

PRODUCT BRIEF

Intel® Itanium® Processor 9500 Series  
Mission Critical Computing



# Intel® Itanium® Processor 9500 Series

Delivering unprecedented capabilities  
for resilient enterprise computing

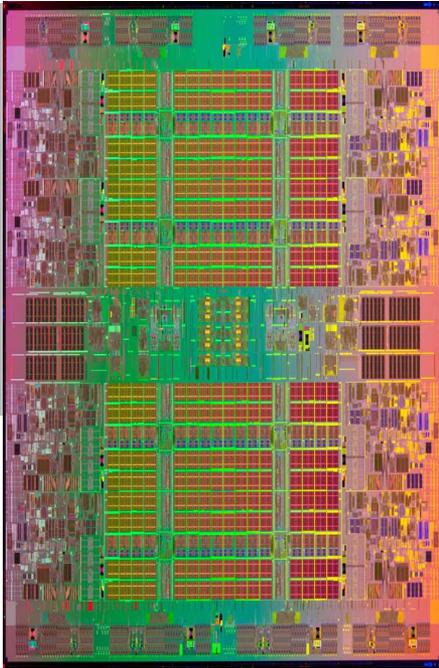


## The State-of-the-Art Intel® Itanium® processor 9500 series

The new Intel® Itanium® processor 9500<sup>9</sup> series features a brand new microarchitecture to deliver breakthrough performance, reliability, and power efficiency. With up to 8 high performance cores, up to 54MB total cache, and support for twice the memory capacity compared to prior generation<sup>1</sup>, Intel Itanium processor 9500 series brings a new level of enterprise performance<sup>2</sup> along with enhanced mainframe-class reliability, availability, serviceability (RAS) features to provide both powerful processing and always-on mission-critical experience.

## Top-of-The-Line in mission-critical computing

The Intel® Itanium® processor family delivers highly scalable performance for UNIX\* and mainframe environments, plus world-class availability for mission-critical applications. Together with field proven hardened operating system environments such as HP-UX\*, HP\* Nonstop\*, OpenVMS\*, Bull\* GCOS\*, NEC\* ACOS\*, etc., servers based on Intel Itanium processor family are ideal for today's most demanding workloads, including database applications, data warehousing, large-scale ERP, and business analytics.



**Intel Itanium processor 9500 series die.**  
8 cores, 32MB Last Level Cache, and over 3.1 Billion transistors.

### Ultimate resiliency capabilities to protect your most valuable data

Servers built on Intel Itanium processor 9500 series provide automatic detection and recovery from many types of otherwise uncorrectable errors. In addition, Intel Itanium processors are architected with error prevention in mind. Many errors are prevented in the first place through the wide adoption of hardened circuits. Along with a vast array of RAS features, Intel Itanium processors deliver the process resiliency, data integrity, and world class system uptime that major enterprises depend on. A highlight of some key capabilities:

- **Intel® Instruction Replay Technology<sup>6</sup>**  
A new capability to enable errant instructions to be re-issued and thereby automatically recover from severe errors to help prevent system crashes and data corruptions.
- **End-to-end error detection<sup>6</sup>**  
Intel Itanium processor 9500 series provides extensive end-to-end error detection for both data and instruction along with enhanced data correction capabilities<sup>1</sup>. Your precious data are protected from the moment they are loaded on the processor.
- **Intel® Cache Safe Technology<sup>6</sup>**  
Intel Itanium processor's predictive error handling feature detects and prevents likely cache line errors. Potentially faulty cache lines are mapped out from future use to improve data integrity.
- **Complete MCA with firmware first error handling<sup>6</sup>**  
Intel Itanium processors support MCA-Recovery, MCA handling of errors in execution path, and in IO. Furthermore, Intel Itanium processor's firmware first error handling enables additional error recovery options and provides a consistent error handling experience across multiple mission-critical applications.

### Optimized performance for your most data-intensive applications

Intel Itanium processor 9500 series delivers a big leap of performance, up to 2.4x performance scaling<sup>2,3</sup> over the previous Intel Itanium processor 9300 series, and provides massive scalability for efficient data warehousing and processing. With up to 8 cores and 16 threads, up to 54MB total cache including up to 32MB of last-level cache, and support for up to 2TB of low voltage DIMMs (in 4 socket config.), Intel Itanium processor 9500 series is ideal for the most demanding ERP, SCM, CRM, and other highly availability workloads.

