ONF CORD CERTIFICATION PROGRAM

OLT Certification - Introduction, Scope and more…

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Introduction

CCP having completed the technical work on SEBA1.0 Fabric switch certification suite is targeting its next certification program on OLT Certification. This document is intended to capture the general guidelines, scope, the *if and buts* related to the program to keep all interested members in sync. This is a live document and all interested members are welcome to add new items and make comments.

This is not a test document.

Certification Domain?

Certification Domain is a term used by CCP to define the scope of feature set being certified on a DUT. The feature set is usually defined by the SEBA release versions.

SEBA2.0 release is expected to be completed by the end of June. SEBA2.0 might be released soon before any significant progress can be made in OLT certification program. It makes sense to target SEBA3.0 because unlike the switch there are significant changes planned for VOLTHA releases which will affect OLT certification program.

SEBA2.1 is targeted for end September 2019 and SEBA3.0 before Christmas 2019.

Advantages to target SEBA 3.0:

1. VOLTHA2.0 is integrated to SEBA (the current version is VOLTHA1.X ((1.7 with SEBA2.0) and 2.0 brings significant architectural changes).
2. The gap between VOLTHA FCAPS requirements and SEBA support will be reduced.
3. BAL will be updated to 3.0 version.
4. New workflows are introduced
5. Multicast Support will be added

Open Q's, Assumptions and Comments

Concerns	Assumptions/Comments
SEBA 3.0 release quality for Certification	The features officially released as part of SEBA3.0 (any selected release) is assumed to be stable enough to successfully complete the OLT certification test cases. Exceptions - a test case which cannot be executed due to lack of support from any dependent component will be exempted from the CCP suite and such test cases and the reason for exception will be listed in the OLT test document.
Gaps in requirements vs release	Since the CCP follows an official SEBA release as the certified domain the feature gaps are automatically inherited by CCP program.
SEBA component Versions	All common SEBA components (anything except voltha driver and adaptor) will have the same version number as specified in the Certification Domain release (say SEBA3.0) and that will be documented in the official test procedure document.
Workflow and CCP Scope	The OLT functional test cases will be dependent on the operator workflows. When there are multiple workflows supported in a SEBA release how should the CCP handle this. Few options below: 1. Verify all workflows supported as part of the SEBA release (generally a major SEBA release is the Certification Domain).

	2. Consider the SEBA release with a particular workflow as a separate Certification Domain. This will result in multiple Certification Domains and hence multiple Certification logos. 3. Have a generic workflow independent of the workflows. Say something we have had in rcord-lite. 4. ??

DUT (Device Under Test)?

The program should entertain both OLTs based on open standards (OCP) and proprietary designs if there is a stable adaptor and driver (agent) which integrates well with the VOLTHA released as part of the selected Certified Domain (SEBA release).

Open Q's, Assumptions and Comments

Concerns	Assumptions/Comments
Which openOLT Adaptor to use?	The openOLT adaptor released as part of SEBA official release.
Which openOLT driver to use?	Provided by the vendor Vendor responsible for installation and successful integration with the corresponding VOLTHA adaptor.
VOLTHA Adaptor for proprietary hardware stability?	Provided by the vendor Vendor responsible for installation and successful integration with the corresponding VOLTHA adaptor. CCP assumes vendor does due-diligence in internal testing.
VOLTHA Adaptor for proprietary hardware stability?	Provided by the vendor Vendor responsible for installation and successful integration with the corresponding VOLTHA adaptor. CCP assumes vendor does due-diligence in internal testing.
Is there any dependency between OLT and support for a particular omci stack?	Open-OMCI (AT&T) is used now since as of now. Assuming addition of turk-telecom workflows will continue to use open-OMCI with support for additional ME's.
Redfish API	Is there an official API versioning? Should we care which version is used by the vendor?
Apart from adaptor, driver, omci, redfish API versions what other soft components details should be captured from the vendor?	

Test Methodology & Scope ?

Tests are concentrated on VOLTHA/seba specific feature supports like validating work-flows, FCAPS, technology/speed profiles.

We should try to follow the same test methodologies followed in switch certification program.

In Fabric switch test development process, to enable better re-usability across multiple test domains, grouping and ease of development of test cases we had all test cases initially developed in a spread-sheet with proper labels added to it. This document is a master test procedure document and will continue to grow across new CCP's.

