PRODUCT BRIEF

Intel® Xeon® E-2200 Processor

Essential Performance for Entry Servers

Performance and Security, Intelligently Designed for Growth

The demands of technology for small businesses and cloud services require intelligently designed solutions to fuel their growth

Business computing needs are growing in sophistication and complexity. Servers that are just a few years old are no longer sufficient to support the demands of today's workloads, which are increasing in capabilities to deliver business intelligence, acceleration, and agility. New business opportunities, customers, and workloads drive a need for tools and technology that will help you win and stay ahead of the competition. With a wide-range of solutions in the marketplace, it can be difficult to identify the right solution for your needs of today and prepare for a winning future.

At Intel, we appreciate these challenges and have worked to understand your needs and demands. We have partnered with industry leaders and solution providers to deliver you a professional-grade solution built from the ground-up with your needs in mind. Intel® Xeon® processors deliver trusted performance and proven innovation, starting with our entry Intel Xeon E processor family. As your business grows and demands increase, so does the Intel Xeon processor portfolio with performance scale and capabilities that extend to our Intel Xeon Scalable processors.

Entry servers and secure cloud services built on the Intel Xeon E processor offer a foundation of capabilities that support your growing and changing demands.

Entry Server Solutions for Small Business

Experience up to 2X more performance with an entry server hardware refresh[1]

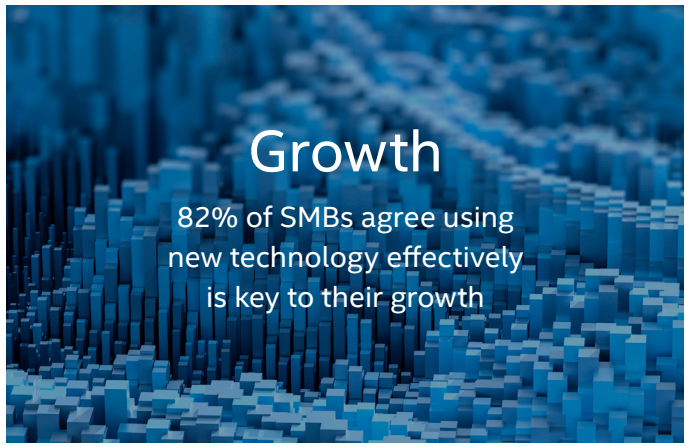
Small businesses are looking for server solutions that deliver productivity, reliability, and hardware-enhanced security, and complement other IT investment options such as cloud-based services. An on-premise server can help address a number of challenges, including the uncertainty for setup and ongoing cost of cloud services, support for legacy applications, regulatory compliance and the need to protect sensitive customer data. A mix of cloud services and in-house solutions provides the flexibility to choose and mix the correct balance for your business needs.

An entry server built with the Intel Xeon E processor is a smart investment positioning you for growth while providing a reliable, always available solution to protect your data and host critical business software solutions. No matter the size of your business, the value of your data is enormous. Keep it accessible and better protected at all times with an affordable Intel Xeon E processor-based server.

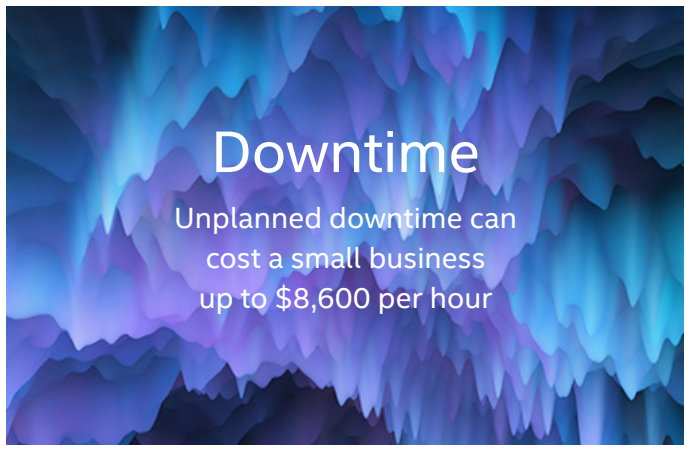
A dedicated, on-premise server delivers answers for a number of small business customers including:

- Bandwidth constraints, latency, or heavy data usage that cause performance issues
- Uncertainty and inability to plan for setup and ongoing cloud service costs
- Preference for up-front payment over extended payment schedule
- Some legacy applications cannot be migrated to the cloud
- Regulatory, compliance, or data sovereignty requirements mandate that data must be secured on-premises

Implementing a powerful server is also a smart investment in security and growth. You'll gain the power to support the features of modern operating systems, including the added peace of mind from timely security patches which help to keep your sensitive business and customer data steps ahead of evolving security threats. New hardware with a modern operating system can also help you more easily deploy new business-class applications and tools that can help you increase sales and improve margins. A server based on the Intel Xeon E processor lets you access your information faster and respond to customers sooner from any device on your network. Keep valuable business data safe, help you and your employees become more productive, and position your company for growth with a powerful and affordable small business server based on the Intel Xeon E processor.



Source: https://www.smb-gr.com/wp-content/uploads/2019/07/23-Jul-Digital-Transformation-V2.pdf



Source: https://www.aberdeen.com/techpro-essentials/downtime-is-money/

Advanced Security for Cloud Services

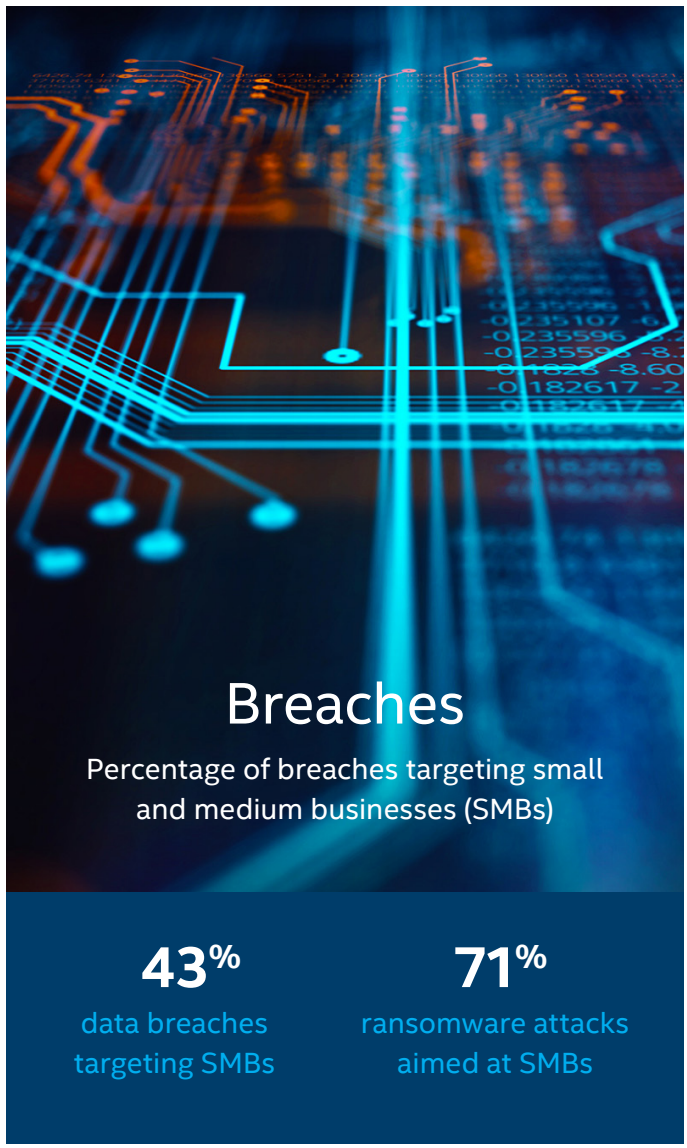
Intel Xeon E processors feature an advanced security technology, known as Intel® Software Guard Extensions (Intel® SGX). Software enhanced with Intel SGX helps protect application code and data from disclosure or modification, enhancing the security of cloud service workloads and applications. Developers can use Intel SGX to partition their application into protected areas of execution in memory known as processor-hardened enclaves to enhance security even on a platform that becomes compromised. Intel Xeon E processors with Intel SGX can be used in concert with existing data center infrastructure, to protect the most sensitive portions of an application or data being used in a workload or service.

