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OpenCAPI 3.0 Certified Definition

Version 1.1
12 May 2020—OpenCAPI Confidential

Approved

Approved for Distribution to OpenCAPI Members Only

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OpenCAPI 3.0 Certified Definition

OpenCAPI Compliance Work Group
OpenCAPI Consortium

Version 1.1 (12 May 2020)

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Abstract

This document defines the requirements that need to be met to be asserted as an OpenCAPI 3.0 Certified device or OpenCAPI 3.0 Certified host. It is the work product of the OpenCAPI Consortium OpenCAPI Compliance Work Group

This document is handled in compliance with the requirements outlined in the OpenCAPI Consortium Work Group (WG) process document. Comments, questions, etc. can be submitted to membership@opencapi.org.

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Preface

This document defines the requirements that must be met to be asserted as an OpenCAPI 3.0 Certified device or OpenCAPI 3.0 Certified host. It is the work product of the OpenCAPI Consortium's OpenCAPI Compliance Work Group.

Conventions

The OpenCAPI Consortium documentation uses several typesetting conventions.

Notices

This section describes Engineering and Developer notices.

Engineering notes

Engineering notes provide additional implementation details and recommendations not found elsewhere. The notes might include architectural compliance requirements. That is, the text might include Architecture compliance terminology. These notes should be read by all implementation and verification teams to ensure architectural compliance.

Developer notes

Developer notes are used to document the reasoning and discussions that led to the current version of the architecture. These notes might also include recommended changes for future versions of the architecture, or warnings of approaches that have failed in the past. These notes should be read by verification teams and contributors to the architecture.

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Document change history

Each release of this document supersedes all previously released versions. The change history log lists all significant changes made to the document since its initial release.

Revision date	Summary of changes
12 May 2020	Version 1.1.
23 October 2017	Version 1.0. Initial release.

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Glossary

The following terms are used in this document.

AFU	Attached functional unit. Architecturally, AFU refers to an end-point unit or resource. Communication from the processor to the AFU goes through a protocol stack, transaction layer (TL), data link layer (DL), and physical medium layer (PHY). Command and data packets at the AFU interface are specified by the AFU command/data interface, which is the interface between the AFU protocol stack and the AFU.
DL	OpenCAPI data link layer found on the host processor.
DLx	OpenCAPI data link layer found on the external OpenCAPI device.
DUT	Device under test.
OMI	OpenCAPI memory interface.
OpenCAPI Ready™	The term defined in this document that asserts a minimum set of characteristics has been met to show a product should be interoperable with other OpenCAPI products.
OpenCAPI Certified™	The term defined in this document that asserts a comprehensive set of characteristics has been met to show a product should be interoperable with other OpenCAPI products and compliant to the OpenCAPI specification.
PHY	Physical medium layer. The PHY layer interfaces to the DL and the network.
TL	OpenCAPI transaction layer found on the host processor.
TLx	OpenCAPI transaction layer found on the external OpenCAPI device.
TMLA	Trademark license agreement.

References

The following documents can be helpful when reading this specification.

OpenCAPI 3.0 Transaction Layer Specification v1.7, 19 February 2019

25 Gbps Physical Signaling Specification

25 Gbps Interface Mechanical Specification

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1. Introduction

The OpenCAPI Certified™ program is used by the OpenCAPI Consortium to enable OpenCAPI ecosystem product developers to indicate that a product has been shown to meet a comprehensive set of characteristics and should be interoperable with other OpenCAPI Certified products and compliant to OpenCAPI specifications. This document defines the meaning of OpenCAPI Certified™ and its different categories.

The OpenCAPI Certified™ program is a level up from the OpenCAPI Ready™ program, providing greater rigor in the qualification process and the addition of third-party validation.

OpenCAPI ecosystem participants who have items or products they are interested in marking shall follow the appropriate criteria described below.

Solution components that submit a request as described in *Section 1.3 Requesting a product to be included on the OpenCAPI Certified list on page 9* will automatically be listed on the OpenCAPI Consortium OpenCAPI Certified List.

Organizations wishing to mark a solution component must receive a license to display the OpenCAPI Certified mark. See *Section 1.4. Requesting license to display the OpenCAPI Certified mark on page 10*.

