

Intel® Xeon® Processor E7 Series

What's new about the Intel® Xeon® Processor E7 Series (formerly codenamed Westmere-EX)?

Platform	Processor	Socket	Chipset
Intel Xeon E7 Series Processors and the Intel 7500 Chipset <i>(formerly codenamed "Boxboro-EX")</i>	Intel Xeon E7 Series Product Family <i>(formerly codenamed "Westmere-EX")</i>	LS	Intel 7500 Chipset

- **Up to 10 cores. Up to 20 threads. Up to 30MB shared cache.**
Dynamically scalable microarchitecture offers up to 10 cores per socket, 2 threads per core, and 30MB shared cache.
- **Intel® Scalable Memory Interconnect (SMI) and Scalable Memory Buffers (SMB)**
The integrated SMI offers high-speed serial links to the SMBs, which support cost-effective, commodity RDDR3 memory. 2 integrated memory controllers per socket accommodate high-capacity bandwidth, up to 8 DIMMs per memory controller, and 4 DDR Channels.
- **Partial Memory Mirroring**
Reduces the cost of memory mirroring by mirroring just the critical portion of memory versus mirroring the entire memory space.
- **Recoverable Machine Check Architecture**
The first machine check recovery in Intel Xeon Processor-based systems works in conjunction with firmware and OS to recover or restart processes to continue normal operation.
- **Advanced Instruction Sets**
Intel® AES-NI (Advanced Encryption Standard New Instructions) accelerates encryption and decryption speeds, allowing broader use of encryption to improve data security.
Intel® Advanced Vector Extensions (AVX) Instructions deliver improved performance on floating point-intensive applications.
- **Intel® Virtualization Technology (Intel VT-x, VT-d, VT-c)**
Higher-level VMM Functions, including resource discovery, provisioning, scheduling, and user interface. Processor virtualization, memory virtualization, I/O device virtualization.

Designed for the most demanding applications and large-scale consolidations.

Expert included.



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Product Specifications

Process	TDP ¹	CPU Number	Frequency	Cores / Threads	Cache	Link Speed	Max Mem Speed ²	Turbo Boost ³	HT	
32nm	130W	E7-8837	2.66 GHz	8 / 8	24 MB	6.4 GT/s	1066 MHz	1 / 1 / 1 / 1	No	
		E7-8870	2.40 GHz		30 MB					
		E7-4870	2.40 GHz		30MB					
	130W	E7-8860	2.26 GHz	10 / 20	24 MB	6.4 GT/s	1066 MHz	1 / 1 / 2 / 3 / 3	Yes	
		E7-4860	2.26 GHz		24 MB					
		E7-8850	2.00 GHz		24 MB					
		E7-4850	2.00 GHz		24 MB					
	LOW POWER	105W	E7-8867L	2.13 GHz	10 / 20	30 MB	6.4 GT/s	1066 MHz	1 / 1 / 2 / 3 / 3	Yes
			E7-8830	2.13 GHz		24 MB	6.4 GT/s			
		105W	E7-4830	2.13 GHz	8 / 16	24 MB	6.4 GT/s	1066 MHz	1 / 1 / 1 / 2	Yes
E7-4820			2.00 GHz		18 MB	5.86 GT/s				
95W	E7-4807	1.86 GHz	6 / 12	18 MB	4.80 GT/s	1066 MHz	n/a	Yes		

1 TDP is Thermal Design Power

2 Only DDR3-1333 RDIMMs will be validated at speeds of 800, 978, and 1066MHz. DDR3-1066 RDIMMs running at 1066, 978, and 800MHz will be supported, but not validated by Intel.

3 Max Turbo Boost frequency based on number of 133-MHz increments above base frequency (+2 = 0.266 GHz, +3 = 0.400 GHz). See pages 5 and 6 for information about interpreting the Turbo Boost specification.

