

# Intel® Xeon® Processor D-1500 Product Family

(Intel® Xeon® Processors D-1527/D-1529/D-1539/D-1548/D-1559/D-1567/D-1577 and Intel® Pentium® Processors D1508/D1509/D1519)

**Support dense, ruggedized Internet of Things solutions with the advanced intelligence, high performance, low power, long-life reliability, and robust thermals of the Intel® Xeon® processor D-1500 family.**

## Internet of Things

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### Product Overview

As the Internet of Things (IoT) expands and technology solutions are expected to use less power and space while offering more reliability and performance, Intel is proud to introduce the Intel® Xeon® processor D-1500 product family. It is Intel's 3rd-generation 64-bit system-on-a-chip (SoC) and the first Intel Xeon SoC based on Intel 14nm silicon technology.

This lineup offers hardware and software scalability from two up to eight cores, making it the perfect choice for a broad range of high-performing, low-power solutions that will bring intelligence and Intel® Xeon® processor reliability, availability, and serviceability (RAS) to the edge. For applications where space is a premium, an integrated Platform Controller Hub (PCH) technology and Intel® Ethernet in a ball grid array (BGA) package offer an inspiring level of design simplicity.

### Enhanced Performance per Watt

The Intel Xeon processor D-1500 product family delivers exceptional value and unmatched performance density per watt with an Intel Xeon processor in an SoC package. Its TDP of ~19 W to 65 W, industry-leading 14 nm process technology, and a compute-only design make it ideal for meeting the diverse needs of customers seeking midrange low-power, high-density solutions—like those found in programmable logic controllers (PLCs), motion control devices, and avionics controllers.

The Intel Xeon processor D-1500 product family represents up to 2.3x greater performance per watt<sup>1</sup> and a scalable product lineup spanning two to eight cores, support for up to 128 GB of high-speed DDR4 memory, up to 12 MB of last-level cache, and two integrated ports of 10 Gb Intel Ethernet for ultra-fast connectivity.

Enjoy high system reliability and data integrity with support for error correction code (ECC) memory, single device data correction (SDDC), memory demand, patrol scrubbing, and much more with Intel Xeon processor-class RAS.

The Intel Xeon processor D-1500 product family also drives enhanced performance on floating point-intensive applications with 256-bit integer package processing from the newly integrated Intel® Advanced Vector Extensions 2 (Intel® AVX2) and fast, low-overhead encryption with Intel® Advanced Encryption Standard New Instructions (Intel® AES-NI).

**Expanded Hardware and Software Scalability**

The Intel Xeon processor D-1500 product family boasts hardware and software scalability from two to eight cores in a TDP of ~19 W to 65 W. Utilizing similar development tools and

processes as Intel® Core™, Intel® Atom™, and other Intel Xeon processors, the Intel Xeon processor D-1500 product family delivers broad application compatibility and software consistency from the data center to the edge. The reliable Intel x86 64-bit software support helps save time, cost, and validation.

It's an ideal platform for supporting a complete product line that meets a range of IoT requirements, including Intel Platform Storage Extensions, which allow smarter and more cost-effective storage solutions through integrated technologies that accelerate data movement, protect data, and simplify data management.

