



OPEN

Compute Project

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Hardware Specification Template (Interim) 2022

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Author: <Primary>

Author: <Secondary. Delete if unnecessary>

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1. License

PLEASE PICK EITHER THE OCP CLA OPTION OR THE OWF OPTION. ONLY ONE CAN BE USED. DELETE THE ONE NOT USED.

1.1. OPTION A: OCP CLA OR

Contributions to this Specification are made under the terms and conditions set forth in Open Compute Project Contribution License Agreement (“OCP CLA”) (“Contribution License”) by:

[Contributor Name(s) or Company name(s)]

You can review the Contributor License(s) for this Specification on the OCP website at <https://www.opencompute.org/legal-documents>. For actual executed copies of either agreement, please contact OCP directly.

Usage of this Specification is governed by the terms and conditions set forth in **[select one:] Open Web Foundation Modified Final Specification Agreement (“OWFa 1.0”) or Open Compute Project Hardware License – Permissive (“OCPHL Permissive”) or Open Compute Project Hardware License – Reciprocal (“OCPHL Reciprocal”)** also known as a “Specification License”.

Notes:

- 1) The above license does not apply to the Appendix or Appendices. The information in the Appendix or Appendices is for reference only and non-normative in nature.

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1.1. OPTION B: Open Web Foundation (OWF) CLA

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[Contributor Name(s) or Company name(s)]

Usage of this Specification is governed by the terms and conditions set forth in **Open Web Foundation Modified Final Specification Agreement (“OWFa 1.0”) (“Specification License”)**.

You can review the applicable OWFa1.0 Specification License(s) referenced above by the contributors to this Specification on the OCP website at <http://www.opencompute.org/participate/legal-documents/>. For actual executed copies of either agreement, please contact OCP directly.

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- 1) The above license does not apply to the Appendix or Appendices. The information in the Appendix or Appendices is for reference only and non-normative in nature.

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1.2 Acknowledgements

The Contributors of this Specification would like to acknowledge the following companies for their feedback:

List all companies or individuals who may have assisted you with the specification by providing feedback and suggestions but did not provide any IP.

2. Compliance with OCP Tenets

Please describe how this Specification complies to the following OCP tenets. Compliance is required for at least three of the four tenets. The ideals behind open sourcing stipulate that everyone benefits when we share and work together. Any open source project is designed to promote sharing of design elements with peers and to help them understand and adopt those contributions. There is no purpose in sharing if all parties aren't aligned with that philosophy. The IC will look beyond the contribution for evidence that the contributor is aligned with this philosophy. The contributor actions, past and present, are evidence of alignment and conviction to all the tenets.

2.1. Openness

The measure of openness is the ability of a third party to build, modify, or personalize the device or platform from the contribution. OCP strives to achieve completely open platforms, inclusive of all programmable devices, firmware, software, and all mechanical and electrical design elements. Any software utilities necessary to modify or use design contributions should also be open sourced. Barriers to achieving this goal should be constantly addressed and actions taken to remove anything that prevents an open platform. Openness can also be demonstrated through collaboration and willingness to share, seek feedback, and accept changes to design and specification contributions under consideration.

2.2. Efficiency

Continuous improvement has been a fundamental value of the industry. New contributions (and updates to existing contributions) shall be more efficient than existing or prior generation contributions. Efficiency can be measured in many ways - OpEx and CapEx reduction, performance, modularity, capacity, power or water consumption, raw materials, utilization, size or floorspace are some examples. The goal is to express efficiency with clear metrics, valued by end-users, when the contribution is proposed.

2.3. Impact

OCP contributions should have a transformative impact on the industry. This impact can come from introducing new technology, time-to-market advantage of technology, and/or enabling technology through supply chains that deliver to many customers in many regions of the world. New technologies are impactful when such technology is enabled through a global supply channel. One example is the NIC 3.0 specification which achieved global impact by having over 12 companies author, adopt, and supply products that conformed to the specification. Another example is emerging and open security features that establish and verify trust of a product

2.4. Scale

OCP contributions must have sufficient enabling, distribution and sales support (pre and post) to scale to Fortune 100 as well as large hyperscale customers. Demonstration of this tenet can be accomplished by providing sales data or by providing go-to-market plans that involve either platform/component providers or systems integrator/VAR (direct and/or channel).

