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

July, 2018

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168 **1 List of Contributing Members**

169

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

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

174 **2 Abstract**

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

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

183 **3 Compliance Level**

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

189 The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”,
190 “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this
191 document are to be interpreted as described in RFC 2119. All key words use upper
192 case, bold text to distinguish them from other uses of the words. Any use of these key
193 words (e.g., may and optional) without [R_], [D_] or [O_] is not normative.
194

195

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-cust}	Time intervals for on-demand modification of Elastic E-Line attributes immediately between SP and customer.	This document
T_{sp-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.	

Table 1: Terminology and Definitions Table

203 **5 Introduction**

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

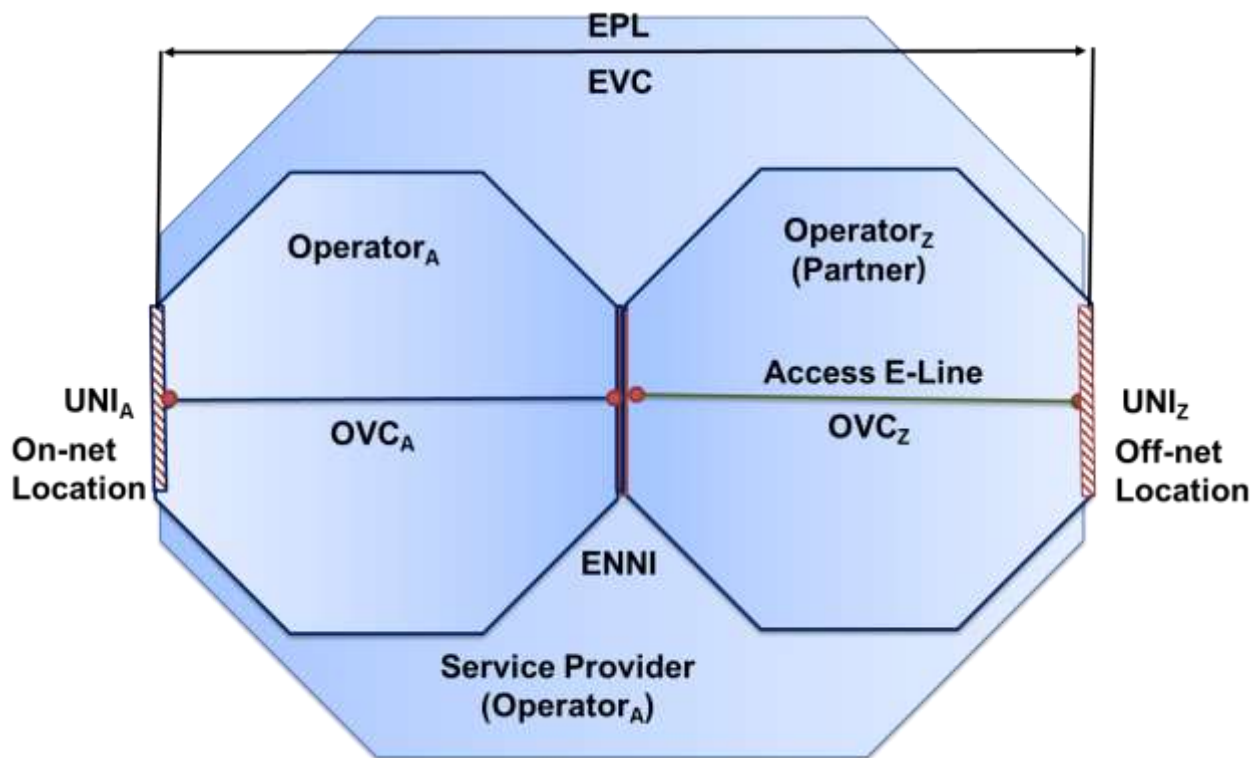
207 Access E-Line service can be a segment of end-to-end E-Line service. In that case,
 208 Access E-Line service order and provisioning are inseparable from E-Line services.

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

214 **6 Reference Architecture**

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

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Figure 1 : EPL crossing networks of two Operators

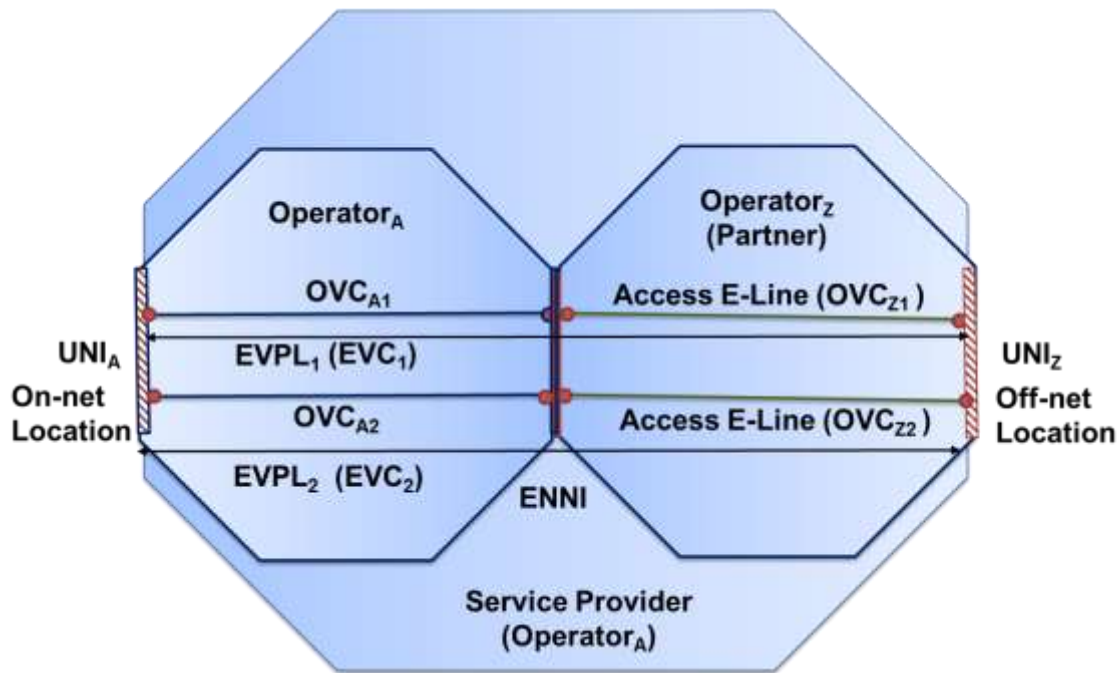


Figure 2 : EVPL crossing networks of two Operators

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

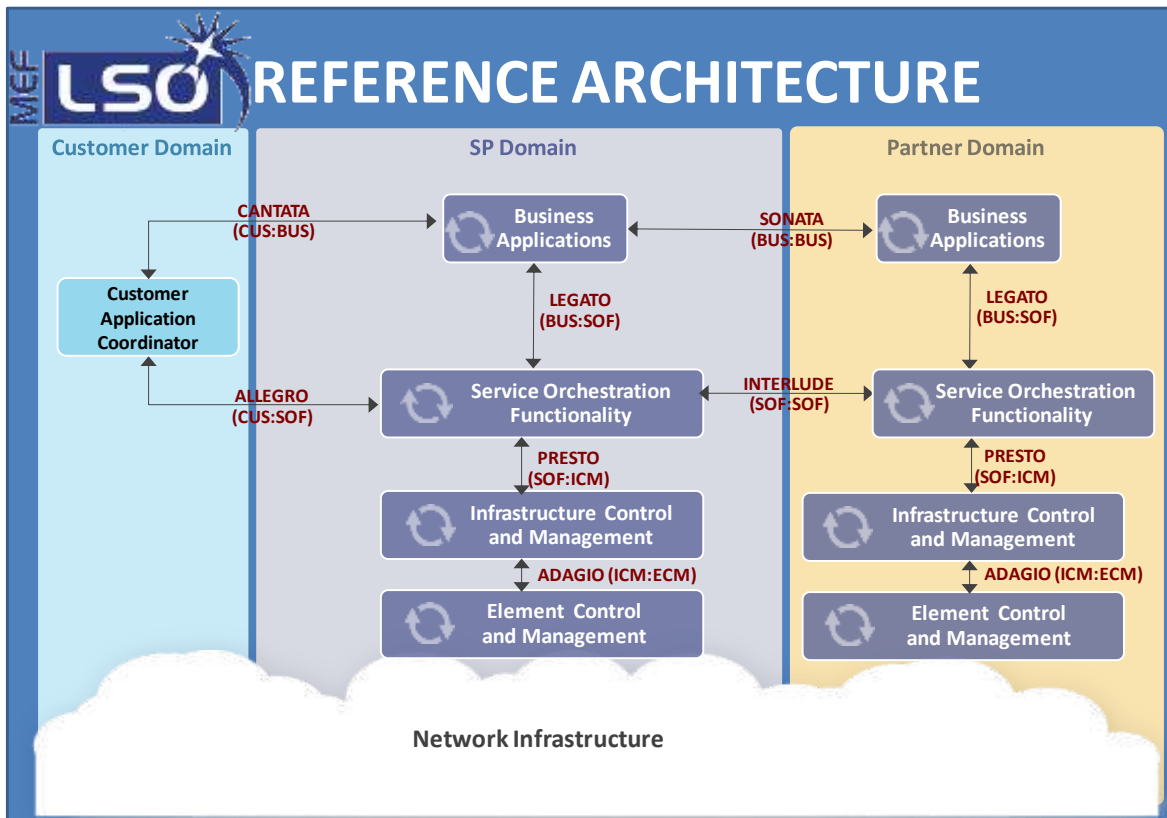


Figure 3 LSO Reference Architecture [2]

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.

239 **7 Business Requirements**

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

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

- 248 1. Establishing ENNI between two operators
- 249 2. Whether SP NID is to be placed at off-net customer¹ location in addition to
250 Partner's NID or not
- 251 3. Identifying off-net location (s) to be served
- 252 4. Identifying service type (s) to be offered at off-net location (s)
- 253 5. Identifying attributes and their value ranges to be supported for each service
254 type
- 255 6. Identifying elastic service attributes that can be modified on-demand
- 256 7. Identifying SLAs for elasticity
- 257 8. Identifying charges for elastic service attribute values

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

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

- 261 1. Identifying service type (s) available at off-net locations
- 262 2. Identifying service (s) and their attributes that can be changed on demand
- 263 3. Identifying charges for elastic service attribute values
- 264 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.

265 **8 Use Cases**

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

- 268 1. On-demand modifications of CIR parameter of ingress bandwidth profiles of an
269 EVC provided by the SP and implemented using an Operator which provides a
270 segment of EVC (i.e. OVC) via an Access E-Line service. The ingress
271 bandwidth profiles of the OVC are those associated with OVC End Point at the
272 UNI and at the ENNI.
- 273 2. On-demand modifications of CBS parameter of an ingress bandwidth profiles of
274 an EVC provided by the SP and implemented using an Operator which provides
275 a segment of EVC (i.e. OVC) via Access E-Line services. The ingress
276 bandwidth profiles are those associated with OVC End Point Per UNI and Per
277 ENNI.
- 278 3. On-demand modifications of EIR parameter of an ingress bandwidth profiles of
279 an EVC crossing provided by the SP and implemented using an Operator which
280 provides a segment of EVC (i.e. OVC) via Access E-Line services. The ingress
281 bandwidth profiles are those associated with OVC End Point Per UNI and Per
282 ENNI.
- 283 4. On-demand modifications of EBS parameter of an ingress bandwidth profile of
284 an EVC provided by the SP and implemented using an Operator which provides
285 a segment of EVC (i.e. OVC) via Access E-Line services. The ingress
286 bandwidth profiles are those associated with OVC End Point Per UNI and Per
287 ENNI.
- 288 5. On-demand modifications of CE-VLAN ID parameter of UNI of an EVC provided
289 by the SP and implemented using an Operator which provides a segment of
290 EVC (i.e. OVC) via Access E-Line services.
- 291 6. On-demand modifications of an on-net or off-net UNI PHY of an EVC provided
292 by the SP and implemented using an Operator which provides a segment of
293 EVC (i.e. OVC) via Access E-Line services.
- 294 7. On-demand activation or deactivation of an EVC provided by the SP and
295 implemented using an Operator which provides a segment of EVC (i.e. OVC)
296 via Access E-Line services.

297 **8.1. On-demand Modifications of Committed Information Rate (CIR) for** 298 **EPL**

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

303 Overall CIR modification process can be summarized as follows:

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

- 307 2. Customer modifies E-Line bandwidth with going thru a negotiation process with
 308 the SP. Customer via user portal requests change within CIR bounds for CIR per
 309 bandwidth profile flow , $\langle \text{CIR}_{\text{lb}} , \text{CIR}_{\text{ub}}^2 \rangle$ for EVC End Point
- 310 a. Immediately
- 311 i. With no end time for new CIR, $\text{CIR}_{\text{elastic}}$, where $\text{CIR}_{\text{elastic}} = \text{CIR}_{\text{lb}}$
 312 $+N \times \text{CIR}_{\text{increment}}$ and N is an integer between 1 and $N_{\text{max,CIR}}$ or
 313 $\langle \text{one of CIR rates available in SP list} \rangle^3$.
- 314 ii. With end time for new CIR, $\text{CIR}_{\text{elastic}}$, where $\text{CIR}_{\text{elastic}} = \text{CIR}_{\text{lb}}$
 315 $+N \times \text{CIR}_{\text{increment}}$. where N is an integer between 1 and $N_{\text{max,CIR}}$. or
 316 $\langle \text{one of CIR rates available in SP list} \rangle$. After end time elapses, the
 317 rate becomes CIR_{lb} .
- 318 b. At certain time and day in the future
- 319 i. With no end time for new CIR, $\text{CIR}_{\text{elastic}}$, where $\text{CIR}_{\text{elastic}} = \text{CIR}_{\text{lb}}$
 320 $+N \times \text{CIR}_{\text{increment}}$ or $\langle \text{one of CIR rates available in SP list} \rangle$ where N
 321 is an integer between 1 and $N_{\text{max,CIR}}$,
- 322 ii. With end time for new CIR , $\text{CIR}_{\text{elastic}}$ where $\text{CIR}_{\text{elastic}} = \text{CIR}_{\text{lb}}$
 323 $+N \times \text{CIR}_{\text{increment}}$ or $\langle \text{one of CIR rates available in SP list} \rangle$ where N
 324 is an integer between 1 and $N_{\text{max,CIR}}$. After end time elapses, the
 325 rate becomes CIR_{lb}
- 326 3. Time intervals for on-demand modification of CIR immediately can be defined in
 327 the contract between SP and customer ($T_{\text{sp-cust}}$)⁴, and SP and PART⁵ ($T_{\text{sp-part}}$)⁶.
 328 The time interval for PART is expected to be smaller than the time interval for
 329 the SP. For example if $T_{\text{sp-cust}}$ is 15 minutes, $T_{\text{sp-part}}$ could be 10 minutes.
- 330 a. The time interval for fulfillment between SP and customer can be
 331 recorded. In the customer contract, there can be a penalty associated
 332 with the requests that are not fulfilled within $T_{\text{sp-cust}}$.
- 333 b. The time interval for fulfillment between SP and PART can be recorded.
 334 There can be a penalty associated with the requests that are not fulfilled
 335 within $T_{\text{sp-part}}$.
- 336 c. If the customer request is not fulfilled within $T_{\text{sp-cust}}$, the customer can
 337 cancel the request. The cancelation may be counted for penalty per the
 338 contract.
- 339 d. The customer may request from user portal a monthly history report
 340 consisting of $T_{\text{sp-cust}}$ and $T_{\text{sp-part}}$.

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 $T_{\text{sp-cust}}$ 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 $T_{\text{sp-part}}$ is expected to be the same for all on-demand attributes.

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

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

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

348 • S1[ALLEGRO or CANTATA+LEGATO]: User requests EVC CIR⁷ change either
349 from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and SP
350 LEGATO interface of SP SOF

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

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

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

367 ➤ *During the validation process, SP may choose to display “Request is in*
368 *Progress” at SP Portal.*

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

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

378 ➤ *If customer requests pass user authentication at S2, it is up to SP SOF to*
379 *wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and*
380 *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]. .

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

383 ➤ *During the validation process, SP may choose to display “Request is in*
384 *Progress” at SP Portal.*

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

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

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

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

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

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

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

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

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

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

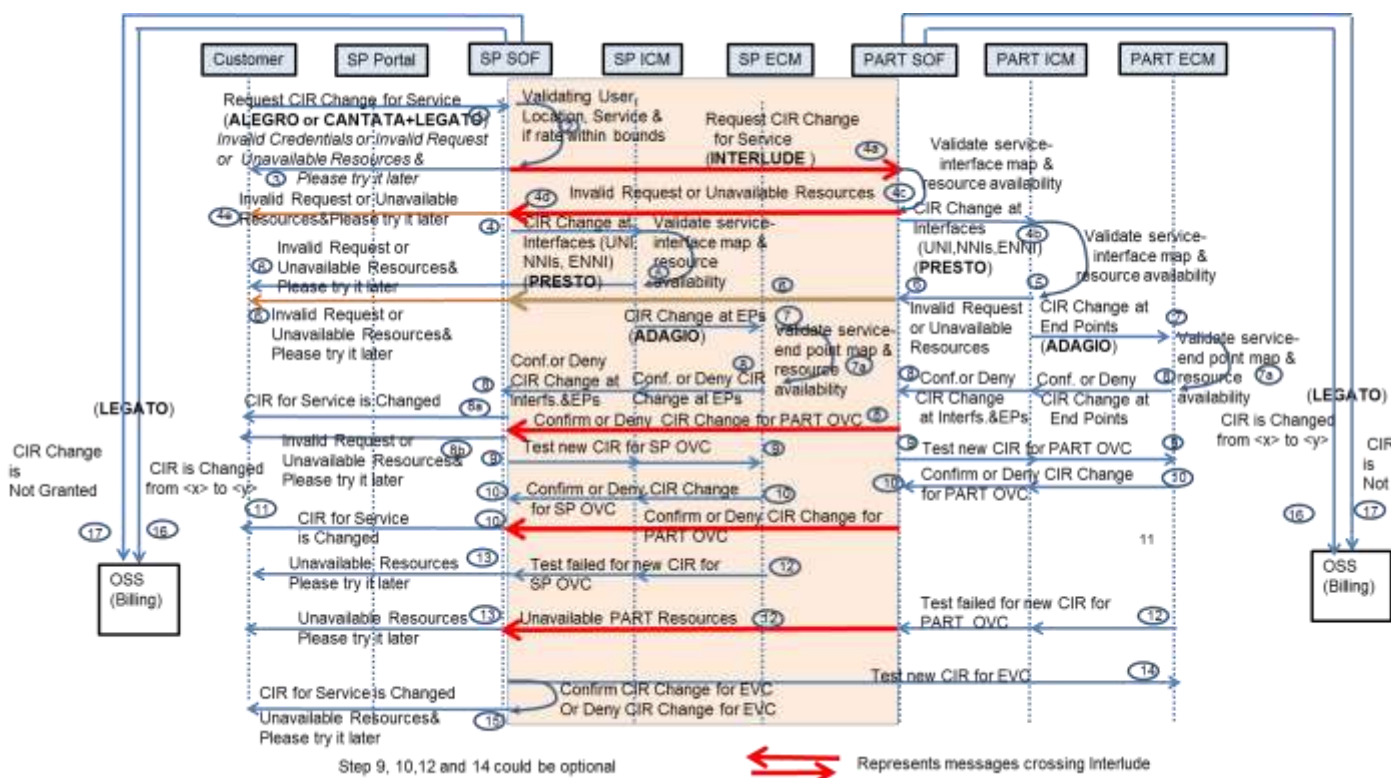
414 • S5:

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

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- 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”.
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- 496 2. [ALLEGRO or CANTATA+LEGATO]if testing is successful, SP SOF informs
497 customer that “CIR for Service is Changed”.
- 498 3. [LEGATO] if testing is successful, to initiate new billing procedure, SP SOF
499 also informs OSS/BSS (BA) that “CIR for Service is Changed”.
- 500 • S16 [LEGATO]:
 - 501 1. a) At S8a and S11, per contract between SP and Ethernet Access
502 Operator (PART), PART SOF informs PART OSS/BSS (BA) that CIR
503 change is confirmed so that SLO between SP and PART, percent of valid
504 requests accepted (TAR/TVR) and percent of accepted requests fulfilled
505 (TFR/TAR), can be updated.
 - 506 b) At S8a and S11,SP chooses to confirm CIR change without an end-to-
507 end testing of EVC and informs OSS/BSS (BA) to initiate the billing and
508 update on-demand SLO parameters, percent of valid requests accepted
509 (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).
 - 510 2. a) At S15, if testing is successful, SP SOF informs OSS/BSS (BA) to
511 initiate new billing procedure for the new CIR and update on demand SLO
512 parameters, percent of valid requests accepted (TAR/TVR) and percent
513 of accepted requests fulfilled (TFR/TAR).
 - 514
 - 515 b) At S15, if testing is successful, SP SOF also informs PART SOF that
516 the testing is successful. In turn, PART SOF informs PART OSS/BSS
517 (BA) that CIR change is successful so that PART OSS/BSS (BA) can
518 update its SLOs.
 - 519 • S17 [LEGATO]:
 - 520 1. At S3, If there is a way to identify the fact that the request is considered to
521 be invalid despite of the fact that it is a valid request, in order to calculate
522 on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP
523 SOF informs SP OSS/BSS (BA) that a valid request was considered to be
524 invalid and rejected.
 - 525 2. At S3,S4e, S6.1, S8b, S13 and S15, if there is not enough resources to
526 support CIR change, SP SOF informs OSS/BSS (BA) to update its SLO
527 for on-demand CIR change, **percent of accepted requests fulfilled**
528 **(TFR/TAR)**.
 - 529 3. At S4d, S6.2, S8b, S11 and S15, if there is not enough resources to
530 support CIR change, PART SOF informs OSS/BSS (BA) to update its
531 SLO for on-demand CIR change, percent of accepted requests fulfilled
532 (TFR/TAR).
 - 533 4. At S15, if testing is unsuccessful, SP SOF informs PART SOF about not
534 being able to honor the customer request so that PART SOF requests
535 PART OSS/BSS (BA) to update on demand SLO parameters.

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Figure 4 CIR Modification Process Flow for Access E-Line

540 The steps above are summarized in two use cases below.

541

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	<ol style="list-style-type: none"> 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 : <ol style="list-style-type: none"> 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.

	<p>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.</p> <p><i>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.</i></p> <p><i>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)</i></p> <p><i>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)</i></p> <p>c. Valid and there is enough capacity in the network to support this new CIR, then S4 will be initiated.</p> <p>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.</p> <p>5. $T_{sp-cust}$ and $T_{sp-part}$ are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA).</p> <p>This UC ends</p>
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 _{increment} 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	<p>1. SP SOF requests CIR change from PART SOF over INTERLUDE and requests CIR change from SP ICM over PRESTO.</p> <p><i>It is a choice for SP to receive confirmation from its ICM and ECM for</i></p>

	<p><i>the CIR change before sending a request to PART SOF.</i></p> <ol style="list-style-type: none"> 2. SP ICM verifies validity of request and if there is adequate capacity at UNI, ENNI and NNIs. <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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. <ol style="list-style-type: none"> 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, <ol style="list-style-type: none"> 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.
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	<ol style="list-style-type: none"> 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, and reported to OSS/BSS (BA).
Post Conditions	Ready for passing traffic with new CIR.
Alternate Paths	
Assumption(s)	
References	S4-S17

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

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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. <i>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.</i>
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 <i>The service attributes must be in the contract (or covered by business relationships) between SP and customer, and between SP and PART.</i>
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 <i>The service attributes must be supported by API of CANTATA for user to enter the on-demand request</i> .
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Source	S1
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555

556

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

557

558

O_ELASTIC_CIR_LEGATO_001	<p>LEGATO should support $CIR_{elastic}$, CIR_{lb}, CIR_{ub}, N, $N_{max,CIR}$ and $CIR_{increment}$ for Elastic Ethernet ServiceElastic Ethernet Service.</p> <p><i>Note that the service attributes must be supported by LEGATO in its communications with SP SOF.</i></p>
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R_ELASTIC_EVC_SLO_001	<p>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].</p>
Source	S1 [1]

562

R_ELASTIC_CIR_SONATA_SLO_001	<p>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.</p> <p><i>Note that these SLOs must be in the contract (or business relationships) between SP and customer, and between SP and PART.</i></p>
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Source	S1 [1]
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R_ELASTIC_CIR_LEGATO_SLO_001	<p>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.</p> <p><i>Note that the SLO parameters must be supported by LEGATO API.</i></p>
Source	S1 [1]

564

R_ELASTIC_CIR_CANTATA_SLO_001	<p>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.</p> <p><i>Remark : The SLO parameters must be supported by CANTATA API.</i></p>
Source	S1 [1]

565

R_ELASTIC_CIR_ALLEGRO_SLO_001	<p>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</p> <p><i>Remark : The SLO parameters must be supported by ALLEGRO API.</i></p>
Source	S1 [1]

566

567

R_ELASTIC_SCH_ALLEGRO_001	<p>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.</p>
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568

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

572

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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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.
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578

O_ADAGIO_TEST_001	ADAGIO should support OVC testing for new CIR
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	that is initiated by SOF, after the CIR change confirmation of ICM and ECM.
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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	

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584

Table 4: Requirements for on-demand CIR change

8.2. On-demand Modification of EIR

585
586
587 Prior to an on-demand request for modifying EIR of an E-LINE, ENNI, UNIs and EVC
588 between off-net and on-net locations of SP are established for this E-LINE: Overall EIR
589 modification process can be summarized as follows:

- 590 1. Customer can modify EVC bandwidth up to UNI PHY rate for E-Line without
591 going thru a negotiation process with the SP, although this may not be feasible
592 for EVPL.
- 593 2. Customer via user portal requests change within EIR bounds for EIR per
594 bandwidth profile flow , $\langle EIR_{lb} , EIR_{ub} \rangle^8$ for EVC End Point

595 a. Immediately

- 596 i. With no end time for new EIR , $EIR_{elastic}$, where $EIR_{elastic} = EIR_{lb}$
597 $+NxEIR_{increment}$ where N is an integer between 1 and N_{max} or
598 \langle one of EIR rates available in SP list \rangle

599 Note that N_{max} for EIR could be different that N_{max} for CIR in section
600 7.1. Therefore, we call N_{max} as $N_{max,EIR}$.

