P920 AND P720 MEMORY CONFIGURATOR

Contents

Overview

The purpose of this document is to provide guidance for users on how to optimally configure the system memory in the ThinkStation P920 and P720 platforms in order to provide the best performance.
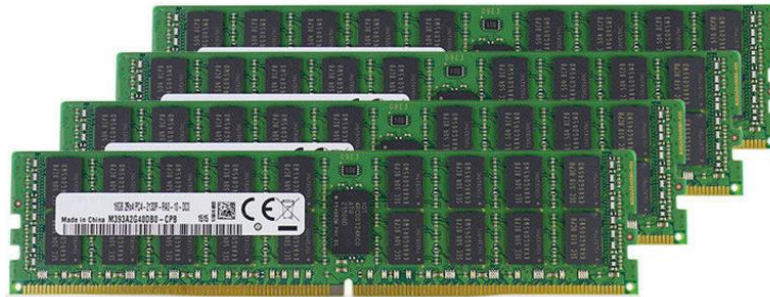
Section 1 – Platform Memory Architecture

The launch of the Intel® Purely platform has brought with it some exciting changes to the system architecture for memory as compared to previous workstation platforms. Newly added features such as support for 6 channels of memory (per CPU) and a higher top supported memory bus speed combine to provide users with significantly improved memory performance in their workstations. Both the ThinkStation P920 and ThinkStation P720 have been designed to take advantage of these new architecture enhancements to the memory subsystem.

Section 2 – P920 Memory Configurations

The ThinkStation P920 is Lenovo's largest and most powerful workstation built to date. The dual CPU design has 16 total DIMM slots (8 per CPU) with a top supported memory bus speed of 2666MHz[1]. With each CPU supporting 8 DIMM slots, the P920 can take full advantage of all 6 channels of memory support offered by the new Intel® Xeon® E5 Skylake CPUs. Figure 1 below shows a visual reference of the DIMM slot layout for the P920 platform.

Figure 1 - P920 Motherboard DIMM Layout

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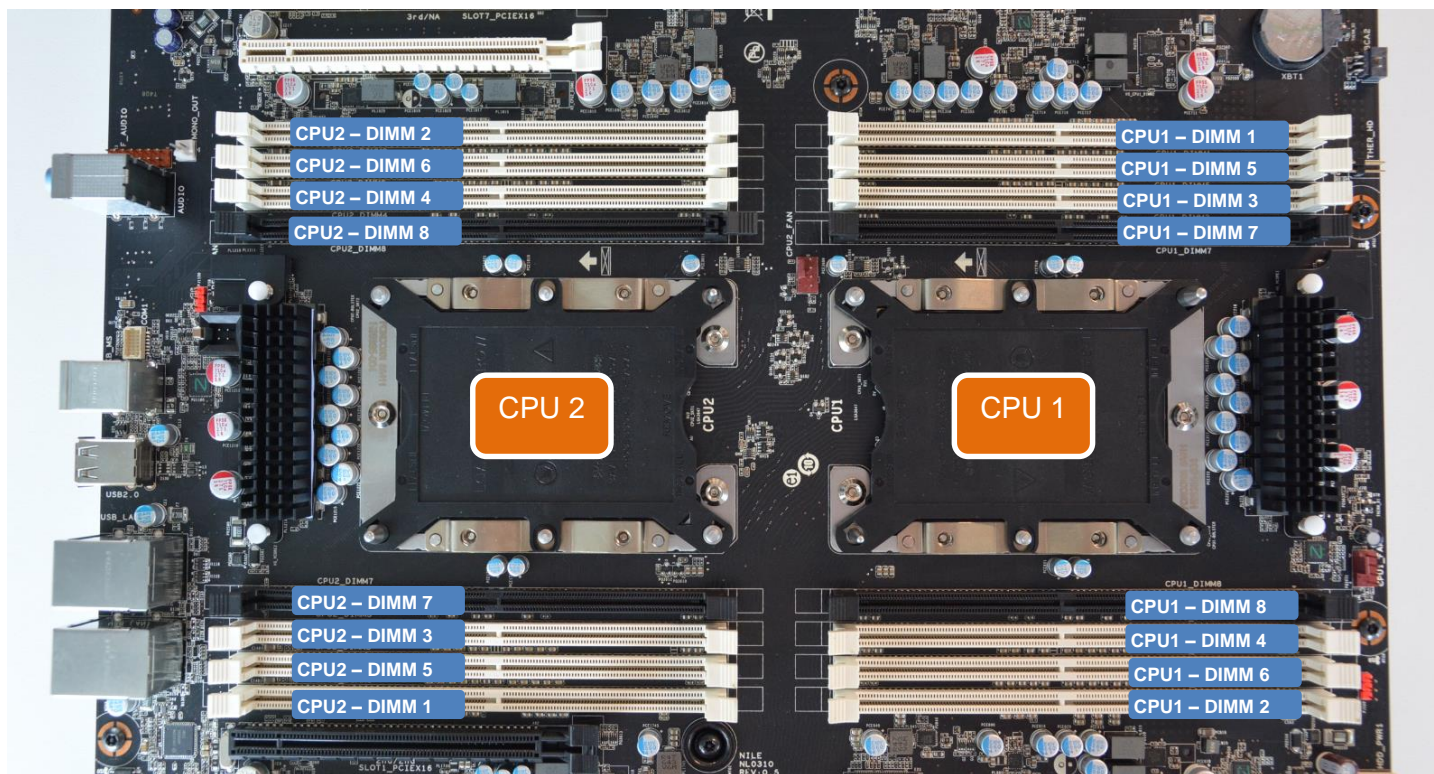
[1] Actual memory bus speed is determined by the CPU(s) selected.

