demand PHY change.
Source	

2704

2705

R_PART_SOF_TIMING_0010	PART SOF shall be able to measure Tsp-part and report it to PART OSS/BSS (BA) for on-demand PHY change for off-net UNI.
Source	

2706

R_LEGATO_TIMING_0019	SP LEGATO API shall be able to support Tsp-cust and Tsp-part for on-demand PHY change for off-net UNI.
Source	
R_LEGATO_TIMING_0020	PART LEGATO API shall be able to support Tsp-part for on-demand PHY change for off-net UNI.
Source	
R_SONATA_TIMING_0010	SONATA API shall be able to support Tsp-cust and Tsp-part for on-demand PHY change for off-net UNI.
Source	

2707

2708 Table 34: Requirements for on-demand PHY change at off-net location Z

2709

2710 ### 7.12.3. Multiple PHY Change Process Flow

2711 It is likely that customers to request changing PHYs at both on-net and off-net
2712 locations. This section describes the process and messages for that.

2713 The details are depicted in **Figure 15**. Steps in **Figure 15** are as follows:

2714 • S1[ALLEGRO or CANTATA+LEGATO]: User requests PHY Changes either from
2715 ALLEGRO interface of SP SOF or CANTATA interface of SP BU and SP
2716 LEGATO interface of SP SOF

2717 • S2: SP SOF validates customer, the E-LINE service configuration between
2718 location A and location Z, and whether requested PHYs are available within SP
2719 and PART networks to support the new PHYs if SP SOF is capable of tracking
2720 available PHYs. Furthermore, if some of the information such as services and

locations that belong to the customer is not in SOF, but in OSS/BSS (BA), then SOF requests the information from the OSS/BSS (BA) using LEGATO interface.

- *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back to user with "Invalid Request" if user credentials are invalid, "Unavailable Resources and Please try it Later" if both PHYs are unavailable, or "Partially available Resources (UNI_A or UNI_Z)" or "Request is accepted and in progress" .

  - *If customer requests pass user authentication at S2, per agreement between SP and PART, SP SOF waits for a confirmation from PART SOF (i.e. results of S4c, S5, S7a) before accepting or denying a customer request based on its own verification that the request is invalid and/or the requested CE-VLAN ID is unavailable.*

  - *If customer requests pass user authentication at S2, it is up to SP SOF to wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and S7a) before denying a customer request based on its own verification that request is invalid and/or the requested PHY is unavailable.*

  - *During the validation process, SP may choose to display "Request is in Progress" at SP Portal.*

- S4 [PRESTO]: Based on S2, if user credentials are valid and either PHY for UNI_A is available or SP SOF has no PHY information, SP SOF sends a request to SP ICM to change PHY for UNI_A at SP side of ENNI, on-net I-NNIs, and on-net UNI.

- S4a [INTERLUDE]: Based on S2, if user credentials are valid and either PHY for UNI_Z is available or SP SOF has no PHY information, SP SOF sends a request to Partner SOF to Change PHY at Partner side of ENNI, off-net UNI, and off-net I-NNIs. S4 and S4a can take place at the same time in order to reduce response time to user or S4a can take place after SP completes S8.

- S4c, S4d and S4e [INTERLUDE]: PART SOF validates the service is valid and requested PHY is available at off-net UNI, ENNI and I-INNIs, if PART SOF has the information. If it is an invalid request and/or requested PHY is unavailable, PART SOF sends message "Invalid Request or Unavailable Resources and please try it later" to SP SOF. If SP SOF does not wait for the SP ICM's validation, SP SOF responds the customer request with "Invalid Request, Unavailable Resources and Please try it later, or Partially available resources (UNI_A or UNI_Z))

- S4b [PRESTO]: If SP SOF wants to wait for SP ICM validation, Partner SOF requests Partner ICM to Change P HY at Partner side of ENNI, off-net UNI (i.e. UNI_Z) and off-net I-NNIs.

- S5:

2761 1. SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP
2762 network and requested PHY is available at UNI_A and can support the
2763 requested PHY for UNI_Z.

2764 2. Similarly, Partner ICM validates if the EVC belongs to ENNI, UNI and I-NNIs
2765 within Partner network and requested PHY is available at UNI_Z to Change
2766 PHY.

2767 • S6:

2768 1. [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if
2769 requested PHY is unavailable at on-net UNI, ENNI or I-NNIs within SP
2770 network, and/or cannot support the PHY for UNI_Z, SP SOF responds to
2771 customer with "Unavailable Resources and Please try it Later". If SP network
2772 can support one of the PHYs, SP SOF responds the customer with "Partially
2773 Available Resources (UNI_A or UNI_Z)".

2774 2. [PRESTO+INTERLUDE+ALLEGRO or
2775 PRESTO+INTERLUDE+CANTATA+LEGATO] Similarly, if requested PHY is
2776 unavailable at off-net UNI, ENNI or I-NNIs of Partner network, Partner SOF
2777 send a message to SP SOF indicating that requested PHY is unavailable to
2778 support the change. SP SOF responds to customer with "Unavailable
2779 Resources and Please try it Later, or Partially Available Resources (UNI_A)".

2780 • S7 [PRESTO]:

2781 1. Based on S5, if requested PHY is available at on-net UNI, ENNI and I-NNIs
2782 of SP network, SP ICM requests SP ECM to modify the PHY to the
2783 customer requested value at on-net UNI and EVC End Point on the on-net
2784 UNI".

2785 2. Similarly, if requested PHY is available at off-net UNI, ENNI and I-NNIs of
2786 Partner network, Partner ICM requests Partner ECM to modify the PHY to
2787 the customer requested value at off-net UNI and EVC End Point on the off-
2788 net UNI".

2789 • S7a [ADAGIO]:

2790 1. SP ECM validates if requested PHY is available at on-net UNI and OVC
2791 End Point, and the new PHY for off-net UNI can be supported.

2792 2. Similarly, PART ECM validates if requested PHY is available at off-net
2793 UNI and off-net OVC End Point.

2794 • S8:

2795 1. [ADAGIO+PRESTO] After SP ECM validates If the requested PHY is
2796 available at on-net UNI and associated OVC End Point, and can support new
2797 PHY at off-net UNI, SP ECM sends a confirmation or denial message to SP
2798 ICM for the PHY Changes. In turn, SP ICM sends a confirmation or denial
2799 message to SP SOF for PHY changes at on-net UNI and on-net OVC End
2800 Point, and off-net UNI.

2. [ADAGIO+PRESTO] Similarly, after PART ECM validates If the requested PHY is available at off-net UNI and associated OVC End Point, PART ECM sends a confirmation or denial message to PART ICM for the PHY Change. In turn, PART ICM sends a confirmation or denial message to PART SOF for the PHY change at off-net UNI and off-net OVC End Point.

- S8a [ALLEGRO or CANTATA+LEGATO]: At S8, if PHY change has been successful, SP SOF sends the message "PHY for service is changed" to customer.

- S8b [ALLEGRO or CANTATA+LEGATO]: At S8, if one or both PHY changes have been unsuccessful, SP SOF sends the message "Unavailable resources, please try it later, or "Partially Available Resources (UNI_A or UNI_Z)" to customer.

- S9 [PRESTO+ADAGIO]: After S8, optionally, SP SOF and PART SOF run tests on their segments of EVC (i.e. SP OVC and Partner OVC) to verify the PHY changes, by requesting ICM and ECM to test the new PHYs at associated interfaces and endpoints. .

- S10:

1.[ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM confirms availability of new PHYs to SP ICM and in turn SP ICM confirms availability of new PHYs to SP SOF.

2.[ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner OVC, Partner ECM confirms availability of new PHY for off-net UNI to Partner ICM and in turn Partner ICM confirms availability of new PHY for off-net UNI to Partner SOF.

3.[INTERLUDE] Partner SOF confirms availability of new PHY for off-net UNI to SP SOF, "Confirmed Availability of New PHY for Partner OVC".

- S11[ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer indicating "PHY_A and PHY_Z are Changed".

- S12:

1. [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for SP OVC, SP ECM confirms failure of testing of both or one of the PHYs to SP ICM and in turn SP ICM confirms failure of testing of both or one of the PHYs to SP SOF.

2. [PRESTO+ADAGIO]Similarly, If tests at S9 are unsuccessful for Partner OVC, Partner ECM confirms failure of PART OVC testing with new PHY at off-net UNI to Partner ICM and in turn Partner ICM confirms failure of PART OVC testing to Partner SOF.

- S13[ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer indicating "Unavailable Resources, Please try it Later"".

- S14[PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without SP and Partner test their OVCs), optionally, SP SOF runs and end-to-end EVC test.

- S15

  1. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP SOF informs customer indicating that "Unavailable Resources and Please try it Later, or Partially Available Resources (UNI_A or UNI_Z)".

  2. [ALLEGRO or CANTATA+LEGATO] If testing is successful, SP SOF informs customer that "PHYs for Service are Changed".