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Memory Overview

Platform capability:

- Up to 4 channels per CPU
- Up to 4 DIMMs per channel

Memory types supported:

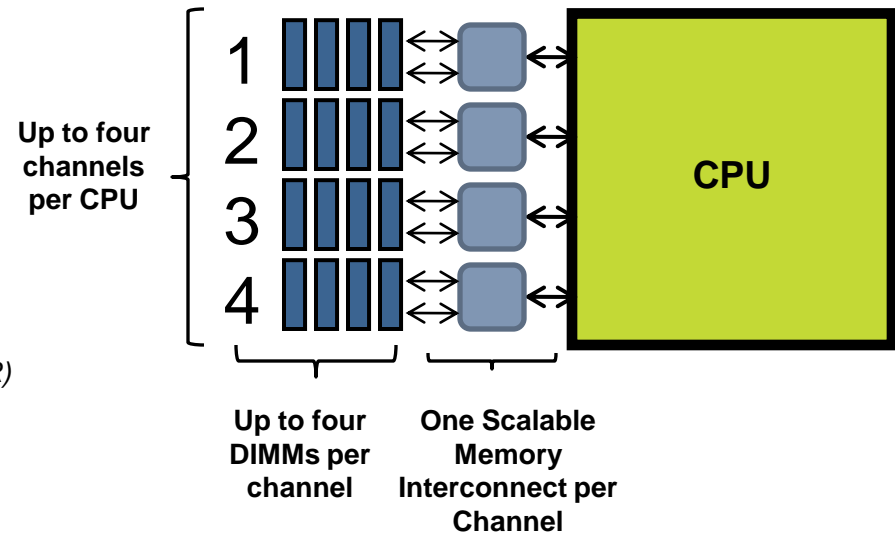
- DDR3-1333 RDIMMs validated at speeds of 800, 978, and 1066 MHz
- DDR3-1066 RDIMMs running at 1066, 978, and 1066MHz will be supported, but not validated.
- Single-rank (SR), dual-rank (DR), or Quad-Rank (QR)

Memory Restrictions

- 32GB support dependent upon DIMM availability.

All channels in a system will run at the fastest common frequency:

- Example: If you populate 4 DIMMs at 1333 MHz in Channels 1, 2, and 3, and 4 DIMMs at 800 MHz in Channel 4, all DIMMs will run at 800 MHz.



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RDIMM Support

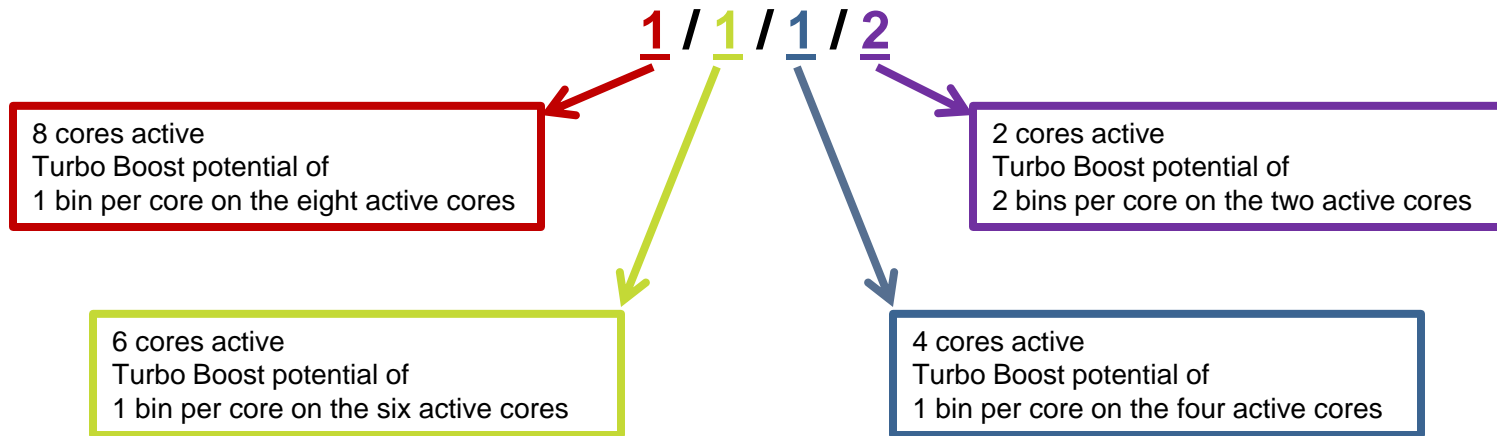
DIMM Slots per DDR Channel	DIMMs Populated per DDR Channel	DIMM Type	POR Speeds	Ranks per DIMM (any combination)
1	1	Registered DDR3 ECC	800 MHz, 978 MHz, 1066 MHz	Single, Dual, or Quad Rank
2	1	Registered DDR3 ECC	800 MHz, 978 MHz, 1066 MHz	Single, Dual, or Quad Rank
2	2	Registered DDR3 ECC	800 MHz, 978 MHz, 1066 MHz	Mixing Single Rank, Dual Rank, and Quad Rank