1.1   OpenCAPI Certified^{TM} mark

The OpenCAPI Consortium has established OpenCAPI Certified™ as a special badge or mark used by an OpenCAPI ecosystem component producer/developer to attest that a specific component has been shown to satisfy the criteria defined in a specific version of this document. The criteria have been defined to increase the likelihood components bearing the mark are compatible.

The mark is available for OpenCAPI Consortium members interested in providing components/products to the OpenCAPI ecosystem. The mark makes a strong statement about support of the OpenCAPI technology as an alternative to other server solutions. See https://opencapi.org/compliance for the OpenCAPI Certified mark logo.

1.2   Demonstrating OpenCAPI Certified

An entity desiring to demonstrate that a product or solution satisfies the respective criteria may do so in the following way**:**

- Assessment at approved OpenCAPI Third-Party Lab
- Assessment at an OpenCAPI Plugfest or workshop administered by approved OpenCAPI Third-Party Lab

1.3   Requesting a product to be included on the OpenCAPI Certified list

Evidence that the criteria are met must be provided by the requesting entity.

Each entity requesting a product be included in the OpenCAPI Certified list must provide the following information regarding the specific product or component to the OpenCAPI Consortium via the online OpenCAPI Certified request. The OpenCAPI Certified request may be submitted by an approved third-party test lab, which performed the testing on behalf of the requesting company.

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Upon receipt of a request containing the required information, the OpenCAPI Consortium will confirm receipt of the request via email. After completeness and applicability of the request is reviewed by the OpenCAPI Consortium, the Consortium will respond via email regarding the status of the OpenCAPI Certified request.

Requested information for internal processing

- Requester/contact name.
- Contact email address.
- Contact phone number (optional).
- Requested information for publishing on OpenCAPI.org
- Company
- Product/component designator (unique name or label).
- Short product/component description.
- Product/component information URL.
- Derivative Listing (Yes/No)
- Keywords (comma separated) to help an interested party search for this product. (optional). Keywords that repeat information are not necessary. Instead, broader categories and alternate industry terms are very helpful.
- Version of OpenCAPI Certified Document used for the criteria. Note: It is recommended that the latest version be used. However, a vendor may select a previous level of the criteria.
- List of supported OpenCAPI specifications (TL, DL).
- Product/component category (OpenCAPI 3.0 Device Interface Class Device, OpenCAPI 3.0 Device Interface Class Host System).
- Certified criteria assessment: Describe how the product fulfills the criteria defined for the selected product category/categories in this document.
- Image/graphic for inclusion with the description (optional, consortium member grants OpenCAPI Consortium rights to use and publish the provided image).
- Information on product availability (i.e. geographies)
- Test Report produced by OpenCAPI Third-Party Lab documenting that all necessary test criteria have been met
- Updates to this information can be provided to OpenCAPI Consortium.

1.4   Requesting license to display the OpenCAPI Certified mark

The OpenCAPI Consortium requires an agreed to trademark license agreement (TMLA) to display the mark. Once the TMLA is agreed to and logged, the OpenCAPI Certified mark can be displayed in accordance with the guidelines.

Reference versions of the OpenCAPI Certified™ TMLA and usage guidelines can be reviewed at: https://opencapi.org/compliance.

During completion of the online OpenCAPI Certified request, the submitter has three options regarding the TMLA.

TMLA options:

- Submit the request without a TMLA. The approved product shall not display the OpenCAPI Certified

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mark.

- Review the TMLA and accept via "click-through".
- Download the TMLA for signature. Upload the signed TMLA.

Note: Products approved for OpenCAPI Certified listing will be listed on the OpenCAPI Certified list regardless of TMLA option selected.

1.5   Publication of OpenCAPI Certified products

The OpenCAPI Consortium will publish a list of products that have been shown to be OpenCAPI Certified. The OpenCAPI Certified list is located on the OpenCAPI Consortium website. This list will be updated regularly. All approved products are considered eligible to be included in the OpenCAPI Certified list.

1.6   Scope

Use of the OpenCAPI Certified mark by OpenCAPI ecosystem product developers or inclusion on the OpenCAPI Certified list indicates that a product has been shown/demonstrated to meet a comprehensive set of characteristics.