Platform/component providers or systems integrators/VARs that can use this contribution to obtain product recognition (OCP Accepted™ or OCP Inspired™) and create Integrated Solutions which would also demonstrate scale. Software projects can also demonstrate this tenet when software is adopted across business segments or geographies, when software is a key factor in accelerating new technology, or when software provides scale of new hardware which meets OCP tenets.

3. Version Table

Date	Version #	Author	Description

4. Scope

This document defines the technical details for one of the following types of specifications:

- base specification for a de-facto standard (new standard with no hardware product)
- base specification for an intended physical <hardware product type>
- modification of an existing specification (state which existing spec is being modified)
 - either a complete revision update or
 - a minor version update
- a detailed specification for a <hardware product type> with a product being available in 120 days of approval of this Spec.

Any supplier seeking OCP recognition for a hardware product based on this Specification must be 100% compliant with any and all features or requirements described in this Specification.

Examples of the types of Specs are given for reference only and can be found in the OCP Contribution Portal:

De-facto Standard - [OpenHBI Spec](#)

Server - [Mt Jade Server](#)

Network - [Wedge 400](#)

Rack- [Open Rack V2.2](#)

Storage - [Datacenter NVMe SSD Spec](#)

Cards - [NIC3.0](#)

Revision Update - [Minipack2](#)

Version Update - [Minipack1 V2.0](#)

Examples of <hardware product type> are for reference only and can be found in our OCP Marketplace:

Card: [NIC2.0 Adapter Card](#)

Server: [Tioga Pass Server](#)

Gateway: [Disaggregated Cell Site Gateway](#)

Rack: [ORv2](#)

Edge Server: [Airframe Open Edge 1U Server](#)

Storage Server: [Goose Lake JBOD](#)

Modules: [Optical Transceiver](#)

GPU: [Yosemite V2](#)

5. Overview

Describe your contribution or product. Explain its utility within the Open Compute Project ecosystem.

INSTRUCTIONS FOR ALL FOLLOWING SECTIONS:

1. Sections 6 – 18 are required to document features and functions of the Hardware system, platform or card.
2. Where possible, please use the OCP Terminology Guidelines for Inclusion and Openness.
3. No NDA (Non-disclosure Agreement) or confidential material should be included in the document or charts. This will be an OPEN document.

6. Rack Compatibility

Please describe if your contribution will be used in a rack installation. If the contribution is rack mountable, the specification must be compliant with one of the following OCP approved rack types: OpenRack (V2.X and beyond), EIA-310, OpenEdge.

7. Physical Specifications

Please describe the physical specifications for your contribution.

[Note to author of this specification: This section can include the following but is not limited to the below items:

- Block Diagrams
- Placement and Form Factor
- CPU and Memory
- Platform Controller Hub (PCH)
- PCIe
- PCB Stack Up
- Figures & Illustrations

8. Thermal Design Requirements

Please describe the thermal design requirements for your contribution.

[Note to author of this specification: This section can include the following but is not limited to the below items:

- Data Center Environmental Conditions
- IT equipment operational conditions (heat sinks, fans, heat dissipation, etc)
- Thermal Requirements for different classes of equipment
- Liquid Cooling Requirements, if applicable - must be compliant with the OCP Advanced Cooling Solutions (ACS) Requirements (for Immersion, Cold Plate, Door Heat Exchanger)

9. I/O System

Please describe the I/O System of the contribution.

[Note to author of this specification: This section can include the following but is not limited to the below items:

- *PCIe x32 Slot/Riser Card*
- *DIMM Sockets*
- *Mezzanine Card (Ver 2.0 or higher)*
- *Network*
- *USB*
- *SATA*
- *M.2*
- *Debug Header*
- *Switches and LEDs*
- *Fan connector*
- *TPM Connector and Module*
- *Sideband Connector*
- *VGA header*
- *Front panel*

10. Rear Side Power, I/O, Expansion Board and Midplane Subsystems

Please describe the power system implementation of the contribution.

[Note to author of this specification: This section can include the following but is not limited to the below items:

- *Overview of Footprint and Population Options*
- *Rear Side Connectors*
- *Midplane*
- *Expansion board*
- *Fixed, redundant, modular, pluggable, adapter?*
- *AC or DC Power*
- *Use of any Blindmate Connectors*

11. Mechanical

Please describe any key mechanical features of your contribution.

