General Purpose Enterprise Server Specification

Rev 1.0

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2.   OCP Tenets Compliance

Please describe how this contribution addresses compliance with three out of the four
OCP Tenets.

Note: 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 hearing 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

This base specification is jointly contributed by 3x OxM (Inspur, Supermicro and Flex) , with
commitment to have associated products made available to cover the enterprise usage
model. The specification requires many of the mature OCP elements as part of the building
blocks for the 1U/2U product. GP enterprise service specification also required firmware
open source for Openness.

2.2.   Efficiency

19" 1U/2U form factor as an easy adoption choice for the enterprise community members.
We understand that there are many more advanced and efficient designs within the OCP
community. However, many of those designs required a much significant
change/modification of the existing infrastructure. The goal of the GP Enterprise Server
specification is to allow a pathway for end users to adopt many of the mature OCP
elements in the conventional 19" form factor so that they can enjoy the outcome/results of
the community without taking that "full" step forward of changing their existing infrastructure.

2.3.   Impact

With at least four OxM signed up for the initial workstream, (Inspur, Supermicro and Flex) and we anticipate more OxM joined this GP enterprise server discsaision. As a community, we will have a new "baseline" for any future 1U/2U design that makes consuming OCP products (with OCP elements) much easier.   All four OxM signed up for the project intent to GTM with an actual product based on this spec in 2021.

3.   Revision Table

Date	Revision #	Author	Description
2/23	0.1	Alan Chang	initial draft
4/20	0.2	Bill Carter	Format changes, removed vendor specific diagrams and content.
5/26	1.0	Alan Chang	Finalizing into 1.0 spec

4. Terminology

Terminology	Definition
Bezel	Aesthetic plastic or metal front-facing cover of a typical computer server.
Cabinet	A freestanding and self-supporting 4-post enclosure for housing electrical and/or electronic equipment. It is usually fitted with access doors and/or side panels, which may or may not be removable.
Chassis	A mechanical structure designed specifically to support associated electrical and electronic components.
EIA-310-D	EIA-310-D is the original document issued by the Electronic Industries Association (renamed the Electronic Alliance in 1997) written to standardize varying features of 19" rack cabinets.
EIA Mounting Flange	The front internal mounting surface within a Cabinet Enclosure or Rack that provides a mounting surface for the server chassis, chassis guides, or slide rails.
Open Units (OU)	An Open Unit, or OU, is 48mm high, and are used instead of Rack Units in Open Rack specifications.
Rack	An open-air structure for mounting electrical or electronic equipment. A Rack is an open Cabinet. There are 2 basic types of Racks, 2-post & 4-post.
Rack Unit (RU)	Equal to 1.75 inches (44.45 millimeters)
Slide Rails	A slide rail is used to mount servers in a 2-post or 4-post rack, and also extend out from the rack for service. There can be sliding, fixed, or tool-less designs.

5.   Scope

This document provides the reference specifications for the General Purpose Enterprise Server of 19" products, detailing the features and functionality of a general purpose 2-socket server board for adoption by the Open Compute Project community. The purpose of this document is to define a common baseline set of features that are most important to general purpose usage by enterprise and private cloud operators. ODM or OEM products will comply with the features sets that are important to "general purpose" usage.

6.   Overview

This product is intended to support usages requiring high storage, compute performance, configuration flexibility, common Redfish-based management, ease of deployment, and supports latest component technologies.

- •   Fits in a conventional 19" EIA rack.
- •   Support the highest TDP offering either using air-cooling or advanced cooling.
- •   Deliver high performance by supporting a minimum of 1 DPC at the highest memory frequency and support a balanced PCIe subsystem.
- •   Support conventional enterprise storage I/O requirements
- •   Support the industry standard OCP NIC interface.
- •   Provide a path for sustainable firmware by making source code available

7. Required Features

To ensure the delivery of products that can be deployed over a period of time, and assure consistency in the services offered to the client of the cloud data server, certain features must be present in each general purpose server. These features are listed in the following tables

Features	Description
Rack Compatibility	See section 8 for detailed requirements
Processor	Supports up to 2x CPU from any CPU silicon providers. ● 1U system shall support 1 or 2 165W TDP processors ● 2U system shall support 1 or 2 165W TDP processors
Memory	● A Minimum of 1x DPC per CPU ● Support for maximum memory capacity and frequency of silicon of choice. ● Memory protection including ECC, memory mirroring, and memory rank sparing
Storage Requirement	Minimum requirement: **1U Rack:** 4* 3.5" and 10* 2.5" **2U Rack :** 12* 3.5" and 24* 2.5"