Refer: https://drive.google.com/drive/folders/1KtgcVSm5zKGHPiNM6P28J5sOCcnQcg1b

And later when an official test document was created for SEBA1.0, all test cases with label "SEBA1.0" was inherited from the master document to the official test document.

Refer: https://drive.google.com/open?id=1Tmm9WvCJq4lNSCuMagsV8YwOWU_uUpqMz4v13SybQH0

We should follow the same approach for OLT test development as well.

Out of Scope Items

1. PON Optics related testing including PLOAM, Ranging, Dynamic Bandwidth Allocation FEC.
2. Performance tests - The current certification release focus is on Functionality. Performance shall be considered for a future release of this OLT CCP program.
3. Scalability tests - The current certification release focus is on Functionality. Scalability shall be considered for a future release of this OLT CCP program.
4. OLT-ONT Interoperability including BBF TR-255 (GPON Interoperability Test Plan)
5. OMCI conformance
6. ??

Test Execution Flow

Pre-requisites

OLT Operating System Loading

OLT Driver Loading

Both provided or pre-loaded by Vendor.

No attempt from ACL to build OLT drivers.

Vendor provides Adaptor as containerized version (one of the targets for VOLTHA2.0)

Functional Test Cases

Unlike the Fabric switch test plan which allowed standalone Open Flow test cases without any other SEBA components, OLT is very much dependent on VOLTHA. And if we need to bring up VOLTHA it's good to have the complete pod for all testing. A complete SEBA POD is recommended for any test here.

The functional test cases should cover test cases related to OLT bring up, successful workflow verifications, subscriber disabling/enabling, subscriber un-provisioning/re-provisioning, technology profile and speed profile validations etc.

Operational Test Cases

Should cover operational and negative test cases like:

OLT reboot, ONT reboot, PON cable flapping, upgrade/downgrade driver etc.

FCAPS Test Cases

This is another major area to be tested for OLT. FCAPS requirements for the PON network is clearly defined (by AT&T). Since that's the only document available, we will use that as the master document to derive the requirements which are valid for OLT directly or indirectly.

Refer: https://drive.google.com/open?id=1W22xHPJv04NpEmPp36L37QwFUSROhBw7 for AT&T FCAPS requirement document.

Currently the community is very active in realizing these requirements under **"Pod Management and VOLTHA FCAPS Brigade"** headed by **Scott Baker** scottb@opennetworking.org

Participating in this brigade will be beneficial for CCP OLT program.

FCAPS requirement for OLT may be direct or indirect. A direct requirement as the name says are pure OLT specific requirements and indirect means the requirement is on some other components but requires OLT participation. e.g. to get ONT status, will require support from OLT to transmit the required OMCI messages, process the response and via Redfish API or gRPC calls pass the results upstream (which eventually end up in Kafka).

A subset of FCAPS requirements which are applicable for CCP OLT program is captured in Appendix1:OLT direct and indirect FCAPS requirements. The table is live as we are also tracking feature gaps.

Open Q's, Assumptions and Comments

Concerns	Assumptions/Comments
Any concerns on testing both direct and indirect req?	
Dependency on ONT/ONU for testing indirect requirements?	The ONT/ONU should support the proper ME's for verifying the requirements. Use Alpha-Networks ONT to be in sync with testing at ONF so that we get better feature coverage and support guarantees?
OLT vendor requesting test cases to be executed with a specific ONT?	Can we mandate all test cases to be executed with the ONF tested and verified ONT?
	90% of ONT testing will also be done if OLT indirect tests are executed.
Upstream Speed profiles and handling is more on the ONT rather than on OLT, shall we ignore upstream bandwidth verification?	There should be some way to prove the profiles are installed in ONT, if traffic is the easiest way to do, then we go with that. Else we may use ONT logs/bcm entries.

Scalability Test Cases

Scale-up the number of ONTs per PON port

Connect ONTs to all PON ports in the OLT

Requesting multiple stats from all ONTs at the same time

Power-down/power-up all ONTs at same time

Trigger/simulate alarms from ONT continuously

Open Q's, Assumptions and Comments

Concerns	Assumptions/Comments
Heavy dependency on more hardware (ONT/ONU)	Consider this section as low priority or out of scope?

Pod level Test Cases

Open Q's, Assumptions and Comments

Concerns	Assumptions/Comments
Since OLT test cases are workflow based and uses the complete POD does it make sense to run Pod level test case?	