Businesses and cloud service providers are using Intel Xeon E processors with Intel SGX to protect a variety of applications and data. Here are some examples of how businesses are using Intel SGX:

- Enables multi-party, joint computation on sensitive data, in a privacy-preserving manner
- Supports encrypted database operations
- Running unmodified applications within enclave
- Trust established for protecting and virtualizing network functions
- Protect encryption keys and/or Hardware Security Module (HSM) replacement
- Protecting keys on local file system; hardening disk protection, building scalable cloud Key Management Service (KMS)
- Secure transaction processing for Crypto currency, Secure Contracts, and Hyper ledger protection
- Secure IoT edge devices and cloud communications

Intel Xeon E processors deliver a powerful component in enhanced application and data protection.

Learn more about Intel Xeon E processor with Intel SGX and Secure Enclaves at **www.intel.com/sgx**



Sources: https://enterprise.verizon.com/resources/reports/dbir/2019/summary-of-findings/

https://www.carbonite.com/blog/article/2019/09/cybersecurity-tops-list-of-smb-priorities-as-attacks-continue

Introducing the new Intel Xeon E-2200 processor

Featuring improvements in processor speeds, higher core count options, expanded enclave capacities, and more, Intel Xeon E-2200 processors deliver a significant impact, especially compared with hardware that is just a few years old. With up to a 2X overall performance increase[1], compared to 2015 Intel Xeon E3-1200v5 processors, Intel Xeon E-2200 processors deliver performance to manage today's most demanding entry server workloads and offer significant advantages over much of the existing installed base. Even compared to the prior generation of Intel Xeon E-2100 processors, Intel Xeon E-2200 processors deliver up to a 1.2X increase in performance.[2] And both of these latest generations are pin compatible, and use the same Intel® 240 Series chipsets.

Intel Xeon E-2200 Processor Details	
Core Count and Threads	Up to 8 cores / Up to 16 threads
Maximum Base Frequency Supported	4.0 GHz
Maximum Intel® Turbo Boost Technology 2.0 Frequency Supported	5.0 GHz
Processor Cache Memory Support	Up to 16 MB Intel® Smart Cache
Processor Performance Support	Intel Turbo Boost 2.0 Technology, Intel® Hyper-Threading Technology (Intel® HTT)
Thermal Design Point (TDP)	Up to 95 Watts
Socket Type	LGA-1151 Socket
System Memory Support	2 channels of DDR4 ECC 2666 MHz, 2 DIMMs per channel
Maximum System Memory Supported	Up to 128 GB
Supported Chipset	Intel® C246 Series Chipset
I/O	PCIe 3.0 – Up to 40 lanes (CPU + Chipset) USB 3.1 – Up to 6 ports USB 3.0 – Up to 10 ports SATA 3.0 – Up to 8 ports DMI – Up to 4 lanes, Gen 3
Management Support	Intel® Server Platform Services; Intel® ME v12 with Intel® Active Management Technology
Intel® Rapid Storage Technology	Intel Rapid Storage Technology PCIe 3.0
Intel® Secure Guard Extensions	Up to 256MB enclave capacity

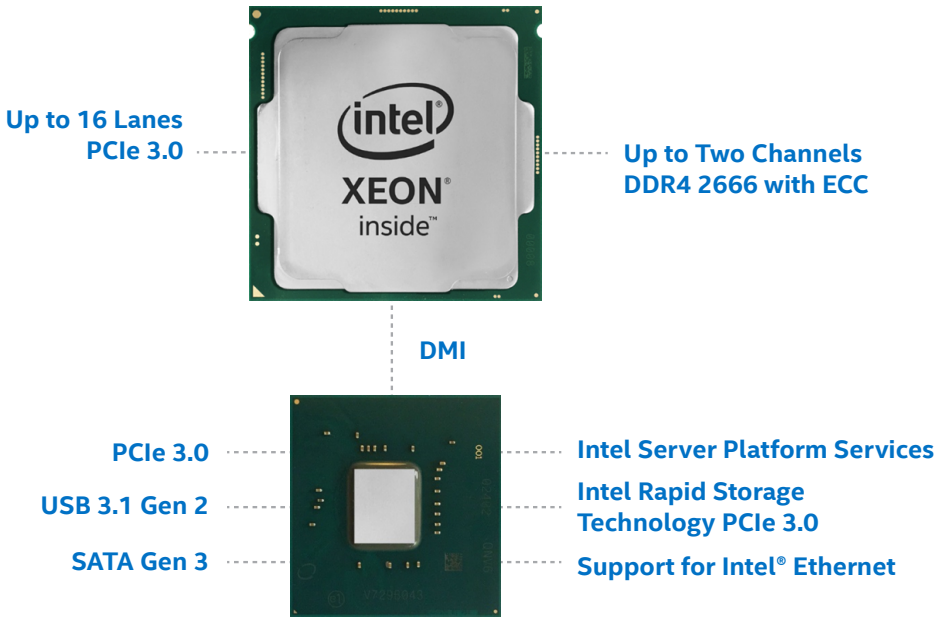
Please contact your hardware or equipment manufacturer for a full list of supported features and capabilities.