Expansion Slots	Minimum requirement:
	1U Rack :
	        1 * OCP 3.0 slots
	        1 * M.2 for boot device
	        2 * PCIe x16 G4 (symmetric)
	2U Rack :
	        1 * OCP 3.0 slots
	        1 * M.2 for boot device
	        4 * PCIe x16 G4 slots (symmetric)

Networking	Minimum requirement:
	
	  1* 1Gb management port
	  1* OCP NIC 3.0 slot (with NCSI)

Management	See Section 14
Security Feature	TPM 2.0 (either module or on baseboard)

8. Rack Compatibility

Requirement	Status
The server chassis SHALL compliant with the EIA-310-D (or later) standard	Required
The server chassis SHALL be designed to fit in racks that are 900mm to 1000mm in depth.	Required
The chassis bezel and pull handles SHALL not extend more than 50mm beyond the EIA Mounting Flange.	Required

8.1. Chassis Dimensions
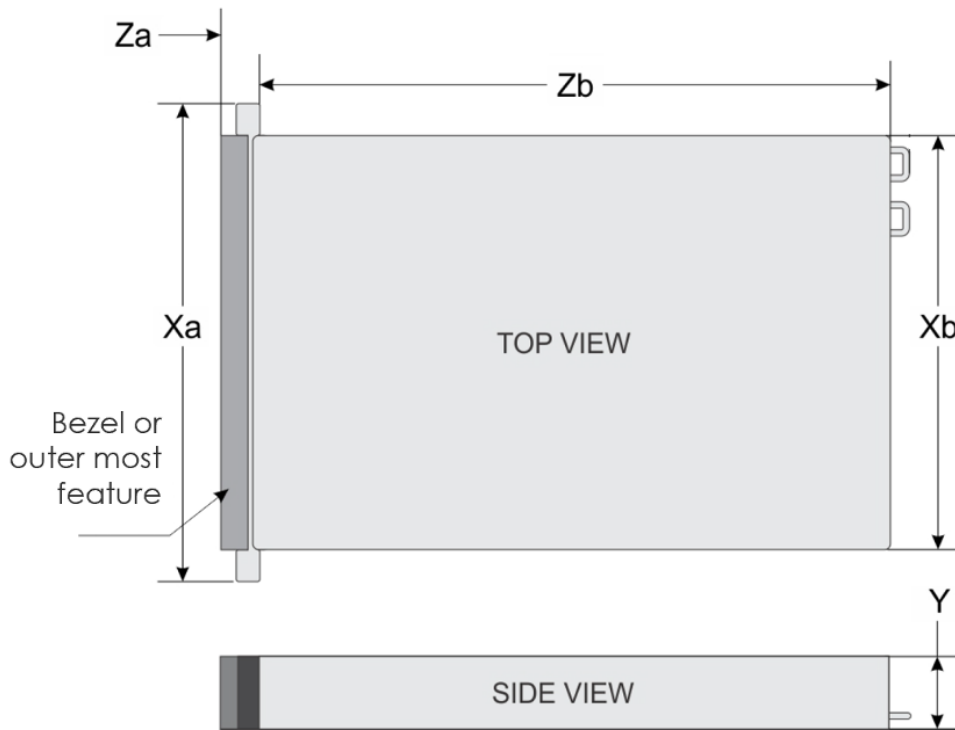
System	Xa	Xb	Y	Za (with bezel)	Zb
2U Chassis	483.4mm max	450mm max	87.9mm max	50mm max	848mm max

Requirement	Status
For Za, the bezel, pull handles, or outer most features should not exceed a maximum of 50mm beyond the front mounting flange, which allows for space to the cabinet door and airflow.	Required
The chassis height (Y) should not exceed a maximum of 87.9mm to account for stack-up tolerances, along with chassis sag and bow concerns.	Required
The total chassis length (Za + Zb) should allow space for server cables of about 152mm, and should not exceed a maximum of 748mm for 900mm rack depth, or 848mm for 1000mm rack depth.	Recommended

8.2.   Thermal Considerations

Requirement	Status
The system should support front to back air flow in air-cooled environments.	Required
Support for liquid cooling should comply with the ACS Project recommendations.	Recommended

9. Block Diagram

General Purpose Server baseboard supports two processors and a minimum of 1x DPC. The CPUs are interconnected over either UPI or any high speed interconnect link provided by the silicon vendor.