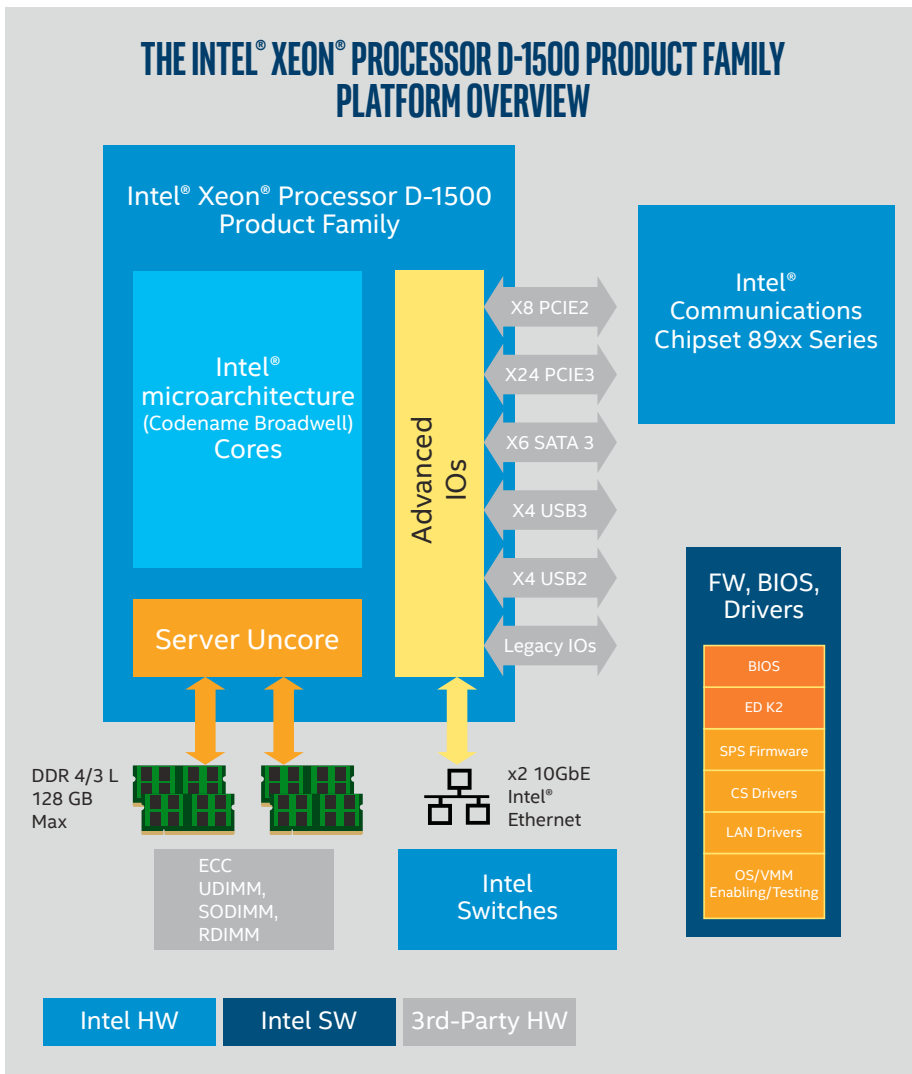
**Integrated SoC Solution**

Save on engineering time and cost thanks to the efficiency of a one-chip solution offered by the Intel Xeon processor D-1500 product family. It brings the performance and advanced intelligence of Intel Xeon processors into a dense, lower-power system-on-a-chip. It removes board design complexity by integrating Platform Controller Hub technology and Intel Ethernet, and by utilizing and an integrated heat spreader and a BGA package to meet TDP targets. For applications where space is at a premium, like ruggedized IoT designs, valuable board space will be conserved for other components.

**Enabling More IoT Use Cases**

The Intel Xeon processor D-1500 product family drives a host of new IoT opportunities for a wide range of environments, while addressing real-time optimization, and workload consolidation. Its temperature rating spans from -40 °C to 85 °C operating ambient conditions, which establishes new possibilities for Intel® architecture in markets that require robust products, like aerospace and industrial. New solutions are enabled for AdvancedMC\*, CompactPCI\*, COM Express\*, and many embedded applications in IoT.

The design of the Intel Xeon processor D-1500 product family reduces engineering and development costs as well as total cost of ownership, by allowing several applications to run in an end design on one consolidated system with built-in Intel® Virtualization Technology. Performance is further enhanced in virtualized and cloud environments by taking advantage of Intel® Cache Monitoring Technology (Intel® CMT), Intel® Cache Allocation Technology (Intel® CAT) and Intel® Memory Bandwidth Monitoring Technology (Intel® MBM) for near-native compute and I/O performance that leads to improvements in service level and infrastructure management.



