

The CCAP Core Simulator (CCS) is a network platform for validation, debugging, and prototyping for Remote PHY platforms. Based on the custom-built Linux operating system with various services and daemons to emulate CCAP Core in Remote PHY architecture. The CCS is a complete platform that allows MSOs for testing RPD from multi-vendors to achieve full interoperability in compliance with the MHA v2 set of specification. Thanks to the CCAP Core Simulator, MSO can successfully secure Remote PHY deployment in their network.

CCAP Core Simulator SW Functions

Software system components

- a. Custom-built OS system based on the Linux operating system;
- b. Set of the network/operation services based on the open standard platforms:
 - 802.1x Server,
 - DHCP Server with support for IPv6 and IPv4,
 - ToD Server IPv4 and IPv6,
 - Mutual Authentication Server based on IKE v2 protocol compliant with R-PHY specification,
 - Secure Software Download Server - with the certificate management.
- c. PTP Master clock:
 - IPv4 / IPv6 support,
 - Support for IEEE1588-2008 Annex J.3, J.4,
 - Support for Telecom Profile G.8275.1
 - Predefined set of configuration for the fast test of each profile.
- d. Custom-built software module with the advanced GUI, allowing for a dynamic change of configuration:
 - Control plane modules:
 - VECTOR TECHNOLOGIES GCP Daemon – GCP module compliant with CM-SP-GCP-I04-180509 and CM-SP-R-PHY. IPv4 / IPv6 support,
 - VECTOR L2TPv3 Daemon
 - Data Plane modules:
 - UEPI- support for IPv4 / IPv6, compliant with the CM-SP-R-DEPI,
 - DEPI- support for IPv4 / IPv6, compliant with the CM-SP-R-UEPI,
 - Custom DOCSIS MAC – D3.0. D3.1 DS, US
- e. Predefined configuration sets for all services in various scenarios – ready “out of the box”,
- f. Web based GUI for status and log reports.

