AMD VERSAL™ PREMIUM SERIES GEN 2 ADAPTIVE SOCS FOR DATA CENTER STORAGE APPLICATIONS

SOLUTION BRIEF

AMD

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OVERVIEW

As data center workloads continue to grow exponentially, equal performance increases at the storage layer are needed to keep pace. AMD Versal™ Premium Series Gen 2 devices provide immense benefits across a wide range of storage applications including enterprise SSDs, encryption/compression accelerators, memory pooling, and live migration. In addition, Versal Premium Series Gen 2 devices provide the flexibility of programmable hardware, allowing you to adapt to the latest standards, as well as in-field updating for faster time to market and longer lifecycles.

Versal Premium Series Gen 2 devices extend the AMD portfolio of adaptive SoCs with CPM6 supporting CXL® 3.1 and PCIe® Gen6. Integrated DDR5 controllers are also added for local memory at the device with inline ECC. These improvements enable development of storage applications in the data center with the latest connectivity standards accessible from the FPGA programmable logic, which can be used to implement custom IP for compression and encryption at high throughput rates. Versal Premium Series Gen 2 devices also offer more secure data transfers with the PCIe Integrity and Data Encryption (IDE) feature in hard IP.[1]

With the introduction of CXL 3.1, there is also support for memory pooling and live migration. Memory pooling effectively provides and shares more memory capacity in the data center through tiering to lower performance memory and by decoupling memory media from the server lifecycle. Live migration and management of virtual machine (VM) resources leveraging CXL interfaces can be accomplished by utilizing the device for near real-time tracking of hot and cold pages to allow for VM migration while host applications remain operational.

KEY APPLICATIONS

ENTERPRISE SSD
- Custom SSD with latest NAND support
- Data rate increases to 1200 MT/s
- I/O support for ONFI 5.0
- DDR5 with inline encryption

ENCRYPTION ACCELERATOR
- PCIe Gen6x8 with Integrity and Data Encryption (IDE)

CXL MEMORY POOLING
- Memory provisioning and sharing
- QoS, isolation, custom features via PL
- Memory lifecycle decoupling from server

LIVE MIGRATION
- Monitor host memory with CXL 3.1
- Improve server resource utilization

HIGHLIGHTS

PCIE GEN6 WITH CXL 3.1

- CXL 3.1, offering the industry's fastest CXL line rate[2]
- 2x Gen6x8 (CXL 3.1)
- PCIe IDE support

INTEGRATED DDR5 CONTROLLERS

- 1.9-2.9X more total memory bandwidth by connecting to CXL memory expander modules versus LPDDR5X memory alone[3]
- Lower memory power consumption and extended supply longevity vs. an LPDDR4 memory interface
- Secure storage and data integrity with inline encryption

FEATURES

FEATURE	HIGHLIGHTS
PROCESSING SYSTEM	• Complex algorithm processing and decision-making tasks • Dual-core Arm® Cortex®-A72 application processing unit • Dual-core Arm Cortex-R5F real-time processing unit
PLATFORM MANAGEMENT CONTROLLER	• Boot, configuration, and advanced power & thermal management • Security, safety, and reliability enclave • Integrated platform interfaces and high-speed debug
PROGRAMMABLE LOGIC	• High-bandwidth, low-latency data movement between engines and I/Os • Programmable memory hierarchy for optimal compute efficiency
DSP ENGINES	• DSP rich architecture with up to 7,616 DSP58 Engines • Wide range of modes supporting fixed and floating point data types suitable for DSP and ML applications
PROGRAMMABLE NETWORK ON CHIP	• High-bandwidth multi-terabit NoC for guaranteed QoS • Programmable framework memory-mapped access to all resources • Easy IP and kernel placement
ON-CHIP MEMORY	• Up to 281 Mb of tightly coupled memory for performance, power, and latency • Up to 59 TB/s of on-chip memory bandwidth
PCIE GEN6	• Up to 2 Tb/s aggregate bandwidth across 16 lanes (two x8 links) operating at 64 Gb/s per lane • Enhanced security features with Integrity and Data Encryption (IDE) support in hard IP
CXL 3.1	• Offering the industry's fastest CXL line rate[2] • Up to 2 Tb/s bandwidth on a memory coherent link
DEDICATED MEMORY CONTROLLERS	• Supports DDR5 up to 6400 Mb/s and LPDDR5X up to 8533 Mb/s • Hard inline ECC and encryption for data integrity and security
400G HIGH-SPEED CRYPTO ENGINES	• AES-GCM-256/128 engines • Up to 800 Gb/s of line rate encryption throughput • 400G of MACsec, IPsec, and bulk encryption per engine

NEXT STEPS

For more information on AMD Versal™ Premium Series Gen 2 devices, **visit www.amd.com/versal-premium-gen2**

Contact your local sales representative for pricing and availability.

ENDNOTES

1. Based on AMD internal analysis in October 2024, AMD Versal Premium Series Gen 2 devices include the PCIe Integrity and Data Encryption feature, while the competition does not. (VER-064)
2. Based on an AMD internal analysis of AMD Versal Premium Series Gen 2 devices with CXL 3.1 vs. comparable competitive device(s) with CXL 2.0, as of July 2024. Actual line rate speed will vary based on system configuration and other factors. (VER-056)
3. Based on AMD internal analysis of the total memory bandwidth (CXL 3.1 and LPDDR5X memory components) available with AMD Versal Premium Series Gen 2 devices vs. the same devices with LPDDR5X memory alone. Memory bandwidth will vary based on system configuration and other factors. (VER-059)

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