  3. [LEGATO] if testing is successful, to initiate new billing procedure, SP SOF also informs OSS that "PHYs for Service are Changed".

- S16 [LEGATO]:
  1. a) At S8a and S11, per contract between SP and Ethernet Access Operator (PART), PART SOF informs PART OSS/BSS (BA) that PHY changes are confirmed so that SLO between SP and PART, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR), can be updated.
     b) At S8a and S11,SP chooses to confirm PHY changes without an end-to-end testing of EVC and informs OSS/BSS (BA) to initiate the billing and update on-demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).
  2. a) At S15, if testing is successful, SP SOF informs OSS to initiate new billing procedure for the new PHYs and update on demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).

     b) At S15, if testing is successful, SP SOF also informs PART SOF that the testing is successful. In turn, PART SOF informs PART OSS/BSS (BA) that PHY changes are successful so that PART OSS/BSS (BA) can update its SLOs.
- S17 [LEGATO]:
  1. At S3, If there is a way to identify the fact that the request is considered to be invalid despite of the fact that it is a valid request, in order to calculate on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP SOF informs SP OSS/BSS (BA) that a valid request was considered to be invalid and rejected.
  2. At S3,S4e, S6.1, S8b, S13 and S15, if PHYs are available to support PHY changes, SP SOF informs OSS to update its SLO for on-demand PHY changes, **percent of accepted requests fulfilled (TFR/TAR)**.
  3. At S4d, S6.2, S8b, S11 and S15, if PHY changes cannot be supported, PART SOF informs OSS to update its SLO for on-demand PHY change, percent of accepted requests fulfilled (TFR/TAR).
  4. At S15, if testing is unsuccessful, SP SOF informs PART SOF about not being able to honor the customer request so that PART SOF requests PART OSS/BSS (BA) to update the on demand SLO parameters.

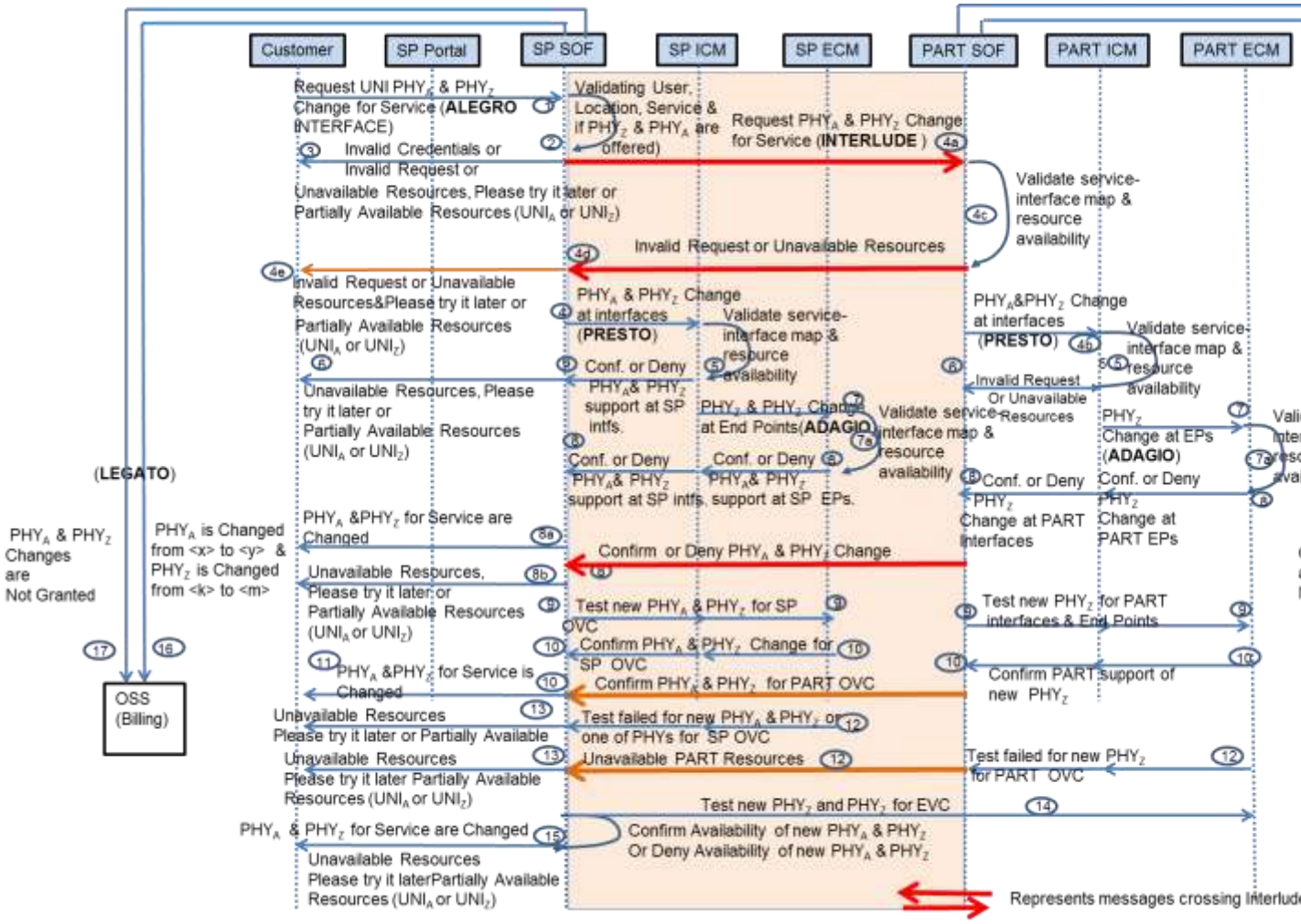

Figure 15: Multiple PHY Change Process

Use Case Number	UC1
Use Case Name	PHY Changes at On-net and Off-net Locations
Description	Customer requests changing PHYs for E-LINE at the Customer Portal
Actor(s)	Customer, Customer Portal, SP OSS/BSS (BA), SP SOF, PART SOF
Pre-Condition(s)	Service has been ordered and configured.
Process Steps	1. Customer uses the Customer Portal to request the PHY change at on-net UNI and off-net UNI. 2. Customer enters all the mandatory data elements displayed on the portal (i.e. PHY values, certain time in the future) 3. Customer Portal, SP OSS/BSS (BA), and SP SOF perform customer authentication and validates the service for this customer, integrity of the data elements, and whether the requested PHY values are available within SP and PART Network. For this, SP SOF may need to collaborate with SP OSS/BSS (BA) over LEGATO interface. 4. If the requested PHYs are :

	a. Invalid (i.e. customer authentication fails, customer-service mapping fails, or change of PHYs is not within contractual bounds), then SP SOF sends "invalid Request" to the customer. This message will be displayed at the Customer Portal. b. Valid, but the requested PHY values are not available at both off-net UNI and on-net UNI or one of the interfaces, SP SOF sends message "Unavailable Resources and Please try it later" or "Partially Available at (UNI_A or UNI_Z)" to the Customer. *It is recommended that If this step is repeated 3 times in an SP selected time interval (e.g. 5 minutes), SP SOF sends "Please try it in <time interval in minutes>" to the customer. These messages will be displayed at the Customer Portal.* *Per agreement between SP and PART, SP SOF may choose to receive confirmation from PART SOF before denying the request*. c. Valid and the requested PHY values are available at both UNI_A and UNI_Z , then S4 and S4a will be initiated. d. If the request is invalid and rejected, or valid and rejected due to resource unavailability , SP SOF informs SP OSS/BSS (BA) to update the customer-SP SLOs. Similarly, PART SOF informs PART OSS/BSS (BA) to update the customer-SP SLOs. *In order PART SOF to inform PART OSS/BSS (BA), SP SOF needs to inform PART SOF that the request is rejected due to resource unavailability.* *5. Tsp-cust and Tsp-part are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA).* 6. This UC ends
Post-Conditions	Customer Portal displays messages in 4a and 4b above or SP SOF initiates the PHY changes.
Alternative Path	
Assumption(s)	
References	

2891

2892 **Table 35:** Use case description for PHY Changes at On-net location A and Off-net
2893 Location Z (S1-S3)

2894

Use Case Number	UC2
Use Case Name	PHY Change process, configuration, testing, accept or denial, billing initiation and SLO update by SP and PART
Description	SP SOF and PART SOF initiate, configure, and test PHY changes over their own PRESTO and ADAGIO interfaces; accept or deny the PHY Changes over CANTATA; initiate billing over LEGATO; and update their SLOs over LEGATO.
Actor(s)	SP SOF, SP ICM, SP ECM, PART SOF, PART ICM, PART ECM, SP OSS/BSS