Connected to three onboard PCIe slots via the PCIe bus, the processor supports a maximum of two PCIe Gen4 x16 full-height half-length cards or two PCIe Gen4 x16 half-height half-length cards and one PCIe Gen4 x16 full-height half-length card.
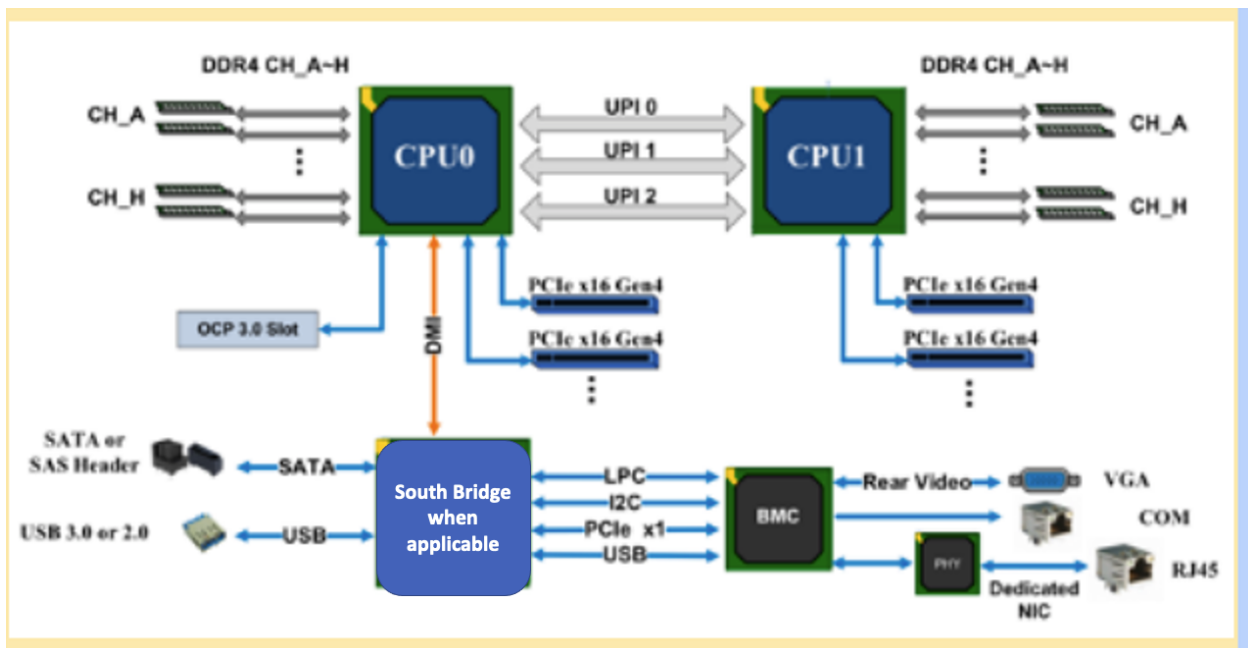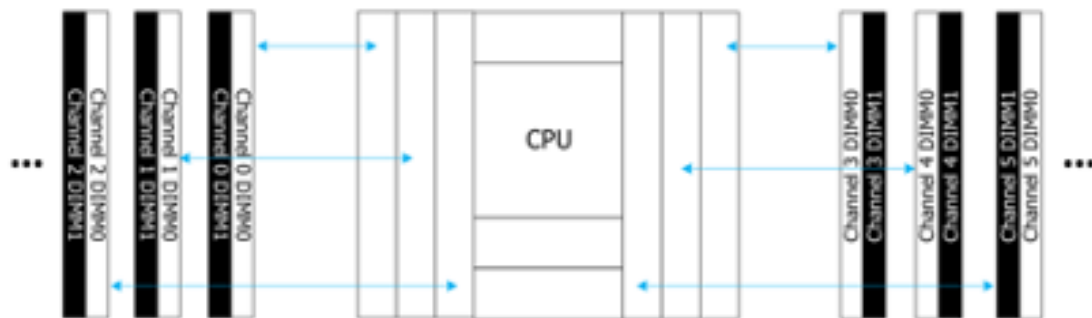

Figure 3: Reference - block diagram motherboard block diagram (alan)

10. Memory Subsystem Requirements

GP Enterprise Server will call out minimum 1x DPC per CPU. A maximum of two memory slots for each memory channel, DIMM0 & DIMM1 shall have different color code upon OxM choice for user to easy identify

