Project Olympus
2U Server Mechanical Specification

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Revision History

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1 Project Olympus Specification List

Table 1 lists the Project Olympus system specifications.

Table 1: List of Specifications

Specification title	Description
Project Olympus Server Rack Specification	Describes the mechanical rack hardware used in the system
Project Olympus Server Mechanical Specification	Describes the mechanical structure for the server used in the system.
Project Olympus Server Motherboard Specification	Describes the server motherboard general requirements.
Project Olympus PSU Specification	Describes the custom Power Supply Unit (PSU) used in the server
Project Olympus Power Management Distribution Unit Specification	Describes the Power Management Distribution Unit (PMDU).
Project Olympus Rack Manager Specification	Describes the Rack Manager PCBA used in the PMDU.

This document is intended for designers and engineers who will be building servers for Project Olympus systems.

2 Overview

This specification focuses on the Project Olympus 2U server mechanical assembly. It covers the mechanical features and supported components of the server, as well as the interfaces with the mechanical and power support structure. An example of a 2U server is shown in Figure 1.

Refer to respective specifications for other elements of Project Olympus such as Power Supply Unit (PSU), Rack Manager (RM), Power and Management Distribution Unit (PMDU), Server Motherboard, and Rack.

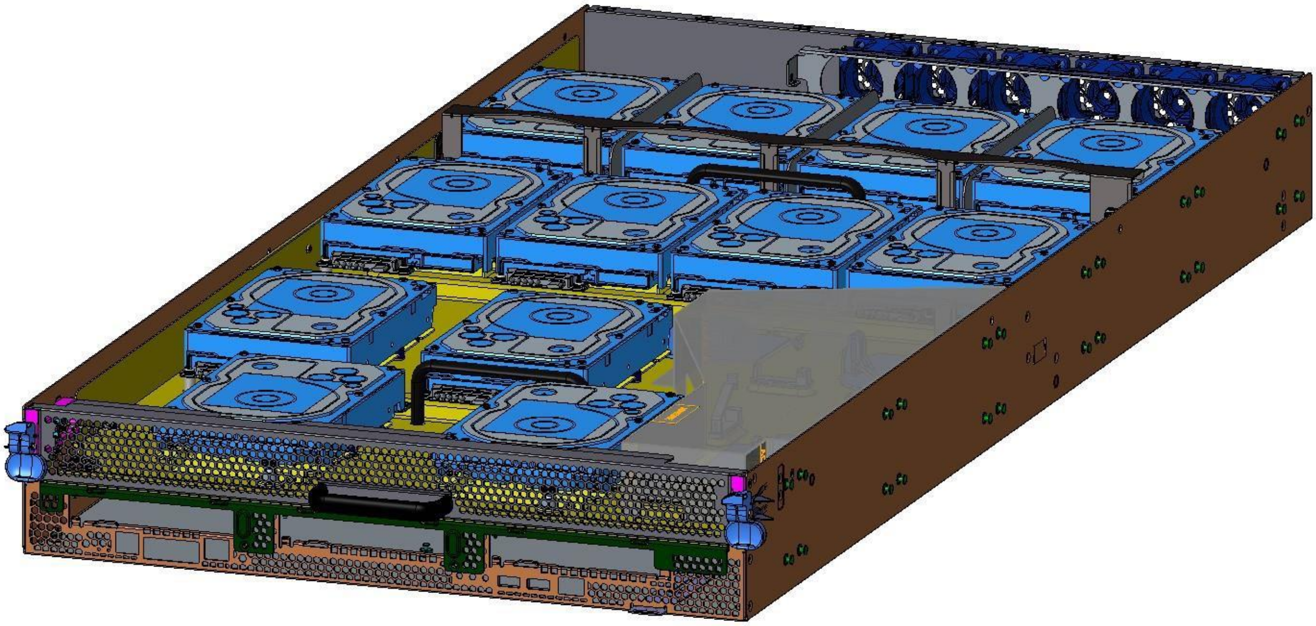

Figure 1. 2U Server Example

3 Background

To conceptualize how the server motherboard fits within the rack, consider the following.

The server motherboard is the computational element of the server. The motherboard includes a full server management solution and supports interfaces to an integrated or a set of rear-access 12V Power Supply Units (PSUs).

The server optionally interfaces a rack-level Power and Management Distribution Unit (PMDU).

The PMDU provides power to servers and interfaces to the Rack Manager (RM).

The motherboard design provides optimum front-cable access (cold aisle) for external IO such as networking and storage as well as standard PCIe cards. This enables flexibility to support many configurations.

4 Server Features

The following is a list of the primary features supported by the motherboard.