The following guidelines are recommended by Lenovo for obtaining the best memory bandwidth from your P920 when filling DIMM slots:

- In single CPU configurations, only DIMM slots for CPU1 can be utilized. For dual CPU configurations, all DIMM slots can be utilized.

- In dual CPU configurations, it is optimal to balance memory across CPUs. This applies to both DIMM quantity and capacity. While the system will function with unbalanced DIMMs, overall memory performance could be affected.

- For best memory bandwidth performance, Lenovo recommends optimizing the overall memory configuration to use 6 DIMMs per CPU. DIMMS A1 and D1 (for each CPU) can be used where overall memory capacity is prioritized over memory bandwidth.

- Once DIMM quantity and DIMM capacity have been balanced across CPUs (if necessary), users should follow the recommended fill order for each CPU found in Figure 2. Largest capacity DIMMs should be installed first if using mixed DIMM capacities.

Figure 2 shows the recommended DIMM slot fill order for each CPU installed in the system.

Figure 2 – P920 DIMM Slot Fill Order Recommendations

# of DIMMs per CPU	DIMM slots used for each CPU
1 DIMM	DIMM 3
2 DIMMs	DIMM 3, DIMM 5
3 DIMMs	DIMM 1, DIMM 3, DIMM 5
4 DIMMs	DIMM 3, DIMM 4, DIMM 5, DIMM 6
5 DIMMs[2]	*Not Recommended*
6 DIMMs	DIMM 1, DIMM 2, DIMM 3, DIMM 4, DIMM 5, DIMM 6
7 DIMMs[2]	*Not Recommended*
8 DIMMs[3]	DIMM 1, DIMM 2, DIMM 3, DIMM 4, DIMM 5, DIMM 6, DIMM 7, DIMM 8

Note: Memory configurations using 5 DIMMs or 7 DIMMs per CPU are not recommended as they are unbalanced configurations that could result in memory performance degradation.

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[2] - 5 DIMM per CPU and 7 DIMM per CPU configurations will function, but should be avoided as they present an unbalanced load to the CPU that could result in memory bandwidth degradation.

[3] - 8 DIMM per CPU configurations represent an unbalanced load to the CPU, but these configurations can be used where overall memory capacity takes priority over bandwidth. For maximum memory bandwidth, Lenovo recommend optimizing on 6 DIMMs per CPU if possible.

Section 3 – P720 Memory Configurations

TCPOUhe ThinkStation P720 is the latest compact dual processor workstation. Like the P920, it also features a dual CPU design. But in an effort to maintain the smaller chassis size the P720 utilizes a 12 DIMM slot design (6 DIMMs per CPU). This allows P720 to take full advantage of all 6 memory channels offered by the new Intel® Xeon® E5 Skylake CPUs in a single DIMM per channel configuration and also support the highest memory bus speed of 2666MHz[4]. Figure 3 shows a visual representation of the DIMM slot layout for the P720 platform.