	(BA), PART OSS/BSS (BA)
Pre-Condition(s)	Customer request has been validated by SP SOF
Process Steps	1. SP SOF requests PHY changes from PART SOF over INTERLUDE and requests PHY changes from SP ICM over PRESTO. *It is a choice for SP to receive confirmation from its ICM and ECM for the PHY changes before sending a request to PART SOF*. 2. SP ICM verifies validity of the request and if requested PHYs can be supported at on-net UNI and NNIs. a. If the verification is successful, it requests PHY changes from SP ECM over ADAGIO. b. If the verification is unsuccessful, SP ICM notifies SP SOF that the request is "invalid or resources are unavailable or partially available (UNI_A or UNI_Z)". In turn, SP SOF sends "Invalid Request, or Unavailable Resources and Please try it later or Partially available (UNI_A or UNI_Z)" to the customer. 3. SP ECM validates the request and if new PHYs can be supported at on-net UNI and OVC End Point. After the SP ECM validation, SP ECM sends a confirmation or denial message or partially available message to SP ICM for the PHY Changes. In turn, SP ICM sends a confirmation or denial message or partially available message to SP SOF for the PHY changes at on-net UNI and on-net OVC End Point. 4. PART SOF verifies validity of request and if requested PHYs are available at off-net UNI and off-net NNIs a. If the verification is successful, it requests PHY change from PART ICM. b. If the verification is unsuccessful, PART SOF notifies SP SOF that either request is invalid or PART resources are unavailable or partially available (UNI_A or UNI_Z)". In turn, SP SOF either sends "invalid Request" or "Resources are Unavailable, Please try it later or Partially available (UNI_A or UNI_Z)" to the customer. 6. PART ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and requested PHYs can be supported on these interfaces. a. if PHYs are unavailable at off-net UNI, ENNI or I-NNIs of Partner network, PART ICM notifies PART SOF about invalid request or unavailability of resources or partially available (UNI_A or UNI_Z)". In turn, PART SOF sends a message to SP SOF indicating that either the request is invalid or PHYs are unavailable or partially available (UNI_A or UNI_Z)". SP SOF responds to customer with "Invalid Request " or "Unavailable Resources and Please try it Later or Partially available ((UNI_A or UNI_Z)". b. If PHYs are available at off-net UNI, ENNI or I-NNI, PART ICM requests PART ECM to change PHYs. 8. PART ECM validates the request and if PHYs are available at off-net UNI and PART OVC End Point . After the PART ECM validation, PART ECM sends a confirmation or denial message to PART ICM for the PHY Changes. In turn, PART ICM sends a confirmation or denial message to PART SOF for PHY changes at off-net UNI and off-net OVC End Point. For the request denial message, SP SOF responds customer with "Invalid Request, or Unavailable Resources and Please try it Later or partially available (UNI_A or UNI_Z)".

	9. If SP SOF receives conformation from SP ICM, SP ECM and PART SOF, a. SP SOF confirms PHY changes to customer without testing the EVC for new PHYs, or b. SP SOF request testing of SP OVC for the new PHYs from SP ICM and ECM c. PART SOF requests testing of PART OVC for the new PHYs from PART ICM and ECM d. Based on test results from SP ICM, SP ECM and PART SOF, SP SOF sends either "PHYs for Service are Changed" or "Unavailable resources, please try it later" or "Partially available (UNI_A or UNI_Z)" to customer. 12. If testing of SP OVC and PART OVC separately validates PHY changes, SP SOF may decide to run an end-to-end EVC test before confirming or denying the PHY changes. Based on the test results, SP SOF sends either "PHY for Service is Changed" or "Unavailable resources, please try it later" or ""Partially available (UNI_A or UNI_Z)" to customer. 13. SP SOF informs SP OSS/BSS (BA) for each denial or confirmation of PHY change request. Similarly, PART SOF informs PART OSS/BSS (BA). 14. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART. 15. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.
Post Conditions	Billing is initiated if the request is conformed. SLOs for Elastic Service are being updated by SP OSS/BSS (BA) and PART OSS/BSS (BA).
Alternate Paths	.
Assumption(s)	
References	S4-S17

Table 36: Use case description for PHY Changes at On-net Location A and Off-net Location Z (S4-S17)

7.12.3.1. Requirements

R_ELASTIC_UNI_PHY_002	Elastic Ethernet Service shall support PHY changes at on-net and off-net locations.
Source	S1

R_ELASTIC_UNI_CANTATA_002	CANTATA shall support PHY changes at on-net and off-net locations.
Source	S1

2903

R_ELASTIC_ACT_EVC_ALLEGRO_002	ALLEGRO shall support PHY changes at on-net and off-net locations.
Source	S1

2904

R_ELASTIC_UNI_PRESTO_002	PRESTO shall support PHY changes at on-net and off-net locations.
Source	S1

2905

R_ELASTIC_UNI_ADAGIO_002	ADAGIO shall support PHY changes at on-net and off-net locations.
Source	S1

2906

R_ELASTIC_UNI_SONATA_002	SONATA shall support PHY changes at on-net and off-net locations.
Source	S1

2907

R_ELASTIC_UNI_INTEELUDE_002	INTERLUDE shall support PHY changes at on-net and off-net locations.
Source	S1

2908

2909

R_ELASTIC_UNI_CANTATA_SLO_002	CANTATA shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for PHY change for on-net and off-net UNIs.
Source	S1, [1]

2910

R_ELASTIC_UNI_ALLEGRO_SLO_002	ALLEGRO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for PHY change for on-net and off-net UNIs.
Source	S1, [1]

2911

R_ELASTIC_UNI_LEGATO_SLO_002	LEGATO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for PHY change for on-net and off-net UNIs.
Source	S1, [1]

2912

R_ELASTIC_UNI_SONATA_SLO_002	SONATA shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for PHY change for on-net and off-net UNIs.
Source	S1, [1]

2913

R_ELASTIC_UNI_INTERLUD_SLO_002	INTERLUDE shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for PHY change for on-net and off-net UNIs.
Source	S1, [1]

2914

R_ELASTIC_SCH_ALLEGRO_007	On-demand request for changing PHY for on-net and off-net UNIs immediately or at certain day and time in the future should be supported from ALLEGRO interface of SP SOF.
Source	S1

2915

R_ELASTIC_SCH_LEGATO_007	On-demand request for changing PHY for on-net and off-net UNIs immediately or at certain day and time in the future should be supported from LEGATO interface.
Source	S1

2916

R_ELASTIC_SCH_CANTATA_007	On-demand request for changing PHY for on-net and off-net UNIs immediately or at certain day and time in the future should be supported from CANTATA interface.
Source	S1

2917

R_ELASTIC_SCH_SONATA_005	On-demand request for changing PHY for on-net and off-net UNIs immediately or at certain day and time in the future should be supported from SONATA interface.
Source	S1

2918

R_ELASTIC_SCH_INTERLUDE_005	On-demand request for changing PHY for on-net and off-net UNIs immediately or at certain day and time in the future should be supported from INTERLUDE interface.
Source	S1

2919

2920

O_PRESTO_TEST_0011	PRESTO should support OVC testing for new on-net and off-net PHYs that are initiated by SOF, after the PHY change for off-net UNI confirmation of ICM and ECM.

2921

O_ADAGIO_TEST_0011	ADAGIO should support OVC testing for new on-net and off-net PHYs that are initiated by SOF, after the PHY change confirmation of ECM.

2922

2923

O_SP_SOF_TEST_008	SP SOF shall be able to initiate SP OVC testing for new on-net and off-net PHYs after the PHY changes confirmation of SP ICM and SP ECM.
Source	S9
O_SP_SOF_TEST_005	SP SOF shall be able to initiate end-to-end EVC testing for new on-net and off-net PHYs after the PHY changes confirmation of SP SOF and PART SOF.
Source	S14

2924

O_INTERLUDE_TEST_004	INTERLUDE should support end-to-end EVC testing of SP SOF for new on-net and off-net PHYs after the PHY changes confirmation of SP SOF and PART SOF.
Source	S14

2925

2926

O_PART_SOF_TEST_004	PART SOF shall be able to initiate PART OVC testing for new on-net and off-net PHYs after the PHY changes confirmation of PART ICM and PART ECM for off-net UNI.
Source	S9

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2929

R_SP_SOF_TIMING_009	SP SOF shall be able to measure Tsp-cust and Tsp-part , report them to SP OSS/BSS (BA) for on-demand on-net and off-net PHY changes.
Source	

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2931

R_PART_SOF_TIMING_0011	PART SOF shall be able to measure Tsp-part and report it to PART OSS/BSS (BA) for on-demand on-net and off-net PHY changes.
Source	

2932

R_LEGATO_TIMING_0021	SP LEGATO API shall be able to support Tsp-cust and Tsp-part for on-demand on-net and off-net PHY changes.
Source	
R_LEGATO_TIMING_0022	PART LEGATO API shall be able to support Tsp-part for on-demand on-net and off-net PHY changes.
Source	
R_SONATA_TIMING_0011	SONATA API shall be able to support Tsp-cust and Tsp-part for on-demand on-net and off-net PHY changes.
Source	

