



# Intel® Xeon™ Processor 5500 Series

## What's new about the Intel Xeon Processor 5500 Series (codenamed Nehalem)?

- **Integrated Memory Controller featuring QuickPath Interconnect (QPI)**  
*QuickPath Technology means that each processor core features an integrated memory controller and high-speed interconnect, linking processors and other components to deliver dynamically scalable interconnect bandwidth, outstanding memory performance and flexibility, and tightly integrated interconnect reliability, availability, and serviceability (RAS).*
- **Intel® Turbo Boost Technology**  
*Turbo Boost delivers additional performance automatically when needed by taking advantage of the processor's power and thermal headroom. This enables increased performance of both multi-threaded and single-threaded workloads.*
- **Intel® Hyper-Threading Technology**  
*Hyper-Threading allows thread-level parallelism on each processor resulting in more efficient use of processor resources. With higher processing throughput, you enjoy substantially improved performance.*
- **DDR3 Memory**  
*The move to DDR3 memory offers increased performance due to higher memory speeds, and reduced power consumption compared to FB-DDR2 memory operating at the same speed.*
- **Improved Energy Efficiency**  
*The new Intel microarchitecture allows for more efficient load and idle performance. Core states are managed in response to demand in order to remain within the thermal envelope.*

**Dramatically Increased Performance**

**Dramatically Decreased Energy Consumption**

**Expert included.**



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## Product Specifications

TDP	CPU Number	Usage	Cores	Cache	Link Speed	Max Mem Speed	Turbo Boost †	HT
95W	X5570 (2.93 GHz)	Advanced	4	8MB	6.4 GT/s	1333 MHz	+3	✓
	X5560 (2.80 GHz)							
	X5550 (2.66 GHz)							
80W	E5540 (2.53 GHz)	Standard	4	8MB	5.86 GT/s	1066 MHz	+2	✓
	E5530 (2.40 GHz)							
80W	E5520 (2.26 GHz)	Low Power	2 - 4	4MB	4.8 GT/s	800 MHz	No Turbo	No HT
	E5506 (2.13 GHz)							
	E5502 (1.86 GHz) <small>2 cores</small>							
60W	L5520							
	L5506							
80W	E5504 (2.00 GHz)	Basic	2 - 4	4MB	4.8 GT/s	800 MHz	No Turbo	No HT
	E5502 (1.86 GHz) <small>2 cores</small>							

Value-add features available on higher-end processors.

† Max Turbo Boost frequency based on number of 133-MHz increments above base frequency (+2 = 0.266 GHz, +3 = 0.400 GHz)

Expert included.



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## Matching Processor to Memory: Selection Guidance

Memory Requirement	Max Bandwidth	Balanced Performance	Max Capacity
Sample Deployments	HPC	General Purpose Enterprise Workloads	Virtualized Environment
Memory Technology	DDR3 1333 32 GB/s 48GB (max)	DDR3 1066 25.5 GB/s 96 GB (max)	DDR3 800 19.2 GB/s 144 GB (max)
Available CPU Options			
<b>Advanced</b> 95W <ul style="list-style-type: none"> <li>8M cache</li> <li>6.4 GT/s QPI</li> <li>HT</li> <li>Turbo Boost</li> </ul>	<b>X5570</b> 2.93 GHz <b>X5560</b> 2.80 GHz <b>X5550</b> 2.66 GHz	<b>X5570</b> 2.93 GHz <b>X5560</b> 2.80 GHz <b>X5550</b> 2.66 GHz	<b>X5570</b> 2.93 GHz <b>X5560</b> 2.80 GHz <b>X5550</b> 2.66 GHz
<b>Standard</b> 80W <ul style="list-style-type: none"> <li>8M cache</li> <li>5.86 GT/s QPI</li> <li>HT</li> <li>Turbo Boost</li> </ul>		<b>E5540</b> 2.53 GHz <b>E5530</b> 2.40 GHz <b>E5520</b> 2.26 GHz	<b>E5540</b> 2.53 GHz <b>E5530</b> 2.40 GHz <b>E5520</b> 2.26 GHz
<b>Basic</b> 80W <ul style="list-style-type: none"> <li>4M cache</li> <li>4.8 GT/s QPI</li> </ul>			<b>E5506</b> 2.13 GHz <b>E5504</b> 2.00 GHz <b>E5502</b> 1.86 GHz

2 cores

Expert included.