Figure 3 - P720 Motherboard DIMM Slot Layout

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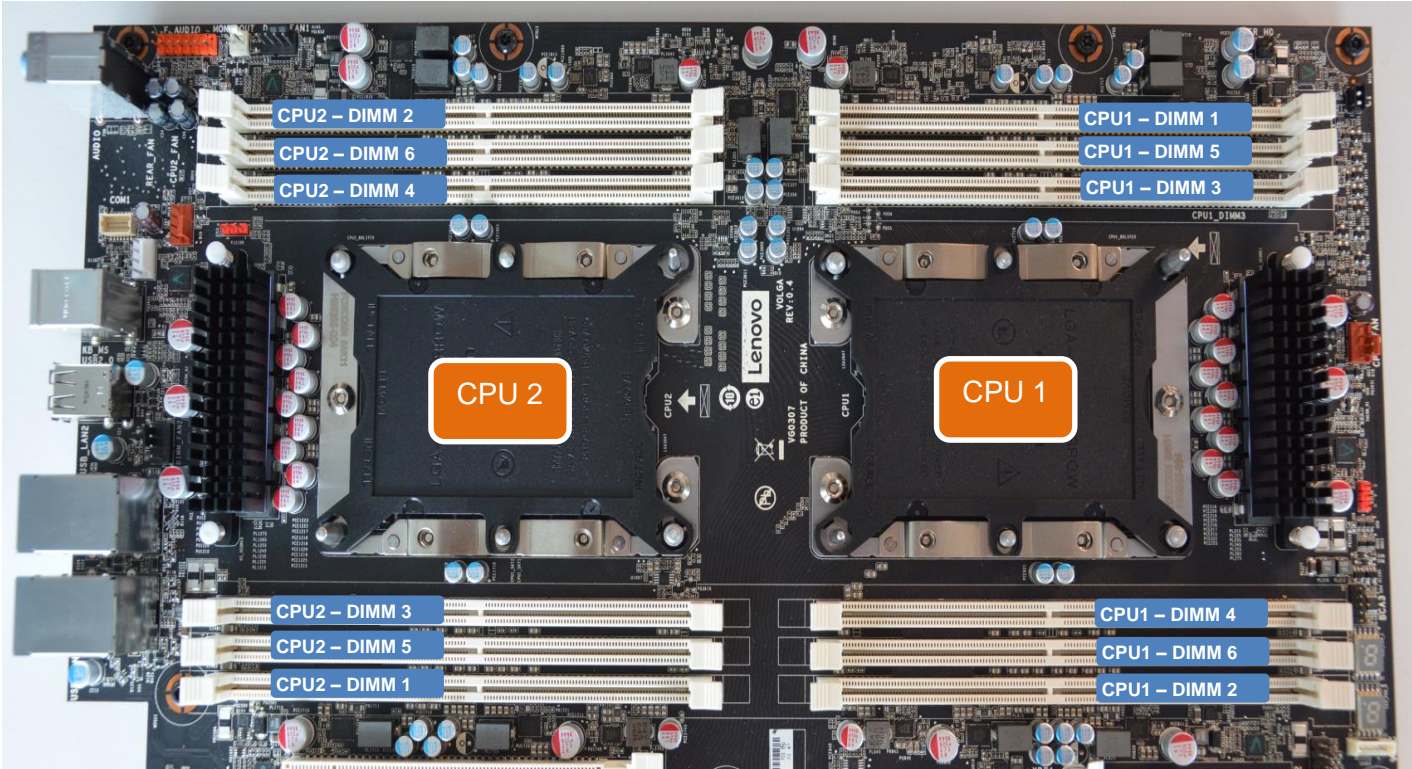
[4] Actual memory bus speed is determined by the CPU(s) selected.

The following guidelines are recommended by Lenovo for obtaining the best memory bandwidth from your P720 when filling DIMM slots:

- In single CPU configurations, only DIMM slots for CPU1 can be utilized. For dual CPU configurations, all DIMM slots can be utilized.

- In dual CPU configurations, it is optimal to balance memory across CPUs. This applies to both DIMM quantity and capacity. While the system will function with unbalanced DIMMs, overall memory performance could be affected.

- For best memory bandwidth performance, Lenovo recommends optimizing the overall memory configuration to use 6 DIMMs per CPU.

- Once DIMM quantity and DIMM capacity have been balanced across CPUs (if necessary), users should follow the recommended fill order for each CPU found in Figure 4. Largest capacity DIMMs should be installed first if using mixed DIMM capacities.

Figure 4 shows the recommended DIMM slot fill order for each CPU installed in the system.

Figure 4 - P720 DIMM Slot Fill Order Recommendations

# of DIMMs per CPU	DIMM slots used for each CPU
1 DIMM	DIMM 3
2 DIMMs	DIMM 3, DIMM 5
3 DIMMs	DIMM 1, DIMM 3, DIMM 5
4 DIMMs	DIMM 3, DIMM 4, DIMM 5, DIMM 6
5 DIMMs[5]	*Not Recommended*
6 DIMMs	DIMM 1, DIMM 2, DIMM 3, DIMM 4, DIMM 5, DIMM 6

Note: Memory configurations using 5 DIMMs per CPU are not recommended as they are unbalanced configurations that could result in memory performance degradation.

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[5] - 5 DIMM per CPU configurations will function, but should be avoided as they present an unbalanced load to the CPU that could result in memory bandwidth degradation.

Section 4 – Document Revision History

Version	Date	Author	Changes/Updates
1.0	11/8/2017	Cory Chapman	Initial launch release