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2934

2935 Table 37: Requirements for on-demand PHY change at on-net and off-net
2936 locations at the same time

2937

7.13 On-demand EVC Activation for E-LINE

Prior to an on-demand request for activating an E-LINE, ENNI, UNIs and EVC between off-net and on-net locations of SP are configured for this E-LINE, but not activated: Overall EVC activation process can be summarized as follows:

1. Customer via user portal requests activating the EVC that is already configured
    a. Immediately
    b. At certain time and day in the future
2. Time intervals for on-demand modification of EVC activation immediately can be defined in the contract between SP and customer ($T_{sp\text{-}cust}$), and SP and PART ($T_{sp\text{-}part}$). The time interval for PART is expected to be smaller than the time interval for the SP. For example if $T_{sp\text{-}cust}$ is 15 minutes, $T_{sp\text{-}part}$ could be 10 minutes.
    a. The time interval for fulfillment between SP and customer can be recorded. In the customer contract, there can be a penalty associated with the requests that are not fulfilled within $T_{sp\text{-}cust}$.
    b. The time interval for fulfillment between SP and PART can be recorded. There can be a penalty associated with the requests that are not fulfilled within $T_{sp\text{-}part}$.
    c. If the customer request is not fulfilled within $T_{sp\text{-}cust}$, the customer can cancel the request. The cancelation may be counted for penalty per the contract.
    d. The customer may request a monthly history report from user portal consisting of $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$.
3. $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$ may apply to on-demand modification of EVC activation at certain date and time in the future. The SP choses to perform the request prior to the scheduled time and have the service ready at the time of the scheduled time.

The details are depicted in **Figure 16**. Steps in **Figure 16** are as follows:

- S1[ALLEGRO or CANTATA+LEGATO]: User requests EVC activation either from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and SP LEGATO interface of SP SOF
- S2: SP SOF validates customer, the E-LINE service configuration between location A and location Z, what are the components of EVC, and whether there is enough capacity in the SP network and/or Partner network to activate the EVC if SP SOF is capable of tracking available network capacity.
- S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back to user with “Invalid Request” if user credentials are invalid or “Unavailable

Resources and Please try it Later" if resources are unavailable or "Request is accepted and in progress"

- S4 [PRESTO]: Based on S2, if user credentials are valid and either capacity is available or SP SOF has no capacity information, SP SOF sends a request to SP ICM to activate EVC components at SP side of ENNI, on-net UNI, and on-net I-NNIs

- S4a [INTERLUDE]: Based on S2, if user credentials are valid and either capacity is available or SP SOF has no capacity information, SP SOF sends a request to Partner SOF to activate the EVC components at Partner side of ENNI, off-net UNI, and off-net I-NNIs. S4 and S4a can take place at the same time in order to reduce response time to user or S4a can take place after SP completes S8.

- S4c, S4d and S4e [INTERLUDE]: PART SOF validates the service is valid and resources are available to activate PART OVC at off-net UNI, ENNI and I-INNIs, if PART SOF has the information. If it is an invalid request and/or resources are unavailable, PART SOF sends message "Invalid Request or Unavailable Resources and please try it later" to SP SOF. If SP SOF does not wait for the SP ICM's validation, SP SOF responds the customer request with "Invalid Request, Unavailable Resources and Please try it later".

- S4b [PRESTO]: If SP SOF wants to wait for SP ICM validation, Partner SOF requests Partner ICM to activate the EVC components at Partner side of ENNI, off-net UNI and off-net I-NNIs.

- S5:

  1. SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and there is enough capacity at these interfaces to activate the EVC.

  2. Similarly, Partner ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within Partner network and there is enough capacity at these interfaces to support the EVC.

- S6:

  1. [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if there is not enough capacity at on-net UNI, ENNI or I-NNIs within SP network, SP SOF responds to customer with "Unavailable Resources and Please try it Later".

  2. [PRESTO+INTERLUDE+ALLEGRO or PRESTO+INTERLUDE+CANTATA+LEGATO] Similarly, if there is not enough capacity at off-net UNI, ENNI or I-NNIs of Partner network, Partner SOF send a message to SP SOF indicating that there is not enough capacity to support the EVC (i.e. Unavailable Resources"). SP SOF responds to customer with "Unavailable Resources and Please try it Later".

- S7:

3015 1. [PRESTO+ADAGIO]Based on S5, if there is enough capacity at on-net UNI,
3016 ENNI and I-NNIs of SP network, SP ICM activates EVC at ENNI and I-NNIs,
3017 sends a message to SP SOF “Activate EVC at ENNI and I-NNIs”, and
3018 requests SP ECM to activate EVC End Point on the on-net UNI”.

3019 2. [PRESTO+ADAGIO]Similarly, if there is enough capacity at off-net UNI,
3020 ENNI and I-NNIs of Partner network, Partner ICM activates EVC components
3021 at ENNI and I-NNIs, sends a message to Partner SOF “Confirming EVC
3022 Activation at ENNI and I-NNIs”, and requests Partner ECM to activate EVC
3023 End Point on the off-net UNI”.

3024 • S7a [ADAGIO]:

3025 1. SP ECM validates if resources are available at on-net UNI and OVC End
3026 Point, and the SP OVC can be activated.

3027 2. Similarly, PART ECM validates if resources are available to actoivate
3028 PART OVC at off-net UNI and off-net OVC End Point.

3029 • S8:

3030 1. [ADAGIO+PRESTO]After SP ECM activates EVC at on-net UNI and
3031 associated EVC End Point, SP ECM sends a confirmation message to SP
3032 ICM. In turn, SP ICM sends a confirmation message to SP SOF indicating
3033 the EVC activation at on-net UNI and EVC End Point.

3034 2. [ADAGIO+PRESTO] Similarly, after Partner ECM activates EVC at off-net
3035 UNI and associated EVC End Point, Partner ECM sends a confirmation
3036 message to Partner ICM. In turn, Partner ICM sends a confirmation message
3037 to Partner SOF indicating EVC activation at off-net UNI and associated EVC
3038 End Point.
3039
3040 • S8a [ALLEGRO or CANTATA+LEGATO]: At S8, if EVC activation has been
3041 successful, SP SOF sends the message “EVC is activated” to customer.

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3046 • S9 [PRESTO+ADAGIO]: After S8, optionally, SP SOF and Partner SOF run
3047 tests on their segments of EVC (i.e. SP OVC and Partner OVC) to verify the
3048 EVC, by requesting ICM and ECM to test the activated EVC components at
3049 associated interfaces and endpoints. .

3050 • S10:

3051 1.[ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM
3052 confirms the SP OVC activation to SP ICM and in turn SP ICM confirms the SP
3053 OVC activation to SP SOF.

3054 2.[ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner OVC,
3055 Partner ECM confirms Partner OVC EP activation to Partner ICM and in turn
3056 Partner ICM confirms Partner OVC activation to Partner SOF.

3057 3.[INTERLUDE] Partner SOF confirms Partner OVC activation to SP SOF,
3058 "Confirm Activation of Partner OVC".

3059 • S11 [ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer
3060 indicating "EVC is Activated".

3061 • S12:

3062 1. [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for SP OVC, SP ECM
3063 confirms failure of EVC testing to SP ICM and in turn SP ICM confirms failure
3064 of EVC testing to SP SOF.

3065 2. [PRESTO+ADAGIO]Similarly, If tests at S9 are unsuccessful for Partner
3066 OVC, Partner ECM confirms failure of PART OVC activation testing to
3067 Partner ICM and in turn Partner ICM confirms failure of PART OVC activation
3068 to Partner SOF.

3069 • S13[ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer
3070 indicating "Unavailable Resources, Please try it Later"".

3071 • S14[PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without SP and
3072 Partner test their OVCs), optionally, SP SOF runs and end-to-end EVC test.

3073 • S15

3074 1. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP
3075 SOF informs customer indicating that "Unavailable Resources, Please try it
3076 Later".

3077 2. [ALLEGRO or CANTATA+LEGATO]if testing is successful, SP SOF informs
3078 customer that "EVC is activated".
3079 3. [LEGATO] if testing is successful, to initiate new billing procedure, SP SOF
3080 also informs OSS that "EVC is activated".
3081 • S16 [LEGATO]:
3082 1. a) At S8a and S11, per contract between SP and PART, PART SOF
3083 informs PART OSS/BSS (BA) that EVC is activated so that SLO between
3084 SP and PART, percent of valid requests accepted (TAR/TVR) and
3085 percent of accepted requests fulfilled (TFR/TAR), can be updated.
3086 b) At S8a and S11,SP chooses to confirm EVC activation without an end-
3087 to-end testing of EVC and informs OSS/BSS (BA) to initiate the billing and
3088 update on-demand SLO parameters, percent of valid requests accepted
3089 (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).