Platform Reliability, Availability and Serviceability

The Intel Xeon E-2200 processor includes support for the following hardware-enhanced reliability features, including:

- **ECC Memory Support:** Avoid business interruptions with automatic data checking for errors, providing increased reliability for the storage of your business data and execution of your critical workloads. Intel Xeon E-2200 processor supports DDR4 memory speeds up to 2666 MHz.
- **Intel Server Platform Services (Intel® SPS):** Designed for managing rack-mount servers, Intel SPS provides a suite of tools to control and monitor power, thermal, and resource utilization.
- **Intel Active Management Technology (Intel® AMT):** Using integrated platform capabilities paired with popular third-party management and security applications, Intel AMT allows IT or managed service providers to better discover, repair, and protect their networked computing assets.
- **Intel Rapid Storage Technology:** Protect your critical business information with redundant storage capabilities that allow quick recovery in the event of a hard drive failure.

Typical Intel Xeon E platform configuration



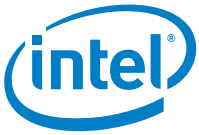
Processors, chipset, and diagram provided for illustration purposes only. Not comprehensive of all features and capabilities.

Intel Xeon E-2200 Processor SKUs

SKUS						
Processor	Cores/ Threads	Base Speed (GHz)	Max Intel® Turbo Boost Technology 2.0 Speed (GHz)	PCI Express 3.0 Lanes (CPU + chipset)	TDP (W)	Processor Cache (MB), SmartCache
Intel Xeon E-2288G Processor	8/16	3.7	5.0	40	95	16
Intel Xeon E-2278G Processor	8/16	3.4	5.0	40	80	16
Intel Xeon E-2286G Processor	6/12	4.0	4.9	40	95	12
Intel Xeon E-2276G Processor	6/12	3.8	4.9	40	80	12
Intel Xeon E-2274G Processor	4/8	4.0	4.9	40	83	8
Intel Xeon E-2246G Processor	6/12	3.6	4.8	40	80	12
Intel Xeon E-2244G Processor	4/8	3.8	4.8	40	71	8
Intel Xeon E-2236 Processor	6/12	3.4	4.8	40	80	12
Intel Xeon E-2234 Processor	4/8	3.6	4.8	40	71	8
Intel Xeon E-2226G Processor**	6/6	3.4	4.7	40	80	12
Intel Xeon E-2224G Processor**	4/4	3.5	4.7	40	71	8
Intel Xeon E-2224 Processor**	4/4	3.4	4.6	40	71	8

**Intel Xeon E-2226G, E-2224G, and E-2224 processors do not support Intel Hyper-Threading Technology.

Visit **intel.com/xeone** for a complete list of available Intel Xeon E processors.



For more information on the Intel Xeon E processor, visit **intel.com/xeone**

Intel technologies' features and benefits depend on system configuration and may require enabled hardware, software or service activation. Performance varies depending on system configuration.

No product or component can be absolutely secure.

Tests document performance of components on a particular test, in specific systems. Differences in hardware, software, or configuration will affect actual performance. For more complete information about performance and benchmark results, visit http://www.intel.com/benchmarks .

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more complete information visit http://www.intel.com/benchmarks.