## KEY FEATURES

### ENHANCED PERFORMANCE PER WATT

**Memory:** Up to 12 MB of last-level cache, support for 128 GB DDR4. Powerful performance that enables intensive activities like large image processing.

**Intel® Advanced Vector Extensions 2 (Intel® AVX2):** Drive enhanced performance on floating point-intensive applications with 256-bit integer package processing.

### EXPANDED HARDWARE/SOFTWARE SCALABILITY

**2–16 cores:** Choose from a wide selection of processors to find a perfect fit for your technology solution.

**Intel platform storage extensions:** Support smarter and more cost-effective storage solutions through integrated technologies that accelerate data movement, protect data, and simplify data management.

**x86 64-bit software support:** Use similar development tools and processes as many different Intel® processors to save time, cost, and validation.

**Thermal design power (TDP) of ~19 W to 65 W:** A wide TDP range enables designs that are truly scalable, creating opportunities for many different usage scenarios.

### INTEGRATED SoC SOLUTION

**Platform Controller Hub technology:** Address more programmable logic controller (PLC) opportunities, midrange robotics applications, and data access points that are compute-centric.

**Intel® Ethernet:** Two integrated ports of 10 Gb Ethernet. Save space and design time with an integrated design that speeds the communication of components.

**Ruggedized BGA with Integrated Heat Spreader:** Simplifies the design of systems where space is at a premium and reduces the total cost of ownership.

### ENABLING MORE IoT SOLUTIONS

**Extended temperature rating of -40 °C to 85 °C:** The first Intel® Xeon® processor to operate at a temperature span this wide.

**Intel® Xeon® processor-class RAS:** High system reliability and data integrity with Intel Xeon processor-class reliability, availability, and serviceability (RAS) for added coverage for mission-critical applications.

**Intel® Cache Monitoring Technology (Intel® CMT), Intel® Cache Allocation Technology (Intel® CAT) and Intel® Memory Bandwidth Monitoring Technology (Intel® MBM):** Achieve near-native compute and I/O performance and better service level and infrastructure management.

**Intel® Virtualization Technology (Intel® VT):** Run several devices in an end design on one consolidated system reducing engineering and development costs as well as total cost of ownership.

**Intel® Advanced Encryption Standard New Instructions (Intel® AES-NI) and Intel® Secure Key Instructions:** Experience fast, low-overhead encryption.

**Extended supply life, 10-year reliability:** Save time and money on upgrades and replacing hardware.

**Robust thermal specifications:** High thermal specifications that allow operation in dense, thermally constrained environments.



### Industrial Sector

Increasing automation in the industrial sector is driving demand for technology solutions that are designed for IoT from the ground up. The Intel® Xeon® processor D-1500 product family offers distinct advantages both in capability and cost-effectiveness for IoT applications. The integrated SoC design opens more programmable logic controller (PLC) opportunities and midrange robotics applications, while reducing equipment footprint and engineering and development costs.



### Military/Aerospace/ Government (MAG)

Demanding, rugged environmental factors, as well as reliability and security concerns, ask a great deal of processors in the MAG sector, such as those found in synthetic aperture radar/lidar and multispectral sensor integration, to image/signal processing, and electronics warfare. The Intel Xeon processor D-1500 product family opens up new opportunities for innovation by meeting or exceeding those requirements with a highly scalable, secure, and generationally-stable Intel® architecture. It also lowers costs and development cycles by allowing you to adopt commercial off-the-shelf (COTS) processors and discontinuing reliance on ASIC- or FPGA-based solutions.