[Note to author of this specification: This section can include the following but is not limited to the below items:

- Chassis
- Single sled/double sled
- PCB Thickness
- Rack Attachment details
- Fixed location
- Handles on motherboards
- levers or arms
- Silkscreen

12. Onboard Power System

Please describe the details of the main power system in your contribution.

[Note to author of this specification: This section can include the following but is not limited to the below items:

- Voltage Regulators (CPU/Dimm/Multi-core)
- Power Management
- Input voltages
- Hot swap controller circuit
- Hard drive power
- Power Tree
- Power Policy
- Power Budget
- Platform Budget
- Capacitive Load

13. Environmental Regulations/Environmental Requirements

Please describe any environmental regulations or requirements for any platform boards and full system, if applicable..

[Note to author of this specification: This section can include the following but is not limited to the below items:

- UL/CE/NRTL/FCC/IEC/EN/etc Certification
- RoHS/WEE directives, REACH regulations
- NEBs compliance requirements
- Gaseous Contamination
- Operating temperature range

- *Storage temperature range*
- *Transportation temperature range*
- *Shock and Vibration requirements*
- *Operating Altitude*

14. Prescribed Materials

Please list any prescribed, disallowed or derated materials in your contribution.

[Note to author of this specification: This section can include the following but is not limited to the below items:

- *Disallowed components*
- *FETs, Capacitors and Inductors*
- *De-rated materials*

15. Software Support (recommended)

Please document any software tools used to validate the hardware design and include test and validation using virtual simulation, design decisions based upon digital models, or proof of manufacturability via 3-D tools.

16. System Firmware

Please document firmware function, features and implementation including documentation package, a firmware image, licensing and distribution rights, explanation of ownership rights, system build utilities, test regime explanations, standards compliance, options for changing firmware configurations, and how firmware upgrades can be accomplished.

[Note to author of this specification: This section can include the following but is not limited to the below items:

- *BIOS Chip*
- *BIOS Source Code*
- *BIOS Feature Requirements*
- *Firmware Feature Plan of Record*

17. Hardware Management

Please document the hardware management implementation of your contribution.

*[Note to author of this specification: This section **should** include the following below items:*

- *Statement on whether the contribution supports out-of-band manageability.*

- *Statement on the modularity of the manageability architecture. (i.e. is a OCP management module used?)*

*[Note to author of this specification: This section **can** include the following but is not limited to the below items:*

- *Architecture of out-of-band management*
 - *Dedicated or shared NIC*
 - *In which power state is the OOB management enabled*
 - *Details about the BMC (size, memory, storage)*
- *A list of on-platform manageability interfaces:*
 - *Connections: I2C/I3C, SMBus, RMII,*
 - *Transport Protocol: MCTP, IPMI (KCS, BT, etc)*
 - *Commands constructs: PLDM ..., IPMI, SPDM, CPER*
- *A list of components whose firmware which can updated programmatically*
 - *Which support failover/rollback mechanisms*
- *A list of diagnostic or management LEDs*
- *A list of HW telemetry/sensors*
- *A list of HW controls*
- *Whether conformance to OCP Profiles has been tested*

18. Security (only for Platform Boards and Systems)

*Please briefly describe security functionality that **your specification requires and recommends***. Include a “required by” date on recommendations. Omit what doesn’t apply and add whatever is missing.*

- *For cryptography, key derivation, key agreement, and hashing, identify*
 - *Required algorithms, modes, strengths, and usage*
 - *Required compliance with national or international standards*
 - *Acceptable sources of entropy*
 - *Acceptable certifications of algorithm implementations*
 - *Recommended certifications of cryptographic modules*
 - *Recommended safeguards against cryptanalysis by quantum computers*
- *Required flow of Secure Boot starting from hardware root(s) of trust*
- *Required measurements from hardware reset through firmware*
- *Required attestation protocols*
- *Acceptable environments and processes for provisioning keys and device secrets*
- *Acceptable processes for identifying CVEs and distributing field updates to address them*
- *Acceptable Secure Boot and Attestation key lifecycle management (from generation through revocation)*
- *Recommended standards for software bills of materials*

- *Recommended firmware recovery mechanisms*

**Required = Required now*

Acceptable = Required now and chosen from a list of acceptable alternatives

Recommended = Recommended now, but required by a specified future date

Please find guidance and examples in the OCP Security Project documents on [Secure Boot](#), [Attestation of System Components](#), [Common Security Threats](#), and the [CSIS document on Secure Firmware Development Best Practices](#).