Intel® Advanced Vector Extensions (Intel® AVX) provides higher throughput to certain processor operations. Due to varying processor power characteristics, utilizing AVX instructions may cause a) some parts to operate at less than the rated frequency and b) some parts with Intel® Turbo Boost Technology 2.0 to not achieve any or maximum turbo frequencies. Performance varies depending on hardware, software, and system configuration and you can learn more at http://www.intel.com/go/turbo.

Intel's compilers may or may not optimize to the same degree for non-Intel microprocessors for optimizations that are not unique to Intel microprocessors. These optimizations include SSE2, SSE3, and SSSE3 instruction sets and other optimizations. Intel does not guarantee the availability, functionality, or effectiveness of any optimization on microprocessors not manufactured by Intel. Microprocessor-dependent optimizations in this product are intended for use with Intel microprocessors. Certain optimizations not specific to Intel microarchitecture are reserved for Intel microprocessors. Please refer to the applicable product User and Reference Guides for more information regarding the specific instruction sets covered by this notice.

Cost reduction scenarios described are intended as examples of how a given Intel-based product, in the specified circumstances and configurations, may affect future costs and provide cost savings. Circumstances will vary. Intel does not guarantee any costs or cost reduction.

Intel does not control or audit third-party benchmark data or the web sites referenced in this document. You should visit the referenced web site and confirm whether referenced data are accurate.

Performance results are based on testing as of 6/03/2019 and may not reflect all publicly available security updates. See configuration disclosure for details.

[1] Up to a 2X performance improvement with an Intel® Xeon® E-2200 processor-based entry server (4-yr refresh). Config: Tested at Intel Corp as of 6/03/2019, 1x Intel® Xeon® E-2288G Processor, Platform: Moss Beach 8, 4 x 16GB DDR4 2666 ECC(64GB 2666MHz) ,OS: Ubuntu 18.04.2 LTS (Kernel 4.15.0-47-generic), Benchmark: SPECrate2017_int_base (Estimated), Compiler: ICC 19.0.1.144, BIOS: CNLSE2R1.R00.X188.B13.1903250419, HT=On, Turbo=On, uCode:0xb0, Storage: SSD S4610 Series 1.92TB, Score: 56 (Estimated). Tested at Intel Corp as of 5/23/2019, 1x Intel® Xeon® Processor E3-1280v5, Platform: S1200SP, 4 x 16GB DDR4 2400MT/s ECC(64GB 2400MHz) ,OS: Ubuntu 18.04.2 LTS (Kernel 4.15.0-45-generic), Benchmark: SPECrate2017_int_base (Estimated), Compiler: ICC 19.0.1.144, BIOS: S1200SP.86B.03.01.1029.01252018838, HT=On, Turbo=On, uCode:0xc6, Storage: SSD S3710 Series 400G, Score: 28 (Estimated).

[2] Up to a 1.2X performance improvement with an Intel® Xeon® E-2200 processor-based entry server (gen-over-gen). Config: 1x Intel® Xeon® E-2288G Processor, Tested at Intel Corp as of 6/03/2019, Platform: Moss Beach 8, 4 x 16GB DDR4 2666 ECC(64GB 2666MHz) ,OS: Ubuntu 18.04.2 LTS (Kernel 4.15.0-47-generic), Benchmark: SPECrate2017_int_base (Estimated), Compiler: ICC 19.0.1.144, BIOS: CNLSE2R1.R00.X188.B13.1903250419, HT=On, Turbo=On, uCode:0xb0, Storage: SSD S4610 Series 1.92TB, Score: 56 (Estimated) compared to 1x Intel® Xeon® E-2186G Processor, Tested at Intel Corp as of 5/23/2019, Platform: Moss Beach, 4 x 16GB DDR4 2666 ECC(64GB 2666MHz), OS: Ubuntu 18.04.2 LTS (Kernel 4.15.0-45-generic), Benchmark: SPECrate2017_int_base (Estimated), Compiler: ICC 19.0.1.144, BIOS: CNLSE2R1.R00.X188.B13.1903250419, HT=On, Turbo=On, uCode:0xaa, Storage: SSD S3710 Series 400G, Score: 45.7 (Estimated).

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