- Support full rack width, 2U height (3.50 inches), server assembly
- Supports blind-mate power with Project Olympus Rack with PMDU
- Supports Project Olympus Server Motherboard
- Supports up to three FHHL x16 Gen3 PCIe Cards.
- Supports cold aisle cabling for I/O and Ethernet management
- Supports cold aisle servicing (VGA + USB 3.0)
- Supports integrated Project Olympus PSU
- Supports up to 12 SATA devices
- Supports 12 (N+2) non hot-swap 40mm fans*
- Supports optional remote heat sink for high power processors

*Microsoft implementation uses 10 non hot swap 40 mm fans.

4.1 Front Panel

A 3D mechanical drawing of the Front Panel is shown in Figure 2. The Front Panel supports the following mechanical features.

- Three FHHL x16 PCIe Cards
- Two USB 3.0 Type A Connectors
- One RJ45 1GbE Connector
- Status LEDs
    - UID, Attention, Power Status

Figure 2. Front Panel

4.2 Rear Panel

A 3D mechanical drawing of the Rear Panel is shown in Figure 3. The Rear Panel supports the following features.

- Support for PSU FCI connection to PMDU
- Support for up to twelve 40mm fans

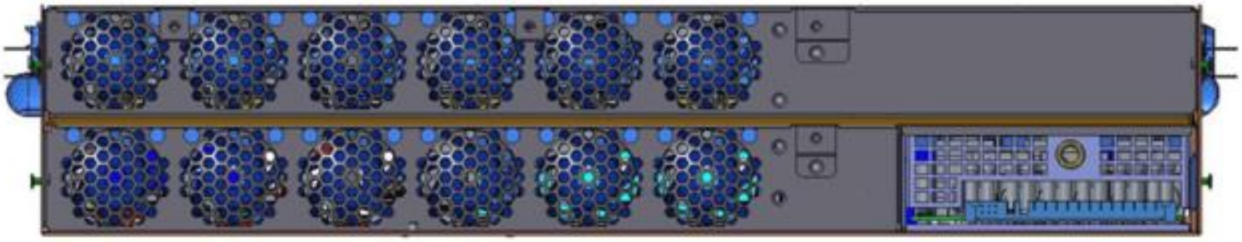

Figure 3. Rear Panel

4.3 PSU

The server assembly shall support up to two Project Olympus PSUs with optional battery. Additional information can be found in the Project Olympus PSU Specification.

4.4 Fans

The server is required to use on-board fans to cool the electrical components. A maximum of six 40mm fans may be used to cool the components in a single U, with a maximum of twelve 40mm fans* in a 2U server configuration. The maximum airflow allowed in a server must not exceed 158 CFM/kW. The server must also operate at its maximum power configuration without performance degradation with 2 failed fans in a single 1U zone. The fans are N+2 redundant to optimize fan efficiency and server availability while eliminating the need for hot swap capability.

The fans shall be variable speed and shall be controlled by the BMC on the server motherboard. Variable fan speed capability allows the rack to minimize energy consumption of the air movers and facilities in conditions that permit it. The speed of airflow is based on component temperature requirements within the server. The server has provisions for 2 airflow zones. One zone for 1U and the second zone for 2U.

*Microsoft implementation uses 10 non hot swap 40 mm fans.

5 Electromagnetic Interference Mitigation

For electromagnetic interference (EMI) containment, EMI shielding and grounding must be accounted for at the server assembly level. All servers must support a top cover that fits within the U envelope to prevent leakage of electromagnetic fields and airflow.

5.1 Grounding and Return

The server chassis grounding/return is provided to the motherboard from the tray assembly through the alignment and mounting holes that secure the motherboard to the tray. The motherboard is also tied to the PSU ground through the 12V power connector. Chassis ground and Logic ground are tied together on the motherboard.

6 Physical Specification

Figure 4 depicts the overall dimensions of the server assembly. The front of the chassis (cold aisle) is on the right. Shown are locations of three PCIe x16 slots on the motherboard as a reference for other motherboards. For detailed mechanical information including mounting hole location and dimensions, please reference Project Olympus mechanical data package and the Server Motherboard Specification.

The total mass of a populated server must not exceed 75 lbs to meet datacenter handling requirements.

Server mechanical stiffness shall be high enough to tolerate general handling and racking ability w/o damage to or interference with other components when fully populated.

