

Target IoT Applications:

- Industrial Systems & Factory Automation
- Smart Cities
- Transportation Management
- Healthcare
- Inventory Management
- Retail & Point of Sale
- Energy

AMD-powered Edge Gateway and Server Solutions:

AMD Embedded SOCs with Onboard GPU Compute

- AMD Embedded G-Series optimized for low power
- AMD Embedded R-Series optimized for performance and power efficiency
- AMD Ryzen™ Embedded V-Series optimized for ultra-high performance

AMD Embedded Processors

- AMD EPYC™ Embedded 3000 for superior CPU performance, I/O flexibility and security features

Application Brief: AMD Internet of Things Exceptional Performance, Security Features and Ease of Use, Enabling Breakthrough Edge Computing Agility for the Internet of Things

The ever-expanding breadth of the Internet of Things (IoT) is enabling a fundamental transformation in the way we harness data for insight and action. Edge computing plays a critical role in this distributed network infrastructure, providing intelligent analytics and near-real-time responsiveness at the edge of the network – between the sensor layer and the cloud – closer to the end application for lower latency, improved efficiency and faster decision making processes.

Pervasive IoT connectivity introduces significant challenges, however, particularly with regard to system security, data integrity, and interoperability. As devices and access points proliferate across the network, security vulnerabilities threaten to multiply, exacerbated by cumbersome system complexities often imposed by legacy, proprietary technologies. At the processor layer, edge gateways and servers can also require significant computing horsepower for advanced machine learning and artificial intelligence applications.

The AMD Advantage

AMD processing solutions deliver the performance, advanced security features, and scalability to meet the demanding edge computing requirements, providing breakthrough processing agility for x86-based IoT infrastructure. Additionally, as a founding member of the EdgeX Foundry™ consortium, AMD has taken a leadership position in fostering an open, vendor-agnostic ecosystem with 70 participating members collaborating together to standardize a common framework for seamless IoT interoperability and ease of use.

For designers seeking uncompromising CPU processing performance and I/O flexibility for edge servers, AMD EPYC™ Embedded 3000 processors harness the breakthrough performance-per-watt benefits of AMD's pioneering "Zen" architecture while enabling scalable performance leveraging up to 16 cores, complemented by enterprise-grade reliability, availability and serviceability features.

For designers seeking the combined benefits of a CPU and GPU on a single die for compute-intensive IoT applications like machine learning and AI, AMD Embedded G-Series and R-Series SOCs, and AMD Ryzen™ Embedded V1000 SOCs provide an optimal balance of performance and power efficiency in a compact footprint for edge gateway devices.

Key AMD Benefits:

Breakthrough Performance

AMD Ryzen™ Embedded V1000 SOCs deliver sustained compute performance up to 3.7 TFLOPS 16FP with versatile multithreading capabilities. AMD EPYC™ Embedded 3000 processors deliver a 52% improvement in instructions per clock (IPC) compared to legacy CPU architectures.

GPU Computing Versatility for AMD Embedded SOCs

The Radeon™ Open eCcosystem (ROCm) compute platform, based on the GPUOpen initiative, equips designers to achieve breakthrough innovations in GPU-driven parallel processing capabilities leveraging open development tools and software. By balancing CPU and GPU workloads for optimal processing performance, system designers can achieve advanced machine intelligence capabilities for IoT infrastructure. This feature is currently supported on select AMD Embedded solutions, with plans to expand support in the future.

Advanced Security Features

AMD Ryzen™ Embedded V1000 SOCs and AMD EPYC™ Embedded 3000 processors feature an independent on-chip AMD Secure Processor designed to enable secure Hardware Validated Boot capabilities that help ensure systems are booted from trusted software, plus advanced capabilities including Secure Memory Encryption (SME) for helping defend against unauthorized memory access, and Secure Encrypted Virtualization (SEV) for isolating hypervisors and virtual machines (VMs).