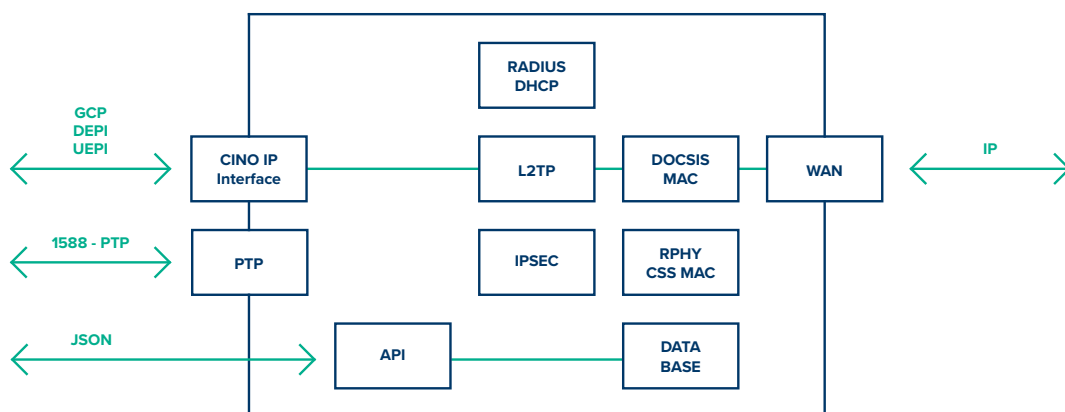


Fig. 1 The CCS internal architecture

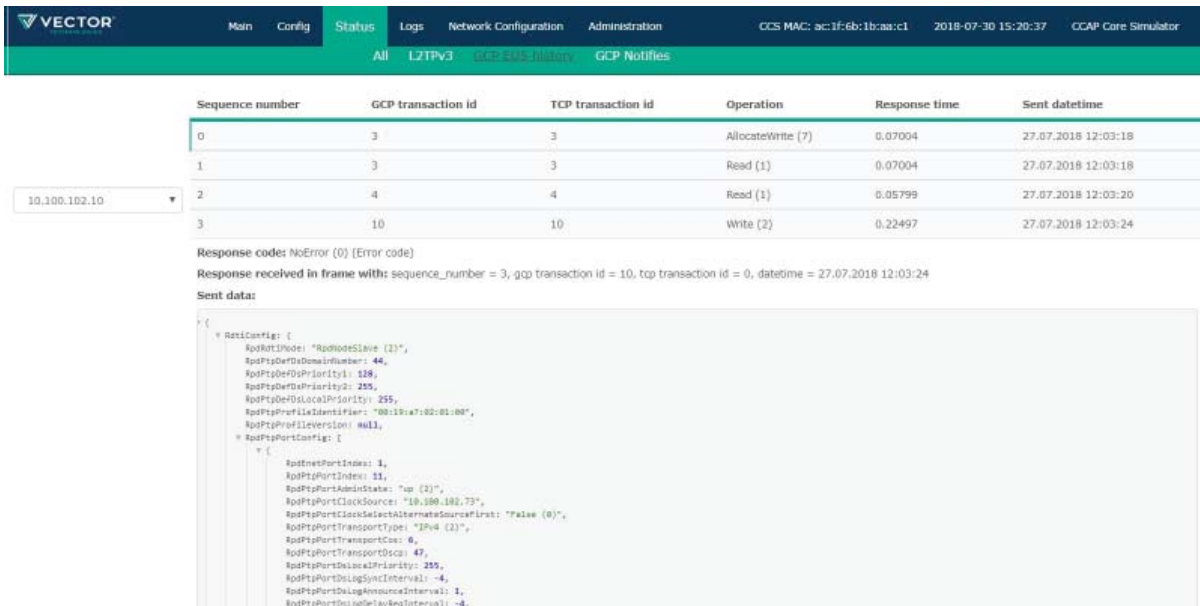


Fig. 2 GCP / LT2Pv3 debug console

With the CCAP Core Simulator (CCS) an operator can make a basic or an advanced Remote PHY Device (RPD) validation and compliance test with Remote PHY specification.

Modular architecture allows the testing of particular function or set of functions of the RPD like initialization process or full process of bringing RPD online. Validation process allows the fast adaptation of Remote PHY in the network due to extensive testing capabilities of the CCS that validates compliance of the RPD with the MHA v2 specification. Finding incompliance in the RPD and the CCAP Core communication stack in matter of hours. Therefore, the CCS will help MSO:

- reduce time needed for validation and testing before deployment,
- providing detailed information to the RPD or the CCAP platforms vendors in terms of resolving communication issues

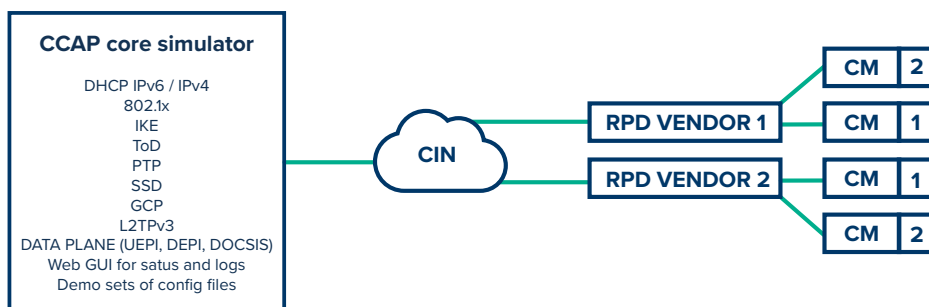


Fig. 3 Principal Core with multi RPD validation architecture

The CCS can simulate variety of CCAP Cores, making it possible to test multicore architecture using the same platform:

- Principal CORE – that controls all configuration and management of RPD
- DOCSIS CORE – that corresponds to the DOCSIS function and cable modem communication
- VIDEO CORE – that corresponds to the VIDEO function, like VIDEO encapsulation (static video stream)
- OOB Core – that corresponds to the control RPD in signal processing, that is used in the HFC network like a sweep, HMS, FM (no data processing, only control function)

Multi-core function in the CCS brings extensive safety in both hardware and space, contrary to the classic CCAP Core architectures, and will be required for multi-core architecture testing. Thanks to the separation of the network's layer and logical elements, the CCS can stimulate different architectures with simple reconfiguration of the CCS, saving time of the network/access engineers.

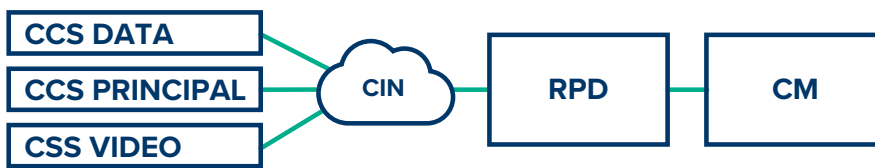


Fig. 4 Multicore architecture validation

PTP is a critical part of the Remote PHY architecture. Synchronization between the RPD and the CCAP Core is required.

