

Dell RAN Accelerator card

Increasing Open RAN performance and efficiency with In-Line Layer 1 acceleration card

Overview

In collaboration with Marvell Technologies, Dell has developed a cutting-edge Layer 1 accelerator card to improve private wireless networks' performance, security, and reliability. As a critical component of overall performance, Layer 1 processing ensures high-speed data transmission and low latency, essential for mission-critical 5G applications. The Dell Accelerator card processes all Layer 1 functions in-line, significantly increasing efficiency and scalability. The solution optimizes resource allocation by accelerating Layer 1 tasks, enabling servers to focus on other critical functions.

Dell RAN Accelerator

The Dell RAN Accelerator card, powered by Marvell's OCTEON CNF105 System on Chip (SoC), delivers state-of-the-art performance with advanced ARM CPU cores, DSP cores, and hardware acceleration blocks for cost and power efficiency. Designed as a PCI Express 5.0 card, it includes three QSFP28 ports, with two dedicated to handling Layer 1 fronthaul Radio Access Network (RAN) traffic and an optional third port for midhaul traffic. Offloading Layer 1 processing to the accelerator card drastically reduces server CPU usage, cutting power consumption and overall costs. This innovation provides an open RAN solution with the same performance as traditional, more resource-intensive RAN systems.

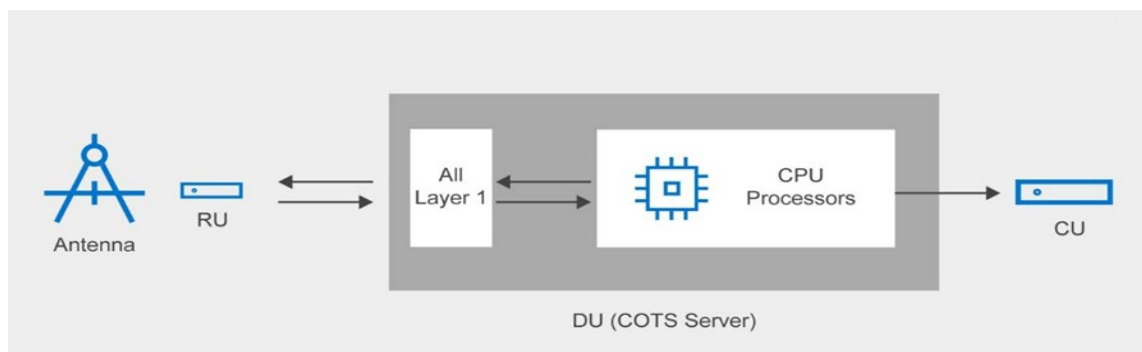


Figure 1: Simplified In-line Layer 1 processing by Dell RAN Accelerator card

Dell RAN Accelerator card	
Feature	Technical Specifications
System on Chip	Marvell OCTEON CNF105 (System on Chip)
General Purpose Processing	18 x ARM Neoverse N2 cores with ARM v9.0 64-bit instruction set
Baseband PHY Processing	Integrated Digital Signal Processor (DSP) cores and Hardware Acceleration Blocks (HABs) optimized for 5G NR and LTE Layer 1 baseband processing
SoC DRAM subsystem (DSS)	Supports 12 x DDR5
SoC Filesystem flash and Memory	32GB eMMC Supports 32 GBytes of ECC protected DDR5 memory operating at 4400 MT/s
PCIe	PCI Express Gen 1 – Gen 5 endpoint (supporting four lanes) provides flexibility in selection of the server CPU (X86)
PCIe Form Factor	Full Height, Half Length (FHHL)
Network Interfaces	<ul style="list-style-type: none"> • Fronthaul: 2 x QSFP28 Eight eCPRI lanes 25GbE or 10GbE (up to 200Gbps), connects 8 point-to-point Radio Units • Midhaul: 1 x QSFP28 (100 Gbps)
I/O Ports (RF) for Synchronization	<ul style="list-style-type: none"> • 1 x SMB IN port: GNSS or ePPS input timing reference • 1 x SMB OUT port: ePPS output to optionally provide timing to a downstream card
Synchronization References	<ul style="list-style-type: none"> • GNSS • ePPS (Embedded 1PPS from upstream card when used in a server with multiple Dell RAN Accelerator cards) • IEEE 1588 V1/V2 Precision Time Protocol (PTP)
GNSS Interface	<ul style="list-style-type: none"> • GPS L1 band C/A • GLONASS L1 band OF • Galileo E1 band B/C
O-RAN Timing Configurations	LLS-C1, LLS-C2, LLS-C3, LLS-C4
Precision Time Protocol (PTP) Modes	T-GM (G.8272), T-BC (G.8273.2, G.8273.4), T-TSC (G.8275.1)
Physical Dimensions	<ul style="list-style-type: none"> • Height: 0.579 in. (1.47 cm) • Width: 4.37 in. (11.09 cm) • Length: 6.4 in. (16.26 cm)
Module Weight	418 g (provisional)
Operating Temperature Range	-10°C to 65°C
Power Consumption (Average Sustained Power)	55W
Dell Software Development Kit (SDK)	Dell SDK is available. It allows customers to develop customizable L1 SW on the Dell RAN Accelerator card.



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