Population Rules:

1. Any combination of x4 and x8 RDIMMs with 1, 2, or 4Gb DRAM density.
2. Populate DIMMs starting with slot 0.
3. When mixing quad rank with single rank or dual rank on the same DDR channel, put the quad rank DIMM in slot 0.

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Interpreting the Turbo Boost Specification



- This example is based on the Intel Xeon Processor E7-8830: 8 cores, 2.13 GHz, with a Turbo Boost specification of 1 / 1 / 1 / 2. **Note: Each Turbo Boost increment applies to 2 cores at a time for the E7-8800/4800 Series.**
- When thermal headroom exists or a core is idle, Turbo Boost increases the base frequency of the cores.
- The frequency increases take place in increments (“bins”) of 133 MHz (.133 GHz).
- The first number corresponds to the boost potential of 1 bin per core when all eight cores are active. The second number refers to the boost potential of 1 bin per core when six cores are active. The third number refers the boost potential of 1 bin per core when four cores are active. The fourth number refers to the boost potential of 2 bins per core when two cores are active.

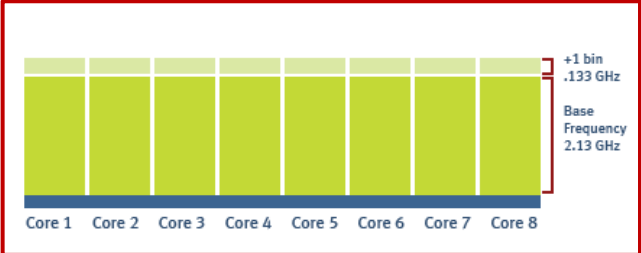


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Interpreting the Turbo Boost Specification

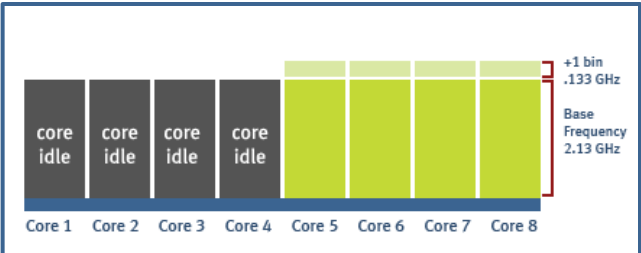
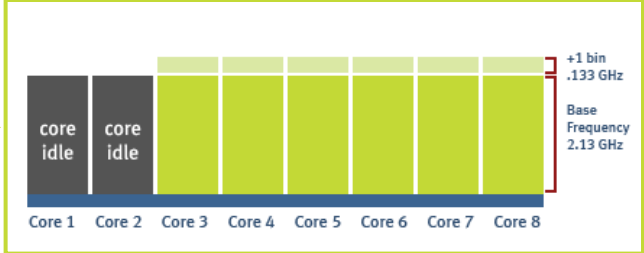
1 / 1 / 1 / 2

Base Frequency: 2.13 GHz
Incremental Increase: .133 GHz



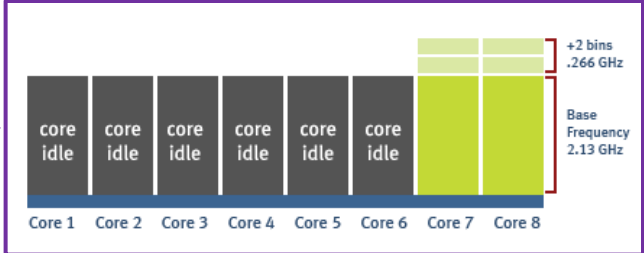
In Use: 8 cores
Turbo Boost: 1 bin
Boosted Frequency: 2.263 GHz