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

- 602 ii. With end time for new EIR, $EIR_{elastic}$, where $EIR_{elastic} = EIR_{lb}$
603 $+NxEIR_{increment}$. or \langle one of EIR rates available in SP list \rangle where N
604 is an integer between 1 and $N_{max,EIR}$. After the end time elapses,
605 the rate becomes EIR_{lb}

606 b. At certain time and day in the future

- 607 i. With no end time for new EIR , $EIR_{elastic}$, where $EIR_{elastic} = EIR_{lb}$
608 $+NxEIR_{increment}$ or \langle one of EIR rates available in SP list \rangle where N
609 is an integer between 1 and $N_{max,EIR}$.

- 610 ii. With end time for new EIR , $EIR_{elastic}$ where $EIR_{elastic} = EIR_{lb}$
611 $+NxEIR_{increment}$ or \langle one of EIR rates available in SP list \rangle where N is
612 an integer between 1 and $N_{max,EIR}$. After end time elapses, the rate
613 becomes EIR_{lb}

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

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

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

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

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

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

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

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

649 ➤ *During the validation process, SP may choose to display “Request is in*
650 *Progress” at SP Portal.*

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

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

- 660 ➤ *If customer requests pass user authentication at S2, it is up to SP SOF to*
661 *wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and*
662 *S7a) before denying a customer request based on its own verification that*
663 *request is invalid and/or there is not enough capacity to support the*
664 *request.*
- 665 ➤ *During the validation process, SP may choose to display “Request is in*
666 *Progress” at SP Portal.*
- 667 • S4 [PRESTO]: Based on S2, if user credentials are valid and either capacity is
668 available or SP SOF has no capacity information, SP SOF sends a request to
669 SP ICM to change EIR at SP side of ENNI, on-net UNI, and on-net I-NNIs.
- 670 • S4a [INTERLUDE]: Based on S2, if user credentials are valid and either capacity
671 is available or SP SOF has no capacity information, SP SOF sends a request to
672 Partner SOF to change EIR at Partner side of ENNI, off-net UNI, and off-net I-
673 NNIs.
- 674 1. *S4 and S4a can take place at the same time in order to reduce response*
675 *time to user, or*
- 676 2. *S4a can take place after SP completes S8.*
- 677 The EIR and EIR_{increment} values for PART OVC are expected to be as same as
678 the EIR and EIR_{increment} values for SP OVC per contract between two operators.
679 If there are differences, this might cause packet loss and is not recommended.
- 680 N, EIR_{increment}, EIR_{lb} and EIR_{ub} attributes may not need to be passed to PART
681 SOF over Interlude. SP may only pass requested EIR value, EIR_{elastic}, to PART
682 SOF.
- 683 • S4c[INTERLUDE]: PART SOF validates the request by checking if the service is
684 being supported at the off-net location and there is adequate capacity to support
685 the change.
- 686 *In S2, SP SOF checks validity of the customer and service, and may verify*
687 *resource availability end-to-end. It is up to the PART SOF to re-validate the*
688 *service and resource availability for the requested off-net location. The*
689 *revalidation should reduce possible errors during the process.*
- 690 • S4d [INTERLUDE]: If validation in S4c fails, PART SOF sends either the
691 message “Invalid Request” or “ Unavailable Resources” to SP SOF. In turn, SP
692 SOF sends the message “Invalid Request” or “Unavailable Resources, please
693 try it later” to the customer.
- 694 If the validation in S4c passes, PART SOF simply continue to the process
695 without sending a confirmation message to SP SOF since SP SOF might need
696 re-validation at its own ICM and ECM layers.
- 697 • S4b [PRESTO]: If validation in S4c is successful, Partner SOF requests Partner
698 ICM to change EIR at Partner side of ENNI, off-net UNI and off-net I-NNIs.

- 699
- S5:

700 1. SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP

701 network and there is enough capacity at these interfaces to support the

702 requested EIR.

703 2. Similarly, Partner ICM validates if the EVC belongs to ENNI, UNI and I-NNIs

704 within Partner network and there is enough capacity at these interfaces to

705 support the requested EIR.
 - S6:

706 1. [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if

707 there is not enough capacity at on-net UNI, ENNI or I-NNIs within SP

708 network, SP SOF responds to customer with “Unavailable Resources and

709 Please try it Later”.

710

711 2. [PRESTO+INTERLUDE+ALLEGRO or

712 PRESTO+INTERLUDE+CANTATA+LEGATO] Similarly, if there is not

713 enough capacity at off-net UNI, ENNI or I-NNIs of Partner network, Partner

714 SOF send a message to SP SOF indicating that there is not enough capacity

715 to support the change. SP SOF responds to customer with “Unavailable

716 Resources and Please try it Later”.
 - S7 [PRESTO]:

717 1. Based on S5, if there is enough capacity at on-net UNI, ENNI and I-NNIs of

718 SP network, SP ICM requests SP ECM to modify the EIR to the customer

719 requested value at on-net UNI and EVC End Point on the on-net UNI”.

720

721 2. Similarly, if there is enough capacity at off-net UNI, ENNI and I-NNIs of

722 Partner network, Partner ICM requests Partner ECM to modify the EIR to the

723 customer requested value at off-net UNI and EVC End Point on the off-net

724 UNI”.
 - S7a [ADAGIO]:

725 1. SP ECM validates if there is enough capacity at on-net UNI and OVC End

726 Point to support new EIR.

727

728 2. Similarly, PART ECM validates if there is enough capacity at off-net UNI

729 and off-net OVC End Point to support new EIR.
 - S8:

730 1. [ADAGIO+PRESTO]After SP ECM validates EIR Change request at on-net

731 UNI and associated OVC End Point, SP ECM sends a confirmation or denial

732 message to SP ICM for the EIR Change. In turn, SP ICM sends a

733 confirmation or denial message to SP SOF for EIR change at on-net UNI and

734 on-net OVC End Point.

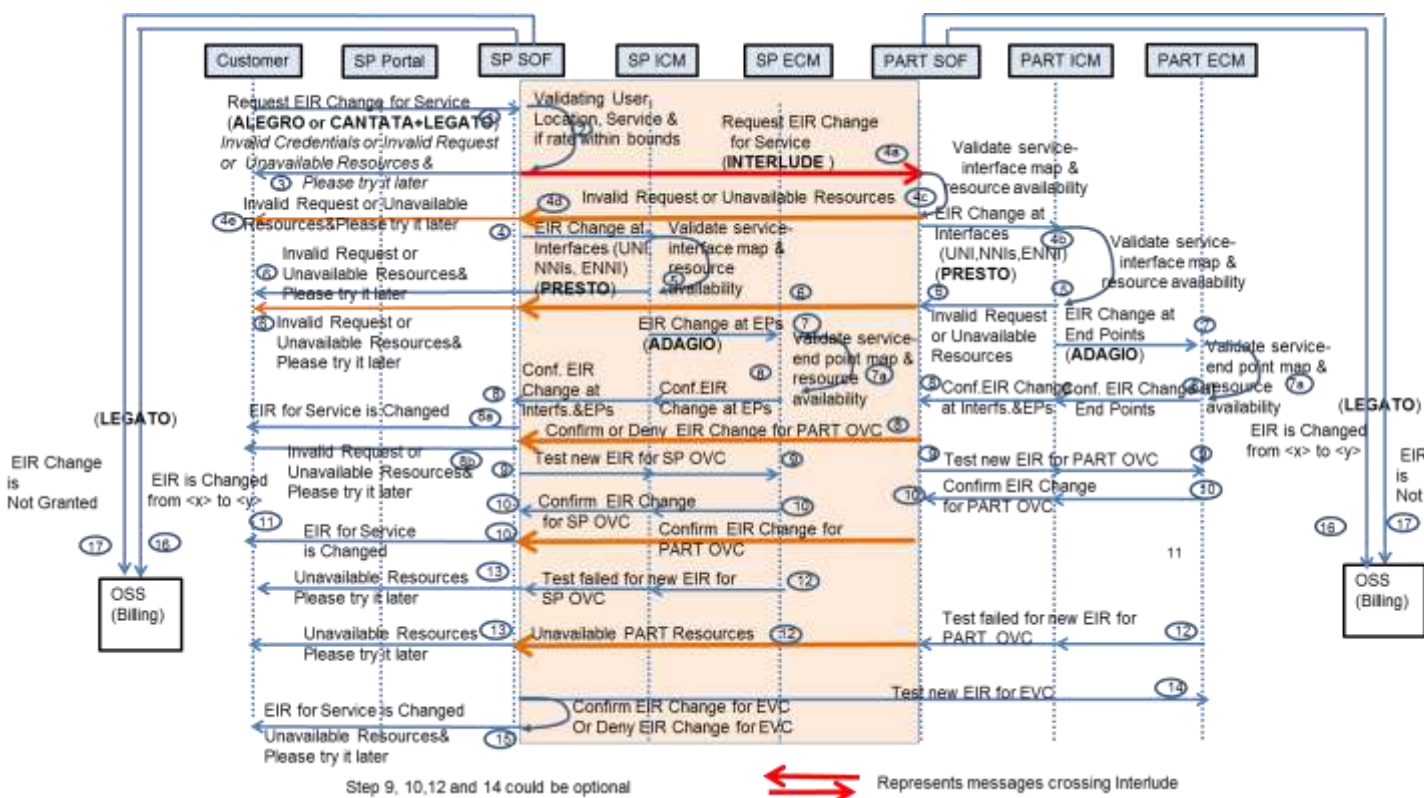
735

736 2. [ADAGIO+PRESTO] Similarly, after PART ECM validates EIR Change

737 request at off-net UNI and associated OVC End Point, PART ECM sends a

- 738 confirmation or denial message to PART ICM for the EIR Change. In turn,
739 PART ICM sends a confirmation or denial message to PART SOF for EIR
740 change at off-net UNI and off-net OVC End Point.
741
- 742 • S8a [ALLEGRO or CANTATA+LEGATO]: At S8, if EIR change has been
743 successful, SP SOF sends the message “EIR for service is changed” to
744 customer.
745
 - 746 • S8b [ALLEGRO or CANTATA+LEGATO]: At S8, if EIR change has been
747 unsuccessful, SP SOF sends the message “Unavailable resources, please try it
748 later” to customer.
- 749
- 750 • S9 [PRESTO+ADAGIO]: After S8, optionally, SP SOF and PART SOF run tests
751 on their segments of EVC (i.e. SP OVC and Partner OVC) to verify the EIR
752 change, by requesting ICM and ECM to test the new EIR at associated
753 interfaces and endpoints. .
- 754
- 755 • S10:
756 1.[ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM
757 confirms availability of new EIR to SP ICM and in turn SP ICM confirms
758 availability of new EIR to SP SOF.
759 2.[ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner OVC,
760 Partner ECM confirms availability of new EIR to Partner ICM and in turn Partner
761 ICM confirms availability of new EIR to Partner SOF.
- 762
- 763 3.[INTERLUDE] Partner SOF confirms Availability of New EIR to SP SOF,
764 “Confirmed Availability of New EIR for Partner OVC”.
- 765 • S11[ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer
766 indicating “EIR for Service is Changed”.
- 767
- 768 • S12:
769 1. [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for SP OVC, SP ECM
770 confirms failure of new EIR testing to SP ICM and in turn SP ICM confirms
771 failure of new EIR testing to SP SOF.
 - 772 2. [PRESTO+ADAGIO]Similarly, If tests at S9 are unsuccessful for Partner
773 OVC, Partner ECM confirms failure of new EIR testing to Partner ICM and in
774 turn Partner ICM confirms failure of new EIR testing to Partner SOF.
- 775 • S13[ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer
776 indicating “Unavailable Resources, Please try it Later”.
- 777 • S14[PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without SP and
778 Partner test their OVCs), optionally, SP SOF runs and end-to-end EVC test.
- 779 • S15

- 776 1. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP
777 SOF informs customer indicating that “Unavailable Resources, Please try it
778 Later”.
- 779 2. [ALLEGRO or CANTATA+LEGATO]if testing is successful, SP SOF informs
780 customer that “EIR for Service is Changed”.
- 781 3. [LEGATO] if testing is successful, to initiate new billing procedure, SP SOF
782 also informs OSS that “EIR for Service is Changed”.
- 783 • S16 [LEGATO]:
 - 784 1. a) At S8a and S11, per contract between SP and Ethernet Access
785 Operator (PART), PART SOF informs PART OSS/BSS (BA) that EIR
786 change is confirmed so that SLO between SP and PART, percent of valid
787 requests accepted (TAR/TVR) and percent of accepted requests fulfilled
788 (TFR/TAR), can be updated.
 - 789 b) At S8a and S11,SP chooses to confirm EIR change without an end-to-
790 end testing of EVC and informs OSS/BSS (BA) to initiate the billing and
791 update on-demand SLO parameters, percent of valid requests accepted
792 (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).
 - 793 2. a) At S15, if testing is successful, SP SOF informs OSS to initiate new
794 billing procedure for the new EIR and update on demand SLO
795 parameters, percent of valid requests accepted (TAR/TVR) and percent
796 of accepted requests fulfilled (TFR/TAR).
 - 797
 - 798 b) At S15, if testing is successful, SP SOF also informs PART SOF that
799 the testing is successful. In turn, PART SOF informs PART OSS/BSS
800 (BA) that EIR change is successful so that PART OSS/BSS (BA) can
801 update its SLOs.
 - 802 • S17 [LEGATO]:
 - 803 1. At S3, If there is a way to identify the fact that the request is considered to
804 be invalid despite of the fact that it is a valid request, in order to calculate
805 on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP
806 SOF informs SP OSS/BSS (BA) that a valid request was considered to be
807 invalid and rejected.
 - 808 2. At S3,S4e, S6.1, S8b, S13 and S15, if there is not enough resources to
809 support EIR change, SP SOF informs OSS to update its SLO for on-
810 demand EIR change, **percent of accepted requests fulfilled**
811 **(TFR/TAR)**.
 - 812 3. At S4d, S6.2, S8b, S11 and S15, if there is not enough resources to
813 support EIR change, PART SOF informs OSS to update its SLO for on-
814 demand EIR change, percent of accepted requests fulfilled (TFR/TAR).
 - 815 4. At S15, if testing is unsuccessful, SP SOF informs PART SOF about not
816 being able to honor the customer request so that PART SOF requests
817 PART OSS/BSS (BA) to update on demand SLO parameters.



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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	<ol style="list-style-type: none"> 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 : <ol style="list-style-type: none"> 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

	<p>customer.</p> <p>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.</p> <p><i>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.</i></p> <p><i>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)</i></p> <p><i>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)</i></p> <p>c. Valid and there is enough capacity in the network to support this new EIR, then S4 will be initiated.</p> <p>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.</p> <p>5. $T_{sp-cust}$ and $T_{sp-part}$ are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA).</p> <p>This UC ends</p>
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 $EIR_{inceregment}$ 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.

	<p><i>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.</i></p> <ol style="list-style-type: none"> 2. SP ICM verifies validity of request and if there is adequate capacity at UNI, ENNI and NNIs. <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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. <ol style="list-style-type: none"> 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, <ol style="list-style-type: none"> 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
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	<p>customer.</p> <ol style="list-style-type: none"> 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, and 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

826

827

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	<p>Interlude should support $EIR_{elastic}$, EIR_{lb}, EIR_{ub}, N, $N_{max,EIR}$ and $EIR_{increment}$ for the OVC Elastic Ethernet Service.</p> <p><i>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 Service where SP communicates these attributes to PART SOF over Interlude.</i></p>
Source	S1

833

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

834

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

Source	S1

835

836

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

837

838

O_ELASTIC_EIR_LEGATO_001	<p>LEGATO should support $EIR_{elastic}$, EIR_{lb}, EIR_{ub}, N, $N_{max,EIR}$ and $EIR_{increment}$ for Elastic Ethernet ServiceElastic Ethernet Service.</p> <p><i>Note that the service attributes must be supported by LEGATO in its communications with SP SOF.</i></p>
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839

840

R_ELASTIC_EVC_SLO_002	<p>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.</p>
Source	S1 [1]

841

R_ELASTIC_EIR_SONATA_SLO_001	<p>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.</p> <p><i>Note that these SLOs must be in the contract (or business relationships) between SP and customer, and between SP and PART.</i></p>
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Source	S1 [1]
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842

R_ELASTIC_EIR_LEGATO_SLO_001	<p>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.</p> <p><i>Note that the SLO parameters must be supported by LEGATO API.</i></p>
Source	S1 [1]

843

R_ELASTIC_EIR_CANTATA_SLO_001	<p>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.</p> <p><i>Remark : The SLO parameters must be supported by CANTATA API.</i></p>
Source	S1 [1]

844

R_ELASTIC_EIR_ALLEGRO_SLO_001	<p>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</p> <p><i>Note that the SLO parameters must be supported by ALLEGRO API.</i></p>
Source	S1 [1]

845

846

R_ELASTIC_SCH_ALLEGRO_002	<p>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.</p>
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847

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

851

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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856

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.
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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.
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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:

- 873 1. There is no CBS change for E-LINE. Customer can use CBS value set for the
874 initial EVC configuration.
- 875 2. Customer via user portal requests changes within CBS bounds for CBS per
876 bandwidth profile flow , $\langle CBS_{lb} , CBS_{ub} \rangle$ ⁹
- 877 a. Immediately
- 878 i. With no end time for new CBS , $CBS_{elastic} ,$ where $CBS_{elastic} = CBS_{lb}$
879 $+N \times CBS_{increment}$ or \langle one of CBS values available in SP list \rangle where
880 N is an integer between 1 and $N_{max,CBS}$. With end time for new
881 CBS, $CBS_{elastic} = CBS_{lb} +N \times CBS_{increment}$ or \langle one of CBS values
882 available in SP list \rangle where N is an integer between 1 and $N_{max,CBS}$.
883 After end time elapses, the burst size becomes CBS_{lb}
- 884 b. At certain time and day in the future
- 885 i. With no end time for new CBS , $CBS_{elastic} = CBS_{lb} +N \times CBS_{increment}$
886 or \langle one of CBS values available in SP list \rangle where N is an integer
887 between 1 and $N_{max,CBS}$.
- 888 ii. With end time for new CBS , $CBS_{elastic} = CBS_{lb} +N \times CBS_{increment}$ or
889 \langle one of CBS values available in SP list \rangle where N is an integer
890 between 1 and $N_{max,CBS}$. . After end time elapses, the rate
891 becomes CBS_{lb} .
- 892 3. CBS changes can be performed automatically by SP and PART based on
893 network events with or without customer involvement, based on customer-SP
894 contract and SP-PART contract. This approach is out of scope for this
895 specification
- 896 4. Time intervals for on-demand modification of CBS immediately can be defined in
897 the contract between SP and customer ($T_{sp-cust}$), and SP and PART ($T_{sp-part}$).
898 The time interval for PART is expected to be smaller than the time interval for
899 the SP. For example if $T_{sp-cust}$ is 15 minutes, $T_{sp-part}$ could be 10 minutes.
- 900 a. The time interval for fulfillment between SP and customer can be
901 recorded. In the customer contract, there can be a penalty associated
902 with the requests that are not fulfilled within $T_{sp-cust}$.
- 903 b. The time interval for fulfillment between SP and PART can be recorded.
904 There can be a penalty associated with the requests that are not fulfilled
905 within $T_{sp-part}$.
- 906 c. If the customer request is not fulfilled within $T_{sp-cust}$, the customer can
907 cancel the request. The cancelation may be counted for penalty per the
908 contract.
- 909 d. The customer may request a monthly history report from user portal
910 consisting of $T_{sp-cust}$ and $T_{sp-part}$.

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.

- 911 5. $T_{sp-cust}$ and $T_{sp-part}$ may apply to on-demand modification of CBS at certain date
912 and time in the future. The SP chooses to perform the request prior to the
913 scheduled time and have the service ready at the time of the scheduled time.
914
- 915 6. CBS changes can be performed automatically by SP and PART when CBS
916 changes. This approach is out of scope for this specification.
- 917 7. CBS change request can be initiated together with the CIR change. This use
918 case is also out-of-scope for this specification.