11.   I/O Subsystem Requirements

11.1.   OCP 3.0 NIC Interface

The OCP GP Server SHALL support one OCP 3.0 module at a transmission rate of 1 Gbit/s, 10 Gbit/s, 25 Gbit/s, 40 Gbit/s, or 100 Gbit/s, which is configurable. The connector pin definition must follow the OCP NIC 3.0 Design Specification
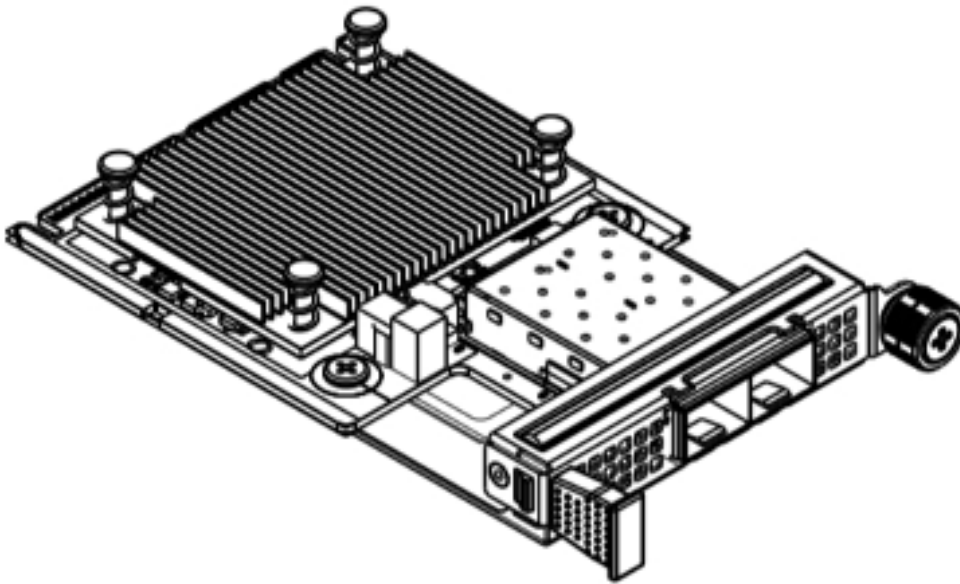

Figure: OCP 3.0 module (reference only)

11.2.   Network Interface

The General Purpose Enterprise Server system data network shall use a Single or Dual Port OCP 3.0 NIC module .

For the Management network baseboard has two options of management network interface for BMC's connection.

    a) One dedicated RJ45 port for Board management and shares data network's physical interface, driven by BMC through RMII/NC-SI.

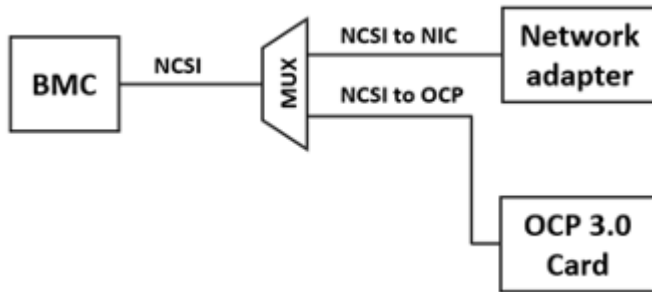   b) One OCP NIC 3.0 shared-NIC, driven by BMC through NCSI.

Figure: BMC managerial network topology (reference only)

11.11. TPM Support

Must support Host TPM 2.0 (FIPS 140-2 certified)

12.   System Requirements

12.1.   Power Delivery

The system SHALL support 2 power supplies and support 1+1 redundancy.

12.2.   Thermal Design

To meet thermal reliability requirements, the thermal and cooling solution should dissipate heat from the components when the system is operating at its maximum thermal power. The thermal solution should be found by setting a high power target for initial design in order to avoid redesign of cooling solution; however, the final thermal solution of the system should be optimized and energy efficient under data center environmental conditions with the lowest capital and operating costs. Thermal solution should not allow any overheating issue for any components in the system. CPU or memory should not throttle due to any thermal issue under the following environment.

● Inlet temperature lower than or equal to 35°C, and 0 inch H2O datacenter pressure with all FANs in each thermal zone running properly

- Inlet temperature lower than or equal to 35°C, and 0.001 inch H2O datacenter pressure with one FAN (or one rotor) in each thermal zone failed

12.3.   Operational Conditions

Altitude: 0 to 914 meters (3000 feet) ; Operating temperature 0 to 35 degrees Celsius

Altitude: 914 to 2133 meters (7000 feet) ; Operating temperature 10 to 32 degrees Celsius

Operating relative humidity: 10%~90% R.H

Storage relative humidity: 10%~93% R.H.

Working temperature: 5~35°C (heat dissipation needs to be clear at (35°C /40°C /45°C)

Storage temperature range: -40~+70°C

13.   System Initialization Firmware (BIOS)

13.1.   System Firmware

All products seeking OCP Accepted™ Product Recognition must complete the Open System Firmware (OSF) Tab in the [2021 Supplier Requirements Checklist.](#)

If based on an open bios (like AMI's Aptio-OpenEdition), a completed checklist shall be uploaded and made available on the [OCP Github](#).