In Use: 6 cores
Turbo Boost: 1 bin
Boosted Frequency: 2.263 GHz



In Use: 4 cores
Turbo Boost: 1 bin
Boosted Frequency: 2.263 GHz

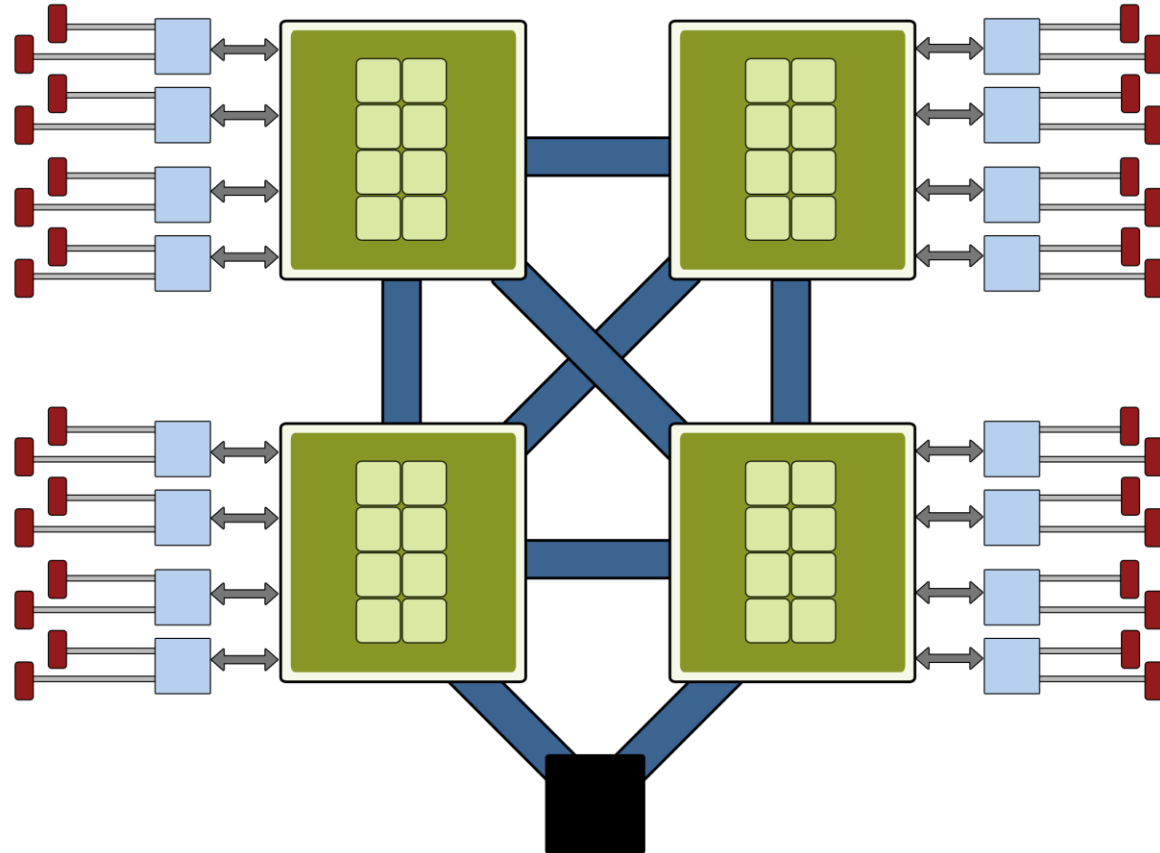
In Use: 2 cores
Turbo Boost: 2 bins
Boosted Frequency: 2.396 GHz



Expert included.