2. a) At S15, if testing is successful, SP SOF informs OSS to initiate new billing procedure for the new PHYs and update on demand SLO parameters, percent of valid requests accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).

   b) At S15, if testing is successful, SP SOF also informs PART SOF that the testing is successful. In turn, PART SOF informs PART OSS/BSS (BA) that PHY changes are successful so that PART OSS/BSS (BA) can update its SLOs.

- S17 [LEGATO]:
  1. At S3, If there is a way to identify the fact that the request is considered to be invalid despite of the fact that it is a valid request, in order to calculate on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP SOF informs SP OSS/BSS (BA) that a valid request was considered to be invalid and rejected.
  2. At S3,S4e, S6.1, S8b, S13 and S15, if resources are available to activate EVC, SP SOF informs OSS to update its SLO for on-demand EVC activation, **percent of accepted requests fulfilled (TFR/TAR)**.
  3. At S4d, S6.2, S8b, S11 and S15, if EVC activation cannot be supported, PART SOF informs OSS to update its SLO for on-demand EVC activation, percent of accepted requests fulfilled (TFR/TAR).
  4. At S15, if testing is unsuccessful, SP SOF informs PART SOF about not being able to honor the customer request so that PART SOF requests PART OSS/BSS (BA) to update the on demand SLO parameters.

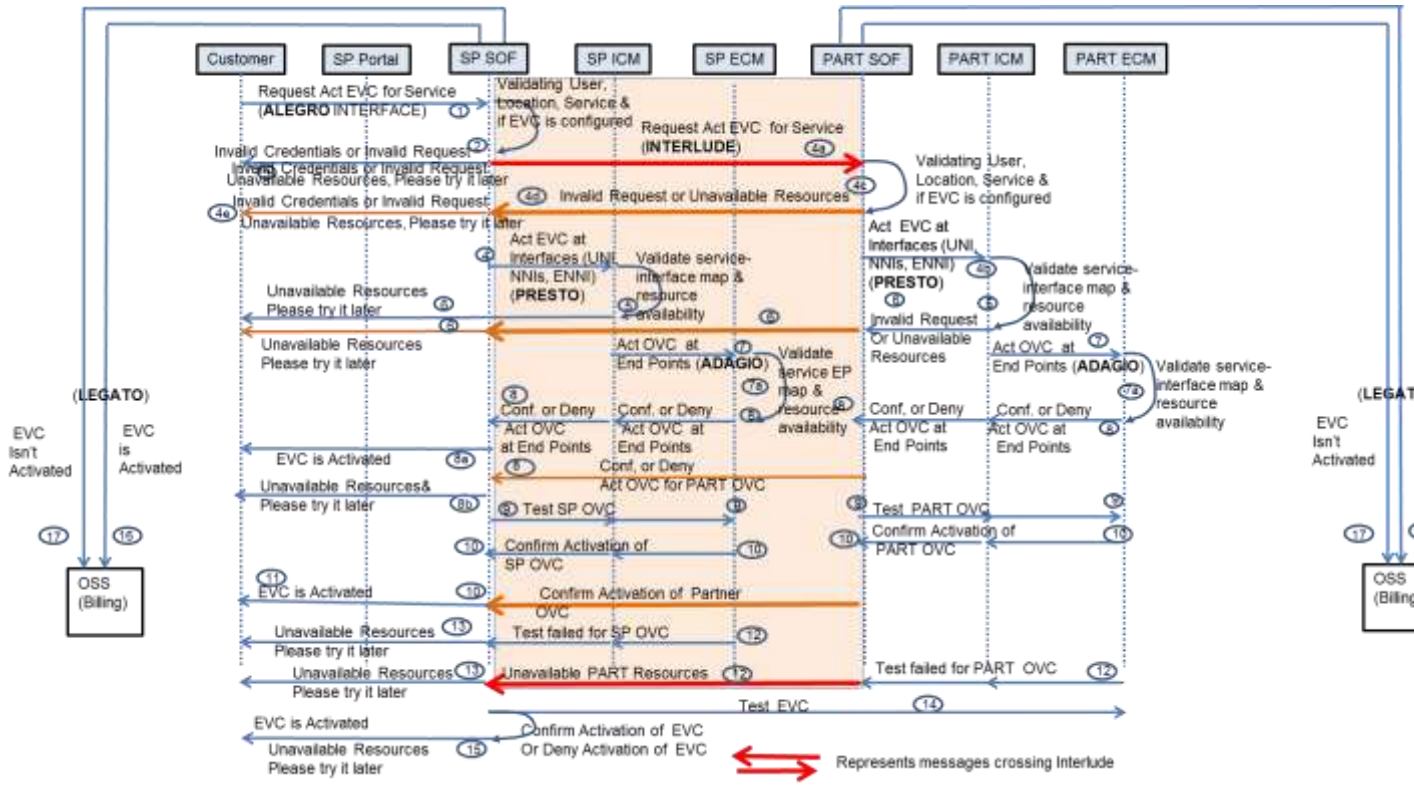

Figure 16 EVC Activation Process Flow for E-LINE

3119

Use Case Number	UCx
Use Case Name	EVC Activation for E-LINE
Description	Customer requests an EVC Activation for E-LINE at the Customer Portal
Actor(s)	Customer, Customer Portal/SP OSS/BSS (BA), SP SOF
Pre-Condition(s)	Service has been ordered and configured.
Process Steps	1. Customer uses the Customer Portal to request the Activation of the EVC. 2. Customer enters all the mandatory data elements displayed on the portal (i.e. Status value for Activation , immediately or certain time in the future) 3. Customer Portal, SP OSS/BSS (BA), and SP SOF perform customer authentication and validates the service for this customer, integrity of the data elements, and whether there is enough capacity in the SP and/or AP Network to support the requested EVC Activation. 4. If the EVC Activation request is : a. Invalid (i.e. customer authentication fails, customer-service mapping fails, or EVC Activation request is not within contractual bounds), then SP SOF sends “invalid Request” to the customer. This message will be displayed at the Customer Portal. b. Valid, but there is not enough Capacity to support the new EVC, SP SOF sends “Resources are Unavailable, Please try it later” to the customer. If this step is repeated 3 times in an SP selected time interval (e.g. 5 minutes), SP SOF sends “Please try it in <time interval in minutes>” to the customer. These messages will be displayed at the Customer Portal. c. Valid and there is enough capacity in the network to support the EVC Activation, then S4 (Step 4) will be initiated. 5. Tsp-cust and Tsp-part are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA). 6. This UC ends
Post-Conditions	Customer Portal displays messages in 4a and 4b above or SP SOF initiates the EVC Activation..
Alternative Path	
Assumption(s)	
References	

3120 **Table 38:** Use case description for EVC Activation

3121

Use Case Number	UC2
Use Case Name	EVC Activation process, configuration, testing, accept or denial, billing initiation and SLO update by SP and PART
Description	SP SOF and PART SOF initiate, configure, and test EVC activation over their own PRESTO and ADAGIO interfaces; accept or deny the EVC Activation over CANTATA; initiate billing over LEGATO; and update their SLOs over LEGATO.
Actor(s)	SP SOF, SP ICM, SP ECM, PART SOF, PART ICM, PART ECM, SP OSS/BSS

	(BA), PART OSS/BSS (BA)
Pre-Condition(s)	Customer request has been validated by SP SOF and PART SOF
Process Steps	2. SP SOF requests PART OVC activation from PART SOF over INTERLUDE and requests SP OVC activation from SP ICM over PRESTO. *It is a choice for SP to receive confirmation from its ICM and ECM for the PHY changes before sending a request to PART SOF*. 3. SP ICM verifies validity of the request and if EVC activation can be supported at on-net UNI and NNIs. c. If the verification is successful, it requests SP OVC activation from SP ECM over ADAGIO. d. If the verification is unsuccessful, SP ICM notifies SP SOF that the request is "invalid or resources are unavailable ". In turn, SP SOF sends "Invalid Request, or Unavailable Resources and Please try it later " to the customer. 5. SP ECM validates the request and if EVC activation can be supported at on-net UNI and OVC End Point. After the SP ECM validation, SP ECM sends a confirmation or denial message to SP ICM for SP OVC activation. In turn, SP ICM sends a confirmation or denial message to SP SOF for the SP OVC ativation at on-net UNI and on-net OVC End Point. 6. PART SOF verifies validity of request and if resources are available at off-net UNI and off-net NNIs c. If the verification is successful, it request OVC activation from PART ICM. d. If the verification is unsuccessful, PART SOF notifies SP SOF that either request is invalid or PART resources are unavailable". In turn, SP SOF either sends "invalid Request" or "Resources are Unavailable, Please try it later" to the customer. 7. PART ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and PART OVC can be supported on these interfaces. c. if resources are available at off-net UNI, ENNI or I-NNIs of Partner network, PART ICM notifies PART SOF about invalid request or unavailability of resources ". In turn, PART SOF sends a message to SP SOF indicating that either the request is invalid or resources are unavailable ". SP SOF responds to customer with "Invalid Request " or "Unavailable Resources and Please try it Later ". d. If resources are available at off-net UNI, ENNI or I-NNI, PART ICM requests PART ECM to activate PART OVC. 10. PART ECM validates the request and if resources are available at off-net UNI and PART OVC End Point . After the PART ECM validation, PART ECM sends a confirmation or denial message to PART ICM for PART OVC activation. In turn, PART ICM sends a confirmation or denial message to PART SOF for PART OVC activation at off-net UNI and off-net OVC End Point. For the request denial message, SP SOF responds customer with "Invalid Request, or Unavailable Resources and Please try it Later". 11. If SP SOF receives conformation from SP ICM, SP ECM and PART SOF, e. SP SOF confirms EVC activation to customer without testing the EVC , or