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

- 920 • S1[ALLEGRO or CANTATA+LEGATO]: User requests EVC CBS change either
921 from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and SP
922 LEGATO interface of SP SOF
- 923 • S2: SP SOF validates customer, the E-LINE service between location A and
924 location Z, and if the CBS is within bounds (i.e. N and $CBS_{increment}$ are valid) or is
925 one of the values within SP CBS list, and whether there is enough capacity in
926 the SP network and/or Partner network if SP SOF is capable of tracking
927 available network capacity. Furthermore, if some of the information such as
928 services and locations that belong to the customer is not in SOF, but in OSS,
929 then SOF requests the information from OSS using LEGATO interface.
- 930 ➤ *During the validation process, SP may choose to display “Request is in*
931 *Progress” at SP Portal.*
- 932 • S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back
933 to user with “Invalid Request” if user credentials are invalid or “Unavailable
934 Resources and Please try it Later” if resources are unavailable or “Request is
935 accepted and in progress” .
- 936 ➤ *If customer requests pass user authentication at S2, per agreement*
937 *between SP and PART, SP SOF waits for a confirmation from PART SOF*
938 *(i.e. results of S4c, S5, S7a) before accepting or denying a customer*
939 *request based on its own verification that the request is invalid and there*
940 *is not enough capacity to support the request.*
- 941 ➤ *If customer requests pass user authentication at S2, it is up to SP SOF to*
942 *wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and*
943 *S7a) before denying a customer request based on its own verification that*
944 *request is invalid and/or there is not enough capacity to support the*
945 *request.*
- 946 ➤ *During the validation process, SP may choose to display “Request is in*
947 *Progress” at SP Portal.*
- 948 • S4 [PRESTO]: Based on S2, if user credentials are valid and either capacity is
949 available or SP SOF has no capacity information, SP SOF sends a request to
950 SP ICM to change CIR at SP side of ENNI, on-net UNI, and on-net I-NNIs.
- 951 • S4a [INTERLUDE]: Based on S2, if user credentials are valid and either capacity
952 is available or SP SOF has no capacity information, SP SOF sends a request to

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

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

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

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

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

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

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

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

975 • S5:

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

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

982 • S6:

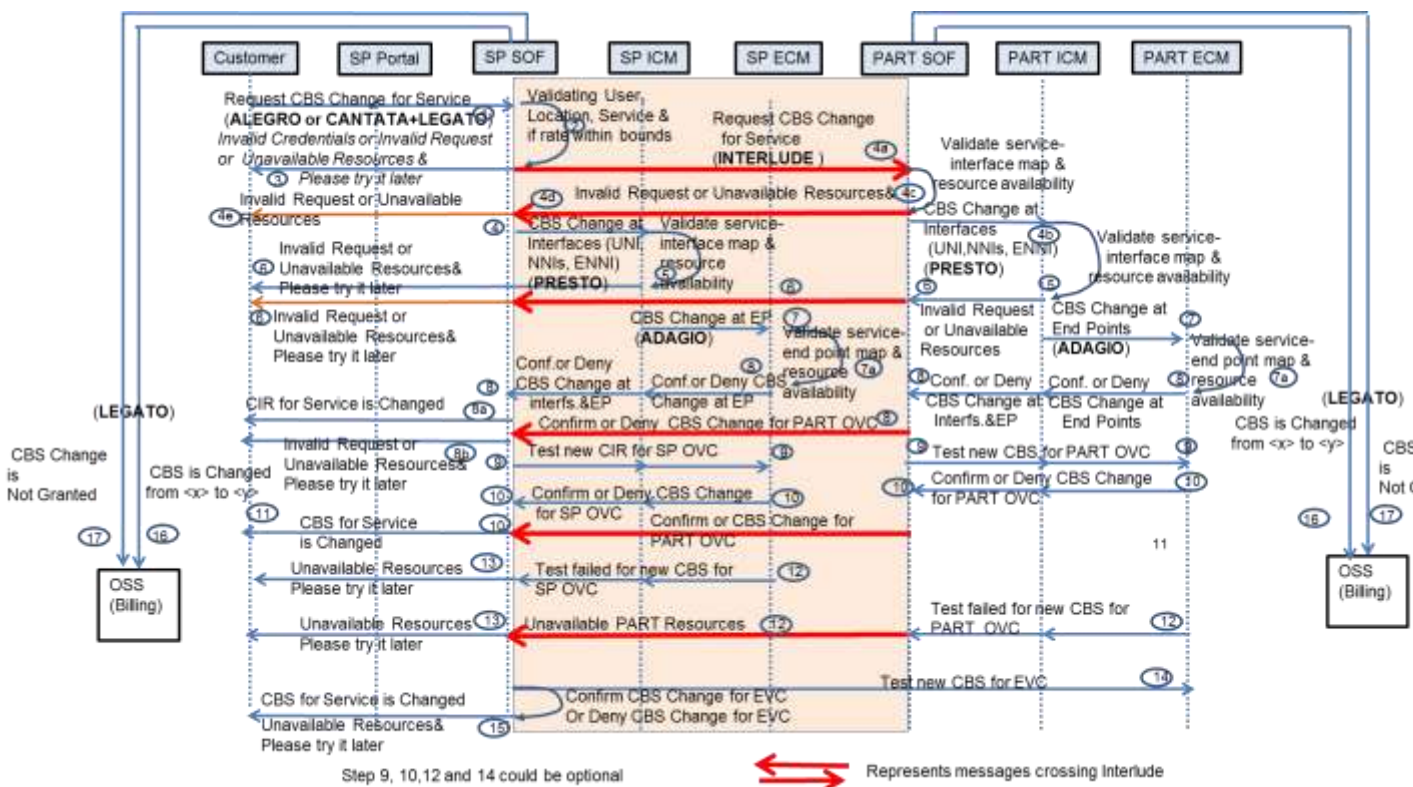
983 1. [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if
984 there is not enough capacity at on-net UNI, ENNI or I-NNIs within SP
985 network, SP SOF responds to customer with “Unavailable Resources and
986 Please try it Later”.

987 2. [PRESTO+INTERLUDE+ALLEGRO or
988 PRESTO+INTERLUDE+CANTATA+LEGATO] Similarly, if there is not
989 enough capacity at off-net UNI, ENNI or I-NNIs of Partner network, Partner
990 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:

- 1030 1.[ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM
1031 confirms availability of new CBS to SP ICM and in turn SP ICM confirms
1032 availability of new CBS to SP SOF.
- 1033 2.[ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner OVC,
1034 Partner ECM confirms availability of new CBS to Partner ICM and in turn Partner
1035 ICM confirms availability of new CBS to Partner SOF.
- 1036 3.[INTERLUDE] Partner SOF confirms availability of new CBS to SP SOF,
1037 “Confirmed Availability of New CBS for Partner OVC”.
- 1038 • S11[ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer
1039 indicating “CBS for Service is Changed”.
- 1040 • S12:
- 1041 3. [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for SP OVC, SP ECM
1042 confirms failure of new CBS testing to SP ICM and in turn SP ICM confirms
1043 failure of new CBS testing to SP SOF.
- 1044 4. [PRESTO+ADAGIO]Similarly, If tests at S9 are unsuccessful for Partner
1045 OVC, Partner ECM confirms failure of new CBS testing to Partner ICM and in
1046 turn Partner ICM confirms failure of new CBS testing to Partner SOF.
- 1047 • S13[ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer
1048 indicating “Unavailable Resources, Please try it Later”.
- 1049 • S14[PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without SP and
1050 Partner test their OVCs), optionally, SP SOF runs and end-to-end EVC test.
- 1051 • S15
- 1052 4. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP
1053 SOF informs customer indicating that “Unavailable Resources, Please try it
1054 Later”.
- 1055 5. [ALLEGRO or CANTATA+LEGATO]if testing is successful, SP SOF informs
1056 customer that “CBS for Service is Changed”.
- 1057 6. [LEGATO] if testing is successful, to initiate new billing procedure, SP SOF
1058 also informs OSS that “CBS for Service is Changed”.
- 1059 • S16 [LEGATO]:
- 1060 1. a) At S8a and S11, per contract between SP and Ethernet Access
1061 Operator (PART), PART SOF informs PART OSS/BSS (BA) that CBS
1062 change is confirmed so that SLO between SP and PART, percent of valid
1063 requests accepted (TAR/TVR) and percent of accepted requests fulfilled
1064 (TFR/TAR), can be updated.
- 1065 b) At S8a and S11,SP chooses to confirm CBS change without an end-to-
1066 end testing of EVC and informs OSS/BSS (BA) to initiate the billing and
1067 update on-demand SLO parameters, percent of valid requests accepted
1068 (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).

- 1069 2. a) At S15, if testing is successful, SP SOF informs OSS to initiate new
 1070 billing procedure for the new CBS and update on demand SLO
 1071 parameters, percent of valid requests accepted (TAR/TVR) and percent
 1072 of accepted requests fulfilled (TFR/TAR).
 1073
 1074 b) At S15, if testing is successful, SP SOF also informs PART SOF that
 1075 the testing is successful. In turn, PART SOF informs PART OSS/BSS
 1076 (BA) that CBS change is successful so that PART OSS/BSS (BA) can
 1077 update its SLOs.
 1078 • S17 [LEGATO]:
 1079 1. At S3, If there is a way to identify the fact that the request is considered to
 1080 be invalid despite of the fact that it is a valid request, in order to calculate
 1081 on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP
 1082 SOF informs SP OSS/BSS (BA) that a valid request was considered to be
 1083 invalid and rejected.
 1084 2. At S3,S4e, S6.1, S8b, S13 and S15, if there is not enough resources to
 1085 support CBS change, SP SOF informs OSS to update its SLO for on-
 1086 demand CBS change, **percent of accepted requests fulfilled**
 1087 **(TFR/TAR)**.
 1088 3. At S4d, S6.2, S8b, S11 and S15, if there is not enough resources to
 1089 support CBS change, PART SOF informs OSS to update its SLO for on-
 1090 demand CBS change, percent of accepted requests fulfilled (TFR/TAR).
 1091 4. At S15, if testing is unsuccessful, SP SOF informs PART SOF about not
 1092 being able to honor the customer request so that PART SOF requests
 1093 PART OSS/BSS (BA) to update on demand SLO parameters.
 1094
 1095



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Figure 6 CBS Change Process Flow for E-LINE

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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	<ol style="list-style-type: none"> 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 : <ol style="list-style-type: none"> 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. <p><i>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.</i></p> <p><i>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></p> <p><i>Per agreement between SP and PART, SP SOF may choose to receive confirmation from PART SOF before denying the request.</i></p> <ol style="list-style-type: none"> 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). <p>This UC ends</p>
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 _{increment} 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

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

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	<ol style="list-style-type: none"> 1. SP SOF requests CBS change from PART SOF over INTERLUDE and requests CBS change from SP ICM over PRESTO. <i>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.</i> 2. SP ICM verifies validity of request and if there is adequate capacity at UNI and NNIs. <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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. <ol style="list-style-type: none"> 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

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	<p>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”.</p> <p>b. If there is enough capacity at off-net UNI, ENNI or I-NNI, PART ICM requests PART ECM to change CBS.</p> <p>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”.</p> <p>7. If SP SOF receives conformation from SP ICM, SP ECM and PART SOF,</p> <p>a. SP SOF confirms CBS change to customer without testing the EVC for new CBS, or</p> <p>b. SP SOF request testing of SP OVC for the new CBS from SP ICM and ECM</p> <p>c. PART SOF requests testing of PART OVC for the new CIR from PART ICM and ECM</p> <p>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.</p> <p>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.</p> <p>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).</p> <p>10. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART.</p> <p>11. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.</p>
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

1101 **Table 9:** CBS use case description for Steps 4-17

1102 **8.3.1. Requirements**

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1104

	Elastic Ethernet Service should support on-demand modifications of CIR of a bandwidth profile flow
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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	<p>Interlude should support CBS_{elastic}, CBS_{lb}, CBS_{ub}, N, N_{max, CBS} and CBS_{increment} for the OVC supporting Elastic Ethernet Service.</p> <p><i>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.</i></p>
Source	S1

1106

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

1107

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

1108

1109

	ALLEGRO should support CBS _{elastic} , CBS _{lb} , CBS _{ub} , N, N _{max, CBS} and CBS _{increment} for the Elastic
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O_ELASTIC_CBS_ALLEGRO_001	Ethernet Service <i>Note that the service attributes must be supported by API of ALLEGRO for user to enter the on-demand request.</i>
Source	S1

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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. <i>Note that the service attributes must be supported by LEGATO in its communications with SP SOF.</i>
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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. <i>Note that these SLOs must be in the contract (or business relationships) between SP and customer, and between SP and PART.</i>
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. <i>Note that the SLO parameters must be supported by LEGATO API.</i>
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Source	S1 [1]
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1116

O_ELASTIC_CBS_CANTATA_SLO_001	<p>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.</p> <p><i>Note that the SLO parameters must be supported by CANTATA API.</i></p>
Source	S1 [1]

1117

R_ELASTIC_CBS_ALLEGRO_SLO_001	<p>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</p> <p><i>Note that the SLO parameters must be supported by ALLEGRO API.</i></p>
Source	S1 [1]

1118

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R_ELASTIC_SCH_ALLEGRO_003	<p>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.</p>
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R_ELASTIC_SCH_CANTATA_003	<p>On-demand request for changing EVC CBS immediately or at certain day and time in the future should be supported from CANTATA interface.</p>
R_ELASTIC_SCH_LEGATO_003	<p>On-demand request for changing EVC CBS immediately or at certain day and time in the future should be supported from LEGATO interface.</p>

1121

O_ELASTIC_SCH_INTERLUD_003	<p>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.</p>
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Source	S1
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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

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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.
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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.
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R_SP_SOF_TIMING_003	SP SOF MUST be able to measure $T_{sp-cust}$ and $T_{sp-part}$, 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 , $\langle EBS_{lb} , EBS_{ub} \rangle^{10}$

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.

- 1150 a. Immediately
 1151 i. With no end time for new EBS , $EBS_{elastic}$, where $EBS_{elastic} = EBS_{lb}$
 1152 $+N \times EBS_{increment}$ or <one of EBS values available in SP list> where
 1153 N is an integer between 1 and $N_{max,EBS}$.
 1154

1155 Note that N_{max} for EBS could be different that N_{max} for EBS in section
 1156 7.4. Therefore, we call N_{max} as $N_{max,EBS}$.
 1157

1158 Furthermore, $EBS_{increment}$ is very likely to be the same as $EBS_{increment}$.

- 1159 ii. With end time for new EBS, $EBS_{elastic} = EBS_{lb} + N \times EBS_{increment}$ OR
 1160 <one of EBS values available in SP list> where N is an integer
 1161 between 1 and $N_{max,EBS}$. . After end time elapses, the burst size
 1162 becomes EBS_{lb}

- 1163 b. At certain time and day in the future

- 1164 i. With no end time for new EBS , $EBS_{elastic} = EBS_{lb} + N \times EBS_{increment}$
 1165 or <one of EBS values available in SP list> where N is an integer
 1166 between 1 and $N_{max,EBS}$.

- 1167 ii. With end time for new EBS , $EBS_{elastic} = EBS_{lb} + N \times EBS_{increment}$ OR
 1168 <one of EBS values available in SP list> where N is an integer
 1169 between 1 and $N_{max,EBS}$. After end time elapses, the rate becomes
 1170 EBS_{lb}

- 1171 3. EBS changes can be performed automatically by SP and PART based on
 1172 network events with or without customer involvement, based on customer-SP
 1173 contract and SP-PART contract. This approach is out of scope for this
 1174 specification

- 1175 4. Time intervals for on-demand modification of EBS immediately can be defined in
 1176 the contract between SP and customer ($T_{sp-cust}$), and SP and PART ($T_{sp-part}$).
 1177 The time interval for PART is expected to be smaller than the time interval for
 1178 the SP. For example if $T_{sp-cust}$ is 15 minutes, $T_{sp-part}$ could be 10 minutes.

- 1179 e. The time interval for fulfillment between SP and customer can be
 1180 recorded. In the customer contract, there can be a penalty associated
 1181 with the requests that are not fulfilled within $T_{sp-cust}$.

- 1182 f. The time interval for fulfillment between SP and PART can be recorded.
 1183 There can be a penalty associated with the requests that are not fulfilled
 1184 within $T_{sp-part}$.

- 1185 g. If the customer request is not fulfilled within $T_{sp-cust}$, the customer can
 1186 cancel the request. The cancelation may be counted for penalty per the
 1187 contract.

- 1188 h. The customer may request a monthly history report from user portal
 1189 consisting of $T_{sp-cust}$ and $T_{sp-part}$.

- 1190 5. $T_{sp-cust}$ and $T_{sp-part}$ may apply to on-demand modification of EBS at certain date
 1191 and time in the future. The SP choses to perform the request prior to the
 1192 scheduled time and have the service ready at the time of the scheduled time.

- 1193
1194 6. EBS changes can performed automatically by SP and PART when EIR changes.
1195 This approach is out of scope for this specification.
1196 7. EBS change request can be initiated together with the CIR change. This use
1197 case is also out-of-scope for this specification.
- 1198 The details of Option 2 are depicted in **Figure 7**. Steps in **Figure 7** are as follows:
- 1199 • S1[ALLEGRO or CANTATA+LEGATO]: User requests EVC EBS change either
1200 from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and SP
1201 LEGATO interface of SP SOF
- 1202 • S2: SP SOF validates customer, the E-LINE service between location A and
1203 location Z, and if the EBS is within bounds (i.e. N and EBS_{increment} are valid) or is
1204 one of the values within SP EBS list, and whether there is enough capacity in
1205 the SP network and/or Partner network if SP SOF is capable of tracking
1206 available network capacity. Furthermore, if some of the information such as
1207 services and locations that belong to the customer is not in SOF, but in OSS,
1208 then SOF requests the information from OSS using LEGATO interface.
- 1209 ➤ *During the validation process, SP may choose to display “Request is in*
1210 *Progress” at SP Portal.*
- 1211
- 1212 • S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back
1213 to user with “Invalid Request” if user credentials are invalid or “Unavailable
1214 Resources and Please try it Later” if resources are unavailable or “Request is
1215 accepted and in progress” .
- 1216 ➤ *If customer requests pass user authentication at S2, per agreement*
1217 *between SP and PART, SP SOF waits for a confirmation from PART SOF*
1218 *(i.e. results of S4c, S5, S7a) before accepting or denying a customer*
1219 *request based on its own verification that the request is invalid and there*
1220 *is not enough capacity to support the request.*
- 1221 ➤ *If customer requests pass user authentication at S2, it is up to SP SOF to*
1222 *wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and*
1223 *S7a) before denying a customer request based on its own verification that*
1224 *request is invalid and/or there is not enough capacity to support the*
1225 *request.*
- 1226 ➤ *During the validation process, SP may choose to display “Request is in*
1227 *Progress” at SP Portal.*
- 1228 • S4 [PRESTO]: Based on S2, if user credentials are valid and either capacity is
1229 available or SP SOF has no capacity information, SP SOF sends a request to
1230 SP ICM to change CIR at SP side of ENNI, on-net UNI, and on-net I-NNIs.
- 1231 • S4a [INTERLUDE]: Based on S2, if user credentials are valid and either capacity
1232 is available or SP SOF has no capacity information, SP SOF sends a request to

1233 Partner SOF to change EBS at Partner side of ENNI, off-net UNI, and off-net I-
 1234 NNIs.

1235 1. *S4 and S4a can take place at the same time in order to reduce response*
 1236 *time to user, or*

1237 2. *S4a can take place after SP completes S8.*

1238 The EBS and EBS_{increment} values for PART OVC are expected to be as same as
 1239 the EBS and EBS_{increment} values for SP OVC per contract between two
 1240 operators. If there are differences, this might cause packet loss and is not
 1241 recommended.

1242 • S4c[INTERLUDE]: PART SOF validates the request by checking if the service is
 1243 being supported at the off-net location and there is adequate capacity to support
 1244 the change.

1245 *In S2, SP SOF checks validity of the customer and service, and may verify*
 1246 *resource availability end-to-end. It is up to the PART SOF to re-validate the*
 1247 *service and resource availability for the requested off-net location. The*
 1248 *revalidation should reduce possible errors during the process.*

1249 • S4d [INTERLUDE]: If validation in S4c fails, PART SOF sends either the
 1250 message “Invalid Request” or “Unavailable Resources” to SP SOF. In turn, SP
 1251 SOF sends the message “Invalid Request” or “Unavailable Resources, please
 1252 try it later” to the customer.

1253 • S4b [PRESTO]: If validation in S4c is successful, Partner SOF requests Partner
 1254 ICM to change EBS at Partner side of ENNI, off-net UNI and off-net I-NNIs.

1255 • S5:

1256 5. SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP
 1257 network and there is enough capacity at these interfaces to support the
 1258 requested EBS.

1259 6. Similarly, Partner ICM validates if the EVC belongs to ENNI, UNI and I-NNIs
 1260 within Partner network and there is enough capacity at these interfaces to
 1261 support the requested EBS.

1262 • S6:

1263 3. [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if
 1264 there is not enough capacity at on-net UNI, ENNI or I-NNIs within SP
 1265 network, SP SOF responds to customer with “Unavailable Resources and
 1266 Please try it Later”.

1267 4. [PRESTO+INTERLUDE+ALLEGRO or
 1268 PRESTO+INTERLUDE+CANTATA+LEGATO] Similarly, if there is not
 1269 enough capacity at off-net UNI, ENNI or I-NNIs of Partner network, Partner
 1270 SOF send a message to SP SOF indicating that there is not enough capacity

- 1271 to support the change. SP SOF responds to customer with “Unavailable
1272 Resources and Please try it Later”.
- 1273 • S7 [PRESTO]:
- 1274 5. Based on S5, if there is enough capacity at on-net UNI, ENNI and I-NNIs of
1275 SP network, SP ICM requests SP ECM to modify the EBS to the customer
1276 requested value at on-net UNI and EVC End Point on the on-net UNI”.
- 1277 6. Similarly, if there is enough capacity at off-net UNI, ENNI and I-NNIs of
1278 Partner network, Partner ICM requests Partner ECM to modify the EBS to
1279 the customer requested value at off-net UNI and EVC End Point on the off-
1280 net UNI”.
- 1281 • S7a [ADAGIO]:
- 1282 1. SP ECM validates if there is enough capacity at on-net UNI and OVC End
1283 Point to support new EBS.
- 1284 2. Similarly, PART ECM validates if there is enough capacity at off-net UNI
1285 and off-net OVC End Point to support new EBS.
- 1286 • S8:
- 1287 3. [ADAGIO+PRESTO]After SP ECM validates EBS Change request at on-net
1288 UNI and associated OVC End Point, SP ECM sends a confirmation or denial
1289 message to SP ICM for the EBS Change. In turn, SP ICM sends a
1290 confirmation or denial message to SP SOF for EBS change at on-net UNI
1291 and on-net OVC End Point.
- 1292 4. [ADAGIO+PRESTO] Similarly, after PART ECM validates EBS Change
1293 request at off-net UNI and associated OVC End Point, PART ECM sends a
1294 confirmation or denial message to PART ICM for the EBS Change. In turn,
1295 PART ICM sends a confirmation or denial message to PART SOF for EBS
1296 change at off-net UNI and off-net OVC End Point.
- 1297
- 1298 • S8a [ALLEGRO or CANTATA+LEGATO]: At S8, if EBS change has been
1299 successful, SP SOF sends the message “EBS for service is changed” to
1300 customer.
- 1301
- 1302 • S8b [ALLEGRO or CANTATA+LEGATO]: At S8, if EBS change has been
1303 unsuccessful, SP SOF sends the message “Unavailable resources, please try it
1304 later” to customer.
- 1305 • S9 [PRESTO+ADAGIO]: After S8, optionally, SP SOF and PART SOF run tests
1306 on their segments of EVC (i.e. SP OVC and Partner OVC) to verify the EBS
1307 change, by requesting ICM and ECM to test the new EBS at associated
1308 interfaces and endpoints. .
- 1309 • S10:

- 1310 1.[ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM
1311 confirms availability of new EBS to SP ICM and in turn SP ICM confirms
1312 availability of new EBS to SP SOF.
- 1313 2.[ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner OVC,
1314 Partner ECM confirms availability of new EBS to Partner ICM and in turn Partner
1315 ICM confirms availability of new EBS to Partner SOF.
- 1316 3.[INTERLUDE] Partner SOF confirms availability of new EBS to SP SOF,
1317 “Confirmed Availability of New EBS for Partner OVC”.
- 1318 • S11[ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer
1319 indicating “EBS for Service is Changed”.
- 1320 • S12:
- 1321 5. [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for SP OVC, SP ECM
1322 confirms failure of new EBS testing to SP ICM and in turn SP ICM confirms
1323 failure of new EBS testing to SP SOF.
- 1324 6. [PRESTO+ADAGIO]Similarly, If tests at S9 are unsuccessful for Partner
1325 OVC, Partner ECM confirms failure of new EBS testing to Partner ICM and in
1326 turn Partner ICM confirms failure of new EBS testing to Partner SOF.
- 1327 • S13[ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer
1328 indicating “Unavailable Resources, Please try it Later”.
- 1329 • S14[PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without SP and
1330 Partner test their OVCs), optionally, SP SOF runs and end-to-end EVC test.
- 1331 • S15
- 1332 7. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP
1333 SOF informs customer indicating that “Unavailable Resources, Please try it
1334 Later”.
- 1335 8. [ALLEGRO or CANTATA+LEGATO]if testing is successful, SP SOF informs
1336 customer that “EBS for Service is Changed”.
- 1337 9. [LEGATO] if testing is successful, to initiate new billing procedure, SP SOF
1338 also informs OSS that “EBS for Service is Changed”.
- 1339 • S16 [LEGATO]:
- 1340 1. a) At S8a and S11, per contract between SP and Ethernet Access
1341 Operator (PART), PART SOF informs PART OSS/BSS (BA) that EBS
1342 change is confirmed so that SLO between SP and PART, percent of valid
1343 requests accepted (TAR/TVR) and percent of accepted requests fulfilled
1344 (TFR/TAR), can be updated.
- 1345 b) At S8a and S11,SP chooses to confirm EBS change without an end-to-
1346 end testing of EVC and informs OSS/BSS (BA) to initiate the billing and
1347 update on-demand SLO parameters, percent of valid requests accepted
1348 (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).