Expansive I/O Options

AMD Embedded solutions provide robust, highly integrated support for new and established interconnects, spanning GbE, PCIe®, USB-C, SATA, eMMC 5.0 and NVMe, enabling myriad connectivity options. AMD EPYC™ Embedded 3000 processors support up to 64 PCIe lanes and eight integrated 10 Gigabit Ethernet ports for new levels of I/O versatility and device configurability.

Power Efficiency

AMD processing solutions support a wide range of thermal design profiles (TDPs), with embedded processors that scale as low as 4W and below, helping designers achieve the optimal performance-per-watt, and minimize thermal constraints and associated system size and cost penalties.

Enterprise-caliber Dependability

AMD EPYC™ Embedded 3000 processors provide enterprise-class reliability, availability and serviceability features, with advanced error detection, correction, recovery and containment capabilities designed for superior data integrity.

Supply Longevity

AMD's planned processor longevity extends to up to 10 years, providing customers with a long-lifecycle support roadmap.

For more information about the specific features and specifications supported by select products in AMD's solution portfolio, or to learn more about AMD's IoT solutions, visit www.amd.com/loT

AMD.com/embedded

1. Updated Feb 28, 2017: Generational IPC uplift for the "Zen" architecture vs. "Piledriver" architecture is +52% with an estimated SPECint_base2006 score compiled with GCC 4.6 -O2 at a fixed 3.4GHz. Generational IPC uplift for the "Zen" architecture vs. "Excavator" architecture is +64% as measured with CinebenchR15 1t, and also +64% with an estimated SPECint_base2006 score compiled with GCC 4.6 -O2, at a fixed 3.4GHz. System configs: AMD reference motherboard(s), AMD Radeon™ R9 290X GPU, 8GB DDR4-2667 ("Zen")/8GB DDR3-2133 ("Excavator")/8GB DDR3-1866 ("Piledriver"). Ubuntu Linux 16.x (SPECint_base2006 estimate) and Windows® 10 x64 RS1 (CinebenchR15). SPECint_base2006 estimates: "Zen" vs. "Piledriver" (31.5 vs. 20.7 | +52%), "Zen" vs. "Excavator" (31.5 vs. 19.2 | +64%). CinebenchR15 1t scores: "Zen" vs. "Piledriver" (139 vs. 79 both at 3.4G | +76%), "Zen" vs. "Excavator" (160 vs. 97.5 both at 4.0G | +64%). GD-108 2.36-Month Limited Warranty to System Manufacturer instead of 12 months for consumer parts. ©2017 Advanced Micro Devices, Inc. All rights reserved. AMD, the AMD Arrow logo, Ryzen, Radeon, and combinations thereof are trademarks of Advanced Micro Devices, Inc. in the United States and/or other jurisdictions. Other names are for informational purposes only and may be trademarks of their respective companies.

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EdgeX Foundry™ Overview and Benefits:

EDGE X FOUNDRY™ EdgeX Foundry™ is an open source project hosted by The Linux Foundation building a common open framework for IoT edge computing and an ecosystem of interoperable components that unifies the marketplace and accelerates the deployment of IoT solutions. Designed to run on any hardware or operating system and with any combination of application environments, EdgeX enables developers to quickly create flexible IoT edge solutions that can easily adapt to changing business needs. What makes EdgeX Foundry unique is that it is not a new connectivity standard. It is a framework that integrates with any and all existing standards.

EdgeX Foundry™ Member Spotlight*

ClearBlade

The combination of AMD embedded processors and ClearBlade's IoT edge platform software gives companies the flexibility to power the edge of any IoT solution, including real-time business rules, data filtering, online and offline execution, machine learning, and messaging. Built from an enterprise-first perspective, the ClearBlade Edge Computing software runs securely in any cloud, on premises, and at the edge, enabling extensive deployment flexibility and scale.

Device Authority

Device Authority's KeyScaler platform delivers secure device provisioning, policy-based credential management and end-to-end data security for gateways leveraging AMD embedded processors. KeyScaler addresses core security vulnerabilities and delivers comprehensive IoT security automation at scale, complemented by a flexible device interface protocol that interoperates with KeyScaler for delivering automated public key infrastructure (PKI) for IoT devices.