	f. SP SOF request testing of SP OVC for the SP OVC from SP ICM and ECM g. PART SOF requests testing of PART OVC for PART OVC from PART ICM and ECM h. Based on test results from SP ICM, SP ECM and PART SOF, SP SOF sends either "EVC is activated" or "Unavailable resources, please try it later" to customer. 16. If testing of SP OVC and PART OVC separately validates OVC activation, SP SOF may decide to run an end-to-end EVC test before confirming or denying the EVC activation. Based on the test results, SP SOF sends either "EVC is activated" or "Unavailable resources, please try it later" to customer. 17. SP SOF informs SP OSS/BSS (BA) for each denial or confirmation of EVC activation request. Similarly, PART SOF informs PART OSS/BSS (BA). 18. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART. 19. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.
Post Conditions	Billing is initiated if the request is conformed. SLOs for Elastic Service are being updated by SP OSS/BSS (BA) and PART OSS/BSS (BA).
Alternate Paths	.
Assumption(s)	
References	S4-S17

Table 39: Use case description for EVC Activation (S4-S17)

7.13.1 Requirements

R_ELASTIC_ACT_EVC_001	Elastic Ethernet Service shall support on-demand EVC activation.
Source	S1

R_ELASTIC_ACT_EVC_CANTATA_00	CANTATA shall support on-demand EVC activation.
Source	S1

R_ELASTIC_ACT_EVC_ALLEGRO_001	ALLEGRO shall support on-demand EVC activation.
Source	S1

3132

R_ELASTIC_ACT_EVC_PRESTO_001	PRESTO shall support on-demand EVC activation.
Source	S1

3133

R_ELASTIC_ACT_EVC_ADAGIO_001	ADAGIO shall support on-demand EVC activation.
Source	S1

3134

R_ELASTIC_ACT_EVC_SONATA_001	SONATA shall support on-demand EVC activation.
Source	S1

3135

R_ELASTIC_ACT_EVC_INTEERLU_00	INTERLUDE shall support on-demand EVC activation.
Source	S1

3136

3137

R_ELASTIC_ACTEVC_CANTA_SLO_(	CANTATA shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for on-demand EVC activation.
Source	S1, [1]

3138

R_ELASTIC_ACTEVC_ALLEG_SLO_001	ALLEGRO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for on-demand EVC activation.
Source	S1, [1]

3139

R_ELASTIC_ACTEVC_LEGAT_SLO_001	LEGATO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for on-demand EVC activation.
Source	S1, [1]

3140

R_ELASTIC_ACTEVC_SONAT_SLO_001	SONATA shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for PHY change for on-demand EVC activation.
Source	S1, [1]

3141

R_ELASTIC_ACTEVC_INTER_SLO_001	INTERLUDE shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for on-demand EVC activation.
Source	S1, [1]

3142

3143

R_ELASTIC_ACTEVC_ALLEGRO_001	On-demand EVC activation immediately or at certain day and time in the future should be supported from ALLEGRO interface of SP SOF.
Source	S1

3144

R_ELASTIC_ACTEVC_LEGATO_001	On-demand EVC activation immediately or at certain day and time in the future should be supported from LEGATO interface.
Source	S1

3145

R_ELASTIC_ACTEVC_CANTATA_001	On-demand EVC activation immediately or at certain day and time in the future should be supported from CANTATA interface.
Source	S1

3146

R_ELASTIC_ACTEVC_SONATA_001	On-demand EVC activation immediately or at certain day and time in the future should be supported from SONATA interface.
Source	S1

3147

R_ELASTIC_ACTEVC_INTERLUD_00	On-demand EVC activation immediately or at certain day and time in the future should be supported from INTERLUDE interface.
Source	S1

3148

3149

O_PRESTO_TEST_0012	PRESTO should support OVC testing for new on-net and off-net PHYs that are initiated by SOF, after the PHY change for off-net UNI confirmation of ICM and ECM.

3150

O_ADAGIO_TEST_0012	ADAGIO should support OVC testing for new on-net and off-net PHYs that are initiated by SOF, after the PHY change confirmation of ECM.

3151

3152

O_SP_SOF_TEST_009	SP SOF shall be able to initiate SP OVC testing of activated EVC after the confirmation of SP ICM and SP ECM.
Source	S9
O_SP_SOF_TEST_006	SP SOF shall be able to initiate end-to-end activated EVC testing after the confirmation of SP SOF and PART SOF.
Source	S14

3153

O_INTERLUDE_TEST_005	INTERLUDE should support end-to-end activated EVC testing of SP SOF after the confirmation of SP SOF and PART SOF.
Source	S14

3154

O_PART_SOF_TEST_005	PART SOF shall be able to initiate PART OVC testing for the activated EVC after the confirmation of PART ICM and PART ECM.

Source	S9

3155

R_SP_SOF_TIMING_0010	SP SOF shall be able to measure Tsp-cust and Tsp-part , report them to SP OSS/BSS (BA) for on-demand EVC activation.
Source	

3156

3157

R_PART_SOF_TIMING_0012	PART SOF shall be able to measure Tsp-part and report it to PART OSS/BSS (BA) for on-demand EVC activation.
Source	

3158

R_LEGATO_TIMING_0023	SP LEGATO API shall be able to support Tsp-cust and Tsp-part for on-demand EVC activation.
Source	
R_LEGATO_TIMING_0024	PART LEGATO API shall be able to support Tsp-part for on-demand EVC activation.
Source	
R_SONATA_TIMING_0012	SONATA API shall be able to support Tsp-cust and Tsp-part for on-demand EVC activation.
Source	

3159

3160 Table 40: Requirements for on-demand EVC Activation

3161 ## 7.14 On-demand Deactivation of EVC for E-LINE

3162 Prior to an on-demand request for de-activating an EVC for E-LINE service, the EVC is
3163 configured between off-net and on-net locations of SP and is active. Overall de-
3164 activation of EVC process can be summarized as follows:

3165 1. Customer via user portal requests de-activating the EVC which is active

3166 c. Immediately or

3167 d. At certain time and day in the future

3168 2. Time intervals for on-demand modification of EVC deactivation immediately can
3169 be defined in the contract between SP and customer ($T_{sp\text{-}cust}$), and SP and PART
3170 ($T_{sp\text{-}part}$). The time interval for PART is expected to be smaller than the time

3171 interval for the SP. For example if $T_{sp\text{-}cust}$ is 15 minutes, $T_{sp\text{-}part}$ could be 10
3172 minutes.

3173 a. The time interval for fulfillment between SP and customer can be
3174 recorded. In the customer contract, there can be a penalty associated
3175 with the requests that are not fulfilled within $T_{sp\text{-}cust}$.
3176 b. The time interval for fulfillment between SP and PART can be recorded.
3177 There can be a penalty associated with the requests that are not fulfilled
3178 within $T_{sp\text{-}part}$.
3179 c. If the customer request is not fulfilled within $T_{sp\text{-}cust}$, the customer can
3180 cancel the request. The cancelation may be counted for penalty per the
3181 contract.
3182 d. The customer may request a monthly history report from user portal
3183 consisting of $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$.

3184 3. $T_{sp\text{-}cust}$ and $T_{sp\text{-}part}$ may apply to on-demand modification of EVC deactivation at
3185 certain date and time in the future. The SP choses to perform the request prior
3186 to the scheduled time and have the service ready at the time of the scheduled
3187 time.

3188

3189 The details are depicted in **Figure 17**. Steps in **Figure 17** are as follows:

3190 • S1[ALLEGRO or CANTATA+LEGATO]: User requests EVC de-activation either
3191 from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and SP
3192 LEGATO interface of SP SOF

3193 • S2: SP SOF validates customer, the E-LINE service configuration between
3194 location A and location Z, the components of EVC, and whether EVC is active
3195 or not.

3196 • S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back
3197 to user with “Invalid Request” if user credentials are invalid. If the credentials
3198 are valid, bit for some reason the EVC deactivation cannot be performed at this
3199 time, SP SOF sends “Please try it later” to the customer or “Request is accepted
3200 and in progress” .

3201 If user credentials are valid, the deactivation is feasible, and traffic is running
3202 over the EVC, SP SOF sends the message, “Are you sure?”, to customer.