Note: The OpenCAPI Certified mark does not ensure that products bearing the OpenCAPI Certified mark are interoperable, compatible, or suitable for the indicated purpose. In addition, it is the responsibility of the vendor to confirm compliance with any other necessary specifications and regulations such as but not limited to *IEEE® 802.3™, RoHS (Restrictions of Hazardous Substances)*, UL, CCC etc.

1.7   OpenCAPI Independent Test Labs

- It is expected that initially a single site will be needed to support the certification program.
- It is expected that OpenCAPI can contract an auditor/test lab to administer third party testing.
- The contracted auditor will be provided the necessary test equipment described in the next section.
- The contracted auditor should be a neutral party and not affiliate with any OpenCAPI product implementor.
- OpenCAPI Independent Test labs should meet the criteria described in the OpenCAPI 3.0/3.1 Independent Test Lab Requirements document.
- OpenCAPI Independent Test labs should have expertise and equipment necessary to perform the testing described in the OpenCAPI Certified Test Resources Engineering Note.
- OpenCAPI BoD may determine the process and any additional criteria for selecting a lab.

1.8   Conflict resolution

A conflict resolution process is provided to ensure that the OpenCAPI Certified Program remains fair and open. This process will allow OpenCAPI members to request changes to the testing specifications, to challenge products that have been issued a logo but appear to be non-conformant in the field, or to challenge the results of an OpenCAPI Third Party Lab.

Conflicts or requests for changes to the test program should be raised to the OpenCAPI Compliance Work Group. Upon review, the Compliance Work Group will either recommend that an audit be performed, initiate the release of an updated version of the test specification, or recommend that resolution occur at the Board of Directors.

All requests for conflict resolution must be submitted to the OpenCAPI Compliance Work Group email list, to the attention of the Compliance Work Group chair. If the Compliance Work Group is no longer active, requests may be submitted to the Technical Steering Committee.

In cases where a mutual agreement on the recommended resolution cannot be reached in the Compliance Work Group, any technical issues will be escalated to the OpenCAPI Technical Steering Committee. Any other issues will be escalated to the OpenCAPI Board of Directors and will be used to make a final determination.

1.9   Derivative products

Products that are not substantially different from products already tested can apply for Logo usage under the derivative product process. A new product would not be considered a derivative if Software or Hardware changes have been made. The following table outlines the cases where a product may be listed as a derivative product, and the cases where the changes to the product require a re-test. Cases not described in the table below can be raised with the OpenCAPI Compliance Workgroup.

Table 1-1. Changes to product which require re-testing

| Modification	Do nothing	Resubmit new Listing Request as a derivative	Re-testing required
Model number or name change, Firmware revision number change (to align with supplier catalog naming)		X	
Software or Firmware change that does not impact OpenCAPI functionality or compliance.	X		
Software or Firmware change that impacts OpenCAPI functionality or compliance.			X
Hardware change that does not impact OpenCAPI functionality or compliance. Some examples may include: ● LED layout ● Color ● Capacity	X		

Modification	Do nothing	Resubmit new Listing Request as a derivative	Re-testing required
Hardware change that impacts OpenCAPI functionality or compliance. Some examples may include: ● Trace length ● Component layout ● Chipset change or revision ● Power management change ● Form factor			X

2. OpenCAPI Certified 3.0 device definition

The OpenCAPI Certified mark and OpenCAPI Certified list apply to OpenCAPI 3.0 device interface class devices. *Figure 2-1* provides an abstracted view of a notional OpenCAPI solution and its key components.

Products are expected to be tested in an "out-of-box" state to ensure that the end user experiences the same product performance observed during testing. This means that software/firmware/hardware submitted for test is the same as will be offered in the market.