- 1349 2. a) At S15, if testing is successful, SP SOF informs OSS to initiate new
 1350 billing procedure for the new EBS and update on demand SLO
 1351 parameters, percent of valid requests accepted (TAR/TVR) and percent
 1352 of accepted requests fulfilled (TFR/TAR).
 1353
 1354 b) At S15, if testing is successful, SP SOF also informs PART SOF that
 1355 the testing is successful. In turn, PART SOF informs PART OSS/BSS
 1356 (BA) that EBS change is successful so that PART OSS/BSS (BA) can
 1357 update its SLOs.
 1358 • S17 [LEGATO]:
 1359 1. At S3, If there is a way to identify the fact that the request is considered to
 1360 be invalid despite of the fact that it is a valid request, in order to calculate
 1361 on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP
 1362 SOF informs SP OSS/BSS (BA) that a valid request was considered to be
 1363 invalid and rejected.
 1364 2. At S3,S4e, S6.1, S8b, S13 and S15, if there is not enough resources to
 1365 support EBS change, SP SOF informs OSS to update its SLO for on-
 1366 demand EBS change, **percent of accepted requests fulfilled**
 1367 **(TFR/TAR)**.
 1368 3. At S4d, S6.2, S8b, S11 and S15, if there is not enough resources to
 1369 support EBS change, PART SOF informs OSS to update its SLO for on-
 1370 demand EBS change, percent of accepted requests fulfilled (TFR/TAR).
 1371 4. At S15, if testing is unsuccessful, SP SOF informs PART SOF about not
 1372 being able to honor the customer request so that PART SOF requests
 1373 PART OSS/BSS (BA) to update on demand SLO parameters.
 1374
 1375

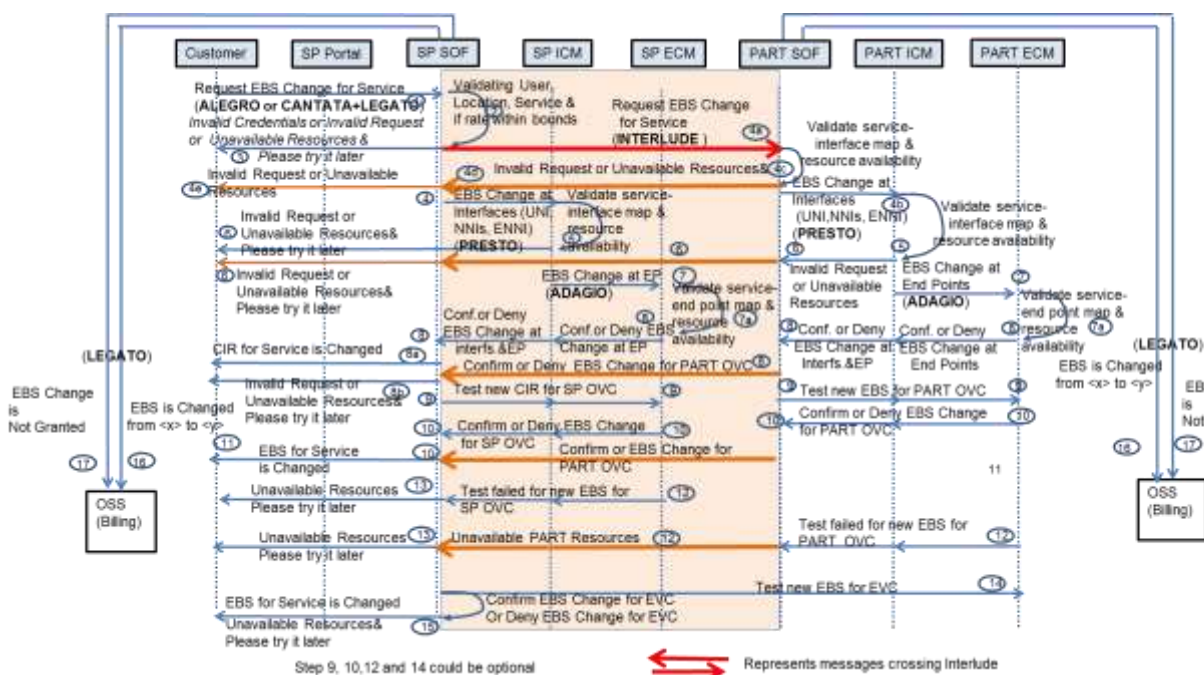


Figure 7 EBS Change Process Flow for E-LINE

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	<ol style="list-style-type: none"> 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 : <ol style="list-style-type: none"> 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. <p><i>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.</i></p> <p><i>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></p> <p><i>Per agreement between SP and PART, SP SOF may choose to receive confirmation from PART SOF before denying the request.</i></p> <ol style="list-style-type: none"> 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, and reported to OSS/BSS (BA). <p>This UC ends</p>
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 _{increment} 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

1381

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

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	<ol style="list-style-type: none"> 1. SP SOF requests EBS change from PART SOF over INTERLUDE and requests EBS change from SP ICM over PRESTO. <i>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.</i> 2. SP ICM verifies validity of request and if there is adequate capacity at UNI and NNIs. <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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. <ol style="list-style-type: none"> 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

	<p>capacity to support the change. SP SOF responds to customer with “Invalid Request or “ or “Unavailable Resources and Please try it Later”.</p> <p>b. If there is enough capacity at off-net UNI, ENNI or I-NNI, PART ICM requests PART ECM to change EBS.</p> <p>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”.</p> <p>7. If SP SOF receives conformation from SP ICM, SP ECM and PART SOF,</p> <p>a. SP SOF confirms EBS change to customer without testing the EVC for new EBS, or</p> <p>b. SP SOF request testing of SP OVC for the new EBS from SP ICM and ECM</p> <p>c. PART SOF requests testing of PART OVC for the new EBS from PART ICM and ECM</p> <p>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.</p> <p>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.</p> <p>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).</p> <p>10. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART.</p> <p>11. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.</p>
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

1382 **Table 12:** EBS use case description for Steps 4-17

1383 **8.3.2. Requirements**

1384

1385

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.
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Source	S1
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1386

O_ELASTIC_EBS_INTERLUDE_001	<p>Interlude should support $EBS_{elastic}$, EBS_{lb}, EBS_{ub}, N, $N_{max, EBS}$ and $EBS_{increment}$ for the OVC supporting Elastic Ethernet Service.</p> <p><i>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.</i></p>
Source	S1

1387

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

1388

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

1389

1390

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

	<i>demand request.</i>
Source	S1

1391

1392

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

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	<p>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.</p> <p><i>Note that these SLOs must be in the contract (or business relationships) between SP and customer, and between SP and PART.</i></p>
Source	S1 [1]

1396

R_ELASTIC_CoS_LEGATO_SLO_001	<p>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.</p> <p><i>Note that the SLO parameters must be supported by LEGATO API.</i></p>
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. <i>Note that the SLO parameters must be supported by CANTATA API.</i>
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 <i>Note that the SLO parameters must be supported by ALLEGRO API.</i>
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.
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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

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

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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.
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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.
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R_SP_SOF_TIMING_004	SP SOF MUST be able to measure $T_{sp-cust}$ and $T_{sp-part}$, 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 $T_{sp-part}$ 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	

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	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	

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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

1422

1423

1424 **7.6. On-demand Modification of CoS**

1425 Prior to an on-demand request for activating an E-LINE, ENNI, UNIs and EVC between
 1426 off-net and on-net locations of SP are established for this E-LINE. Overall CoS Change
 1427 process can be summarized as follows:

1428 1. Customer via user portal requests CoS change: CoS Name (e.g. Gold, Bronze,
 1429 Silver) or MEF CoSi Label (i.e. H, M, L)

1430 a. Immediately

1431 i. With no end time for new CoS, $CoS_{elastic}$

1432 ii. With end time for new CoS, $CoS_{elastic}$. After end time elapses, the
 1433 $CoS_{elastic}$ becomes previous CoS.

1434 b. At certain time and day in the future

1435 i. With no end time for new CoS, $CoS_{elastic}$

1436 ii. With end time for new CoS, $CoS_{elastic}$. After end time elapses, the
 1437 $CoS_{elastic}$ becomes previous CoS.

1438 2. Time intervals for on-demand modification of CoS immediately can be defined in
 1439 the contract between SP and customer ($T_{sp-cust}$), and SP and PART ($T_{sp-part}$).
 1440 The time interval for PART is expected to be smaller than the time interval for
 1441 the SP. For example if $T_{sp-cust}$ is 15 minutes, $T_{sp-part}$ could be 10 minutes.

1442 a. The time interval for fulfillment between SP and customer can be
 1443 recorded. In the customer contract, there can be a penalty associated
 1444 with the requests that are not fulfilled within $T_{sp-cust}$.

1445 b. The time interval for fulfillment between SP and PART can be recorded.
 1446 There can be a penalty associated with the requests that are not fulfilled
 1447 within $T_{sp-part}$.

1448 c. If the customer request is not fulfilled within $T_{sp-cust}$, the customer can
 1449 cancel the request. The cancelation may be counted for penalty per the
 1450 contract.

1451 d. The customer may request a monthly history report from user portal
 1452 consisting of $T_{sp-cust}$ and $T_{sp-part}$.

1453 3. $T_{sp-cust}$ and $T_{sp-part}$ may apply to on-demand modification of CoS at certain date
 1454 and time in the future. The SP choses to perform the request prior to the
 1455 scheduled time and have the service ready at the time of the scheduled time.
 1456

1457 The details are depicted in **Figure 8**. Steps in **Figure 8** are as follows:

- 1458 • S1[ALLEGRO or CANTATA+LEGATO]: User requests CoS change either from
 1459 ALLEGRO interface of SP SOF or CANTATA interface of SP BU and SP
 1460 LEGATO interface of SP SOF

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- 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.*
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- 1468
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- 1472
- 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.*
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- 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.*
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- 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.

1502 *In S2, SP SOF checks validity of the customer and service, and may verify*
1503 *resource availability end-to-end. It is up to the PART SOF to re-validate the*
1504 *service and resource availability for the requested off-net location. The*
1505 *revalidation should reduce possible errors during the process.*

1506 • S4d [INTERLUDE]: If validation in S4c fails, PART SOF sends either the
1507 message “Invalid Request” or “ Unavailable Resources” to SP SOF. In turn, SP
1508 SOF sends the message “Invalid Request” or “Unavailable Resources, please
1509 try it later” to the customer.

1510 • S4b [PRESTO]: If validation in S4c is successful, Partner SOF requests Partner
1511 ICM to change CoS at Partner side of ENNI, off-net UNI and off-net I-NNIs.

1512 • S5:

1513 1. SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP
1514 network and there is enough capacity at these interfaces to support the
1515 requested CoS.

1516 2. Similarly, Partner ICM validates if the EVC belongs to ENNI, UNI and I-NNIs
1517 within Partner network and there is enough capacity at these interfaces to
1518 support the requested CoS.

1519 • S6:

1520 1. [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if
1521 there is not enough capacity at on-net UNI, ENNI or I-NNIs within SP
1522 network, SP SOF responds to customer with “Unavailable Resources and
1523 Please try it Later”.

1524 2. [PRESTO+INTERLUDE+CANTATA+LEGATO] Similarly, if there is not
1525 enough capacity at off-net UNI, ENNI or I-NNIs of Partner network, Partner
1526 SOF send a message to SP SOF indicating that there is not enough capacity
1527 to support the change. SP SOF responds to customer with “Unavailable
1528 Resources and Please try it Later”.

1529 • S7 [PRESTO]:

1530 7. Based on S5, if there is enough capacity at on-net UNI, ENNI and I-NNIs of
1531 SP network, SP ICM requests SP ECM to modify the CoS to the customer
1532 requested value at on-net UNI and EVC End Point on the on-net UNI”.

1533 8. Similarly, if there is enough capacity at off-net UNI, ENNI and I-NNIs of
1534 Partner network, Partner ICM requests Partner ECM to modify the CoS to the
1535 customer requested value at off-net UNI and EVC End Point on the off-net
1536 UNI”.

1537 • S7a [ADAGIO]:

1538 1. SP ECM validates if there is enough capacity at on-net UNI and OVC End
1539 Point to support new CoS.

1540 2. Similarly, PART ECM validates if there is enough capacity at off-net UNI
1541 and off-net OVC End Point to support new CoS.

1542 • S8:

1543 5. [ADAGIO+PRESTO]After SP ECM validates CoS Change request at on-net
1544 UNI and associated OVC End Point, SP ECM sends a confirmation or denial
1545 message to SP ICM for the CoS Change. In turn, SP ICM sends a
1546 confirmation or denial message to SP SOF for CoS change at on-net UNI
1547 and on-net OVC End Point.

1548 6. [ADAGIO+PRESTO] Similarly, after PART ECM validates CoS Change
1549 request at off-net UNI and associated OVC End Point, PART ECM sends a
1550 confirmation or denial message to PART ICM for the CoS Change. In turn,
1551 PART ICM sends a confirmation or denial message to PART SOF for CoS
1552 change at off-net UNI and off-net OVC End Point.

1553
1554 • S8a [ALLEGRO or CANTATA+LEGATO]: At S8, if CoS change has been
1555 successful, SP SOF sends the message “CoS for service is changed” to
1556 customer.

1557
1558 • S8b [ALLEGRO or CANTATA+LEGATO]: At S8, if CoS change has been
1559 unsuccessful, SP SOF sends the message “Unavailable resources, please try it
1560 later” to customer.

1561 • S9 [PRESTO+ADAGIO]: After S8, optionally, SP SOF and PART SOF run tests
1562 on their segments of EVC (i.e. SP OVC and Partner OVC) to verify the CoS
1563 change, by requesting ICM and ECM to test the new CoS at associated
1564 interfaces and endpoints.

1565 • S10:

1566 1.[ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM
1567 confirms availability of new CoS to SP ICM and in turn SP ICM confirms
1568 availability of new CoS to SP SOF.

1569 2.[ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner OVC,
1570 Partner ECM confirms availability of new CoS to Partner ICM and in turn Partner
1571 ICM confirms availability of new CoS to Partner SOF.

1572 3.[INTERLUDE] Partner SOF confirms availability of new CoS to SP SOF,
1573 “Confirmed Availability of New CoS for Partner OVC”.

1574 • S11[ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer
1575 indicating “CoS for Service is Changed”.

1576 • S12:

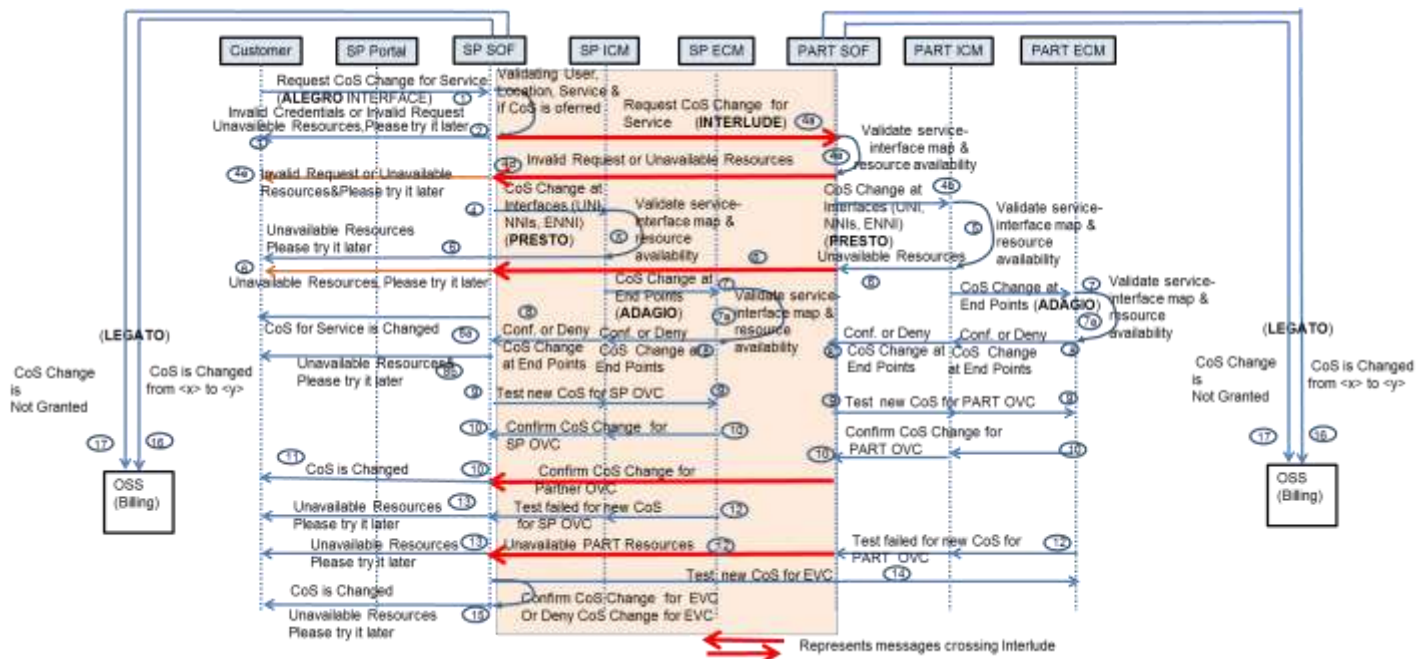
1577 1. [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for SP OVC, SP ECM
1578 confirms failure of new CoS testing to SP ICM and in turn SP ICM confirms
1579 failure of new CoS testing to SP SOF.

- 1580 2. [PRESTO+ADAGIO]Similarly, If tests at S9 are unsuccessful for Partner
1581 OVC, Partner ECM confirms failure of new CoS testing to Partner ICM and in
1582 turn Partner ICM confirms failure of new CoS testing to Partner SOF.
- 1583 • S13[ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer
1584 indicating “Unavailable Resources, Please try it Later”.
- 1585 • S14[PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without SP and
1586 Partner test their OVCs), optionally, SP SOF runs and end-to-end EVC test.
- 1587 • S15
- 1588 1. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP
1589 SOF informs customer indicating that “Unavailable Resources, Please try it
1590 Later”.
- 1591 2. [ALLEGRO or CANTATA+LEGATO]if testing is successful, SP SOF informs
1592 customer that “CoS for Service is Changed”.
- 1593 3. [LEGATO] if testing is successful, to initiate new billing procedure, SP SOF
1594 also informs OSS that “CoS for Service is Changed”.
- 1595 • S16 [LEGATO]:
- 1596 1. a) At S8a and S11, per contract between SP and Ethernet Access
1597 Operator (PART), PART SOF informs PART OSS/BSS (BA) that CoS
1598 change is confirmed so that SLO between SP and PART, percent of valid
1599 requests accepted (TAR/TVR) and percent of accepted requests fulfilled
1600 (TFR/TAR), can be updated.
1601 b) At S8a and S11,SP chooses to confirm CoS change without an end-to-
1602 end testing of EVC and informs OSS/BSS (BA) to initiate the billing and
1603 update on-demand SLO parameters, percent of valid requests accepted
1604 (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).
- 1605 2. a) At S15, if testing is successful, SP SOF informs OSS to initiate new
1606 billing procedure for the new CoS and update on demand SLO
1607 parameters, percent of valid requests accepted (TAR/TVR) and percent
1608 of accepted requests fulfilled (TFR/TAR).
- 1609 b) At S15, if testing is successful, SP SOF also informs PART SOF
1610 that the testing is successful. In turn, PART SOF informs PART
1611 OSS/BSS (BA) that CoS change is successful so that PART
1612 OSS/BSS (BA) can update its SLOs.
1613 c) At S15, if testing is unsuccessful, SP SOF informs SP OSS to
1614 update on demand SLO parameters, percent of valid requests
1615 accepted (TAR/TVR) and percent of accepted requests fulfilled
1616 (TFR/TAR).
- 1617
- 1618
- 1619 • S17 [LEGATO]:
- 1620 1. At S3, If there is a way to identify the fact that the request is considered to
1621 be invalid despite of the fact that it is a valid request, in order to calculate
1622 on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP
1623 SOF informs SP OSS/BSS (BA) that a valid request was considered to be
1624 invalid and rejected.

- 1625 2. At S3, S4e, S6.1, S8b, S13 and S15, if there is not enough resources to
- 1626 support CoS change, SP SOF informs OSS to update its SLO for on-
- 1627 demand CoS change, **percent of accepted requests fulfilled**
- 1628 **(TFR/TAR).**
- 1629 3. At S4d, S6.2, S8b, S10 and S15, if there is not enough resources to
- 1630 support CoS change, PART SOF informs OSS to update its SLO for on-
- 1631 demand CoS change, percent of accepted requests fulfilled (TFR/TAR).
- 1632 4. At S15, if testing is unsuccessful, SP SOF informs PART SOF about not
- 1633 being able to honor the customer request so that PART SOF requests
- 1634 PART OSS/BSS (BA) to update on demand SLO parameters.
- 1635
- 1636

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1640

1641 **Figure 8 CoS Change Process Flow for E-LINE**

1642

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	<ol style="list-style-type: none"> 1. Customer uses CANTATA or ALLEGRO interface to trigger a CoS change request 2. Customer provides CoS name and indicates whether the request is

	<p>immediate or certain time in the future .</p> <p>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.</p> <p>4. If the CoS change request is :</p> <ul style="list-style-type: none"> 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. <p><i>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.</i></p> <p><i>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></p> <p><i>Per agreement between SP and PART, SP SOF may choose to receive confirmation from PART SOF before denying the request.</i></p> <ul style="list-style-type: none"> 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 <p>5. Tsp-cust and Tsp-part are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA).</p> <p>This UC ends</p>
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

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

1643

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	<ol style="list-style-type: none"> 1. SP SOF requests CoS change from PART SOF over INTERLUDE and requests CoS change from SP ICM over PRESTO. <i>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.</i> 2. SP ICM verifies validity of request and if there is adequate capacity at UNI and NNIs. <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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. <ol style="list-style-type: none"> 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,

	<ol style="list-style-type: none"> 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. <ol style="list-style-type: none"> 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

1645 Table 15: CoS use case description for Steps 4-17

1646 **7.10.1 Requirements**

1647

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

1648

1649

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]

1650

R_ELASTIC_CoS_SONATA_SLO_001	<p>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.</p> <p><i>Note that these SLOs must be in the contract (or business relationships) between SP and customer, and between SP and PART.</i></p>
Source	S1 [1]

1651

R_ELASTIC_CoS_LEGATO_SLO_001	<p>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.</p> <p><i>Note that the SLO parameters must be supported by LEGATO API.</i></p>
Source	S1 [1]

1652

R_ELASTIC_CoS_CANTATA_001	<p>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.</p> <p><i>Note that the SLO parameters must be supported by CANTATA API.</i></p>
Source	S1 [1]

1653

R_ELASTIC_CoS_ALLEGRO_SLO_001	<p>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</p> <p><i>Note that the SLO parameters must be supported by ALLEGRO API.</i></p>
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.
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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_000	SP SOF shall be able to keep track of current and previous CoS _{elastic} values.
Source	

1666

R_ELASTIC_COS_PSOFT_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 T _{sp-cust} and T _{sp-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 T _{sp-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 T _{sp-cust} and T _{sp-part} for on-demand CoS change.
Source	
R_SONATA_TIMING_006	SONATA API shall be able to support T _{sp-cust} and T _{sp-part} for on-demand CoS change.
Source	

1670

1671 Table 16: Requirements for on-demand CoS change

1672

1673

1674 7.11. On-demand Modification of CE-VLAN ID¹¹

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 ($T_{sp-cust}$), and SP and PART
 1692 ($T_{sp-part}$). The time interval for PART is expected to be smaller than the time
 1693 interval for the SP. For example if $T_{sp-cust}$ is 15 minutes, $T_{sp-part}$ 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 $T_{sp-cust}$.

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 $T_{sp-part}$.

1701 c. If the customer request is not fulfilled within $T_{sp-cust}$, 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 $T_{sp-cust}$ and $T_{sp-part}$.

1706 3. $T_{sp-cust}$ and $T_{sp-part}$ 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].

1711 **7.11.1 CE-VLAN ID Change at On-net Location A**1712 The details are depicted in **Figure 9**. Steps in **Figure 9** are as follows:

- 1713
- 1714
- 1715
- 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.

