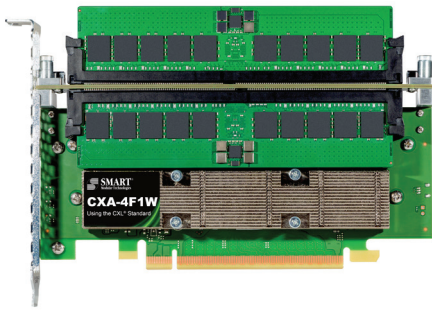




## Enhancing Performance with SMART's CXL<sup>®</sup> Memory Add-in Cards on Dell<sup>®</sup> PowerEdge Servers



### Background

Dell's new PowerEdge<sup>®</sup> servers, including models like the R770, R670, R7725, R7715, and R6725, are designed to handle memory-intensive workloads such as In-Memory Database Management Systems (IMDBMS) and High-Performance Computing (HPC). These applications often face limitations due to traditional memory constraints, which can hinder performance and efficiency.

### Problem Statement

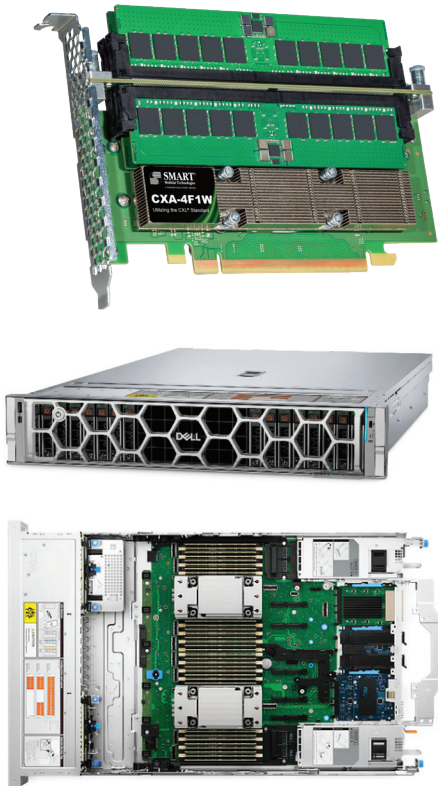
- **Memory Constraints:** Traditional DIMM slots on servers have limitations in terms of memory capacity and bandwidth, hindering performance in memory-intensive applications.
- **Cost and Complexity:** Upgrading servers to accommodate more memory using traditional methods can be expensive and complex, often requiring significant hardware changes.

### Solution: SMART Modular Technologies' CXL Add-in-Card

- **High Memory Capacity:** The CXL Add-in-Card allows for significant memory expansion beyond traditional DIMM limits, supporting up to 512GB of memory per card.
- **Performance Enhancement:** The CXL 2.0 standard provides additional bandwidth of up to 64 GB/s per x16 interface, reducing memory bandwidth bottlenecks and enhancing performance in compute-intensive applications. This bandwidth significantly enhances DDR5 main memory by adding an additional interface for accessing memory in parallel. On average, a x16 CXL link offers equivalent bandwidth to a DDR5-6400 memory channel.
- **Cost Efficiency:** By using CXL technology, organizations can expand memory capacity without needing to upgrade entire systems, reducing costs. Populating CXL add-in cards with lower-density DIMMs can achieve the same memory capacity at a lower overall cost.
- **Reliability and Security:** The CXL Add-in-Card implements advanced Reliability, Availability, and Serviceability (RAS) features, including end-to-end data path integrity, SECDED ECC support, and secure boot, ensuring high reliability and security.

### Deployment on Dell PowerEdge Servers

The CXL-4F1W can be easily integrated into Dell PowerEdge servers like the R7725 and R770, which support CXL Type 3 memory devices. This integration enables data centers and cloud services to efficiently scale memory ensuring optimal performance, high reliability and security.



## Key Applications

### In-Memory Database Management Systems (IMDBMS)

In-Memory Database Management Systems and memory-intensive applications require systems that can handle large amounts of data stored in DRAM memory to ensure fast data access and processing. This setup is essential for real-time analytics, financial transactions, and other applications where speed is paramount. A financial services company for example needs to process millions of transactions per second while maintaining real-time analytics on customer behavior. The system must support an In-Memory database capable of handling vast amounts of data without significant latency.

### High-Performance Computing (HPC)

HPC applications, such as weather forecasting and computational fluid dynamics, require substantial memory bandwidth and capacity. CXL memory expansion modules enhance both, allowing for faster execution of complex simulations and improved overall system performance.

## Benefits for Dell PowerEdge Users

- **Enhanced Performance:** Increased memory capacity and bandwidth improve performance in HPC and IMDBMS applications.
- **Cost Savings:** Lower costs compared to traditional memory expansion methods.
- **Flexibility and Futureproofing:** Easy integration into existing systems allows for gradual upgrades and future-proofing against evolving memory demands.

## Summary

SMART Modular Technologies' CXL Add-in-Card offers Dell PowerEdge server users a powerful tool to overcome memory constraints, enhance performance, and reduce costs in demanding HPC and IMDBMS workloads.

### New Dell PowerEdge Servers with SMART CXL Expansion Memory

Technology	Dell PowerEdge Models	
	R770	R7725
4-DIMM AICs	2TB	14.5TB
PCIe x16 Slots	4	9

Ask your Dell sales representative to configure your Dell PowerEdge servers with SMART CXL Add-in-Cards.

If you'd like to learn more about CXL technology and SMART's Add-in-Card solution, visit [smartm.com/product/cxl-aic-cxa-4f1w](https://smartm.com/product/cxl-aic-cxa-4f1w)



For more information, please visit: [www.smartm.com](https://www.smartm.com)

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