The CCS has the ability to be a master clock or a slave clock with a variety of supported PTP profiles. It allows the testing for both the validation of RPD and the architecture of the network.

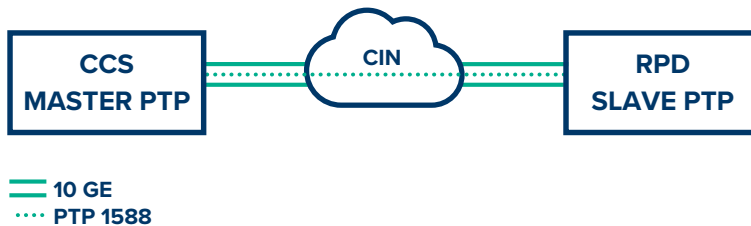


Fig. 5 PTP architecture validation, CCS as a master scenario

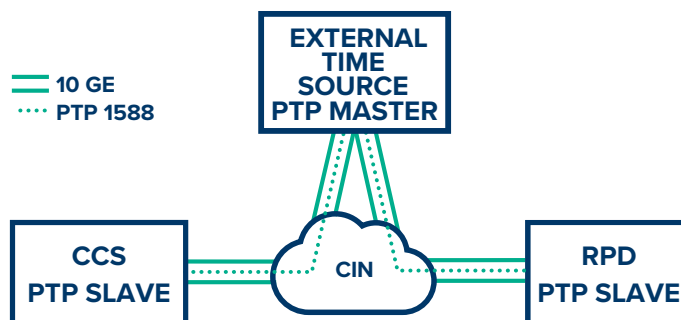
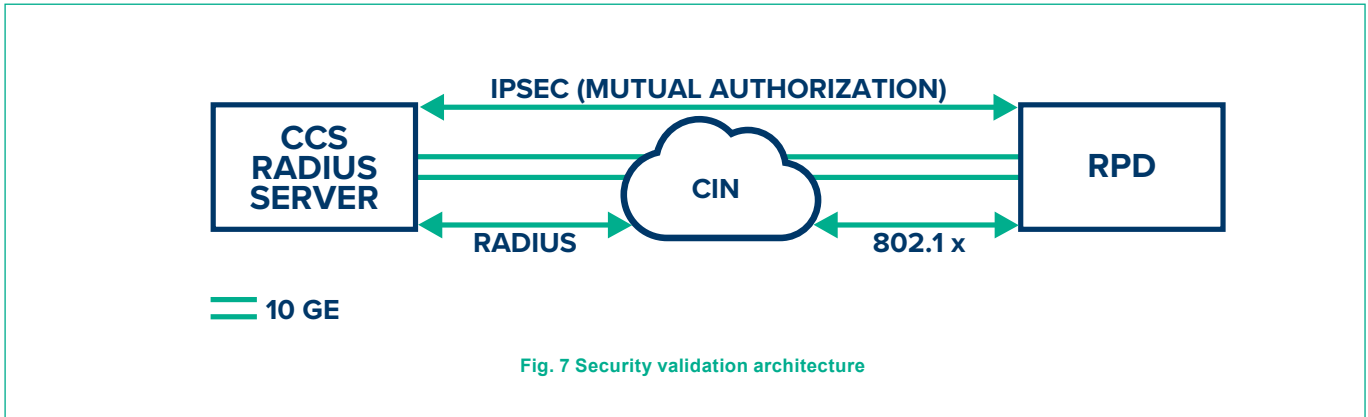


Fig. 6 PTP architecture validation, CCS as a slave scenario

With digitalization of the network MSOs have to face new challenges while transforming their networks. One of those is security.

The 10GE optics used by the RPD allows the access to the MSO's network. The CCS support network function defined in Remote PHY specification that allows testing o security of the CIN and RPD. MSO can go through the validation process in compliance with the RPD specification. Planning new architectures and deployments preparation is also possible.



CCAP Core Simulator HW Functions

The system is based on the COTS components, with no proprietary hardware elements:

1. 1RU x86 server platform

- IEEE 1588 hardware support

2. Preconfigured Layer 3 switch S5750E-28X-SI:

- 24x 10/100/1000Mb RJ45
- 4x 1/10Gb SFP+
- 802.1x support