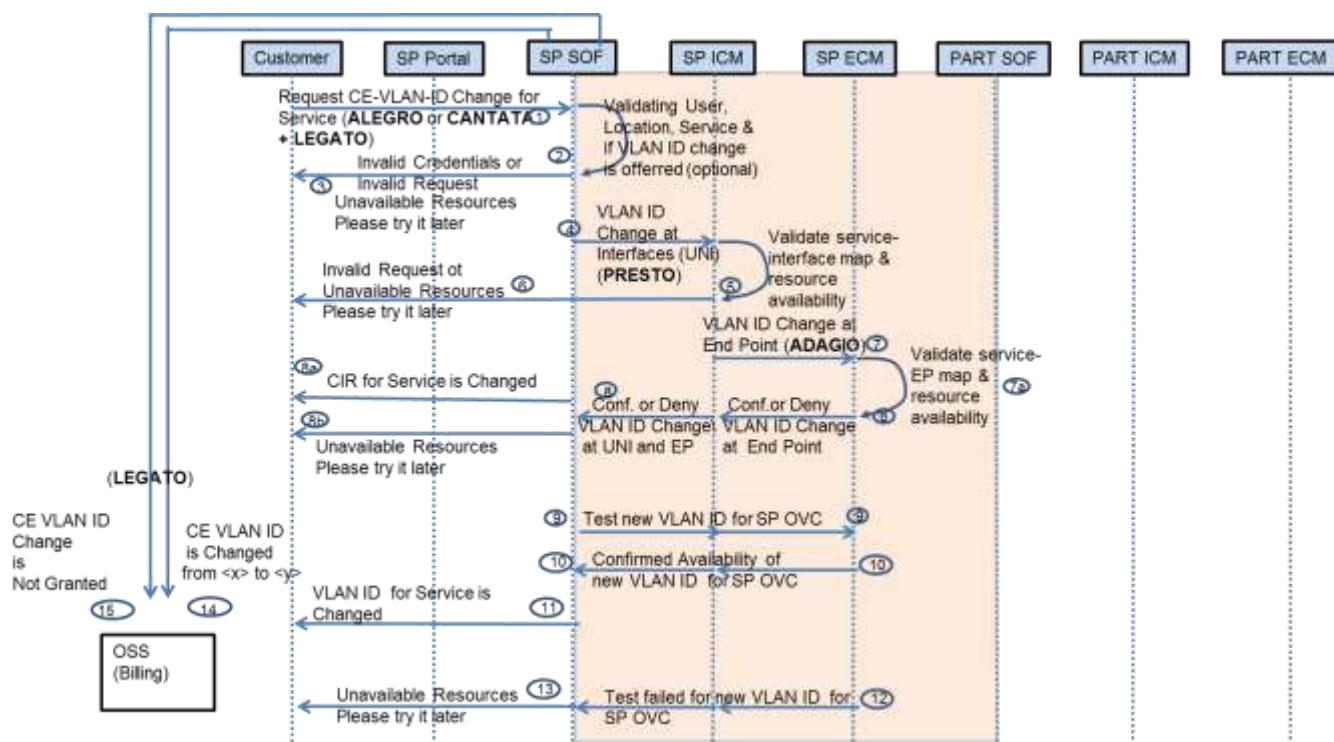
 - S5: SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP network and requested CE-VLAN ID is available at UNI to Change CE-VLAN ID.

 - 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.
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- 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.
- 1755
- 1756
- S8a [ALLEGRO or CANTATA+LEGATO] At S8, if CE-VLAN ID change is successful, SP SOF sends the message “PHY is changed” to customer.
- 1757
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- 1759
- 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.
- 1760
- 1761
- 1762
- 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.
- 1763
- 1764
- 1765
- 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.
- 1766
- 1767
- S11 [ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer indicating “CE-VLAN ID is Changed”.
- 1768
- 1769
- 1770
- 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.
- 1771
- 1772
- S13: [ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer indicating “Unavailable Resources, Please try it later”.
- 1773
- 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.
- 1774
- 1775
- 1776
- S15 [LEGATO]:
- 1777
1. After 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.
- 1779
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)**.
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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	<ol style="list-style-type: none"> 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 : <ol style="list-style-type: none"> 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

	<p>available, SP SOF sends “Resources are Unavailable, Please try it later” to the customer. .</p> <p><i>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.</i></p> <p><i>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.</i></p> <ul style="list-style-type: none"> 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 <p>5. Tsp-cust is measured by SP SOF, an reported to OSS/BSS (BA).</p> <ul style="list-style-type: none"> a. <p>This UC ends</p>
Post Conditions	SP Customer Portal displays messages in 4a and 4b above or SP SOF initiates S4.
Alternate Paths	
Assumption(s)	
References	S1, S2

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1793
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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	<ol style="list-style-type: none"> 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. <ul style="list-style-type: none"> 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

	<p>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.</p> <ol style="list-style-type: none"> 4. If SP SOF receives conformation from SP ICM, <ol style="list-style-type: none"> 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-VLAN 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

1796
1797
1798

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

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1830 7.11.2 CE-VLAN ID Change at On-net Location A with CE-VLAN 1831 ID Preservation

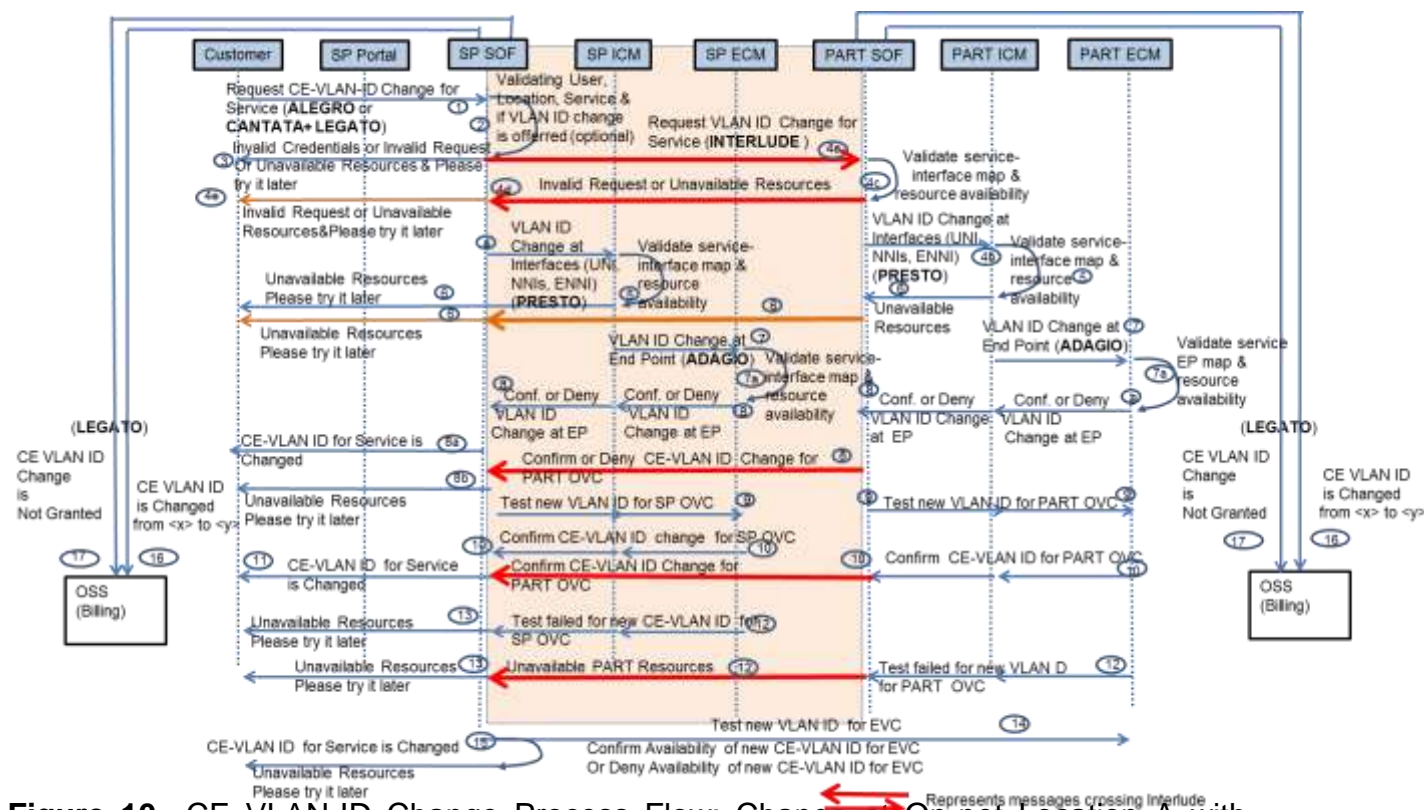
1832 The details are depicted in **Figure 10**. Steps in **Figure 10** are as follows:

- 1833 • S1[ALLEGRO or CANTATA+LEGATO]: User requests CE-VLAN ID Change
1834 either from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and
1835 SP LEGATO interface of SP SOF
- 1836 • S2: SP SOF validates customer, the E-LINE service configuration between
1837 location A and location Z, and whether requested CE-VLAN ID is available within
1838 SP and PART network to support the new CE-VLAN ID if SP SOF is capable of
1839 tracking available CE-VLAN IDs. Furthermore, if some of the information such as
1840 services and locations that belong to the customer is not in SOF, but in
1841 OSS/BSS (BA), then SOF requests the information from the OSS/BSS (BA)
1842 using LEGATO interface.
 - 1843 ➤ *During the validation process, SP may choose to display “Request is in*
1844 *Progress” at SP Portal.*
- 1845 • S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back
1846 to user with “Invalid Request” if user credentials are invalid or “Unavailable
1847 Resources and Please try it Later” if CE-VLAN ID is unavailable or “Request is
1848 accepted and in progress” .
 - 1849 ➤ *If customer requests pass user authentication at S2, per agreement*
1850 *between SP and PART, SP SOF waits for a confirmation from PART SOF*
1851 *(i.e. results of S4c, S5, S7a) before accepting or denying a customer*
1852 *request based on its own verification that the request is invalid and/or the*
1853 *requested CE-VLAN ID is unavailable.*
 - 1854 ➤ *If customer requests pass user authentication at S2, it is up to SP SOF to*
1855 *wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and*
1856 *S7a) before denying a customer request based on its own verification that*
1857 *request is invalid and/or the requested CE-VLAN ID is unavailable.*
 - 1858 ➤ *During the validation process, SP may choose to display “Request is in*
1859 *Progress” at SP Portal.*
- 1860 • S4 [PRESTO]: Based on S2, if user credentials are valid and either CE-VLAN ID
1861 is available or SP SOF has no CE-VLAN ID information, SP SOF sends a
1862 request to SP ICM to change CE-VLAN ID at SP side of ENNI, on-net I-NNIs,
1863 and on-net UNI.
- 1864 • S4a [INTERLUDE]: Based on S2, if user credentials are valid and either CE-
1865 VLAN ID is available or SP SOF has no CE-VLAN ID information, SP SOF
1866 sends a request to Partner SOF to Change CE-VLAN ID at Partner side of
1867 ENNI, off-net UNI, and off-net I-NNIs. S4 and S4a can take place at the same
1868 time in order to reduce response time to user or S4a can take place after SP
1869 completes S8.

- 1870 • S4b [PRESTO]: Partner SOF requests Partner ICM to Change CE-VLAN ID at
1871 Partner side of ENNI, off-net UNI and off-net I-NNIs.
- 1872 • S5 [PRESTO]:
- 1873 1. SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP
1874 network and requested CE-VLAN ID is available at UNI to Change CE-VLAN
1875 ID.
- 1876 2. Similarly, Partner ICM validates if the EVC belongs to ENNI, UNI and I-NNIs
1877 within SP network and requested CE-VLAN ID is available at UNI to Change
1878 CE-VLAN ID.
- 1879 • S6:
- 1880 1. [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if
1881 CE-VLAN ID is not available at on-net UNI, ENNI or I-NNI within SP
1882 network, SP SOF responds to customer with “Unavailable Resources and
1883 Please try it later”.
- 1884 2. [PRESTO+INTERLUDE+CANTATA+LEGATO] Similarly, if CE-VLAN ID
1885 is not supported at off-net UNI, ENNI or I-NNIs of Partner network,
1886 Partner SOF send a message to SP SOF indicating “Unavailable
1887 Resources”. SP SOF responds to customer with “Unavailable Resources
1888 and Please try it later”.
- 1889 • S7: [PRESTO+ADAGIO]
- 1890 1. Based on S5, if CE-VLAN ID is available at on-net UNI,ENNI and I-NNIs,
1891 SP ICM changes CE-VLAN ID at UNI and requests SP ECM to change
1892 the CE-VLAN ID of End Point on the on-net UNI”.
- 1893 2. Similarly, if CE-VLAN ID can be supported at off-net UNI, ENNI and I-
1894 NNIs of Partner network, Partner ICM changes CE-VLAN ID at ENNI and
1895 I-NNIs and requests Partner ECM to change the CE-VLAN ID of the End
1896 Point on off-net UNI”.
- 1897 • S8: [ADAGIO+PRESTO]
- 1898 1. After SP ECM changes CE-VLAN ID at on-net UNI and associated EVC
1899 End Point, SP ECM sends a confirmation message to SP ICM. In turn, SP
1900 ICM sends a confirmation message to SP SOF indicating the CE-VLAN
1901 ID change at on-net UNI and EVC End Point.
- 1902 2. Similarly, after Partner ECM changes CE-VLAN ID at off-net UNI and
1903 associated EVC End Point, Partner ECM sends a confirmation message
1904 to Partner ICM. In turn, Partner ICM sends a confirmation message to
1905 Partner SOF indicating CE-VLAN ID change at off-net UNI and
1906 associated EVC End Point.
- 1907 • S8a [ALLEGRO or CANTATA+LEGATO] At S8, if CE-VLAN ID change is
1908 successful, SP SOF sends the message “CE-VLAN ID is changed” to customer.

- 1909 • S8b [ALLEGRO or CANTATA+LEGATO] At S8, if CE-VLAN ID change is
 1910 unsuccessful, SP SOF sends the message “Unavailable resources, please try it
 1911 later” to customer.
- 1912 • S9 [PRESTO+ADAGIO]: After S8, optionally, SP SOF runs tests on SP OVC to
 1913 verify the new CE-VLAN ID, by requesting ICM and ECM to test the new CE-
 1914 VLAN ID at UNI and endpoint. PART SOF runs tests on PART OVC to verify
 1915 the new CE-VLAN ID, by requesting ICM and ECM to test the new CE-VLAN ID
 1916 at off-net UNI and endpoint. .
- 1917 • S10:
- 1918 1. [ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM
 1919 confirms the CE-VLAN ID change to SP ICM and in turn SP ICM confirms
 1920 the CE-VLAN ID change to SP SOF.
- 1921 2. [ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner
 1922 OVC, Partner ECM confirms CE-VLAN ID change to Partner ICM and in
 1923 turn Partner ICM confirms CE-VLAN ID change to Partner SOF.
- 1924 3. [INTERLUDE] Partner SOF confirms CE-VLAN ID change to SP SOF,
 1925 “Confirm Availability of new CE-VLAN ID for PART OVC”.
- 1926 • S11 [ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer
 1927 indicating “CE-VLAN ID is Changed”.
- 1928 • S12: [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for SP OVC, SP ECM
 1929 confirms failure of SP OVC testing to SP ICM and in turn SP ICM confirms
 1930 failure of new CE-VLAN ID testing to SP SOF.
- 1931 • S13: [ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer
 1932 indicating “Unavailable Resources, Please try it Later”.
- 1933 • S14 [PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without SP and
 1934 Partner test their OVCs), optionally, SP SOF runs an end-to-end EVC test for
 1935 new CE-VLAN ID reservation at on-net location A.
- 1936 • S15
- 1937 1. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP
 1938 SOF informs customer indicating that “Unavailable Resources, Please try it
 1939 Later”.
- 1940 2. [ALLEGRO or CANTATA+LEGATO]if testing is successful, SP SOF informs
 1941 customer that “CE-VLAN ID for Service is Changed”.
- 1942 • S16 [LEGATO]:
- 1943 1. a) After S8a and S11, per contract between SP and Ethernet Access
 1944 Operator (PART), PART SOF informs PART OSS/BSS (BA) that CE-
 1945 VLAN ID change is confirmed so that SLO between SP and PART,
 1946 **percent of valid requests accepted (TAR/TVR) and percent of**
 1947 **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 fact 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



1977
1978
1979
1980

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	<ol style="list-style-type: none"> 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 : <ol style="list-style-type: none"> 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

	<p>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.</p> <p><i>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.</i></p> <p><i>Per agreement between SP and PART, SP SOF may choose to receive confirmation from PART SOF before denying the request.</i></p> <ul style="list-style-type: none"> 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. <ul style="list-style-type: none"> 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	

1981

1982 Table 20: Use case description for CE-VLAN ID Change at On-net Location with CE-VLAN ID Preservation
 1983 (S1,2,and 3)

1984

1985

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	<ul style="list-style-type: none"> 1. SP SOF requests CE-VLAN ID change from PART SOF over INTERLUDE and requests CE-VLAN ID change from SP ICM over PRESTO. <p><i>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.</i></p>

	<ol style="list-style-type: none"> 2. SP ICM verifies validity of request and if CE-VLAN ID is available at on-net UNI and I-NNIs. <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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. <ol style="list-style-type: none"> 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, <ol style="list-style-type: none"> 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
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	<p>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.</p> <p>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).</p> <p>10. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART.</p> <p>11. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.</p>
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

1986 Table 21: Use case description for CE-VLAN ID Change at On-net Location with CE-VLAN ID Preservation (S4-
1987 17)

1988 **7.11.2.1 Requirements**

1989

1990

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

1991

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

1992

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

1993

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

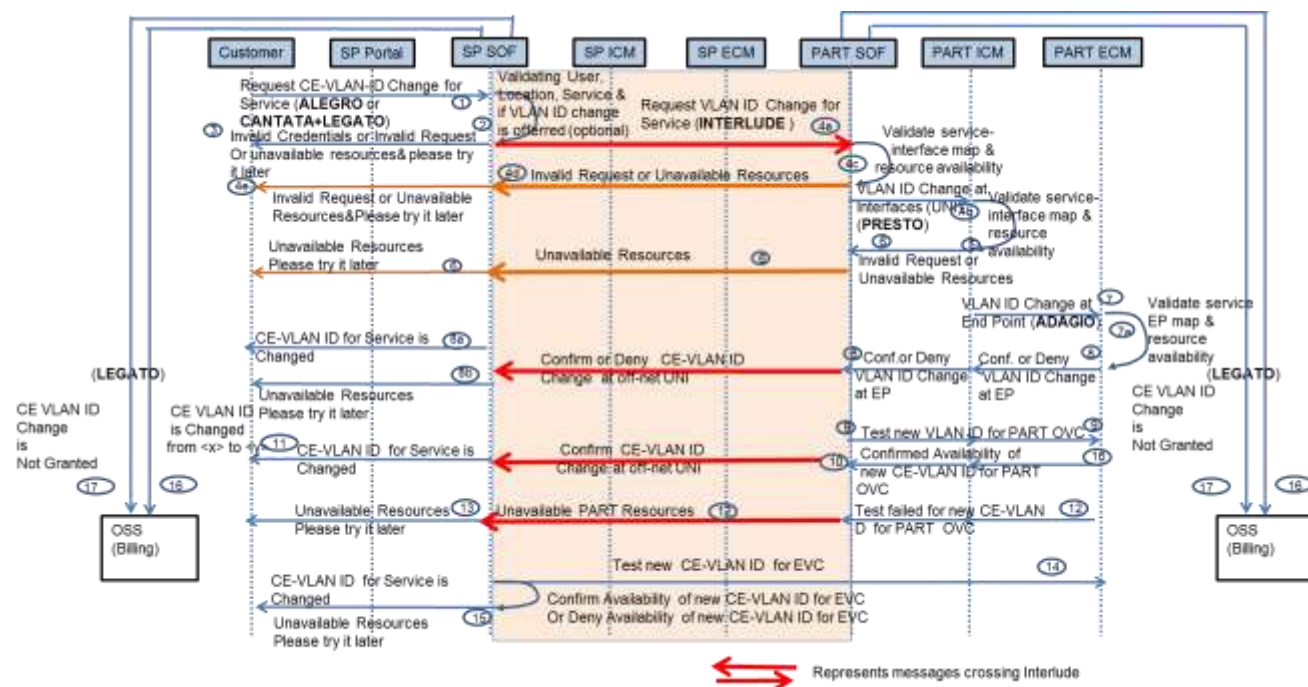
2024 **7.11.3 CE-VLAN ID Change at Off-net Location Z**

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

- 2026
2027
2028
- 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
- 2029
2030
2031
2032
2033
2034
2035
- 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.
- 2036
2037
- *During the validation process, SP may choose to display “Request is in Progress” at SP Portal.*
- 2038
2039
2040
2041
- 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” .
- 2042
2043
2044
2045
2046
- *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.*
- 2047
2048
2049
2050
- *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.*
- 2051
2052
- *During the validation process, SP may choose to display “Request is in Progress” at SP Portal.*
- 2053
2054
2055
- 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.
- 2056
2057
- S4b [PRESTO]: PART SOF requests PART ICM to Change CE-VLAN ID at off-net UNI.
- 2058
2059
- 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.
- 2060
2061
2062
2063
- 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.

- 2064 • S7: [PRESTO+ADAGIO] If CE-VLAN ID can be supported at off-net UNI, Partner
2065 ICM changes CE-VLAN ID at off-net UNI and requests Partner ECM to change
2066 the CE-VLAN ID of the End Point on off-net UNI”.
- 2067 • S8: [ADAGIO+PRESTO] After Partner ECM changes CE-VLAN ID at off-net UNI
2068 and associated EVC End Point, Partner ECM sends a confirmation message to
2069 Partner ICM. In turn, Partner ICM sends a confirmation message to Partner SOF
2070 indicating CE-VLAN ID change at off-net UNI and associated EVC End Point.
- 2071 • S8a [ALLEGRO or CANTATA+LEGATO] At S8, if CE-VLAN ID change is
2072 successful, SP SOF sends the message “CE-VLAN ID is changed” to customer.
- 2073 • S8b [ALLEGRO or CANTATA+LEGATO] At S8, if CE-VLAN ID change is
2074 unsuccessful, SP SOF sends the message “Unavailable resources, please try it
2075 later” to customer.
- 2076 • S9 [PRESTO+ADAGIO]: After S8, optionally, PART SOF runs tests on PART
2077 OVC to verify the new CE-VLAN ID, by requesting ICM and ECM to test the new
2078 CE-VLAN ID at off-net UNI and OVC endpoint. .
- 2079 • S10:
 - 2080 1. [ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner
2081 OVC, Partner ECM confirms CE-VLAN ID change to Partner ICM and in
2082 turn Partner ICM confirms CE-VLAN ID change to Partner SOF.
 - 2083 2. [INTERLUDE] Partner SOF confirms CE-VLAN ID change to SP SOF,
2084 “Confirm Availability of new CE-VLAN ID for PART OVC”.
- 2085 • S11 [ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer
2086 indicating “CE-VLAN ID is Changed”.
- 2087 • S12: [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for PART OVC, PART
2088 ECM confirms failure of PART OVC testing to PART ICM and in turn PART ICM
2089 confirms failure of new CE-VLAN ID testing to PART SOF. After that, PART
2090 SOF sends message “Unavailable Resources” to SP SOF.
- 2091 • S13: [ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer
2092 indicating “Unavailable Resources, Please try it Later””.
- 2093 • S14 [PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without Partner
2094 test its OVC), optionally, SP SOF runs and end-to-end EVC test.
- 2095 • S15
 - 2096 1. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP
2097 SOF informs customer indicating that “Unavailable Resources, Please try it
2098 Later”.
 - 2099 2. [ALLEGRO or CANTATA+LEGATO] If testing is successful, SP SOF informs
2100 customer that “CE-VLAN ID for Service is Changed”.

- 2101 3. [LEGATO] if testing is successful, to initiate new billing procedure, SP SOF
2102 also informs SP OSS that “CE-VLAN ID is Changed”.
- 2103 • S16 [LEGATO]:
- 2104 1. a) After S8a and S11, per contract between SP and PART, PART SOF
2105 informs PART OSS/BSS (BA) that CE-VLAN ID change is confirmed so
2106 that SLO between SP and PART, **percent of valid requests accepted**
2107 **(TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR)**, can
2108 be updated.
- 2109 b) After S8a and S11, SP chooses to confirm CE-VLAN ID change
2110 without an end-to-end testing of EVC and informs OSS/BSS (BA) to
2111 initiate the billing and update on-demand SLO parameters, **percent of**
2112 **valid requests accepted (TAR/TVR) and percent of accepted**
2113 **requests fulfilled (TFR/TAR)**.
- 2114 2. After S14, if testing is successful, SP SOF informs OSS to initiate new
2115 billing procedure for the new CE-VLAN ID and update on demand SLO
2116 parameters, **percent of valid requests accepted (TAR/TVR) and**
2117 **percent of accepted requests fulfilled (TFR/TAR)**.
- 2118 3. a) After S14, if testing is unsuccessful, PART SOF informs OSS to update
2119 on demand SLO parameters, percent of valid requests accepted
2120 (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).
- 2121 b) After S14, if testing is unsuccessful, SP SOF informs OSS to update on
2122 demand SLO parameters, percent of valid requests accepted (TAR/TVR)
2123 and percent of accepted requests fulfilled (TFR/TAR).
- 2124 c) After S14, whether testing successful or unsuccessful, SP SOF informs
2125 PART SOF about the outcome so that PART SOF can inform SP OSS for
2126 the SLO update.
- 2127 c) After S14, whether testing successful or unsuccessful, SP SOF informs
2128 PART SOF about the outcome so that PART SOF can inform SP OSS for
2129 the SLO update.
- 2130
- 2131 • S17 [LEGATO]:
- 2132 1. After S2, If there is a way to identify the fact that the request is considered
2133 to be invalid despite of the fact that it is a valid request, in order to
2134 calculate on-demand SLO, **percent of valid requests accepted**
2135 **(TAR/TVR)**, SP SOF informs SP OSS/BSS (BA) that a valid request was
2136 considered to be invalid and rejected.
- 2137 2. After S2, S6, S8b, S13 and S15, if CE-VLAN ID is not available to support
2138 CE-VLAN ID change, SP SOF informs OSS to update its SLO for on-
2139 demand CE-VLAN ID change, **percent of accepted requests fulfilled**
2140 **(TFR/TAR)**.
- 2141
- 2142



2143

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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	<ol style="list-style-type: none"> 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 : <ol style="list-style-type: none"> 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.