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Processor Block Diagram for 4P Mainboards



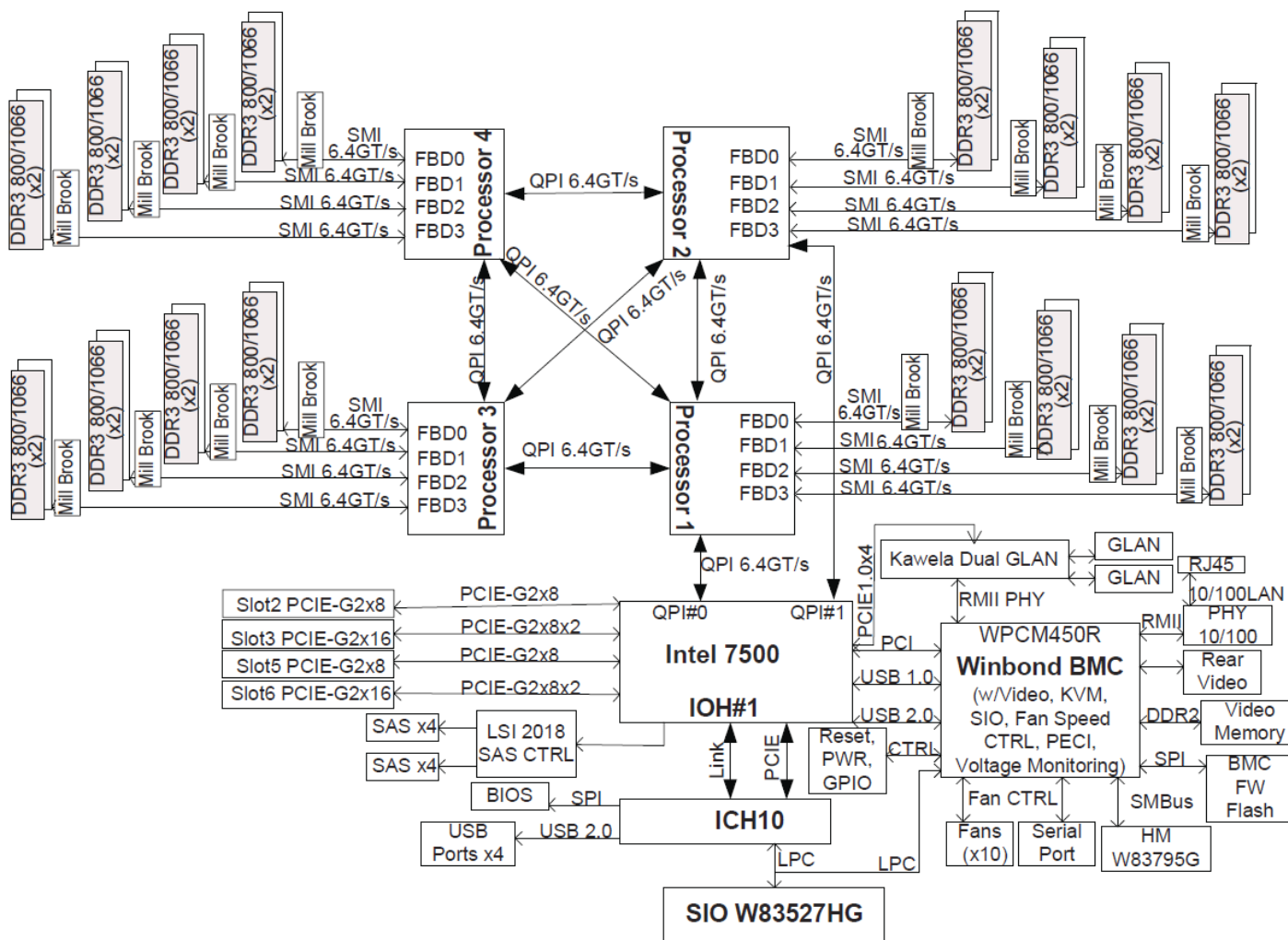
- | | | | |
|-------------------------|------------|------------|--------------|
| Cores | DDR3 DIMMs | SMI Links | 7500 I/O Hub |
| Scalable Memory Buffers | QPI Links | DDR3 Links | |

Expert included.



