

Dell Technologies Collaborative Contributions to OCP NIC 3.0 Development

Tech Note by

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Summary

After the release of OCP2.0, Dell Technologies collaborated with various technology leaders to design the all-inclusive OCP3.0 adapter card.

This DfD shares the story of how Dell Technologies contributed to the OCP3.0 design and will explain how this design is superior to alternate adapter card form factors such as OCP2.0 and PCI.

History Briefing

The Open Compute Project (OCP) is a non-profit organization consisting of technology leaders working together to define and standardize superior data center product designs. In 2015 the group released the first standard OCP2.0 adapter card and soon after decided to focus development around improving the network interface of the next-gen OCP3.0 adapter card. In 2017, Dell Technologies began actively participating with OCP3.0 collaborators to produce the superior NIC adapter card.

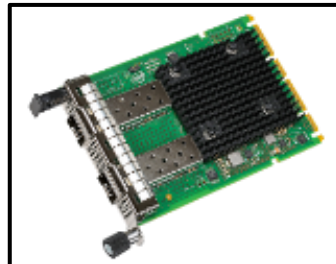


Figure 1 - OCP3 Card

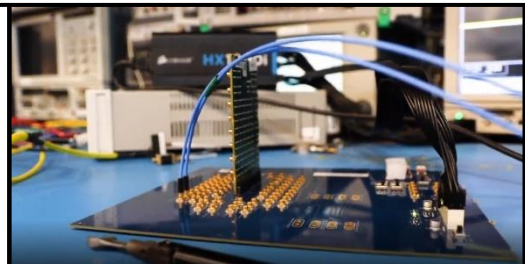


Figure 2 - Electrical test fixture that Dell Technologies contributed for the [2020 Virtual OCP Summit](#). *Note that you must register online to access videos*

Key Contributions to OCP3.0

By sharing and making public proprietary test fixtures and design concepts from the existing rack network daughter card (rNDC), Dell Technologies was a key contributor in defining the OCP3.0 architecture in various ways:

1. Designing and manufacturing many of the compliance test fixtures required for compliance testing; this includes **PCIe electrical compliance** (as seen in [Figure 2](#)), **systems management**, and **thermal tier compliance**
2. Architecture design contributions taken from the rNDC design:
 - a. Simplified power supply
 - b. Basic systems management
 - c. Complete compliance specified with the adapter, including fixtures for industry-wide consistency
 - d. Reliability requirements to simplify system integration
 - e. Mechanical drawings with tolerances

Why OCP3.0 is Important

Production units of OCP3.0 adapter card solutions arrived on the market in 2019 and outperformed existing alternative solutions in various ways:

- 1. Open > Proprietary**
 - a. Completely open specifications
 - b. Dell customizations through software and firmware
 - c. Decreases time to market with new technologies
- 2. OCP3.0 > OCP2.0**
 - a. OCP NIC 3.0 has a defined SFF mechanical specification, whereas OCP2 did not have defined tolerances, which enables a seamless integration
 - b. Simplified power delivery, reducing complexity on the system and allowing more general support for adapters
 - c. Improved thermal performance and power capability
 - d. Added Hot-Plug capability, which allows for operation in high-availability systems
 - e. Host interface forward looking to PCIe Gen 5
 - f. Adapter includes all necessary mechanical components, allowing for ease of replacement
 - g. Base systems management allows systems to intelligently power the card or not
- 3. OCP3.0 > PCI**
 - a. More compact design allowing for users to stack PCIe and OCP3 slots in a 1U server design where two PCIe cards would not fit
 - b. Full compliance mechanical specifications, as explained in 1a
 - c. High-speed sideband management (NC-SI)
 - d. Base systems management requires thermal monitoring
- 4. General Improvements**
 - a. Forward looking for next 5-7 years of use for mainstream servers, including support to 400G I/O throughput
 - b. Support for hot-aisle and cold-aisle operation using the same adapter
 - c. Base systems management requires thermal monitoring

Dell Technologies currently supports OCP3.0 on the PowerEdge R6525, R7525 and C6525, and will include support for many future platforms, including the PowerEdge R650, R750 and C6520.

The OCP3.0 NIC adapter card is a standardized data center peripheral that became realized because competing technology leaders, such as Dell Technologies, HPE and Lenovo, were willing to collaborate proprietary information to design a superior innovation together. To learn more about The Open Compute Project, visit www.opencompute.org.



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