	<p><i>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.</i></p> <p><i>Per agreement between SP and PART, SP SOF may choose to receive confirmation from PART SOF before denying the request.</i></p> <ul style="list-style-type: none"> 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. <p>5. Tsp-cust and Tsp-part are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA).</p> <p>6. This UC ends</p>
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	

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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	<ol style="list-style-type: none"> 1. SP SOF requests CE-VLAN ID change from PART SOF over INTERLUDE and requests CE-VLAN ID change from SP ICM over PRESTO. <p><i>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.</i></p> <ol style="list-style-type: none"> 2. SP ICM verifies validity of request and if there is adequate capacity at UNI and NNIs. <ul style="list-style-type: none"> 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

	<p>unavailable. In turn, SP SOF sends “Invalid Request, or Unavailable Resources and Please try it later” to the customer</p> <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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. <ol style="list-style-type: none"> 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, <ol style="list-style-type: none"> 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
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	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

2150 **Table 24:** Use case description for CE-VLAN ID Change at Off-net Location Z (S4-
2151 S17)

2152 **7.11.3.1 Requirements**

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2154

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

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

2156

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

2157

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

2158

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]

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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

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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
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	from INTERLUDE interface.
Source	S1

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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.
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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.
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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

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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	

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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

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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

- 2198 SP and PART network to support the new CE-VLAN ID if SP SOF is capable of
2199 tracking available CE-VLAN IDs. Furthermore, if some of the information such as
2200 services and locations that belong to the customer is not in SOF, but in
2201 OSS/BSS (BA), then SOF requests the information from the OSS/BSS (BA)
2202 using LEGATO interface.
- 2203 ➤ *During the validation process, SP may choose to display “Request is in*
2204 *Progress” at SP Portal.*
- 2205 • S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back
2206 to user with “Invalid Request” if user credentials are invalid or “Unavailable
2207 Resources and Please try it Later” if CE-VLAN ID is unavailable or “Request is
2208 accepted and in progress” .
- 2209 ➤ *If customer requests pass user authentication at S2, per agreement*
2210 *between SP and PART, SP SOF waits for a confirmation from PART SOF*
2211 *(i.e. results of S4c, S5, S7a) before accepting or denying a customer*
2212 *request based on its own verification that the request is invalid and/or the*
2213 *requested CE-VLAN ID is unavailable.*
- 2214 ➤ *If customer requests pass user authentication at S2, it is up to SP SOF to*
2215 *wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and*
2216 *S7a) before denying a customer request based on its own verification that*
2217 *request is invalid and/or the requested CE-VLAN ID is unavailable.*
- 2218 ➤ *During the validation process, SP may choose to display “Request is in*
2219 *Progress” at SP Portal.*
- 2220 • S4 [PRESTO]: Based on S2, if user credentials are valid and either CE-VLAN ID
2221 is available or SP SOF has no CE-VLAN ID information, SP SOF sends a
2222 request to SP ICM to change CE-VLAN ID at SP side of ENNI, on-net I-NNIs
2223 and on-net UNI.
- 2224 • S4a [INTERLUDE]: Based on S2, if user credentials are valid and either CE-
2225 VLAN ID is available or SP SOF has no CE-VLAN ID information, SP SOF
2226 sends a request to Partner SOF to Change CE-VLAN ID at Partner side of
2227 ENNI, off-net UNI, and off-net I-NNIs. S4 and S4a can take place at the same
2228 time in order to reduce response time to user or S4a can take place after SP
2229 completes S8.
- 2230 • S4b [PRESTO]: Partner SOF requests Partner ICM to Change CE-VLAN ID at
2231 Partner side of ENNI, off-net UNI and off-net I-NNIs.
- 2232 • S5 [PRESTO]:
- 2233 1. SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP
2234 network and requested CE-VLAN ID is available at on-net UNI to Change
2235 CE-VLAN ID.
- 2236 2. Similarly, PART ICM validates if the EVC belongs to ENNI, UNI and I-
2237 NNIs within PART network and requested CE-VLAN ID is available at off-
2238 net UNI to Change CE-VLAN ID.

- 2239
- S6:
 - 2240 1. [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if
 - 2241 CE-VLAN ID is not available at on-net UNI, SP SOF responds to
 - 2242 customer with “Unavailable Resources and Please try it Later”.

 - 2243 2. [PRESTO+INTERLUDE+ALLEGRO or
 - 2244 PRESTO+INTERLUDE+CANTATA+LEGATO] Similarly, if CE-VLAN ID is
 - 2245 not supported at off-net UNI, ENNI or I-NNIs of Partner network, Partner
 - 2246 SOF send a message to SP SOF indicating “Unavailable Resources”. SP
 - 2247 SOF responds to customer with “Unavailable Resources and Please try it
 - 2248 Later”.

 - 2249 • S7: [PRESTO+ADAGIO]
 - 2250 1. Based on S5, if CE-VLAN ID is available at on-net UNI, SP ICM changes
 - 2251 CE-VLAN ID at UNI and requests SP ECM to change the CE-VLAN ID
 - 2252 of End Point on the on-net UNI”.

 - 2253 2. Similarly, if CE-VLAN ID can be supported at off-net UNI, ENNI and I-
 - 2254 NNIs of Partner network, Partner ICM changes CE-VLAN ID at ENNI and
 - 2255 I-NNIs and requests Partner ECM to change the CE-VLAN ID of the End
 - 2256 Point on off-net UNI”.

 - 2257 • S8: [ADAGIO+PRESTO]
 - 2258 1. After SP ECM changes CE-VLAN ID at on-net UNI and associated EVC
 - 2259 End Point, SP ECM sends a confirmation message to SP ICM. In turn, SP
 - 2260 ICM sends a confirmation message to SP SOF indicating the CE-VLAN
 - 2261 ID change at on-net UNI and EVC End Point.

 - 2262 2. Similarly, after Partner ECM changes CE-VLAN ID at off-net UNI and
 - 2263 associated EVC End Point, Partner ECM sends a confirmation message
 - 2264 to Partner ICM. In turn, Partner ICM sends a confirmation message to
 - 2265 Partner SOF indicating CE-VLAN ID change at off-net UNI and
 - 2266 associated EVC End Point.

 - 2267 • S8a [ALLEGRO or CANTATA+LEGATO] At S8, if CE-VLAN ID change is
 - 2268 successful, SP SOF sends the message “CE-VLAN ID is changed” to customer.

 - 2269 • S8b [ALLEGRO or CANTATA+LEGATO] At S8, if CE-VLAN ID change is
 - 2270 unsuccessful, SP SOF sends the message “Unavailable resources, please try it
 - 2271 later” to customer.

 - 2272 • S9 [PRESTO+ADAGIO]: After S8, optionally, SP SOF runs tests on SP OVC to
 - 2273 verify the new CE-VLAN ID, by requesting ICM and ECM to test the new CE-
 - 2274 VLAN ID at UNI and endpoint. PART SOF runs tests on PART OVC to verify
 - 2275 the new CE-VLAN ID, by requesting ICM and ECM to test the new CE-VLAN ID
 - 2276 at off-net UNI and endpoint. .

 - 2277 • S10:

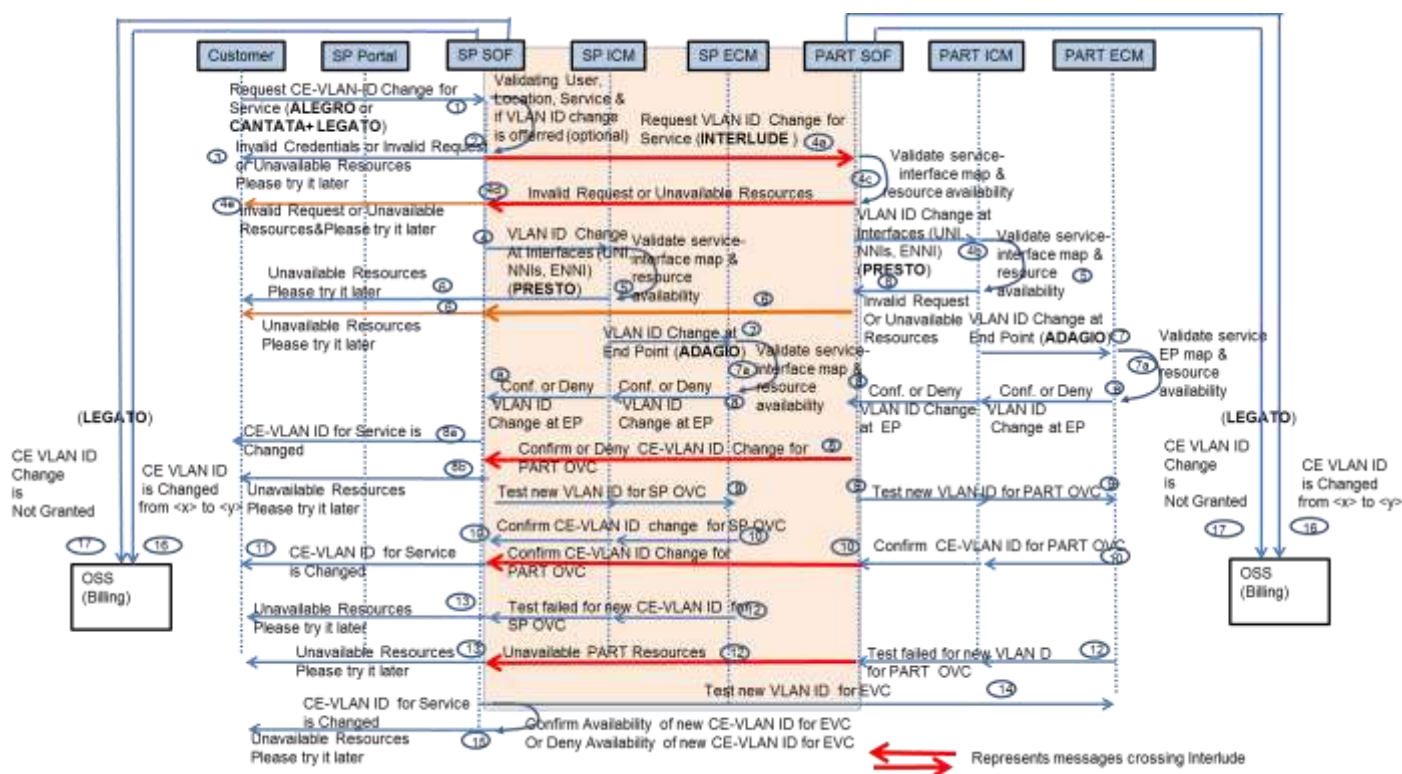
- 2278 1. [ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM
 2279 confirms the CE-VLAN ID change to SP ICM and in turn SP ICM confirms
 2280 the CE-VLAN ID change to SP SOF.
- 2281 2. [ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner
 2282 OVC, Partner ECM confirms CE-VLAN 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).

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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 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 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)**.



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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	<ol style="list-style-type: none"> 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 : <ol style="list-style-type: none"> 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. <p style="text-align: center;"><i>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.</i></p> <p style="text-align: center;"><i>Per agreement between SP and PART, SP SOF may choose to receive confirmation from PART SOF before denying the request.</i></p> 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	

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Table 26: Use case description for CE-VLAN ID Change at Off-net Location Z with CE-VLAN ID Preservation (Step 1,2,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-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	<ol style="list-style-type: none"> 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. <i>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.</i> 2. SP ICM verifies validity of request and if CE-VLAN ID is available at off-net UNI and I-NNIs. <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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. <ol style="list-style-type: none"> 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”.

	<p>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.</p> <p>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”.</p> <p>7. If SP SOF receives conformation from SP ICM, SP ECM and PART SOF,</p> <ol style="list-style-type: none"> SP SOF confirms CE-VLAN ID change to customer without testing the EVC for new CE-VLAN ID, or SP SOF request testing of SP OVC for the new CE-VLAN ID from SP ICM and ECM PART SOF requests testing of PART OVC for the new CE-VLAN ID from PART ICM and ECM 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. <p>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.</p> <p>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).</p> <p>10. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART.</p> <p>11. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.</p>
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

2345

2346 **Table 27:** Use case description for CE-VLAN ID Change at Off-net Location Z with CE-VLAN ID
 2347 Preservation (Steps 4-17)

2348

2349 **7.11.4.1 Requirements**

2350

R_ELASTIC_EVC_CEVLANID_004	Elastic Ethernet Service shall support CE-VLAN ID change with CE-VLAN ID preservation for off-net UNI.
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	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
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	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.
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2370

O_ADAGIO_TEST_008	ADAGIO should support OVC testing for new CE-
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	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.
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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 T _{sp-cust} and T _{sp-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

- 2404
- 2405
- 2406
- After end time elapses, the rate becomes the previous UNI PHY, $\langle \text{UNI PHY}_{A\text{-elastic-k}}, \text{UNI PHY}_{Z\text{-elastic-m}} \rangle$
- 2407
- 2408
- 2409
- 2410
3. Time intervals for on-demand modification of PHY immediately can be defined in the contract between SP and customer ($T_{\text{sp-cust}}$), and SP and PART ($T_{\text{sp-part}}$). The time interval for PART is expected to be smaller than the time interval for the SP. For example if $T_{\text{sp-cust}}$ is 6 hours, $T_{\text{sp-part}}$ 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 $T_{\text{sp-cust}}$.
 - 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 $T_{\text{sp-part}}$.
 - c. If the customer request is not fulfilled within $T_{\text{sp-cust}}$, 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 $T_{\text{sp-cust}}$ and $T_{\text{sp-part}}$.
 4. $T_{\text{sp-cust}}$ and $T_{\text{sp-part}}$ may apply to on-demand modification of PHY at certain date and time in the future. The SP chooses to perform the request prior to the scheduled time and have the service ready at the time of the scheduled time.

2425

2426 7.12.1. On-net PHY Change Process Flow

2427 The details are depicted in **Figure 13**. Steps in **Figure 13** are as follows:

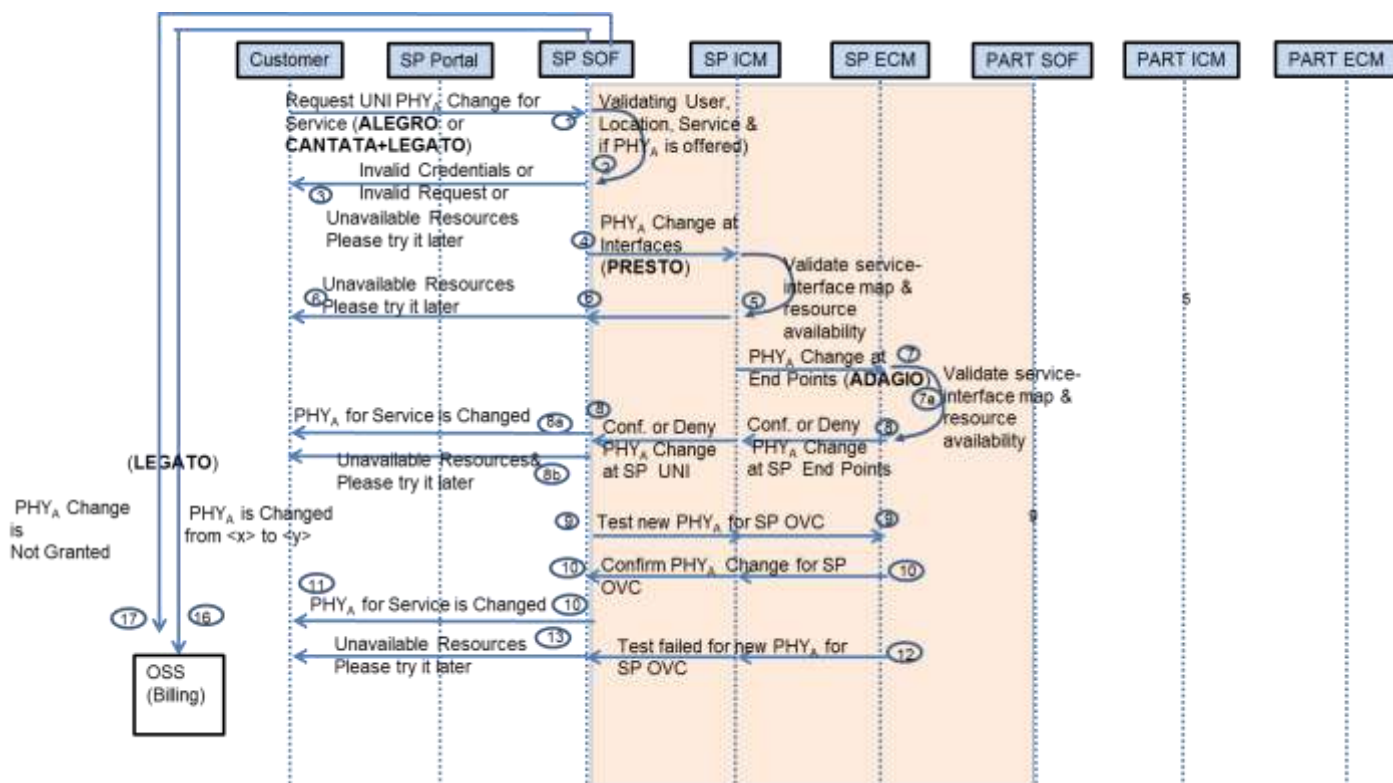
- 2428
- 2429
- 2430
- S1[ALLEGRO or CANTATA+LEGATO]: User requests PHY Change either from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and SP LEGATO interface of SP SOF
 - S2: SP SOF validates customer, the E-LINE service configuration between location A and location Z, and whether requested 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”.
- 2431
- 2432
- 2433
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- 2436
- 2437
- 2438
- 2439
- 2440
- 2441
- 2442

- 2443 ➤ *If customer requests pass user authentication at S2, it is up to SP SOF to*
2444 *wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and*
2445 *S7a) before accepting or denying a customer request based on its own*
2446 *verification that request is invalid and/or the PHY requested is*
2447 *unavailable.*
2448 ➤ *During the validation process, SP may choose to display “Request is in*
2449 *Progress” at SP Portal.*
- 2450 • S4 [PRESTO]: Based on S2, if user credentials are valid and either PHY is
2451 available or SP SOF has no PHY information, SP SOF sends a request to SP
2452 ICM to change PHY at on-net UNI.
- 2453 • S5: SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP
2454 network and requested CE-VLAN ID is available at UNI to Change PHY.
- 2455 • S6: [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if
2456 PHY is not available at on-net UNI, SP SOF responds to customer with
2457 “Unavailable Resources and Please try it Later”.
- 2458 • S7:[PRESTO+ADAGIO] Based on S5, if PHY is available at on-net UNI, SP
2459 ICM changes PHY at UNI, sends a message to SP SOF “Confirm PHY Change
2460 ”, and requests SP ECM to change the PHY of End Point on the on-net UNI”.
- 2461 • S7a [ADAGIO] SP ECM validates if requested PHY is available at on-net UNI
2462 and OVC End Point.
2463
- 2464 • S8: [ADAGIO+PRESTO]
- 2465 1. After SP ECM changes PHY at on-net UNI and associated EVC End
2466 Point, SP ECM sends a confirmation or denial message to SP ICM for the
2467 PHY change. In turn, SP ICM sends a confirmation or denial message to
2468 SP SOF indicating the CE-VLAN ID change at on-net UNI and EVC End
2469 Point.
- 2470 • S8a [ALLEGRO or CANTATA+LEGATO] At S8, if PHY change is successful, SP
2471 SOF sends the message “PHY is changed” to customer.
- 2472 • S8b [ALLEGRO or CANTATA+LEGATO] At S8, if PHY change is unsuccessful,
2473 SP SOF sends the message “Unavailable resources, please try it later” to
2474 customer.
- 2475 • S9 [PRESTO+ADAGIO]: After S8, optionally, SP SOF runs tests on SP OVC to
2476 verify the new PHY, by requesting ICM and ECM to test the new PHY at UNI
2477 and endpoint.
- 2478 • S10: [ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM
2479 confirms the PHY change to SP ICM and in turn SP ICM confirms the PHY
2480 change to SP SOF.
- 2481 • S11 [ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer
2482 indicating “PHY is Changed”.

- 2483 • S12: [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for SP OVC, SP ECM
 2484 confirms failure of SP OVC testing to SP ICM and in turn SP ICM confirms
 2485 failure of new PHY testing to SP SOF.

- 2486 • S13: [ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer
 2487 indicating “Unavailable Resources, Please try it later”.
- 2488 • S14 [LEGATO]: After S11, SP SOF informs OSS that PHY is changed, to
 2489 initiate billing and update SLO between SP and PART, percent of valid requests
 2490 accepted (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR), can
 2491 be updated.
- 2492 • S15 [LEGATO]:
 2493 1. After S3, If there is a way to identify the fact that the request is considered
 2494 to be invalid despite of the fact that it is a valid request, in order to
 2495 calculate on-demand SLO, **percent of valid requests accepted**
 2496 **(TAR/TVR)**, SP SOF informs SP OSS/BSS (BA) that a valid request was
 2497 considered to be invalid and rejected.
 2498 2. After S3,S6, S8b and S13, if the PHY change is not supported, SP SOF
 2499 informs OSS to update its SLO for on-demand changes, **percent of**
 2500 **accepted requests fulfilled (TFR/TAR)**.

2501



2502

2503

2504

Figure 13: On-net PHY Change Process

2505

2506

Use Case Number	UC1
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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	<p>6. Customer uses CANTATA or ALLEGRO interface to trigger a PHY change request</p> <p>7. Customer enters all the mandatory data elements displayed on the portal (i.e. PHY value, certain day and time in the future)</p> <p>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.</p> <p>9. If the CE-VLAN ID change request is :</p> <ul style="list-style-type: none"> 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. <p><i>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.</i></p> <p><i>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.</i></p> <ul style="list-style-type: none"> 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 <p>10. Tsp-cust is measured by SP SOF, an reported to OSS/BSS (BA).</p> <p>This UC ends</p>
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

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2509
2510

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 the 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	<ol style="list-style-type: none"> 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. <ol style="list-style-type: none"> 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, <ol style="list-style-type: none"> 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
2512

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

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-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-cust} for on-demand PHY change for on-net UNI.
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Source	
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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.
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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

- 2550 • S2: SP SOF validates customer, the E-LINE service configuration between
2551 location A and location Z, and whether requested PHY is available within PART
2552 network to support the new PHY if SP SOF is capable of tracking available
2553 PHYs. Furthermore, if some of the information such as services and locations
2554 that belong to the customer is not in SOF, but in OSS/BSS (BA), then SOF
2555 requests the information from the OSS/BSS (BA) using LEGATO interface.
- 2556 ➤ *During the validation process, SP may choose to display “Request is in
2557 Progress” at SP Portal.*
- 2558 • S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back
2559 to user with “Invalid Request” if user credentials are invalid or “Unavailable
2560 Resources and Please try it Later” if PHY is unavailable or “Request is
2561 accepted and in progress” .
- 2562 ➤ *If customer requests pass user authentication at S2, per agreement
2563 between SP and PART, SP SOF waits for a confirmation from PART SOF
2564 (i.e. results of S4c, S5, S7a) before accepting or denying a customer
2565 request based on its own verification that the request is invalid and/or the
2566 requested CE-VLAN ID is unavailable.*
- 2567 ➤ *If customer requests pass user authentication at S2, it is up to SP SOF to
2568 wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and
2569 S7a) before denying a customer request based on its own verification that
2570 request is invalid and/or the requested PHY is unavailable.*
- 2571 ➤ *During the validation process, SP may choose to display “Request is in
2572 Progress” at SP Portal.*
- 2573 • S4a [INTERLUDE]: Based on S2, if user credentials are valid and either PHY is
2574 available or SP SOF has no PHY information, SP SOF sends a request to
2575 Partner SOF to Change PHY at off-net UNI.
- 2576 • S4b [PRESTO]: PART SOF requests PART ICM to Change PHY at off-net UNI.
- 2577 • S5: PART ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP
2578 network and requested PHY is available at UNI to Change PHY.
- 2579 • S6: [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if
2580 PHY is not available at off-net UNI, PART SOF sends message “Unavailable
2581 Resources and Please try it Later” to SP SOF. In turn, SP SOF sends message
2582 “Unavailable Resources and Please try it Later” to customer.
- 2583 • S7: [PRESTO+ADAGIO] If PHY can be supported at off-net UNI, Partner ICM
2584 changes PHY at off-net UNI and requests Partner ECM to change the PHY of
2585 the End Point on off-net UNI”.
- 2586 • S8: [ADAGIO+PRESTO] After Partner ECM changes PHY at off-net UNI and
2587 associated EVC End Point, Partner ECM sends a confirmation message to
2588 Partner ICM. In turn, Partner ICM sends a confirmation message to Partner SOF
2589 indicating PHY change at off-net UNI and associated EVC End Point.