## PLANNED OPERATING SYSTEM SUPPORT

OS VENDORS	OPERATING SYSTEM SUPPORT (64B)	DISTRIBUTION	SUPPORT	BIOS VENDORS
Microsoft	Windows* Server 2016	Microsoft	Intel/Microsoft	American Megatrends Inc. Insyde Software Phoenix Technologies BYOSOFT
	Windows* Server 2012 R2	Microsoft	Intel/Microsoft	
	Windows* Server 2008 R2 SP1	Microsoft	Intel/Microsoft	
	Windows* 7	Microsoft	Intel/Microsoft	
	Windows* 8.1	Microsoft	Intel/Microsoft	
	Windows* 10 Enterprise	Microsoft	Intel/Microsoft	
Linux / Opensource	Red Hat* Enterprise Linux* Server (RHEL)	Opensource	Red Hat	American Megatrends Inc. Insyde Software Phoenix Technologies BYOSOFT
	Novell SUSE* Linux* Enterprise Server (SUSE)		Novell	
	Wind River* Linux*		Wind River	
	CentOS *		Community	
	Yocto*		Yoctoproject.org	
	FreeBSD *		Community	
	Fedora*		Community	
Ubuntu*	Canonical Ltd.			
Hypervisor & VM support	Xen* and KVM*	Opensource	Community	
	ESXi*		VMware, Inc.	
	VMware		VMware, Inc.	
RTOS	VxWorks* 7	Wind River Systems		

Not all features are supported. Contact your local Intel representative for more information.

## INTEL® XEON® PROCESSOR D-1500 PRODUCT FAMILY FOR INTERNET OF THINGS

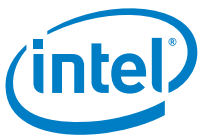
PROCESSOR NUMBER	CORES/ THREADS	BASE FREQUENCY	ALL CORE TURBO (MAX)	INTEL® SMART CACHE	THERMAL DESIGN POWER	PACKAGE	INTEL® AES-NI	INTEL® AVX	EXTENDED TEMP
D-1577	16C/32T	1.3 GHz	1.6	24 MB	45 W	BGA 1667	Yes	2.0	No
D-1567	12C/24T	2.1 GHz	2.4	18 MB	65 W	BGA 1667	Yes	2.0	No
D-1559	12C/24T	1.5 GHz	1.8	18 MB	45 W	BGA 1667	Yes	2.0	Yes
D-1548	8C/16T	2 GHz	2.3	12 MB	45 W	BGA 1667	Yes	2.0	No
D-1539	8C/16T	1.6 GHz	1.9	12 MB	35 W	BGA 1667	Yes	2.0	Yes
D-1529	4C/8T	1.3 GHz	1.3	6 MB	20 W	BGA 1667	Yes	2.0	Yes
D-1527	4C/8T	2.2 GHz	2.5	6 MB	35 W	BGA 1667	Yes	2.0	No

## INTEL® PENTIUM® PROCESSORS D1519, D1509 AND D1508

D1519	4C/8T	1.5 GHz	1.8	6 MB	25 W	BGA 1667	Yes	2.0	Yes
D1509	2C/2T	1.5 GHz	1.5	3 MB	19 W	BGA 1667	Yes	2.0	No
D1508	2C/4T	2.2 GHz	2.5	3 MB	25 W	BGA 1667	Yes	2.0	No

## For More Information

Learn more at [intel.com/iot](http://intel.com/iot).



### 1. Intel® Xeon® D-1548 vs. Intel® Core™ i7-4702EC

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. Results have been simulated and are provided for informational purposes only. Results were derived using simulations run on an architecture simulator or model. Any difference in system hardware or software design or configuration may affect actual performance. Configurations: SPECint\*\_rate\_base2006. Intel® Xeon® processor D-1548 (8C, 2.0 GHz, QS, 64GB, HT on, Turbo on) vs. Intel® Core™ i7-4702EC (4C, 2.0GHz, 32GB, Turbo on)/Intel® Communications Chipset 8955. For more complete information visit [intel.com/performance](http://intel.com/performance).

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