

H3C UniServer R4900 G3 Rack Server PCIe Lane Allocation Matrix - Official Technical Overview & Hardware Datasheet

EXECUTIVE SUMMARY

The H3C UniServer R4900 G3 represents a significant architectural evolution in 2U rack server design, purpose-built to address the escalating demands of enterprise datacenter workloads, virtualization densification, and software-defined infrastructure deployments. This technical overview provides a comprehensive analysis of the R4900 G3 platform, with particular emphasis on its PCIe lane allocation architecture and expansion capabilities.

The R4900 G3 leverages the Intel C622 chipset paired with dual Intel Xeon Scalable processor support, delivering a balanced architecture that prioritizes I/O throughput without compromising computational density. The platform's defining characteristic — its flexible PCIe topology — enables configurations ranging from dense compute nodes to I/O-intensive storage controllers and GPU-accelerated workload engines within a single unified hardware foundation.

This document is intended for systems architects, datacenter engineers, and technical procurement specialists requiring authoritative reference material for platform evaluation and deployment planning.



ARCHITECTURE & CHASSIS DESIGN

The R4900 G3 employs a 2U rack-mount form factor with physical dimensions of 87.5mm × 445.4mm × 748mm (without security bezel), accommodating standard 19-inch EIA-310 rack infrastructure. The chassis design incorporates a modular internal layout that separates thermal zones between processor/memory domains and storage/expansion domains, optimizing airflow management across varying workload profiles.

At the heart of the platform lies the Intel C622 Platform Controller Hub (PCH), which orchestrates I/O traffic between the dual processor sockets, memory subsystems, storage backplanes, and PCIe expansion fabric. The architecture supports up to two Intel Xeon Scalable processors with a maximum core count

of 28 cores per socket, yielding up to 56 physical cores in dual-socket configurations.

The memory subsystem provides 24 DDR4 DIMM slots distributed across six channels per processor, supporting RDIMM and LRDIMM modules at speeds up to 2933 MT/s. Maximum memory capacity reaches 3TB when fully populated with appropriate LRDIMM modules, enabling memory-resident database and in-memory analytics workloads.

HARDWARE FEATURES

PCIe EXPANSION ARCHITECTURE

The R4900 G3 's expansion subsystem represents its most architecturally significant feature. Depending on configuration and riser card selection, the platform supports up to 10 or 11 PCIe 3.0 slots, with the distinction arising from riser configuration and whether both processor sockets are populated.

The base configuration includes 8 standard PCIe slots, supplemented by one dedicated array card slot and one dedicated network interface card slot. The dedicated slots employ specialized lane routing that bypasses general-purpose riser logic, ensuring deterministic bandwidth allocation for storage controllers

and network adapters respectively.

Riser Card Topology

The R4900 G3 employs a sophisticated riser card system that determines PCIe slot availability, lane widths, and physical form factor support. The RC-2*FHFL-2U-G3 riser card, when installed on riser connector 1 or 2, presents two PCIe 3.0 x16 slots (capable of link width negotiation down to x1). The slot numbering follows an m/n convention where m represents the slot number when installed on connector 1, and n represents the slot number when installed on connector 2.

For GPU-intensive deployments, the RC-3GPU-R4900-G3 riser card supports up to three GPU modules across a combination of x16 and x8 electrical lanes. Slot configurations include PCIe 3.0 x16 (supporting link widths of 8, 4, 2, or 1) for slots 1/4 and 2/5, and PCIe 3.0 x8 for slot 3/6. This riser architecture accommodates up to three double-width GPU cards or eight single-width GPU cards, positioning the platform for AI inference and HPC-adjacent workloads.

Lane Allocation Principles

The PCIe lane allocation on the R4900 G3 follows deterministic routing from the

processor root complexes. Each processor provides 48 PCIe 3.0 lanes, with bifurcation capabilities enabling flexible lane distribution across riser connectors and dedicated slots. The dedicated array card slot and network card slot receive dedicated lane assignments that do not contend with general-purpose expansion traffic, preserving storage and management network performance under heavy I/O loads.

COMPLIANCE & STANDARDS

The R4900 G3 carries certifications including CCC, CECP, and SEPA, reflecting compliance with Chinese mandatory safety and energy efficiency directives. The platform’s power supplies are available in 80 PLUS Platinum and Titanium efficiency ratings, with support for 550W, 800W, 1200W, and 1600W configurations in 1+1 redundant topologies.

TECHNICAL SPECIFICATIONS

The following table summarizes the principal technical parameters of the H3C UniServer R4900 G3 platform.

Parameter	Specification
Form Factor	2U Rack Server

Processor Support	Dual Intel Xeon Scalable Processors, up to 28 cores per socket
Chipset	Intel C622
Memory Slots	24 × DDR4 DIMM (6 channels per CPU)
Memory Speed	Up to 2933 MT/s (RDIMM/LRDIMM)
Maximum Memory	3TB
PCIe Expansion	Up to 10-11 × PCIe 3.0 slots (varies by riser configuration)
Dedicated Slots	1 × Array Card Slot, 1 × Network Card Slot
Standard PCIe Slots	8 (base configuration)
GPU Support	Up to 3 × Double-Width or 8 × Single-Width GPU Modules
Storage Bays	Up to 40 × 2.5" or 3.5" drives (SAS/SATA/SSD)
NVMe Support	Up to 32 × Front-Accessible NVMe Drives
M.2 Support	2 × M.2 NVMe (PCIe 3.0 x4, 2280 form factor)
RAID Options	Onboard SATA RAID 0/1/10/5; Mezzanine or PCIe RAID cards

	supporting 0/1/10/5/6/50/60
Network Controller	1 × 1Gbps Management Port; Optional mLOM 4×1GE, 2×10GE
Power Supply	1+1 Redundant Hot-Plug (550W/800W/1200W/1600W Platinum/Titanium)
Dimensions (W×D×H)	445.4mm × 748mm × 87.5mm (without bezel)
Operating Temperature	5°C to 45°C (standard); 5°C to 50°C (extended)
Certifications	CCC, CECP, SEPA

ORDERING OPTIONS

The R4900 G3 is offered through a configurable build-to-order model, with base SKUs differentiated by processor selection, memory population, storage backplane type, and riser card configuration. Critical ordering decisions include:

Processor selection determines PCIe lane availability from the second socket, with single-processor configurations potentially reducing total slot count. Riser card choice governs physical slot form factors (FHFL, LP, GPU-specific) and lane

width distribution. Storage backplane selection affects NVMe support density, with configurations supporting up to 32 front-accessible NVMe drives. GPU enablement requires the RC-3GPU-R4900-G3 riser card and appropriate power provisioning.