- 2590 • S8a [ALLEGRO or CANTATA+LEGATO] At S8, if PHY change is successful, SP
2591 SOF sends the message “PHY is changed” to customer.
- 2592 • S8b [ALLEGRO or CANTATA+LEGATO] At S8, if PHY change is unsuccessful,
2593 SP SOF sends the message “Unavailable resources, please try it later” to
2594 customer.
- 2595 • S9 [PRESTO+ADAGIO]: After S8, optionally, PART SOF runs tests on PART
2596 OVC to verify the new PHY, by requesting ICM and ECM to test the new PHY at
2597 off-net UNI and OVC endpoint. .
- 2598 • S10:
 - 2599 1. [ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner
2600 OVC, Partner ECM confirms PHY change to Partner ICM and in turn
2601 Partner ICM confirms PHY change to Partner SOF.
 - 2602 2. [INTERLUDE] Partner SOF confirms PHY change to SP SOF, “Confirm
2603 Availability of new CE-VLAN ID for PART OVC”.
- 2604 • S11 [ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer
2605 indicating “CE-VLAN ID is Changed”.
- 2606 • S12: [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for PART OVC, PART
2607 ECM confirms failure of PART OVC testing to PART ICM and in turn PART ICM
2608 confirms failure of new PHY testing to PART SOF. After that, PART SOF sends
2609 message “Unavailable Resources” to SP SOF.
- 2610 • S13: [ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer
2611 indicating “Unavailable Resources, Please try it Later”.
- 2612 • S14 [PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without Partner
2613 test its OVC), optionally, SP SOF runs and end-to-end EVC test.
- 2614 • S15
 - 2615 4. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP
2616 SOF informs customer indicating that “Unavailable Resources, Please try it
2617 Later”.
 - 2618 5. [ALLEGRO or CANTATA+LEGATO] If testing is successful, SP SOF informs
2619 customer that “PHY for Service is Changed”.
 - 2620 6. [LEGATO] if testing is successful, to initiate new billing procedure, SP SOF
2621 also informs SP OSS that “PHY is Changed”.
- 2622 • S16 [LEGATO]:
 - 2623 1. a) After S8a and S11, per contract between SP and PART, PART SOF
2624 informs PART OSS/BSS (BA) that PHY change is confirmed so that SLO
2625 between SP and PART, **percent of valid requests accepted**
2626 **(TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR)**, can
2627 be updated.
 - 2628 b) After S8a and S11, SP chooses to confirm PHY change without an
2629 end-to-end testing of EVC and informs OSS/BSS (BA) to initiate the

2630 billing and update on-demand SLO parameters, **percent of valid**
2631 **requests accepted (TAR/TVR) and percent of accepted requests**
2632 **fulfilled (TFR/TAR).**

- 2633 2. After S14, if testing is successful, SP SOF informs OSS to initiate new
2634 billing procedure for the new PHY and update on demand SLO
2635 parameters, **percent of valid requests accepted (TAR/TVR) and**
2636 **percent of accepted requests fulfilled (TFR/TAR).**
- 2637 3. a) After S14, if testing is unsuccessful, PART SOF informs OSS to update
2638 on demand SLO parameters, percent of valid requests accepted
2639 (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).
2640 b)After S14, if testing is unsuccessful, SP SOF informs OSS to update on
2641 demand SLO parameters, percent of valid requests accepted (TAR/TVR)
2642 and percent of accepted requests fulfilled (TFR/TAR).
2643 c) After S14, whether testing successful or unsuccessful, SP SOF informs
2644 PART SOF about the outcome so that PART SOF can inform SP OSS for
2645 the SLO update.
2646 c) After S14, whether testing successful or unsuccessful, SP SOF informs
2647 PART SOF about the outcome so that PART SOF can inform SP OSS for
2648 the SLO update.

- 2650 • S17 [LEGATO]:

- 2651 1. After S2, If there is a way to identify the fact that the request is considered
2652 to be invalid despite of the fact that it is a valid request, in order to
2653 calculate on-demand SLO, **percent of valid requests accepted**
2654 **(TAR/TVR)**, SP SOF informs SP OSS/BSS (BA) that a valid request was
2655 considered to be invalid and rejected.
- 2656 2. After S2,S6, S8b, S13 and S15, if PHY is not available to support PHY
2657 change, SP SOF informs OSS to update its SLO for on-demand PHY
2658 change, **percent of accepted requests fulfilled (TFR/TAR).**

2659

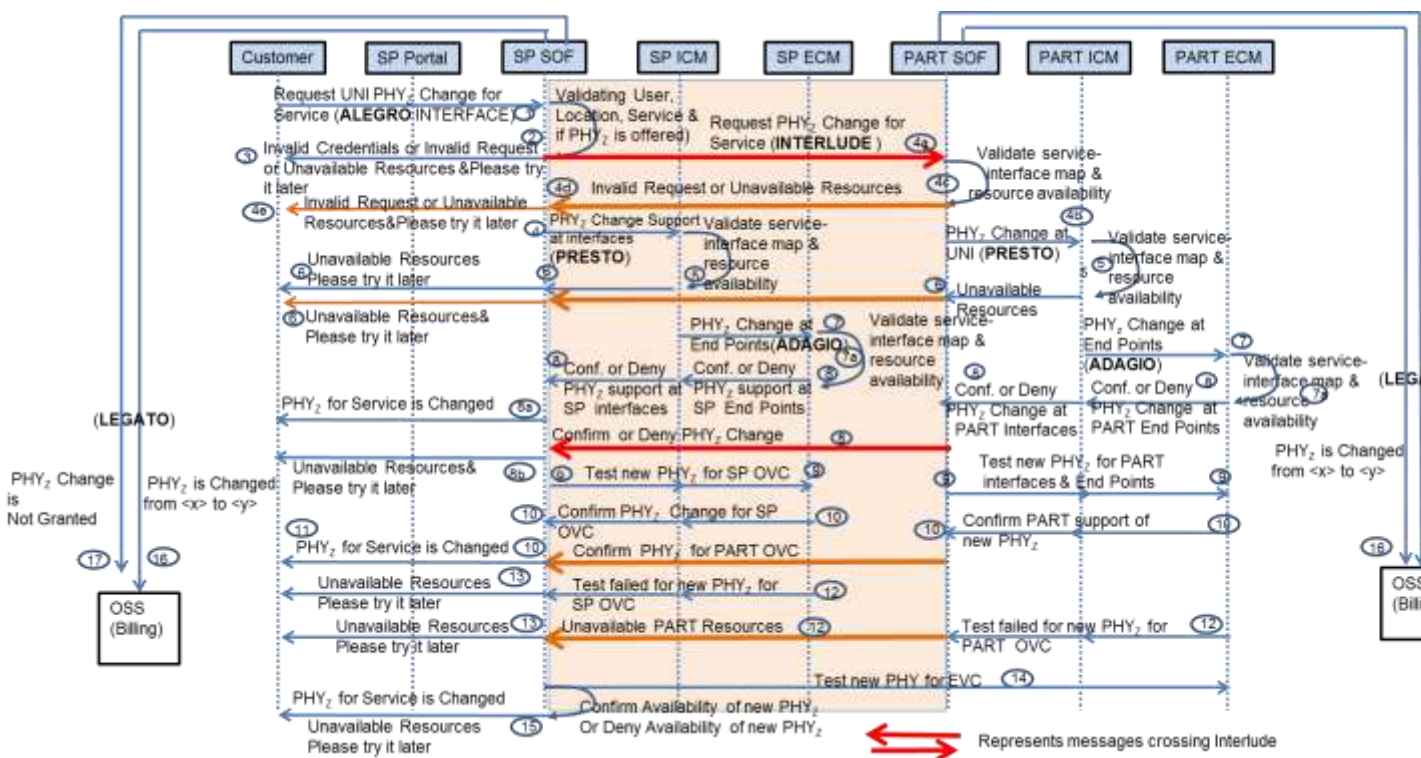


Figure 14: Off-net PHY Change Process

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2662
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2665

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	<ol style="list-style-type: none"> 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 : <ol style="list-style-type: none"> 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 “Unavailability Resources and Please try it later” to the SP SOF. In turn

	<p>SP SOF sends message “Unavailable Resources are, Please try it later” to the Customer.</p> <p><i>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.</i></p> <p><i>Per agreement between SP and PART, SP SOF may choose to receive confirmation from PART SOF before denying the request.</i></p> <p>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.</p> <p>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.</p> <p>5. Tsp-cust and Tsp-part are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA).</p> <p>6. This UC ends</p>
Post-Conditions	Customer Portal displays messages in 4a and 4b above or SP SOF initiates the PHY change.
Alternative Path	
Assumption(s)	
References	

2666

2667 **Table 32:** Use case description for PHY Change at Off-net Location Z (S1-S3)

2668

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	<p>1. SP SOF PHY change from PART SOF over INTERLUDE and requests CE-VLAN ID change from SP ICM over PRESTO.</p> <p><i>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.</i></p> <p>2. SP ICM verifies validity of request and if there is adequate capacity at UNI and NNIs.</p> <p>a. If the verification is successful, it requests PHY change from SP ECM over ADAGIO.</p> <p>b. If the verification is unsuccessful, SP ICM notifies SP</p>

	<p>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</p> <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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. <ol style="list-style-type: none"> 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, <ol style="list-style-type: none"> 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
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	<p>PHY change request. Similarly, PART SOF informs PART OSS/BSS (BA).</p> <p>10. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART.</p> <p>11. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.</p>
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

2669 **Table 33:** Use case description for PHY Change at Off-net Location Z (S4-S17)

2670

2671 **7.12.2.1. Requirements**

2672

2673

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

2674

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

2675

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

2676

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

2677

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

2678

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.
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Source	S1, [1]
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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.
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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.
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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_PSOFT_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

- 2721 locations that belong to the customer is not in SOF, but in OSS/BSS (BA), then
2722 SOF requests the information from the OSS/BSS (BA) using LEGATO interface.
- 2723 ➤ *During the validation process, SP may choose to display “Request is in
2724 Progress” at SP Portal.*
- 2725 • S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back
2726 to user with “Invalid Request” if user credentials are invalid, “Unavailable
2727 Resources and Please try it Later” if both PHYs are unavailable, or “Partially
2728 available Resources (UNI_A or UNI_Z)” or “Request is accepted and in progress” .
- 2729 ➤ *If customer requests pass user authentication at S2, per agreement
2730 between SP and PART, SP SOF waits for a confirmation from PART SOF
2731 (i.e. results of S4c, S5, S7a) before accepting or denying a customer
2732 request based on its own verification that the request is invalid and/or the
2733 requested CE-VLAN ID is unavailable.*
- 2734 ➤ *If customer requests pass user authentication at S2, it is up to SP SOF to
2735 wait for confirmations from SP ICM and SP ECM (i.e. results of S5 and
2736 S7a) before denying a customer request based on its own verification that
2737 request is invalid and/or the requested PHY is unavailable.*
- 2738 ➤ *During the validation process, SP may choose to display “Request is in
2739 Progress” at SP Portal.*
- 2740 • S4 [PRESTO]: Based on S2, if user credentials are valid and either PHY for
2741 UNI_A is available or SP SOF has no PHY information, SP SOF sends a request
2742 to SP ICM to change PHY for UNI_A at SP side of ENNI, on-net I-NNIs, and on-
2743 net UNI.
- 2744 • S4a [INTERLUDE]: Based on S2, if user credentials are valid and either PHY for
2745 UNI_Z is available or SP SOF has no PHY information, SP SOF sends a request
2746 to Partner SOF to Change PHY at Partner side of ENNI, off-net UNI, and off-net
2747 I-NNIs. S4 and S4a can take place at the same time in order to reduce
2748 response time to user or S4a can take place after SP completes S8.
- 2749 • S4c, S4d and S4e [INTERLUDE]: PART SOF validates the service is valid and
2750 requested PHY is available at off-net UNI, ENNI and I-INNI, if PART SOF has
2751 the information. If it is an invalid request and/or requested PHY is unavailable,
2752 PART SOF sends message “Invalid Request or Unavailable Resources and
2753 please try it later” to SP SOF. If SP SOF does not wait for the SP ICM’s
2754 validation, SP SOF responds the customer request with “Invalid Request,
2755 Unavailable Resources and Please try it later, or Partially available resources
2756 (UNI_A or UNI_Z)”
- 2757 • S4b [PRESTO]: If SP SOF wants to wait for SP ICM validation, Partner SOF
2758 requests Partner ICM to Change P HY at Partner side of ENNI, off-net UNI (i.e.
2759 UNI_Z) and off-net I-NNIs.
- 2760 • 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.

- 2801 2. [ADAGIO+PRESTO] Similarly, after PART ECM validates If the requested
2802 PHY is available at off-net UNI and associated OVC End Point, PART ECM
2803 sends a confirmation or denial message to PART ICM for the PHY Change.
2804 In turn, PART ICM sends a confirmation or denial message to PART SOF for
2805 the PHY change at off-net UNI and off-net OVC End Point.
2806
- 2807 • S8a [ALLEGRO or CANTATA+LEGATO]: At S8, if PHY change has been
2808 successful, SP SOF sends the message “PHY for service is changed” to
2809 customer.
2810
 - 2811 • S8b [ALLEGRO or CANTATA+LEGATO]: At S8, if one or both PHY changes
2812 have been unsuccessful, SP SOF sends the message “Unavailable resources,
2813 please try it later, or “Partially Available Resources (UNI_A or UNI_Z)” to customer.
 - 2814 • S9 [PRESTO+ADAGIO]: After S8, optionally, SP SOF and PART SOF run tests
2815 on their segments of EVC (i.e. SP OVC and Partner OVC) to verify the PHY
2816 changes, by requesting ICM and ECM to test the new PHYs at associated
2817 interfaces and endpoints. .
 - 2818 • S10:
2819 1.[ADAGIO+PRESTO] If tests at S9 are successful for SP OVC, SP ECM
2820 confirms availability of new PHYs to SP ICM and in turn SP ICM confirms
2821 availability of new PHYs to SP SOF.
2822 2.[ADAGIO+PRESTO] Similarly, If tests at S9 are successful for Partner OVC,
2823 Partner ECM confirms availability of new PHY for off-net UNI to Partner ICM and
2824 in turn Partner ICM confirms availability of new PHY for off-net UNI to Partner
2825 SOF.
2826 3.[INTERLUDE] Partner SOF confirms availability of new PHY for off-net UNI to
2827 SP SOF, “Confirmed Availability of New PHY for Partner OVC”.
 - 2828 • S11[ALLEGRO or CANTATA+LEGATO]: After S10, SP SOF informs customer
2829 indicating “PHY_A and PHY_Z are Changed”.
 - 2830 • S12:
2831 1. [PRESTO+ADAGIO]: If tests at S9 are unsuccessful for SP OVC, SP ECM
2832 confirms failure of testing of both or one of the PHYs to SP ICM and in turn
2833 SP ICM confirms failure of testing of both or one of the PHYs to SP SOF.
2834 2. [PRESTO+ADAGIO]Similarly, If tests at S9 are unsuccessful for Partner
2835 OVC, Partner ECM confirms failure of PART OVC testing with new PHY at
2836 off-net UNI to Partner ICM and in turn Partner ICM confirms failure of PART
2837 OVC testing to Partner SOF.
 - 2838 • S13[ALLEGRO or CANTATA+LEGATO]: After S12, SP SOF informs customer
2839 indicating “Unavailable Resources, Please try it Later””.

- 2840 • S14[PRESTO+ADAGIO+INTERLUDE]: After S10 or after S8 (without SP and
2841 Partner test their OVCs), optionally, SP SOF runs and end-to-end EVC test.
- 2842 • S15
- 2843 1. [ALLEGRO or CANTATA+LEGATO]: After S14, if testing is unsuccessful, SP
2844 SOF informs customer indicating that “Unavailable Resources and Please try
2845 it Later, or Partially Available Resources (UNI_A or UNI_Z)”.
- 2846 2. [ALLEGRO or CANTATA+LEGATO] If testing is successful, SP SOF informs
2847 customer that “PHYs for Service are Changed”.
- 2848 3. [LEGATO] if testing is successful, to initiate new billing procedure, SP SOF
2849 also informs OSS that “PHYs for Service are Changed”.
- 2850 • S16 [LEGATO]:
- 2851 1. a) At S8a and S11, per contract between SP and Ethernet Access
2852 Operator (PART), PART SOF informs PART OSS/BSS (BA) that PHY
2853 changes are confirmed so that SLO between SP and PART, percent of
2854 valid requests accepted (TAR/TVR) and percent of accepted requests
2855 fulfilled (TFR/TAR), can be updated.
- 2856 b) At S8a and S11, SP chooses to confirm PHY changes without an end-
2857 to-end testing of EVC and informs OSS/BSS (BA) to initiate the billing and
2858 update on-demand SLO parameters, percent of valid requests accepted
2859 (TAR/TVR) and percent of accepted requests fulfilled (TFR/TAR).
- 2860 2. a) At S15, if testing is successful, SP SOF informs OSS to initiate new
2861 billing procedure for the new PHYs and update on demand SLO
2862 parameters, percent of valid requests accepted (TAR/TVR) and percent
2863 of accepted requests fulfilled (TFR/TAR).
- 2864 b) At S15, if testing is successful, SP SOF also informs PART SOF that
2865 the testing is successful. In turn, PART SOF informs PART OSS/BSS
2866 (BA) that PHY changes are successful so that PART OSS/BSS (BA) can
2867 update its SLOs.
- 2868 2869 • S17 [LEGATO]:
- 2870 1. At S3, If there is a way to identify the fact that the request is considered to
2871 be invalid despite of the fact that it is a valid request, in order to calculate
2872 on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP
2873 SOF informs SP OSS/BSS (BA) that a valid request was considered to be
2874 invalid and rejected.
- 2875 2. At S3, S4e, S6.1, S8b, S13 and S15, if PHYs are available to support PHY
2876 changes, SP SOF informs OSS to update its SLO for on-demand PHY
2877 changes, **percent of accepted requests fulfilled (TFR/TAR)**.
- 2878 3. At S4d, S6.2, S8b, S11 and S15, if PHY changes cannot be supported,
2879 PART SOF informs OSS to update its SLO for on-demand PHY change,
2880 percent of accepted requests fulfilled (TFR/TAR).
- 2881 4. At S15, if testing is unsuccessful, SP SOF informs PART SOF about not
2882 being able to honor the customer request so that PART SOF requests
2883 PART OSS/BSS (BA) to update the on demand SLO parameters.
- 2884

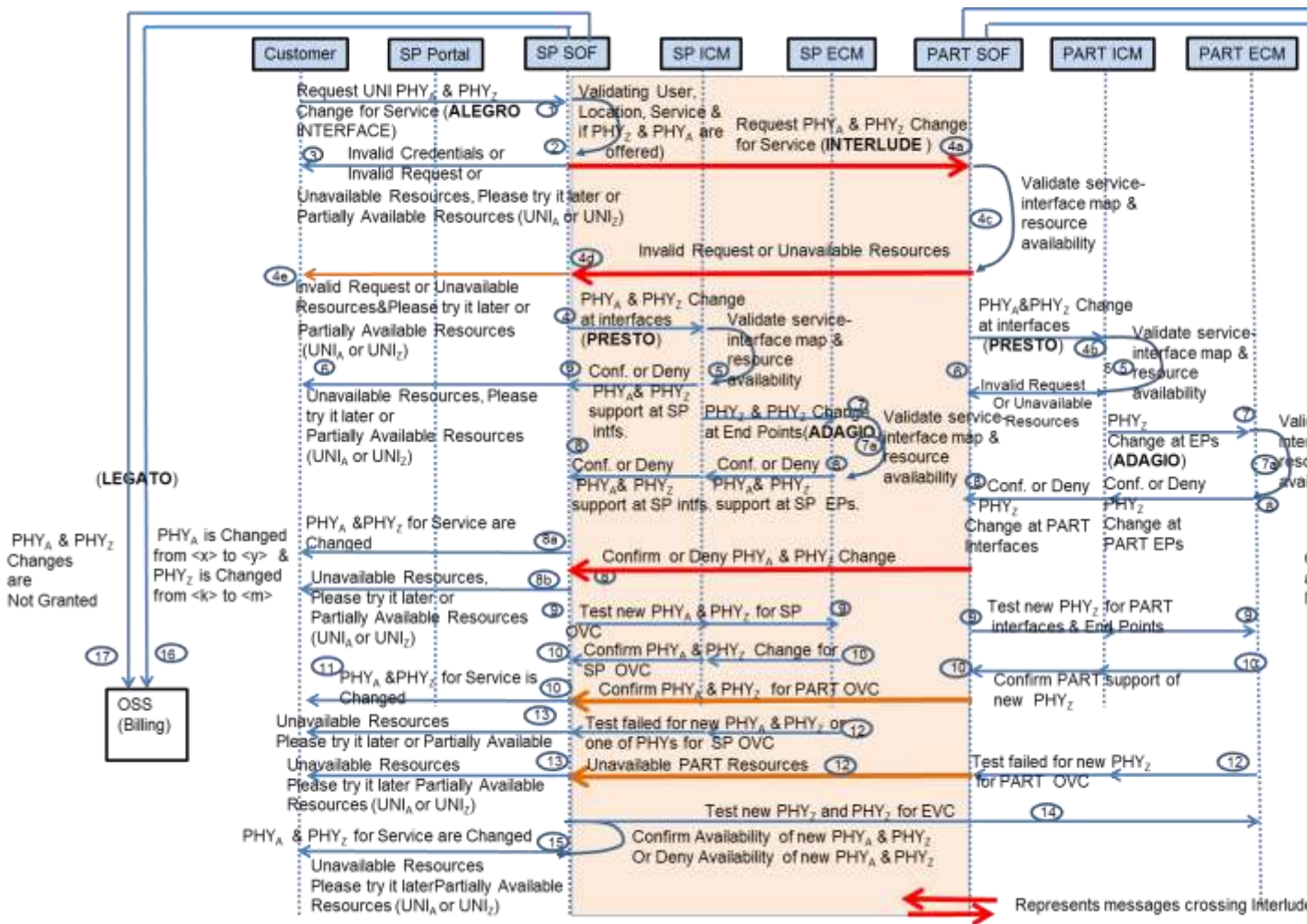


Figure 15: Multiple PHY Change Process

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	<ol style="list-style-type: none"> 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 :

	<p>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.</p> <p>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.</p> <p style="text-align: center;"><i>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.</i></p> <p style="text-align: center;"><i>Per agreement between SP and PART, SP SOF may choose to receive confirmation from PART SOF before denying the request.</i></p> <p>c. Valid and the requested PHY values are available at both UNI_A and UNI_Z, then S4 and S4a will be initiated.</p> <p>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.</p> <p style="text-align: center;"><i>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.</i></p> <p>5. <i>Tsp-cust and Tsp-part are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA).</i></p> <p>6. This UC ends</p>
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	<ol style="list-style-type: none"> 1. SP SOF requests PHY changes from PART SOF over INTERLUDE and requests PHY changes from SP ICM over PRESTO. <i>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.</i> 2. SP ICM verifies validity of the request and if requested PHYs can be supported at on-net UNI and NNIs. <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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. <ol style="list-style-type: none"> 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)”.