3203 If customer response is “No” for “Are you sure?”, then SP SOF disregards the
3204 request. “Request is not processed” message should be displayed at user portal.

3205 • S4 [PRESTO]: Based on S2 and S3, if user credentials are valid and customer
3206 responds with “Yes” for “Are you sure” question, SP SOF sends a request to SP
3207 ICM to de-activate EVC components at SP side of ENNI, on-net UNI, and on-net
3208 I-NNIs.

3209 • S4a [INTERLUDE]: Based on S2 and S3, if user credentials and customer
3210 responds with “Yes” for “Are you sure” question, SP SOF sends a request to

Partner SOF to validate customer request and de-activate the EVC components at Partner side of ENNI, off-net UNI, and off-net I-NNIs. S4 and S4a can take place at the same time in order to reduce response time to user or S4a can take place after SP completes S8.

- S4c, S4d and S4e [INTERLUDE]: PART SOF validates the service is valid and EVC is active. If it is an invalid request, PART SOF sends message “Invalid Request” to SP SOF.

- S4b [PRESTO]: If PART SOF wants to wait for PART ICM validation, Partner SOF requests Partner ICM to de-activate the EVC components at Partner side of ENNI, off-net UNI and off-net I-NNIs.

- S5:

  1. SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and the SP OVC is active.

  2. Similarly, Partner ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within Partner network and the PART OVC is active.

- S6:

  1. [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if request is invalid or the deactivation cannot be performed, SP SOF responds to customer with “Invalid Request or Please try it later”.

  2. [PRESTO+INTERLUDE+ALLEGRO or PRESTO+INTERLUDE+CANTATA+LEGATO] Similarly, if the request is invalid for Partner network or the deactivation cannot be performed, Partner SOF send a message to SP SOF indicating that it is an invalid request or the deactivation cannot be performed. SP SOF responds to customer with “Invalid Request or Please try it later”.

- S7:

  1. [PRESTO+ADAGIO]Based on S5, if the request is valid, SP ICM de-activates SP OVC at ENNI and I-NNIs, sends a message to SP SOF indicating that SP OVC is deactivated, and requests SP ECM to de-activate EVC End Point on the on-net UNI”.

  2. [PRESTO+ADAGIO]Similarly, if the request is valid, Partner ICM de-activates PART OVC, sends a message to Partner SOF “Confirming EVC de-activation at PART side of ENNI and I-NNIs”, and requests Partner ECM to de-activate EVC End Point on the off-net UNI”.

- S7a [ADAGIO]:

  1. SP ECM validates if the SP OVC can be de-activated at on-net UNI and OVC end-point.

3248 2. Similarly, PART ECM validates if PART OVC can be deactivated at off-
3249 net UNI and off-net OVC End Point.

3250 • S8:

3251 1. [ADAGIO+PRESTO]After SP ECM de-activates EVC at on-net UNI and
3252 associated EVC End Point, SP ECM sends a confirmation message to SP
3253 ICM. In turn, SP ICM sends a confirmation message to SP SOF indicating
3254 the EVC de-activation at on-net UNI and EVC End Point.

3255 2. [ADAGIO+PRESTO] Similarly, after Partner ECM de-activates EVC at off-net
3256 UNI and associated EVC End Point, Partner ECM sends a confirmation
3257 message to Partner ICM. In turn, Partner ICM sends a confirmation message
3258 to Partner SOF indicating EVC de-activation at off-net UNI and associated
3259 EVC End Point.

3260 • S8a [ALLEGRO or CANTATA+LEGATO]: Based on S8, SP SOF sends the
3261 message to customer, “EVC is deactivated”.

3262 • S8b [[ALLEGRO or CANTATA+LEGATO]: Based on S8, for some reason, the
3263 EVC deactivation fails, PART SOF sends the message to customer, “Please try
3264 it later”.
3265 • S9 [LEGATO]:
3266 a) At S8a, per contract between SP and PART, PART SOF informs PART
3267 OSS/BSS (BA) that EVC is de-activated so that SLO between SP and
3268 PART, percent of valid requests accepted (TAR/TVR) and percent of
3269 accepted requests fulfilled (TFR/TAR), can be updated.
3270 b) At S8a,SP informs OSS/BSS (BA) to initiate the billing and update on-
3271 demand SLO parameters, percent of valid requests accepted (TAR/TVR)
3272 and percent of accepted requests fulfilled (TFR/TAR).
3273 • S10 [LEGATO]:
3274 1. At S3, If there is a way to identify the fact that the request is considered to
3275 be invalid despite of the fact that it is a valid request, in order to calculate
3276 on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP
3277 SOF informs SP OSS/BSS (BA) that a valid request was considered to be
3278 invalid and rejected.
3279 2. At S8b, if EVC de-activation fails, SP SOF informs OSS to update its SLO
3280 for on-demand EVC activation, **percent of accepted requests fulfilled**
3281 **(TFR/TAR)**.
3282 3. At S8b, if EVC de-activation fails, PART SOF informs OSS to update its
3283 SLO for on-demand EVC activation, percent of accepted requests fulfilled
3284 (TFR/TAR).

3285

3286

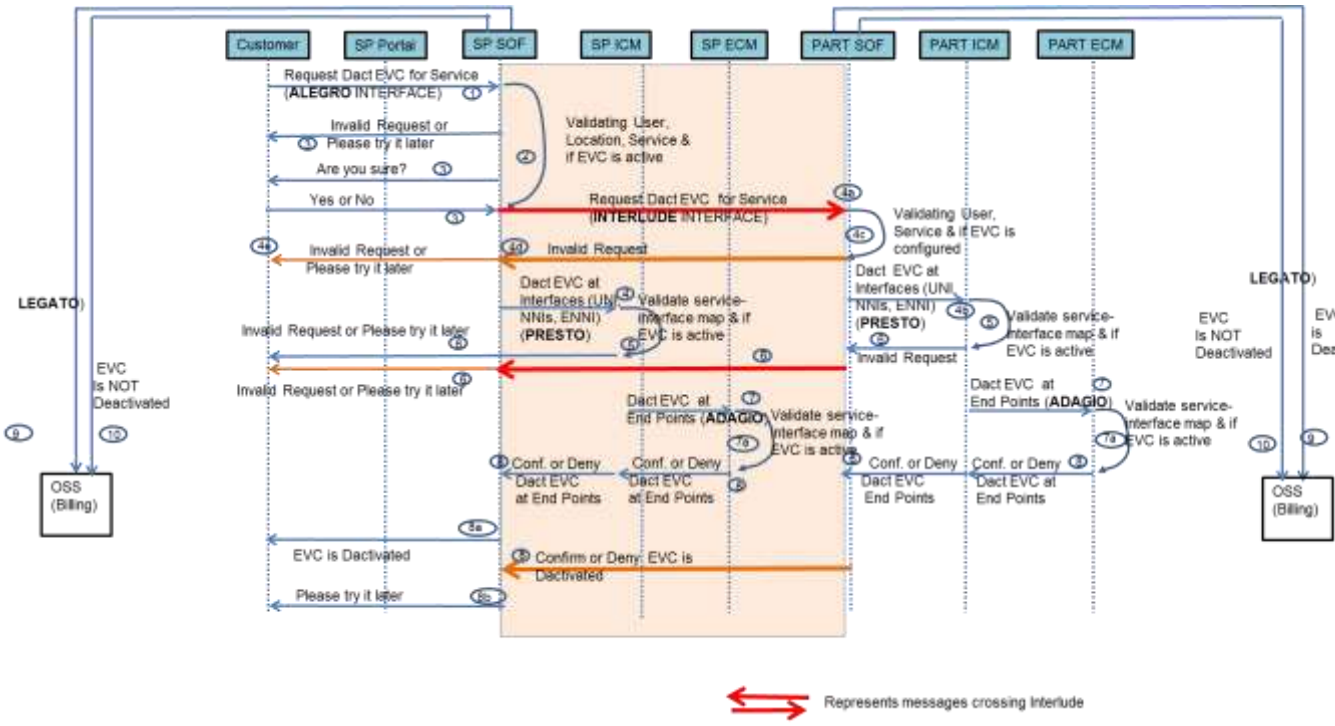

Figure 17 EVC Deactivation Process Flow for E-LINE

Use Case Number	UCx
Use Case Name	EVC Deactivation for E-LINE
Description	Customer requests an EVC Deactivation for E-LINE at the Customer Portal
Actor(s)	Customer, Customer Portal/SP OSS/BSS (BA), SP SOF
Pre-Condition(s)	Service has been ordered and configured.
Process Steps	1. Customer uses the Customer Portal to request the Deactivation of the EVC. 2. Customer enters all the mandatory data elements displayed on the portal (i.e. Status value for Deactivation , immediately or certain time in the future) 3. Customer Portal, SP OSS/BSS (BA), and SP SOF perform customer authentication and validates the service for this customer, integrity of the data elements to support the requested EVC Deactivation. 4. If the EVC Deactivation request is : a. Invalid (i.e. customer authentication fails, customer-service mapping fails, or EVC Deactivation request is not within contractual bounds), then SP SOF sends “invalid Request” to the customer. This message will be displayed at the Customer Portal. b. Valid and the requested EVC is carrying live traffic, SP SOF responds the customer with “Are you sure?”. If the customer responds back with “Yes”,

	then S4 (Step 4) will be initiated. 5. Tsp-cust and Tsp-part are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA). 6. This UC ends
Post-Conditions	Customer Portal displays messages in 4a and 4b above or SP SOF initiates the EVC Deactivation..
Alternative Path	
Assumption(s)	
References	