Figure 2-1. OpenCAPI 3.0 platform solution overview for device compliance
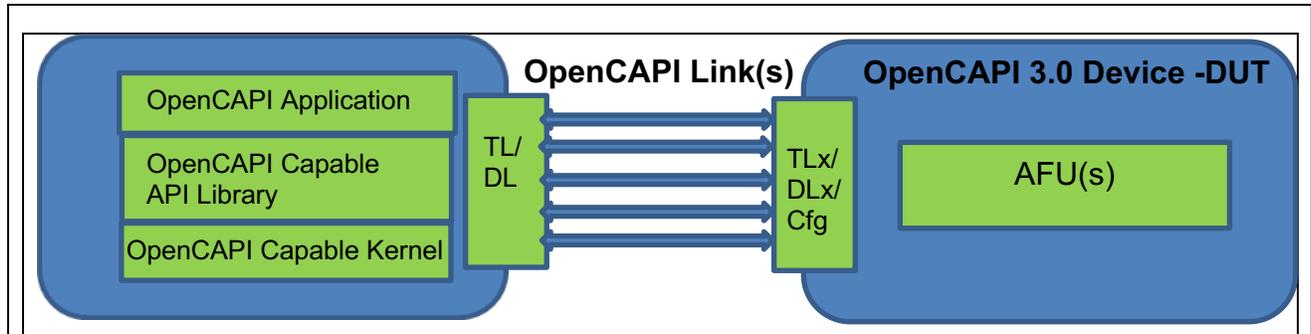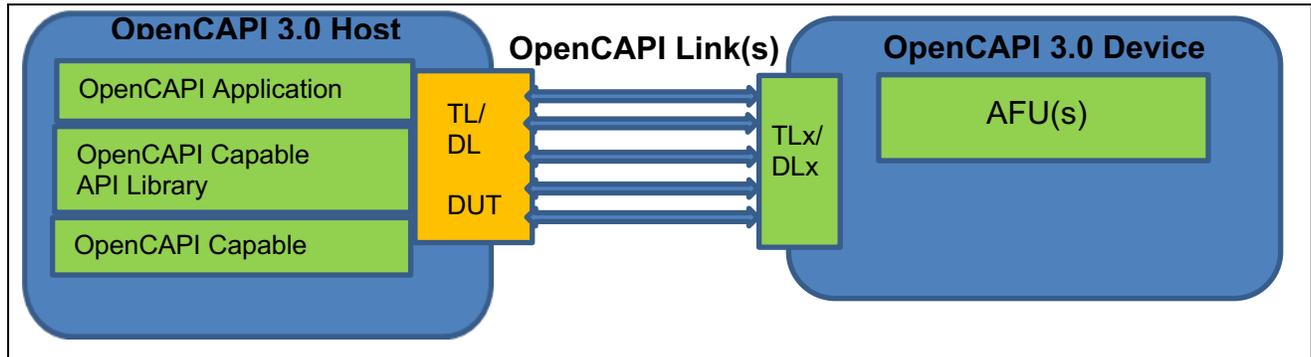

This section outlines all the requirements an OpenCAPI 3.0 device must meet to be considered OpenCAPI Certified. When submitting a product for approval, the manufacturer of the OpenCAPI device shall assert that it has satisfactorily met these requirements. An OpenCAPI 3.0 device shall meet all the requirements in the following list:

(1) An OpenCAPI Certified 3.0 device shall meet all the requirements defined in the OpenCAPI 3.0 Ready definition.

(2) An OpenCAPI Certified 3.0 device shall have a test report provided by an approved third party OpenCAPI Test Lab documenting passing results for all applicable tests in the OpenCAPI 3.0 TL CTS.

3. OpenCAPI Certified 3.0 host system definition

The OpenCAPI Certified mark and OpenCAPI Certified list apply to OpenCAPI 3.0 host systems. *Figure 3-1* provides an abstracted view of a notional OpenCAPI solution and its key components.

Figure 3-1: OpenCAPI 3.0 platform solution overview for host compliance

This section outlines all the requirements an OpenCAPI 3.0 host system must meet to be considered OpenCAPI Certified. The manufacturer of the OpenCAPI host shall assert when it has satisfactorily met these requirements. An OpenCAPI 3.0 host shall meet all the requirements in the following list:

(1) An OpenCAPI Certified 3.0 Host shall meet all the requirements defined in the OpenCAPI 3.0 Ready definition.

(2) An OpenCAPI Certified 3.0 host shall have a test report provided by an approved third-party OpenCAPI Test Lab documenting passing results for all applicable tests in the OpenCAPI 3.0 TL CTS.