Note to authors: replace [vendor_name] and [product_name] with actual company name and product identifier.

14.   Baseboard Management Controller

14.1. Compliance

All Products seeking OCP Accepted™ Product Recognition shall have source code and binary blobs submitted for BMC, if applicable.

The BMC management source code shall be uploaded at:
https://github.com/opencomputeproject/Hardware-Management/[vendor_name]/[product_name]

14.2. BMC Features

In addition to the requirements described in this section, the BMC must also support the following features:

- IPMI 2.0
- Simple network management protocol (SNMP v1/v2c/v3)
- HTML5/Java remote console (keyboard, mouse, and video)
- Remote virtual media
- Web browser login
- Intelligent fault diagnosis system

15. Environmental and Regulatory Requirements

15.1. Regulations

Region	Certification Item	Certification Logo	Mandatory/ Voluntary
China	3C		Mandatory
	Environment label		Voluntary
	Energy conservation certification		Voluntary
International recognition	CB		Voluntary
EU	CE		Mandatory
Australia	RCM		Voluntary
India	BIS		Voluntary
USA	FCC		Mandatory
	UL		Voluntary
	Energy star		Voluntary
Russia	CU Certification		Voluntary

	Information security	N/A	Voluntary
	CU RoHS	N/A	Voluntary
Korea	E-Standby Energy Efficiency Certification		Mandatory
	KC Certification		Mandatory

16. Security

All products seeking OCP Inspired™ or OCP Accepted™ Product Recognition shall have a completed Security Profile in the 2021 Supplier Requirements Checklist. Whether the answer is a yes or no, the profile must be completed. For Additional Security Badges (Bronze/Silver/Gold), please fill out the Security Profile in accordance with the requirements for that level. Security Badges will be reassessed on an annual basis as requirements are subject to change.

Appendix A - Requirements for IC Approval List all the requirements in one summary table with links from the sections.

Requirements	Details	Link to which Section in Spec
Contribution License Agreement	Modified OWF-CLA Modified OWFa 1.0 Final Spec Agreement	Link to Sec 1
Are All Contributors listed in Sec 1: License?	Yes	
Did All the Contributors sign the appropriate license for this spec? Final Spec Agreement/HW License?	Yes	
Which 3 of the 4 OCP Tenets are supported by this Spec?	Openness Efficiency Impact Scale	List reasons here. Link to presentation if separate.
Is there a Supplier(s) that is building a product based on this Spec? (Supplier must be an OCP Solution Provider)	Yes	List Supplier Name(s) Inspur, Flex and SuperMicro
Will Supplier(s) have the product available for GENERAL AVAILABILITY within 120 days?	Yes	Please have each Supplier fill out Appendix B.

Appendix B-1 - Inspur Product Requirements

List all the requirements in one summary table with links from the sections.

Requirements	Details	Link to which Section in Spec
Contact Info: Name/Email	Alan Chang AlanChang@Inspur.com	
Product Name SKU#/Model # Landing Page	Inspur with OCP-inspired - NF5180M6 Intel Icelake Generation https://www.inspursystems.com/product/nf5180m6	
Design Files Contributed (optional)	Will include in the Product Contribution	
BMC (if applicable)	OpenBMC 1.8; Will also include in the product contribution package	
Rack Compatibility	EIA 19"	Link to Sec 5
System Firmware	Complies with OSF Checklist (y/n) yes	
Management Profile	Redfish & Std. IPMI	Link to Sec 10
Software Support	N/A	Link to Sec 20
Security	Complies with Security Checklist (y/n)	

Supplier Requirements Checklist		
Will they apply for OCP product recognition?	OCP-Inspired	

Appendix B-3 - Flex, Inc. Product Requirements

List all the requirements in one summary table with links from the sections.

Requirements	Details	Link to which Section in Spec
Contact Info: Name/Email	Kevin Hart Kevin.Hart@Flex.com	
Product Name SKU#/Model # Landing Page	"Hudson Bay" 2U GP Enterprise Server Available at Intel SPR launch	
Design Files Contributed (optional)	N/A	
BMC (if applicable)	N/A	
Rack Compatibility	EIA 19"	Link to Sec 5
System Firmware	Complies with OSF Checklist (y/n) No	
Management Profile	DMTF Redfish v1.3x and Standard IPMI	Link to Sec 10
Software Support	N/A	Link to Sec 20
Security	Complies with Security Checklist	
Supplier Requirements Checklist		
Will they apply for OCP product recognition?	TBD	