3292 Table 41: Use case description for EVC Deactivation (S1-S3)

3293

Use Case Number	UC2
Use Case Name	EVC Deactivation process, configuration, accept or denial, billing initiation and SLO update by SP and PART
Description	SP SOF and PART SOF initiate and configure EVC deactivation over their own PRESTO and ADAGIO interfaces; accept or deny the EVC deactivation over CANTATA; initiate billing over LEGATO; and update their SLOs over LEGATO.
Actor(s)	SP SOF, SP ICM, SP ECM, PART SOF, PART ICM, PART ECM, SP OSS/BSS (BA), PART OSS/BSS (BA)
Pre-Condition(s)	Customer request has been validated by SP SOF and PART SOF
Process Steps	3. SP SOF requests PART OVC deactivation from PART SOF over INTERLUDE and requests SP OVC deactivation from SP ICM over PRESTO. *It is a choice for SP to receive confirmation from its ICM and ECM for the EVC deactivation before sending a request to PART SOF*. 4. SP ICM verifies validity of the request and if EVC deactivation can be supported at on-net UNI and NNIs. e. If the verification and deactivation are successful, it requests SP OVC deactivation from SP ECM over ADAGIO. f. If the verification is unsuccessful or deactivation fails, SP ICM notifies SP SOF that the request is “invalid ” or “Deactivation is failed”. In turn, SP SOF sends “Invalid Request or Please try it later ” to the customer. 7. SP ECM validates the request and if EVC activation can be supported at on-net UNI and OVC End Point. After the SP ECM validation, SP ECM sends a confirmation or denial message to SP ICM for SP OVC deactivation. In turn, SP ICM sends a confirmation or denial message to SP SOF for the SP OVC deativation at on-net UNI and on-net OVC End Point. 8. PART SOF verifies validity of request and if the deactivation can be performed at off-net UNI and off-net NNIs e. If the verification is successful, it request OVC activation from PART ICM. f. If the verification is unsuccessful or deactivation fails, PART SOF notifies SP SOF that either request is invalid or Please try it later”. In turn, SP SOF either sends “invalid Request” or “ Please try it later” to the customer. 8. PART ICM validates if the EVC belongs to ENNI, UNI and I-NNIs

	within SP network and deactivation of PART OVC can be supported on these interfaces. e. if validation or deactivation is unsuccessful at off-net UNI, ENNI or I-NNIs of Partner network, PART ICM notifies PART SOF about invalid request or unable to deactivate OVC ". In turn, PART SOF sends a message to SP SOF indicating that either the request is invalid or unable to deactivate ". SP SOF responds to customer with "Invalid Request " or " Please try it Later ". f. If deactivation is successful at off-net UNI, ENNI or I-NNI, PART ICM requests PART ECM to deactivate PART OVC. 9. PART ECM validates the request and if deactivates PART OVC at off-net EVC End Point . After the PART ECM validation, PART ECM sends a confirmation or denial message to PART ICM for PART OVC deactivation. In turn, PART ICM sends a confirmation or denial message to PART SOF for PART OVC deactivation at off-net UNI and off-net OVC End Point. For the request denial message, SP SOF responds customer with "Invalid Request or Please try it Later". 20. SP SOF informs SP OSS/BSS (BA) for each denial or confirmation of EVC deactivation request. Similarly, PART SOF informs PART OSS/BSS (BA). 21. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART. 22. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.
Post Conditions	Billing is initiated if the request is confirmed. SLOs for Elastic Service are being updated by SP OSS/BSS (BA) and PART OSS/BSS (BA).
Alternate Paths	.
Assumption(s)	
References	S4-S17

Table 42: Use case description for EVC Deactivation (S4-S17)

7.14.1 Requirements

R_ELASTIC_DACTIVATE_EVC	Elastic Ethernet Service shall support on-demand EVC de-activation.
Source	S1

R_ELASTIC_DACT_EVC_CANTAT	CANTATA shall support on-demand EVC de-activation.

Source	S1

3302

R_ELASTIC_DACT_EVC_ALLEGR(	ALLEGRO shall support on-demand EVC de-activation.
Source	S1

3303

ELASTIC_DACT_EVC_PRESTO_001	PRESTO shall support on-demand EVC de-activation.
Source	S1

3304

ELASTIC_DACT_EVC_ADAGIO_001	ADAGIO shall support on-demand EVC de-activation.
Source	S1

3305

R_ELASTIC_DACT_EVC_SONATA_	SONATA shall support on-demand EVC de-activation.
Source	S1

3306

R_ELASTIC_DACT_EVC_INTERLU	INTERLUDE shall support on-demand EVC de-activation.
Source	S1

3307

3308

3309

R_ELASTIC_DACT_EVC_CANT_S	CANTATA shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for on-demand EVC de-activation.
Source	S1, [1]

3310

R_ELASTIC_DACT_EVC_ALLEG_SLO	ALLEGRO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for on-demand EVC

	de-activation.
Source	S1, [1]

3311

R_ELASTIC_DACT_EVC_LEGAT_SLO	LEGATO shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for on-demand EVC de-activation.
Source	S1, [1]

3312

R_ELASTIC_DACT_EVC_SONAT_SLO	SONATA shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for PHY change for on-demand EVC de-activation.
Source	S1, [1]

3313

R_ELASTIC_DACT_EVC_INTER_SLO_	INTERLUDE shall support percent of valid requests accepted (TAR/TVR) per month and percent of accepted requests fulfilled (TFR/TAR) per month for on-demand EVC de-activation.
Source	S1, [1]

3314

R_ELASTIC_DACT_EVC_SCH_INTER	On-demand EVC de-activation immediately or at certain day and time in the future should be supported from ALLEGRO interface of SP SOF.
Source	S1

3315

R_ELASTIC_DACT_EVC_SCH_LEGAT	On-demand EVC de-activation immediately or at certain day and time in the future should be supported from LEGATO interface.
Source	S1

3316

R_ELASTIC_DACT_EVC_SCH_CANT	On-demand EVC de-activation immediately or at certain day and time in the future should be supported from CANTATA interface.
Source	S1

3317

R_ELASTIC_DACT_EVC_SCH_SONTA	On-demand EVC de-activation immediately or at certain day and time in the future should be supported from SONATA interface.
Source	S1

3318

R_ELASTIC_DACT_EVC_SCH_INTER	On-demand EVC de-activation immediately or at certain day and time in the future should be supported from INTERLUDE interface.
Source	S1

3319

R_SP_SOF_TIMING_0011	SP SOF shall be able to measure Tsp-cust and Tsp-part , report them to SP OSS/BSS (BA) for on-demand EVC de-activation.
Source	

3320

3321

R_PART_SOF_TIMING_0013	PART SOF shall be able to measure Tsp-part and report it to PART OSS/BSS (BA) for on-demand EVC de-activation.
Source	

3322

R_LEGATO_TIMING_0025	SP LEGATO API shall be able to support Tsp-cust and Tsp-part for on-demand EVC de-activation.
Source	
R_LEGATO_TIMING_0026	PART LEGATO API shall be able to support Tsp-part for on-demand EVC de-activation.
Source	
R_SONATA_TIMING_0013	SONATA API shall be able to support Tsp-cust and Tsp-part for on-demand EVC de-activation.
Source	

3323

3324 Table 43: Requirements for on-demand EVC Deactivation

3325

3326

9 References

[1] MEF 47 “Carrier Ethernet Services for Cloud Implementation Agreement”, October 2014

[2] MEF 55 “Lifecycle Service Orchestration (LSO): Reference Architecture and Framework”, March 2016.

[3] MEF 10.3 Ethernet Services Attributes Phase 3, October 2013.

[4] MEF 51, “OVC Services Definitions”, August 2015.

[5] MEF 33, “Ethernet Access Services Definition”, January 2012.

[6] MEF 6.2, “EVC Ethernet Services Definitions Phase 3”, August, 2014.

[7] MEF.12.2, “Carrier Ethernet Network Architecture Framework Part 2: Ethernet Services Layer”, May 2014.

10 Revision History

Date	Editor	Comments
October 9, 2017	Toy	Initial Draft
September 23, 2017	Toy	Draft ToC
January 31, 2018	Toy	First Draft
July 16, 2018		Second Draft