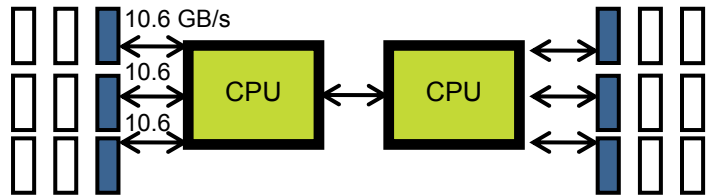
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## Memory Population Scenarios

CPU

### Maximum Bandwidth:

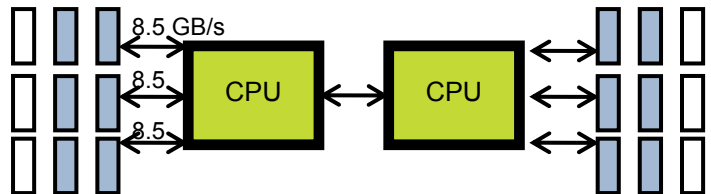
- DDR3 1333 across 3 channels per CPU
- 1 DIMMs per channel (6 DIMMs)



X5550 and above

### Balanced Performance:

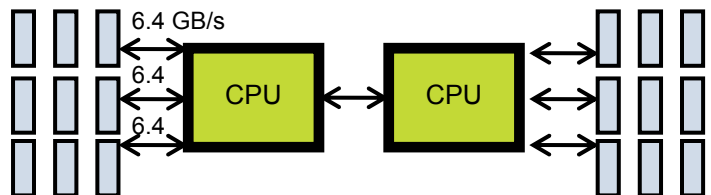
- DDR3 1066 across 3 channels per CPU
- Up to 2 DIMMs per channel (12 DIMMs)



E5520 and above

### Maximum Capacity:

- DDR3 800 across 3 channels per CPU
- Up to 3 DIMMs per channel (18 DIMMs total) †



All 5500 SKUs

For maximum bandwidth, you want the fastest memory speed, which requires one of the Advanced CPU SKUs (X55xx). Since 1333MHz memory is only supported at up to 1 DIMM per channel, the maximum installation with 2 CPUs would be 6 DIMMs.

For maximum capacity, you want to be able to install as many DIMMs as possible. Populating 3 DIMMs per channel will result in the memory running at a maximum of 800MHz, meaning you can choose any of the Xeon 5500 SKUs, since they all support 800MHz or higher, and will clock down memory speed if necessary, to support 3 DIMMs per channel.

† For systems offering 18 DIMMs, please contact your Silicon Mechanics sales representative.

Expert included.

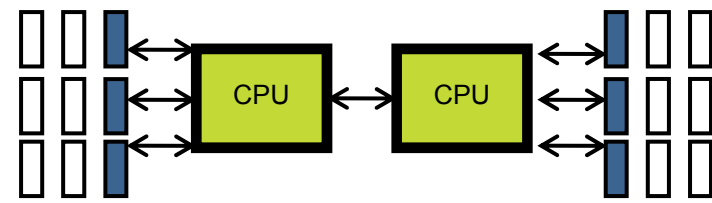


# Intel® Xeon™ Processor 5500 Series

## Balanced vs. Unbalanced Memory Population Considerations

### Recommended: Balanced Memory Population

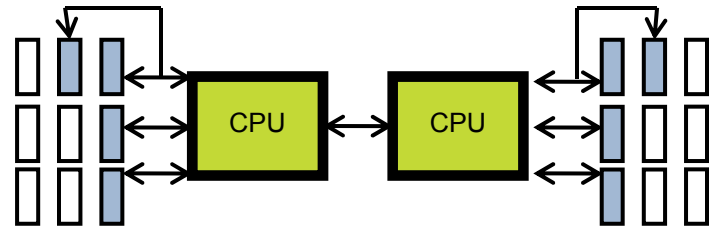
- Use a “balanced” platform configuration: populate the same number of DIMMs for each channel and each socket.
- Use identical DIMM types throughout the platform: same size, speed, and number of ranks.



Balanced 1-1-1 Memory Population

### Alternatives: Unbalanced Memory Population “2-1-1” (not recommended)

Option 1



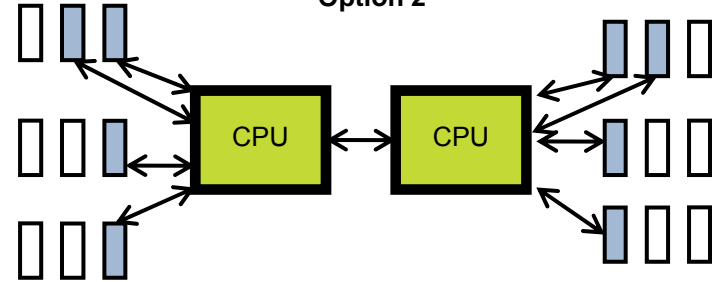
#### Population Scenario

- Interleave the first 3 DIMMs equally across the 3 channels and add the 4<sup>th</sup> DIMM to the first channel.

#### Performance Consideration: Unpredictable Performance

- If your application uses only the first three DIMMs, your results will be the same as in a balanced 1-1-1 memory population scenario.
- If the 4<sup>th</sup> DIMM is used, your performance will be reduced to the equivalent of a single channel.

Option 2



#### Population Scenario

- Interleave across all four DIMMs equally.

#### Performance Consideration: Bandwidth Bottleneck

- For every memory request the application makes to channels 2 and 3, channel 1 will need to handle two requests.
- The doubled number of requests to channel 1 will result in a bottleneck of your bandwidth.

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](mailto:sales@siliconmechanics.com)

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Expert included.