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Sample 4P Board Diagram (Rackform iServ R413 and R422)



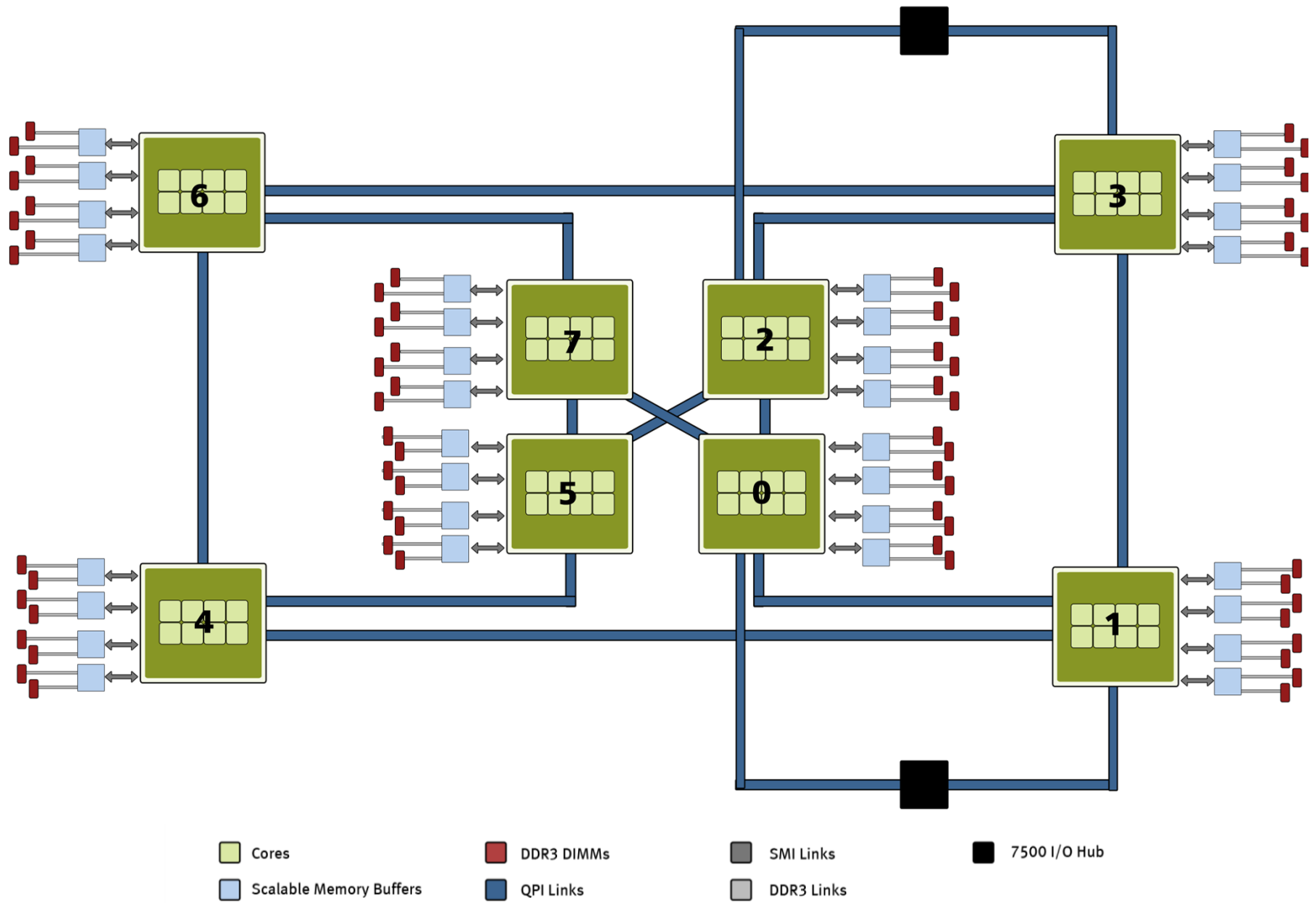
Expert included.