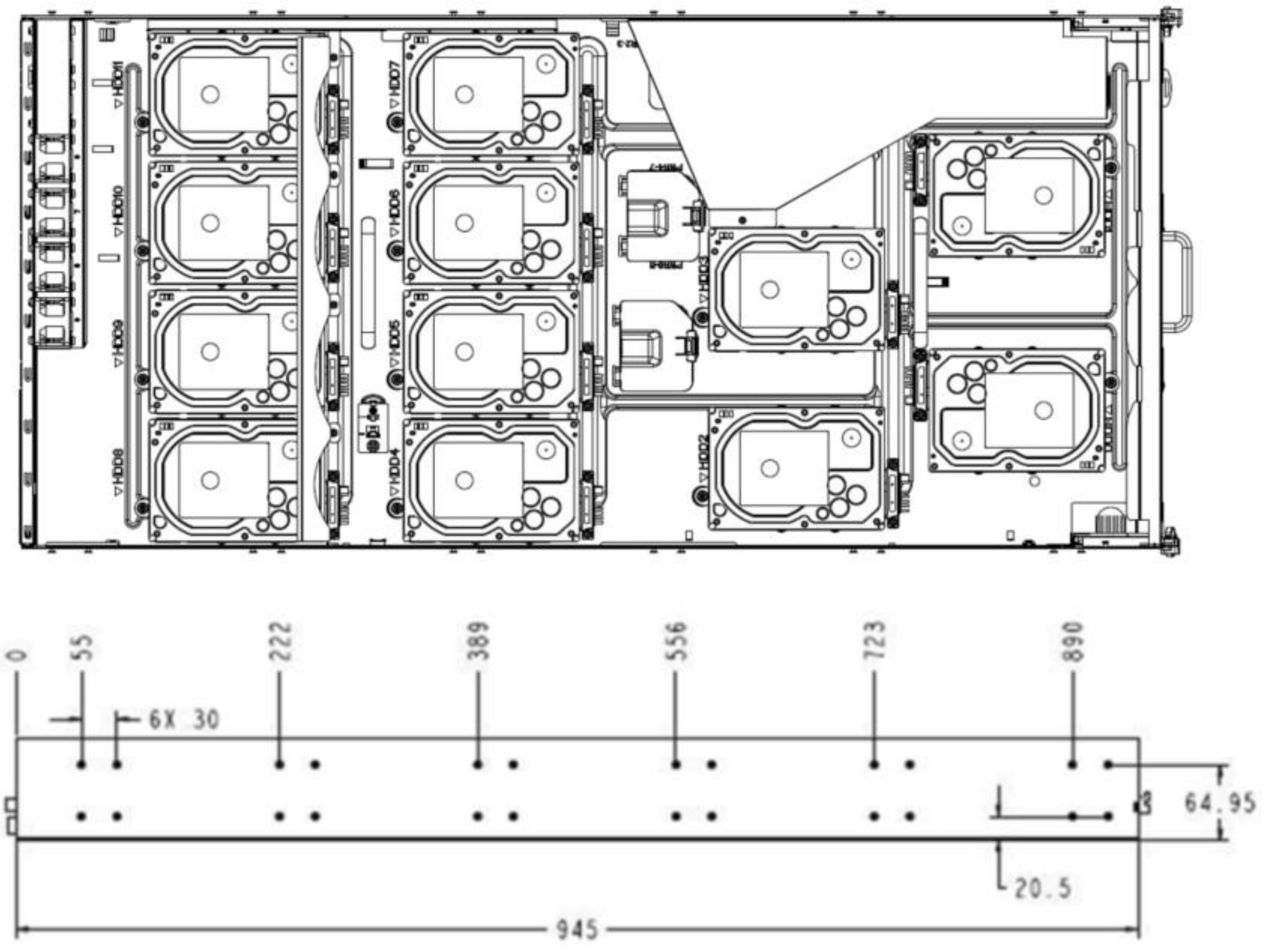

Figure 4. 2U Server Dimensions. Top cover omitted for clarity.

7 Environmental

The server is to be deployed in an environmentally controlled location. The inlet to the server will be exposed to the environment described in Table 2. The server must have the capability to provide full functional operation under the conditions provided.

Table 2. Environmental Requirement

Specification	Requirement	
Inlet temperature	Operating	• 50°F to 95°F (10°C to 35°C) • Maximum rate of change: 18°F (10°C)/hour • Allowable derating guideline of 1.6°F/1000ft (0.9°C/304m) above 3000 ft.
	Non-operating	• -40°F to 140°F (-40°C to 60°C) • Rate of change less than 36°F (20°C)/hour
Acoustic	Less than 6.8 bells at maximum fan speed operating condition	
Non-Operational Shock and Vibration	The server must be capable of rack level transportation via common carrier. Rack level testing to comply with ASTM 4169. Recommended levels for a single server in a fixture to simulate installation in a rack: • Shock – Half sine, 10G, 5m/s • Vibration – 1.146 Grms, 1 hour	