- **Intel® Hyper-Threading Technology<sup>4</sup>, enhanced with dual-domain-multi-threading support**  
New Intel Itanium processor 9500 series architecture enables independent front and backend pipeline execution to improve multi-thread efficiency and performance for both new and existing applications.
- **Advanced Explicitly Parallel Instruction Computing (EPIC) architecture**  
Intel Itanium processor 9500 series takes instruction parallelism to the next level by maximizing execution throughput. The new architecture doubles the capacity of instruction retirement from 6 instructions per cycle to a maximum 12 instructions per cycle per core.
- **Intel® Itanium processor New-Instructions<sup>6</sup>**  
Intel Itanium processor 9500 series supports new instructions to help simplify common tasks for performance improvements, and to lay the foundation for the future of Intel Itanium processor based computing.

▪ **Full compatibility with legacy applications**

Intel Itanium processor 9500 series offers an easy path for speeding up existing applications for users who value IT stability. No costly recompilation or application re-qualification is required to take advantage of the new Intel Itanium processor architecture.

**Intelligent power efficiency features maximize your utilization and reduce costs**

Intel Itanium processor 9500 series helps IT organizations meet today's power and thermal challenges by reducing not just overall power<sup>1</sup>, but also cutting dynamic and leakage power substantially. The result is the most power efficient Intel Itanium processor developed.

▪ **Intel® Turbo Boost Technology<sup>8</sup>, featuring sustained boost**

Intel Itanium processor 9500 series employs advanced power monitoring and control to deliver a higher processor boost frequency at all times, for maximum performance on all workloads. The result is higher thermal envelop utilization for more overall performance.

▪ **Memory dynamic clock enable support<sup>6</sup>**

Intel Itanium processor 9500 series sup-

ports enhanced DIMM clock gating<sup>6</sup> to reduce system power consumption.

**Powerful platform for virtualization and consolidation**

Servers based on Intel Itanium processor 9500 series provide an ideal platform for data center consolidation. They are built to handle massive workloads and support multiple consolidation strategies, including:

▪ **Hard (Physical) Partitioning<sup>6</sup>**

Intel Itanium processor 9500 series supports system partitioning with full electrical isolation and dynamic allocation of resources among running partitions. This enables complete workload isolation for mission-critical applications, while providing the flexibility to scale resources as needed to deliver consistent and reliable performance. It also enables hardware maintenance without bringing down the system.

▪ **OS partitions for high consolidation efficiency<sup>6</sup>**

OS partitions enable multiple applications to operate under a single OS, while each appears to have a dedicated OS. This capability is provided by special manageability firmware and is therefore independent of the OS.

▪ **Virtual partitions for the most granular and dynamic control of resources<sup>7</sup>**

Intel Itanium processor 9500 series includes enhanced Intel® Virtualization Technology<sup>7</sup>. This third-generation virtualization extension provides additional hardware assists for virtualization to further improve performance and capacity in each partition, to increase reliability and resiliency of virtualized environments, and to provide better and more flexible sharing of server and data center resources.

**Flexible common platform ingredients**

Intel Itanium processor 9500 series based servers share many common platform ingredients with Intel Xeon processor E7 family such as the chipset, memory buffer, interconnects, and industry standard memory, to bring the volume economics of the Intel Xeon server industry to the Intel Itanium platform. Intel Itanium processor 9500 series is compatible with Intel 7500 Chipset and a number of node controllers<sup>5</sup> and chipsets from OEM partners.

**Intel® Itanium® Processor 9500 Series Product SKUs**

PROCESSOR NUMBER <sup>A</sup>	OPTIMIZED FOR	CORES / THREADS	LAST LEVEL CACHE (L3)	POWER	CPU FREQUENCY
Intel® Itanium® Processor 9560	Performance	8 / 16	32 MB	170 W	2.53 GHz
Intel® Itanium® Processor 9550	Performance per core	4 / 8	32 MB	170 W	2.4 GHz
Intel® Itanium® Processor 9540	Price Performance	8 / 16	24 MB	170 W	2.13 GHz
Intel® Itanium® Processor 9520	Value	4 / 8	20 MB	130 W	1.73 GHz

**Table 1.** Intel Itanium processor 9500 series offers a variety of SKUs for system and application optimization. All SKUs come with full RAS, performance, power efficiency and virtualization feature support.