Automation – Tools, Framework and Re-usability

Open Q's, Assumptions and Comments

Concerns	Assumptions/Comments
Which framework to be used for automation?	Robot framework which is used by ONF for work-flow regression might be a good choice. Integrating excessive traffic verification will be a challenge.
Which traffic generation and verification tool to be used?	Technology profile validations will require to generate packets simultaneously with different priority(802.1p) and then validate the QoS functionality by capturing packets for upstream and downstream traffic.
	Identify test cases developed by the community within SEBA and VOLTHA to leverage them for CCP -OLT.

What else?

Any other concerns which does not fit in above sections:

Concerns	Assumptions/Comments
	5.

Appendix1:OLT direct and indirect FCAPS requirements

FCAPS major section (for OLT)	FCAPS Operator Requirements (for OLT)	Current SEBA support	SEBA3.0 target?	Jira
OLT Management (direct)	Retrieve OLT hardware inventory information		Must	
	Manage OLT software and upgrades		Should	
	Reset OLT hardware		Must	
	Backup and Restore Configuration information (OLT, ONT, Subscriber) for the OLT		Should	
	Delete OLT	Yes	Must	
	Run OLT hardware diagnostics	No	Must	
	Retrieve inventory information of SFP devices plugged into OLT ports	No	Must	
	Provide a summary Health status for the OLT	No	Must	
ONT Management FCAPS dependent on OLT (Indirect)	Assign ONT to specific OLT port and assigned ONT number via serial number (or another unique identifier)		Must	
	Map upstream ONT identifications (OLT CLI ONT port) to dynamic VOLTHA assignments		Must	
	Retrieve ONT hardware inventory information	No	Must	
	Manage ONT software and upgrade	No	Must	
	Reset ONT hardware		Must	

	Manage associated ONT database configurations			
	Delete ONT hardware	Yes	Must	
	Run available ONT diagnostics and retrieve result	No	Must	
	Retrieve inventory information for SFP device plugged into the ONT	No	Must	
	Disable the ONT	Yes	Must	
	Manage the ONT UNI port - Reset ONT UNI		Must	
	Manage the ONT UNI port -Disable ONT UNI		Must	
Operational Status ONT (Indirect)	Estimated distance between ONT and OLT	No	Must	SEBA-43
	PLOAM status - active alarm status	No	Must	SEBA-43
Operational Status ONT Alarm Interface (Indirect)	Yang Definition – WT-383 Retrieved Parameters – Total optics signal level •Ability to configure a low threshold alarm •Ability to configure a high threshold alarm	No	Must	SEBA-44
Operational Status ONT Locally Persisted Data (Indirect)	Retrieve date and time ONT data is persisted to flash	No	Must	SEBA-45
	Ability to persist active configuration to flash	No	Must	SEBA-45
Operational Status ONT UNI Port (Indirect)	Retrieve Ethernet Status (Status, speed and duplex mode)	No	Must	SEBA-46
Operational Status Current Optical Data - ONT (indirect)	Retrieve ONT Receive optical signal level	No	Must	SEBA-595
	Retrieve ONT Transmit optical signal level	No	Must	SEBA-595
	Retrieve ONT Optical module temperature	No	Must	SEBA-595
	Retrieve ONT Optical module voltage	No	Must	SEBA-595
	Retrieve ONT Laser bias current	No	Must	SEBA-595
Operational Status Current Optical Data - OLT (direct)	Retrieve OLT Receive optical signal level	No	Must	SEBA-47
	Retrieve OLT Transmit optical signal level	No	Must	SEBA-47
	Retrieve OLT Optical module temperature	No	Must	SEBA-47
	Retrieve OLT Optical module voltage	No	Must	SEBA-47
	Retrieve OLT Laser bias current	No	Must	SEBA-47
Operational Status Historical Optical Data -	Retrieve Date and time of measurement (stored for multiple intervals)	No	Must	SEBA-596
	Retrieve ONT Receive optical signal level	No	Must	SEBA-596