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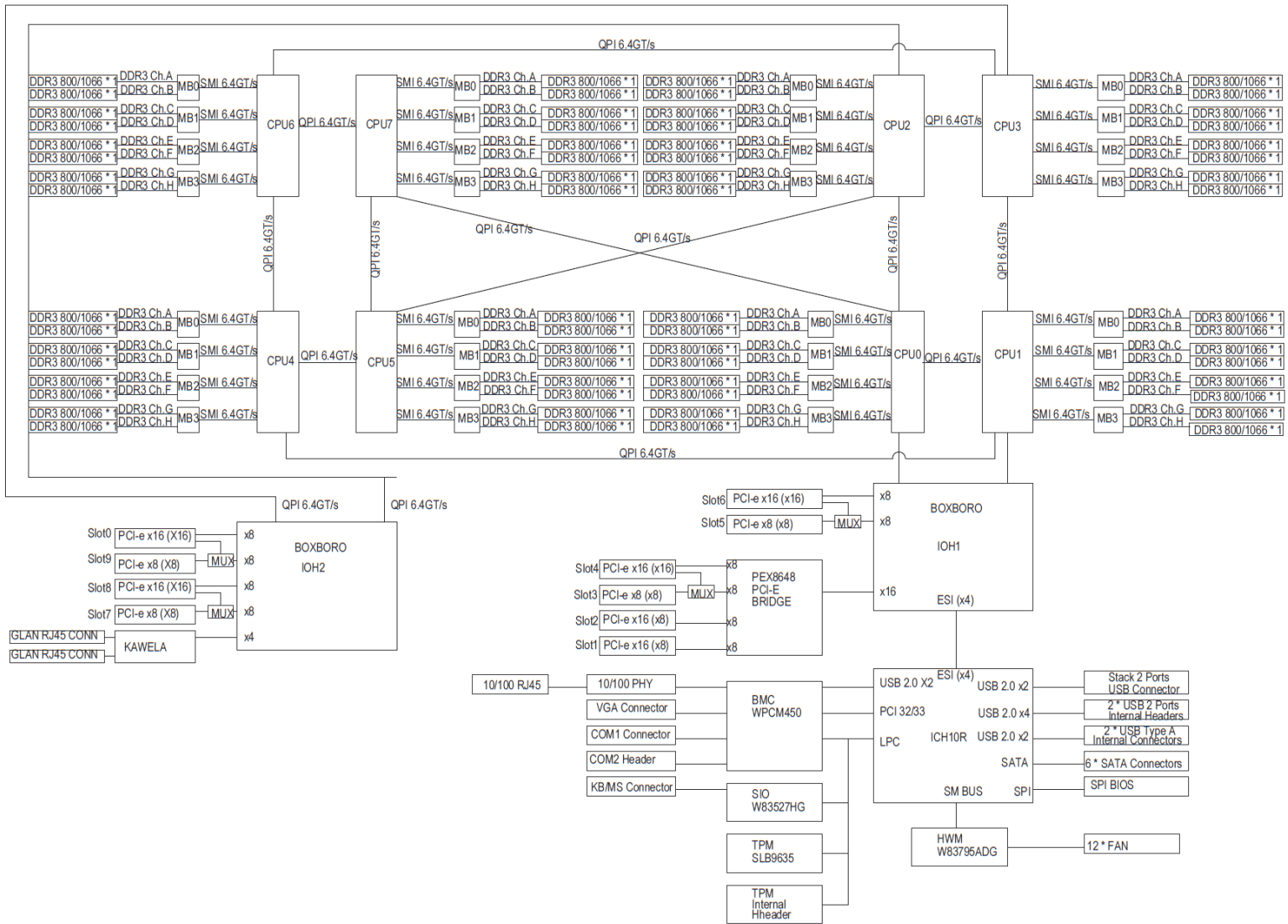
Processor Block Diagram for 8P Mainboards



Expert included.

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Sample 8P Board Diagram (Rackform iServ R485)



Expert included.



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Rackmount Servers with Intel® Xeon® Processor E7 Series

- [Rackform iServ R413.v2](#)
- [Rackform iServ R422.v2](#)
- [Rackform iServ R485](#)

Expert included.



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Contact Silicon Mechanics

For answers regarding processor selection, memory matching, or other questions you may have, contact one of the Experts at Silicon Mechanics:

Email: sales@siliconmechanics.com

Toll Free: 866.352.1173

www.siliconmechanics.com

Expert included.