19. References (recommended)

[1] "Title", publication year, publication journal/conference/standard, volume, pages, link to publication if available

Appendix A - Checklist for IC approval of this Specification (to be completed by contributor(s) of this Spec)

Complete all the checklist items in the table with links to the section where it is described in this spec or an external document .

Item	Status or Details	Link to detailed explanation
Is this contribution entered into the OCP Contribution Portal?	Yes or No	If no, please state reason.
Was it approved in the OCP Contribution Portal?	Yes or No	If no, please state reason.
Is there a Supplier(s) that is building a product based on this Spec? (Supplier must be an OCP Solution Provider)	Yes or No	List Supplier Name(s)
Will Supplier(s) have the product available for GENERAL AVAILABILITY within 120 days?	Yes or No	If more time is required, please state the timeline and reason for extension request. Please have each Supplier fill out Appendix B.

Appendix B-__ <supplier name> - OCP Supplier Information and Hardware Product Recognition Checklist

(to be provided by each supplier seeking OCP recognition for a Hardware Product based on this specification)

Company:

Contact Info:

Product Name:

Product SKU#:

Link to Product Landing Page:

The following is needed for OCP hardware product recognition:

For OCP Inspired™

- All Suppliers must be a Silver, Gold or Platinum Member.
- Declare product is 100% compliant with specification
- Complete the [OCP Inspired™ Product Recognition Checklist](#), which includes hardware management conformance checks and security profile.

For OCP Accepted™

- All Suppliers must be an OCP Member. All corporate membership levels are eligible.
- Complete the [OCP Accepted™ Product Recognition Checklist](#), which includes hardware management conformance checks, security profile and open system firmware conformance checks.
- Submit a design package meeting [OCP Hardware Design Guideline Contribution Checklist](#) (if not already submitted by the contributor). If already submitted, declare the product is 100% compliant with the design package.
- Submit a firmware package including a firmware image, build scripts, documentation, test results and a tool that verifies modifications
- Submit the BMC source code, if applicable to product type

Please complete the OCP Inspired™ Product Recognition Submission Checklist or OCP Accepted™ Product Recognition Checklist and the following table.

Open Compute Project • <Specification Title>

Item	Details	Links
Which product recognition?	OCP Accepted™ or OCP Inspired™	Provide link for the appropriate Product Checklist
If OCP Accepted™, who provided the Design Package?		Link to OCP Contribution Database
Where can a potential adopter purchase the product?		Link to OCP Marketplace

Appendix C - Contribution Process FAQs

As a contributor to a hardware specification, here are some questions that often come up.

- Q1. What type of hardware specification am I contributing to OCP? Is it any of the below?
- base specification for a de-facto standard (new standard with no hardware product on the horizon)
 - base specification for an intended physical <hardware product type> (product may be coming but within the next 1-2 years)
 - modification of an existing specification (state which existing spec is being modified)
 - either a complete revision update or
 - a minor version update
 - design spec (based on an existing base specification) with more refined design details (product coming in 12-15months)
 - a detailed specification for a <hardware product type> for a very specific product being available in 3-6months of approval of this Spec
 - If none of the above, please contact OCP Staff for better direction.
- Q2. How do I know if what I am contributing will be accepted by OCP?
- Before contributing any specifications, please contact either OCP Staff (Archna Haylock or Michael Schill) or the Project Lead for the Project that best represents your contribution. For example, if you are contributing a Server Specification, please contact one of the Server Project Leads. You can see all the Projects [here](#).
 - They will help you with your contribution and help you navigate the process.
- Q3. What is the contribution process for my hardware spec?
- Follow the flow for your spec type [here](#).
 - This flow is subject to change so please check with the OCP Staff for more information or any questions.
- Q4. What if my spec is not developed yet and I want to collaborate with other companies?
- Please contact either OCP Staff (Archna Haylock or Michael Schill) or the Project Lead for the Project that best represents your contribution.
 - They will help you find other collaborators and help you with the contribution process for a multi-party contribution.
- Q5. I have a question on the Contribution License Agreement.
- Please contact OCP Staff and we can help you with questions.
- Q6. Do I need to have a product in order to contribute a spec?

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- a. Please see Q1. Some types of specs do not require an immediate product. Some do. Please work with the OCP Staff on better direction on your specification type.