ONT (indirect)	Retrieve ONT Transmit optical signal level	No	Must	SEBA-596
	Retrieve ONT Optical module temperature	No	Must	SEBA-596
	Retrieve ONT Optical module voltage	No	Must	SEBA-596
	Retrieve ONT Laser bias current	No	Must	SEBA-596
Operational Status Historical Optical Data - OLT (direct)	Retrieve OLT Receive optical signal level	No	Must	SEBA-48
	Retrieve OLT Transmit optical signal level	No	Must	SEBA-48
	Retrieve OLT Optical module temperature	No	Must	SEBA-48
	Retrieve OLT Optical module voltage	No	Must	SEBA-48
	Retrieve OLT Laser bias current	No	Must	SEBA-48
Operational Status PON (direct)	Retrieve Bit Error Count Downstream	No	Must	SEBA-49
	Reset Bit Error Downstream counter	No	Must	SEBA-49
	Retrieve Bit Error Count Upstream	No	Must	SEBA-49
	Reset Bit Error Upstream counter	No	Must	SEBA-49
	Retrieve ONT range indication status	No	Must	SEBA-49
Operational Status PON SFP (direct)	Retrieve Vendor SFP Name	No	Must	SEBA-50
	Retrieve Vendor SFP Part Number	No	Must	SEBA-50
	Retrieve SFP serial number	No	Must	SEBA-50
	Retrieve SFP Manufacture Date	No	Must	SEBA-50
Technology Profile Management		Yes	Must	Feature Integration SEBA-31
Speed Profile Management		Yes	Must	Feature Integration SEBA-32
Operational Status - 802.1x Authenticator (indirect)	Retrieve Current PAE Authenticator State Machine Status	No		
	Retrieve Current PAE Backend State Machine Status	No		
	Retrieve Status of the Authenticator	No		
	Retrieve current number of valid EAPOL frames received	No		
	Retrieve current number of EAPOL frames transmitted	No		
	Retrieve current number of start EAPOL frames received	No		
	Retrieve current number of logoff EAPOL frames received	No		
	Retrieve current number of response ID EAP frames received	No		

	Retrieve current number of response EAP frames received	No		
	Retrieve current number of request ID EAP frames transmitted	No		
	Retrieve current number of request EAP frames transmitted	No		
	Retrieve current number of EAPOL frames received with invalid frame type	No		
	Retrieve current number of EAPOL frames received with invalid body length	No		
	Retrieve most recently received protocol version	No		
	Retrieve most recently received source MAC address	No		
Operational Status - 802.1x Diagnostics (indirect)	Retrieve connection status	No		
	Retrieve number of EAPOL logoff messages received resulting in disconnected state	No		
	Retrieve number of authenticating transitions due to EAP response or identity message	No		
	Retrieve number of authenticated transitions due to successful authentication	No		
	Retrieve number of transitions to aborting due to timeout	No		
	Retrieve number of transitions to held due to authentication failure	No		
	Retrieve number of transitions to aborting due to reauthentication request	No		
	Retrieve number of transitions to aborting due to start request	No		
	Retrieve number of transitions to aborting due to logoff request	No		
	Retrieve number of transitions to connecting due to reauthentication request	No		
	Retrieve number of transitions to connecting due to start request	No		
	Retrieve number of transitions to disconnected due to logoff request	No		
	Retrieve number of access request packets sent	No		
	Retrieve number of access challenge packets received	No		

	Retrieve number of EAP request packets sent due to the authenticator choosing the EAP method	No		
	Retrieve number of transitions to response (received response other that NAK)	No		
	Retrieve number of EAP success messages received	No		
	Retrieve number of EAP failure messages received	No		
Operational Status - 802.1x Session (indirect)	Retrieve session identifier	No		
	Retrieve user name of supplicant PAE	No		
	Retrieve session duration	No		
	Retrieve session termination reason	No		
	Retrieve authentication method	No		
	Retrieve received user data frames	No		
	Retrieve received use data octets	No		
	Retrieve transmitted user data frames	No		
	Retrieve transmitted user data octets	No		

Appendix2: Helpful Links

SEBA pod Installation Guide - https://guide.opencord.org/#installation-guide

SEBA 1.0 wiki - https://wiki.opencord.org/display/CORD/SEBA+1.0+Release

OpenOLT setup - https://guide.opencord.org/openolt/

SEBA BOM - SEBA BOM can be found at: https://guide.opencord.org/prereqs/hardware.html#seba-bom

CCP - https://wiki.opencord.org/display/CORD/Certification+Brigade

CCP Policy and Procedure Manual - https://docs.google.com/document/d/1rR4qBZTCBG18bLGGqciXByiffjsbL1ZXMw3V85kaHms/

Note:/ the cord guide is updated for every new release, where “Master” version of the guide becomes the latest version and the documentation for existing version (current master) will freeze under the release name as its version name.