## Intel® Itanium® Processor 9500 Series Feature Overview

### Features

### Benefits

Up to 8 cores and 16 threads per socket with Intel® Hyper-Threading Technology <sup>2</sup> , enhanced with dual-domain multithreading	<ul style="list-style-type: none"> <li>Increases performance and scalability for the most data-demanding, mission-critical applications.</li> <li>Improves compute performance and system utilization.</li> <li>Enables powerful processing for mission-critical UNIX-based operating environments.</li> </ul>
New Intel® Itanium® Processor 9500 Series Microarchitecture (Poulson)	<ul style="list-style-type: none"> <li>Boosts parallelism at all levels with advanced EPIC architecture, including the ability to retire up to 12 instructions per cycle per core, to improve performance on multiple applications/user environments and data-demanding workloads, while enabling denser data center deployments.</li> </ul>
Large addressable memory to 1024 Terabytes	<ul style="list-style-type: none"> <li>Holds vast datasets in main memory for faster processing in large SMP configurations.</li> <li>Supports massively scalable deployments and high availability workloads.</li> </ul>
Up to 54 MB total cache; 32 MB last-level cache	<ul style="list-style-type: none"> <li>Promotes fast access to data and improved throughput for memory-intensive applications.</li> </ul>
Intel® Itanium® New-Instructions	<ul style="list-style-type: none"> <li>Boosts performance and lower processor overhead with new instructions to speed up common tasks.</li> </ul>
Intel® Instruction Replay Technology	<ul style="list-style-type: none"> <li>Improves on Intel Itanium's world class RAS capabilities for higher availability and data integrity.</li> </ul>
Complete Machine Check Architecture, with firm-ware first error handling	<ul style="list-style-type: none"> <li>Delivers intelligent handling of multiple classes of rare errors to minimize service interruption and increases system level resiliency.</li> </ul>
Intel® Cache Safe Technology	<ul style="list-style-type: none"> <li>Enables predictive error handling to safeguard against persistent cache errors.</li> </ul>
End-to-end error detection	<ul style="list-style-type: none"> <li>Provides world-class data integrity to protect your most valuable data.</li> </ul>
Intel® Virtualization Technology <sup>5</sup>	<ul style="list-style-type: none"> <li>Enables 3<sup>rd</sup> generation virtualization extensions for better workload isolation, reduced latency and less overhead when consolidating application in virtualized environments.</li> </ul>
Directory-based Cache Coherency	<ul style="list-style-type: none"> <li>Improves cache efficiency and lowers inter-system communication overhead for better scalability in large SMP configurations.</li> </ul>
Intel® Turbo Boost Technology <sup>6</sup> , featuring sustained boost	<ul style="list-style-type: none"> <li>Delivers power to areas where it is needed most to achieve higher performance for all workloads, with better thermal envelop utilization.</li> </ul>
Demand Based Switching	<ul style="list-style-type: none"> <li>Dynamically optimizes voltage and frequency to reduce energy consumption during typical CPU utilization to reduce energy costs.</li> </ul>

For more information on Intel® Itanium® Processor Family, visit [www.intel.com/Itanium](http://www.intel.com/Itanium)

<sup>1</sup> Based on Intel measurements comparing Intel Itanium processor 9560 with Intel Itanium processor 9350.

<sup>2</sup> 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.

<sup>3</sup> Configuration: Intel internal test systems, with 4S, MT, 1TB memory. OLTP benchmark run by Intel test team at least 3 times, reporting mean. For more information go to <http://www.intel.com/performance>. Relative performance is calculated by assigning a baseline value of 1.0 to one benchmark result, and then dividing the actual benchmark result for the baseline platform into each of the specific benchmark results of each of the other platforms, and assigning them a relative performance number that correlates with the performance improvements reported.

<sup>4</sup> Hyper-Threading Technology requires a computer system with an Intel® processor supporting HT Technology and a HT Technology enabled chipset, BIOS and operating system. Performance will vary depending on the specific hardware and software you use. See [http://developer.intel.com/products/ht/Hyperthreading\\_more.htm](http://developer.intel.com/products/ht/Hyperthreading_more.htm) for additional information.

<sup>5</sup> Node controllers are an area in which server vendors can add unique value in their system designs (such as additional RAS and manageability features), so some may continue to design and integrate node controllers even in their 4-socket and 8-socket system designs.

<sup>6</sup> Some features are supported fully in silicon and are performed automatically and transparently. Others require additional support from the firmware, platform or OS and may not be supported in all systems.

<sup>7</sup> Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, virtual machine monitor (VMM) and, for some uses, certain platform software enabled for it. Functionality, performance or other benefits will vary depending on hardware and software configurations and may require a BIOS update. Software applications may not be compatible with all operating systems. Please check with your application vendor.

<sup>8</sup> Intel® Turbo Boost Technology requires a platform with a processor with Intel Turbo Boost Technology capability. Intel Turbo Boost Technology performance varies depending on hardware, software and overall system configuration. Check with your platform manufacturer on whether your system delivers Intel Turbo Boost Technology. For more information, see <http://www.intel.com/technology/turboboost>.

<sup>9</sup> Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. See [http://www.intel.com/products/processor\\_number](http://www.intel.com/products/processor_number) for details.

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