	<p>9. If SP SOF receives conformation from SP ICM, SP ECM and PART SOF,</p> <ol style="list-style-type: none"> 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. <p>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.</p> <p>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).</p> <p>14. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART.</p> <p>15. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.</p>
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

2895

2896 **Table 36:** Use case description for PHY Changes at On-net Location A and Off-net
2897 Location Z (S4-S17)

2898

2899 **7.12.3.1. Requirements**

2900

2901

R_ELASTIC_UNI_PHY_002	Elastic Ethernet Service shall support PHY changes at on-net and off-net locations.
Source	S1

2902

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

2927

2928

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	

2930

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	

2933

2934

2935 Table 37: Requirements for on-demand PHY change at on-net and off-net
 2936 locations at the same time

2937

2938 **7.13 On-demand EVC Activation for E-LINE**

2939 Prior to an on-demand request for activating an E-LINE, ENNI, UNIs and EVC between
 2940 off-net and on-net locations of SP are configured for this E-LINE, but not activated:
 2941 Overall EVC activation process can be summarized as follows:

- 2942 1. Customer via user portal requests activating the EVC that is already configured
- 2943 a. Immediately
- 2944 b. At certain time and day in the future
- 2945 2. Time intervals for on-demand modification of EVC activation immediately can be
- 2946 defined in the contract between SP and customer ($T_{sp-cust}$), and SP and PART
- 2947 ($T_{sp-part}$). The time interval for PART is expected to be smaller than the time
- 2948 interval for the SP. For example if $T_{sp-cust}$ is 15 minutes, $T_{sp-part}$ could be 10
- 2949 minutes.
- 2950 a. The time interval for fulfillment between SP and customer can be
- 2951 recorded. In the customer contract, there can be a penalty associated
- 2952 with the requests that are not fulfilled within $T_{sp-cust}$.
- 2953 b. The time interval for fulfillment between SP and PART can be recorded.
- 2954 There can be a penalty associated with the requests that are not fulfilled
- 2955 within $T_{sp-part}$.
- 2956 c. If the customer request is not fulfilled within $T_{sp-cust}$, the customer can
- 2957 cancel the request. The cancelation may be counted for penalty per the
- 2958 contract.
- 2959 d. The customer may request a monthly history report from user portal
- 2960 consisting of $T_{sp-cust}$ and $T_{sp-part}$.
- 2961 3. $T_{sp-cust}$ and $T_{sp-part}$ may apply to on-demand modification of EVC activation at
- 2962 certain date and time in the future. The SP choses to perform the request prior
- 2963 to the scheduled time and have the service ready at the time of the scheduled
- 2964 time.

2965

2966 The details are depicted in **Figure 16**. Steps in **Figure 16** are as follows:

- 2967 • S1[ALLEGRO or CANTATA+LEGATO]: User requests EVC activation either
- 2968 from ALLEGRO interface of SP SOF or CANTATA interface of SP BU and SP
- 2969 LEGATO interface of SP SOF
- 2970 • S2: SP SOF validates customer, the E-LINE service configuration between
- 2971 location A and location Z, what are the components of EVC, and whether there
- 2972 is enough capacity in the SP network and/or Partner network to activate the EVC
- 2973 if SP SOF is capable of tracking available network capacity.
- 2974 • S3 [ALLEGRO or CANTATA+LEGATO]: Based on S2, SP SOF responds back
- 2975 to user with "Invalid Request" if user credentials are invalid or "Unavailable"

- 2976 Resources and Please try it Later” if resources are unavailable or “Request is
2977 accepted and in progress”
- 2978 • S4 [PRESTO]: Based on S2, if user credentials are valid and either capacity is
2979 available or SP SOF has no capacity information, SP SOF sends a request to
2980 SP ICM to activate EVC components at SP side of ENNI, on-net UNI, and on-net
2981 I-NNIs
- 2982 • S4a [INTERLUDE]: Based on S2, if user credentials are valid and either capacity
2983 is available or SP SOF has no capacity information, SP SOF sends a request to
2984 Partner SOF to activate the EVC components at Partner side of ENNI, off-net
2985 UNI, and off-net I-NNIs. S4 and S4a can take place at the same time in order to
2986 reduce response time to user or S4a can take place after SP completes S8.
- 2987 • S4c, S4d and S4e [INTERLUDE]: PART SOF validates the service is valid and
2988 resources are available to activate PART OVC at off-net UNI, ENNI and I-INNI, s,
2989 if PART SOF has the information. If it is an invalid request and/or resources are
2990 unavailable, PART SOF sends message “Invalid Request or Unavailable
2991 Resources and please try it later” to SP SOF. If SP SOF does not wait for the
2992 SP ICM’s validation, SP SOF responds the customer request with “Invalid
2993 Request, Unavailable Resources and Please try it later”.
- 2994 • S4b [PRESTO]: If SP SOF wants to wait for SP ICM validation, Partner SOF
2995 requests Partner ICM to activate the EVC components at Partner side of ENNI,
2996 off-net UNI and off-net I-NNIs.
- 2997 • S5:
- 2998 1. SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP
2999 network and there is enough capacity at these interfaces to activate the EVC.
- 3000 2. Similarly, Partner ICM validates if the EVC belongs to ENNI, UNI and I-NNIs
3001 within Partner network and there is enough capacity at these interfaces to
3002 support the EVC.
- 3003 • S6:
- 3004 1. [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if
3005 there is not enough capacity at on-net UNI, ENNI or I-NNIs within SP
3006 network, SP SOF responds to customer with “Unavailable Resources and
3007 Please try it Later”.
- 3008 2. [PRESTO+INTERLUDE+ALLEGRO or
3009 PRESTO+INTERLUDE+CANTATA+LEGATO] Similarly, if there is not
3010 enough capacity at off-net UNI, ENNI or I-NNIs of Partner network, Partner
3011 SOF send a message to SP SOF indicating that there is not enough capacity
3012 to support the EVC (i.e. Unavailable Resources”). SP SOF responds to
3013 customer with “Unavailable Resources and Please try it Later”.
- 3014 • 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 activate
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.
- 3042
- 3043
- 3044
- 3045
- 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).

- 3090 2. a) At S15, if testing is successful, SP SOF informs OSS to initiate new
- 3091 billing procedure for the new PHYs and update on demand SLO
- 3092 parameters, percent of valid requests accepted (TAR/TVR) and percent
- 3093 of accepted requests fulfilled (TFR/TAR).
- 3094
- 3095 b) At S15, if testing is successful, SP SOF also informs PART SOF that
- 3096 the testing is successful. In turn, PART SOF informs PART OSS/BSS
- 3097 (BA) that PHY changes are successful so that PART OSS/BSS (BA) can
- 3098 update its SLOs.

- 3099 • S17 [LEGATO]:
- 3100 1. At S3, If there is a way to identify the fact that the request is considered to
- 3101 be invalid despite of the fact that it is a valid request, in order to calculate
- 3102 on-demand SLO, **percent of valid requests accepted (TAR/TVR)**, SP
- 3103 SOF informs SP OSS/BSS (BA) that a valid request was considered to be
- 3104 invalid and rejected.
- 3105 2. At S3,S4e, S6.1, S8b, S13 and S15, if resources are available to activate
- 3106 EVC, SP SOF informs OSS to update its SLO for on-demand EVC
- 3107 activation, **percent of accepted requests fulfilled (TFR/TAR)**.
- 3108 3. At S4d, S6.2, S8b, S11 and S15, if EVC activation cannot be supported,
- 3109 PART SOF informs OSS to update its SLO for on-demand EVC
- 3110 activation, percent of accepted requests fulfilled (TFR/TAR).
- 3111 4. At S15, if testing is unsuccessful, SP SOF informs PART SOF about not
- 3112 being able to honor the customer request so that PART SOF requests
- 3113 PART OSS/BSS (BA) to update the on demand SLO parameters.
- 3114
- 3115
- 3116

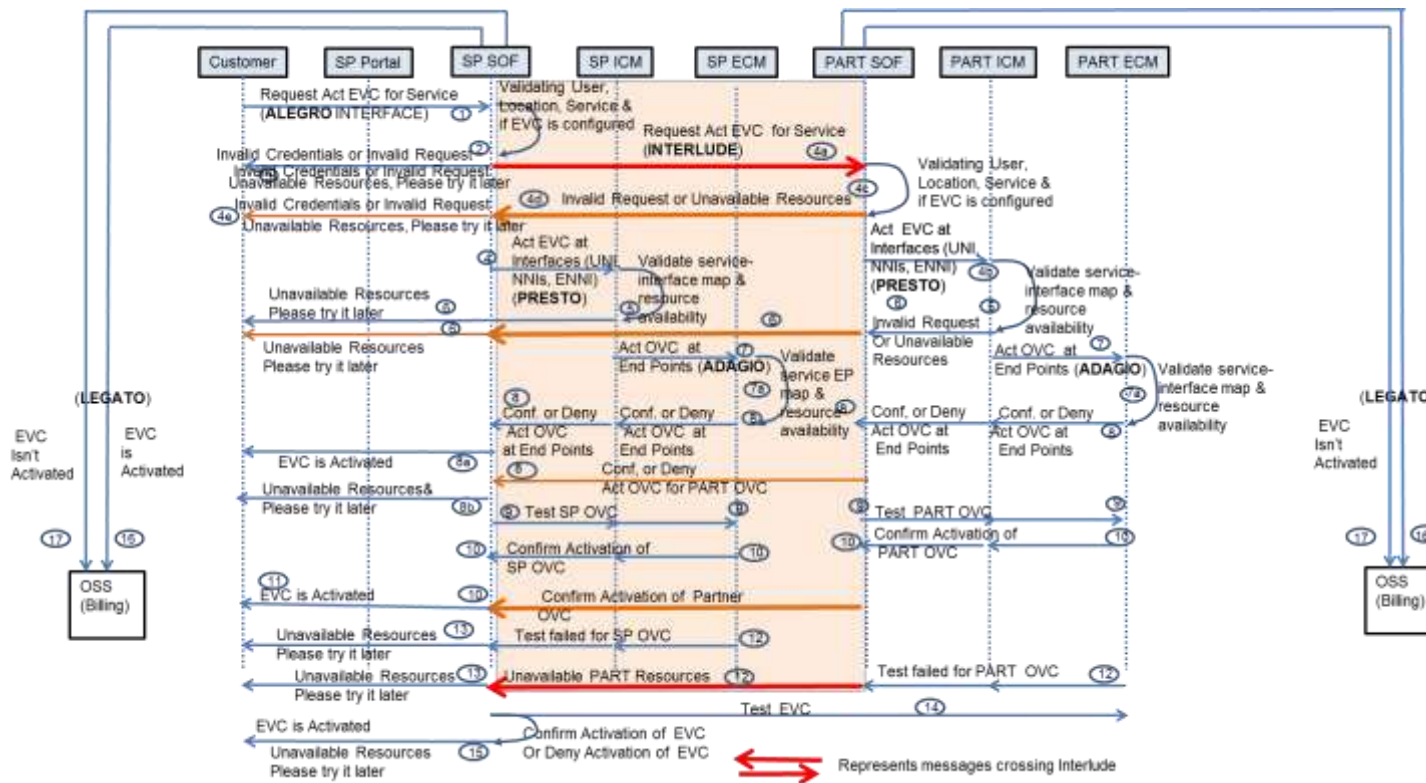


Figure 16 EVC Activation Process Flow for E-LINE

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	<ol style="list-style-type: none"> 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 : <ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 2. SP SOF requests PART OVC activation from PART SOF over INTERLUDE and requests SP OVC activation from SP ICM over PRESTO. <ul style="list-style-type: none"> <i>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.</i> 3. SP ICM verifies validity of the request and if EVC activation can be supported at on-net UNI and NNIs. <ul style="list-style-type: none"> 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 activation 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 <ul style="list-style-type: none"> 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. <ul style="list-style-type: none"> 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, <ul style="list-style-type: none"> e. SP SOF confirms EVC activation to customer without testing the EVC , or

	<ul style="list-style-type: none"> 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. <p>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.</p> <p>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).</p> <p>18. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART.</p> <p>19. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.</p>
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

3122

3123

Table 39: Use case description for EVC Activation (S4-S17)

3124

3125

3126

7.13.1 Requirements

3128

3129

R_ELASTIC_ACT_EVC_001	Elastic Ethernet Service shall support on-demand EVC activation.
Source	S1

3130

R_ELASTIC_ACT_EVC_CANTATA_00	CANTATA shall support on-demand EVC activation.
Source	S1

3131

3132

R_ELASTIC_ACT_EVC_ALLEGRO_001	ALLEGRO shall support on-demand EVC activation.
Source	S1

3133

R_ELASTIC_ACT_EVC_PRESTO_001	PRESTO shall support on-demand EVC activation.
Source	S1

3134

R_ELASTIC_ACT_EVC_ADAGIO_001	ADAGIO shall support on-demand EVC activation.
Source	S1

3135

R_ELASTIC_ACT_EVC_SONATA_001	SONATA shall support on-demand EVC activation.
Source	S1

3136

R_ELASTIC_ACT_EVC_INTEERLU_001	INTERLUDE shall support on-demand EVC activation.
Source	S1

3137

R_ELASTIC_ACTEVC_CANTA_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 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.
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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.
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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.
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Source	S9
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3155

R_SP_SOF_TIMING_0010	SP SOF shall be able to measure $T_{sp-cust}$ and $T_{sp-part}$, 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 $T_{sp-part}$ 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 $T_{sp-cust}$ and $T_{sp-part}$ for on-demand EVC activation.
Source	
R_LEGATO_TIMING_0024	PART LEGATO API shall be able to support $T_{sp-part}$ for on-demand EVC activation.
Source	
R_SONATA_TIMING_0012	SONATA API shall be able to support $T_{sp-cust}$ and $T_{sp-part}$ 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 ($T_{sp-cust}$), and SP and PART
 3170 ($T_{sp-part}$). The time interval for PART is expected to be smaller than the time

3171 interval for the SP. For example if $T_{sp-cust}$ is 15 minutes, $T_{sp-part}$ 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 $T_{sp-cust}$.
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 $T_{sp-part}$.
3179 c. If the customer request is not fulfilled within $T_{sp-cust}$, 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 $T_{sp-cust}$ and $T_{sp-part}$.

3184 3. $T_{sp-cust}$ and $T_{sp-part}$ 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

- 3211 Partner SOF to validate customer request and de-activate the EVC components
3212 at Partner side of ENNI, off-net UNI, and off-net I-NNIs. S4 and S4a can take
3213 place at the same time in order to reduce response time to user or S4a can take
3214 place after SP completes S8.
- 3215 • S4c, S4d and S4e [INTERLUDE]: PART SOF validates the service is valid and
3216 EVC is active. If it is an invalid request, PART SOF sends message “Invalid
3217 Request” to SP SOF.
- 3218 • S4b [PRESTO]: If PART SOF wants to wait for PART ICM validation, Partner
3219 SOF requests Partner ICM to de-activate the EVC components at Partner side
3220 of ENNI, off-net UNI and off-net I-NNIs.
- 3221 • S5:
- 3222 1. SP ICM validates if the EVC belongs to ENNI, UNI and I-NNIs within SP
3223 network and the SP OVC is active.
- 3224 2. Similarly, Partner ICM validates if the EVC belongs to ENNI, UNI and I-NNIs
3225 within Partner network and the PART OVC is active.
- 3226 • S6:
- 3227 1. [PRESTO+ALLEGRO or PRESTO+CANTATA+LEGATO] Based on S5, if
3228 request is invalid or the deactivation cannot be performed, SP SOF responds
3229 to customer with “Invalid Request or Please try it later”.
- 3230 2. [PRESTO+INTERLUDE+ALLEGRO or
3231 PRESTO+INTERLUDE+CANTATA+LEGATO] Similarly, if the request is
3232 invalid for Partner network or the deactivation cannot be performed, Partner
3233 SOF send a message to SP SOF indicating that it is an invalid request or the
3234 deactivation cannot be performed. SP SOF responds to customer with
3235 “Invalid Request or Please try it later”.
- 3236 • S7:
- 3237 1. [PRESTO+ADAGIO]Based on S5, if the request is valid, SP ICM de-activates
3238 SP OVC at ENNI and I-NNIs, sends a message to SP SOF indicating that SP
3239 OVC is deactivated, and requests SP ECM to de-activate EVC End Point on
3240 the on-net UNI”.
- 3241 2. [PRESTO+ADAGIO]Similarly, if the request is valid, Partner ICM de-activates
3242 PART OVC, sends a message to Partner SOF “Confirming EVC de-
3243 activation at PART side of ENNI and I-NNIs”, and requests Partner ECM to
3244 de-activate EVC End Point on the off-net UNI”.
- 3245 • S7a [ADAGIO]:
- 3246 1. SP ECM validates if the SP OVC can be de-activated at on-net UNI and
3247 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

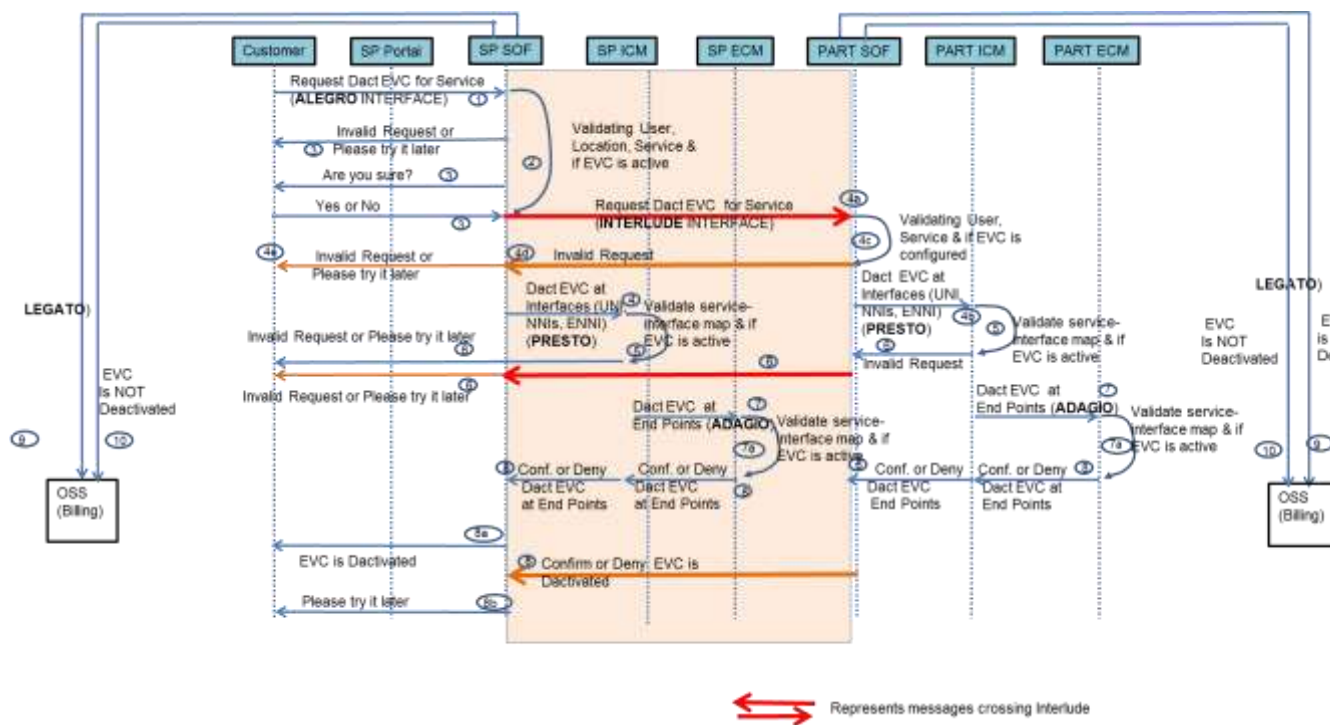


Figure 17 EVC Deactivation Process Flow for E-LINE

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	<ol style="list-style-type: none"> 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 : <ol style="list-style-type: none"> 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”,

	<p>then S4 (Step 4) will be initiated.</p> <p>5. Tsp-cust and Tsp-part are measured by SP SOF and PART SOF, an reported to OSS/BSS (BA).</p> <p>6. This UC ends</p>
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)

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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	<p>3. SP SOF requests PART OVC deactivation from PART SOF over INTERLUDE and requests SP OVC deactivation from SP ICM over PRESTO.</p> <p><i>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.</i></p> <p>4. SP ICM verifies validity of the request and if EVC deactivation can be supported at on-net UNI and NNIs.</p> <ul style="list-style-type: none"> 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. <p>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 deactivation at on-net UNI and on-net OVC End Point.</p> <p>8. PART SOF verifies validity of request and if the deactivation can be performed at off-net UNI and off-net NNIs</p> <ul style="list-style-type: none"> 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. <p>8. PART ICM validates if the EVC belongs to ENNI, UNI and I-NNIs</p>

	<p>within SP network and deactivation of PART OVC can be supported on these interfaces.</p> <ul style="list-style-type: none"> 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. <p>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".</p> <p>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).</p> <p>21. If there are discrepancies between SP OSS/BSS (BA) and PART OSS/BSS (BA), it would be solved between SP and PART.</p> <p>22. If there are discrepancies between customer records and SP records regarding to validity of requests, it would be solved between the customer SP.</p>
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

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Table 42: Use case description for EVC Deactivation (S4-S17)

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7.14.1 Requirements

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R_ELASTIC_DACTIVATE_EVC	Elastic Ethernet Service shall support on-demand EVC de-activation.
Source	S1

3301

R_ELASTIC_DACT_EVC_CANTATA	CANTATA shall support on-demand EVC de-activation.
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Source	S1					
3302	<table border="1"> <tr> <td>R_ELASTIC_DACT_EVC_ALLEGRO</td> <td>ALLEGRO shall support on-demand EVC de-activation.</td> </tr> <tr> <td>Source</td> <td>S1</td> </tr> </table>		R_ELASTIC_DACT_EVC_ALLEGRO	ALLEGRO shall support on-demand EVC de-activation.	Source	S1
R_ELASTIC_DACT_EVC_ALLEGRO	ALLEGRO shall support on-demand EVC de-activation.					
Source	S1					
3303	<table border="1"> <tr> <td>ELASTIC_DACT_EVC_PRESTO_001</td> <td>PRESTO shall support on-demand EVC de-activation.</td> </tr> <tr> <td>Source</td> <td>S1</td> </tr> </table>		ELASTIC_DACT_EVC_PRESTO_001	PRESTO shall support on-demand EVC de-activation.	Source	S1
ELASTIC_DACT_EVC_PRESTO_001	PRESTO shall support on-demand EVC de-activation.					
Source	S1					
3304	<table border="1"> <tr> <td>ELASTIC_DACT_EVC_ADAGIO_001</td> <td>ADAGIO shall support on-demand EVC de-activation.</td> </tr> <tr> <td>Source</td> <td>S1</td> </tr> </table>		ELASTIC_DACT_EVC_ADAGIO_001	ADAGIO shall support on-demand EVC de-activation.	Source	S1
ELASTIC_DACT_EVC_ADAGIO_001	ADAGIO shall support on-demand EVC de-activation.					
Source	S1					
3305	<table border="1"> <tr> <td>R_ELASTIC_DACT_EVC_SONATA</td> <td>SONATA shall support on-demand EVC de-activation.</td> </tr> <tr> <td>Source</td> <td>S1</td> </tr> </table>		R_ELASTIC_DACT_EVC_SONATA	SONATA shall support on-demand EVC de-activation.	Source	S1
R_ELASTIC_DACT_EVC_SONATA	SONATA shall support on-demand EVC de-activation.					
Source	S1					
3306	<table border="1"> <tr> <td>R_ELASTIC_DACT_EVC_INTERLUDE</td> <td>INTERLUDE shall support on-demand EVC de-activation.</td> </tr> <tr> <td>Source</td> <td>S1</td> </tr> </table>		R_ELASTIC_DACT_EVC_INTERLUDE	INTERLUDE shall support on-demand EVC de-activation.	Source	S1
R_ELASTIC_DACT_EVC_INTERLUDE	INTERLUDE shall support on-demand EVC de-activation.					
Source	S1					
3307						
3308						
3309	<table border="1"> <tr> <td>R_ELASTIC_DACT_EVC_CANTATA</td> <td>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.</td> </tr> <tr> <td>Source</td> <td>S1, [1]</td> </tr> </table>		R_ELASTIC_DACT_EVC_CANTATA	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]
R_ELASTIC_DACT_EVC_CANTATA	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	<table border="1"> <tr> <td>R_ELASTIC_DACT_EVC_ALLEGRO_SLO</td> <td>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</td> </tr> </table>		R_ELASTIC_DACT_EVC_ALLEGRO_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		
R_ELASTIC_DACT_EVC_ALLEGRO_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]

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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]

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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

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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_CANTATA	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_SONT	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	

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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	

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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	

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Table 43: Requirements for on-demand EVC Deactivation

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3327 **9 References**

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- 3335 [7] MEF.12.2, “Carrier Ethernet Network Architecture Framework Part 2: Ethernet Services
3336 Layer”, May 2014.
- 3337

3338 **10 Revision History**

3339

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

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