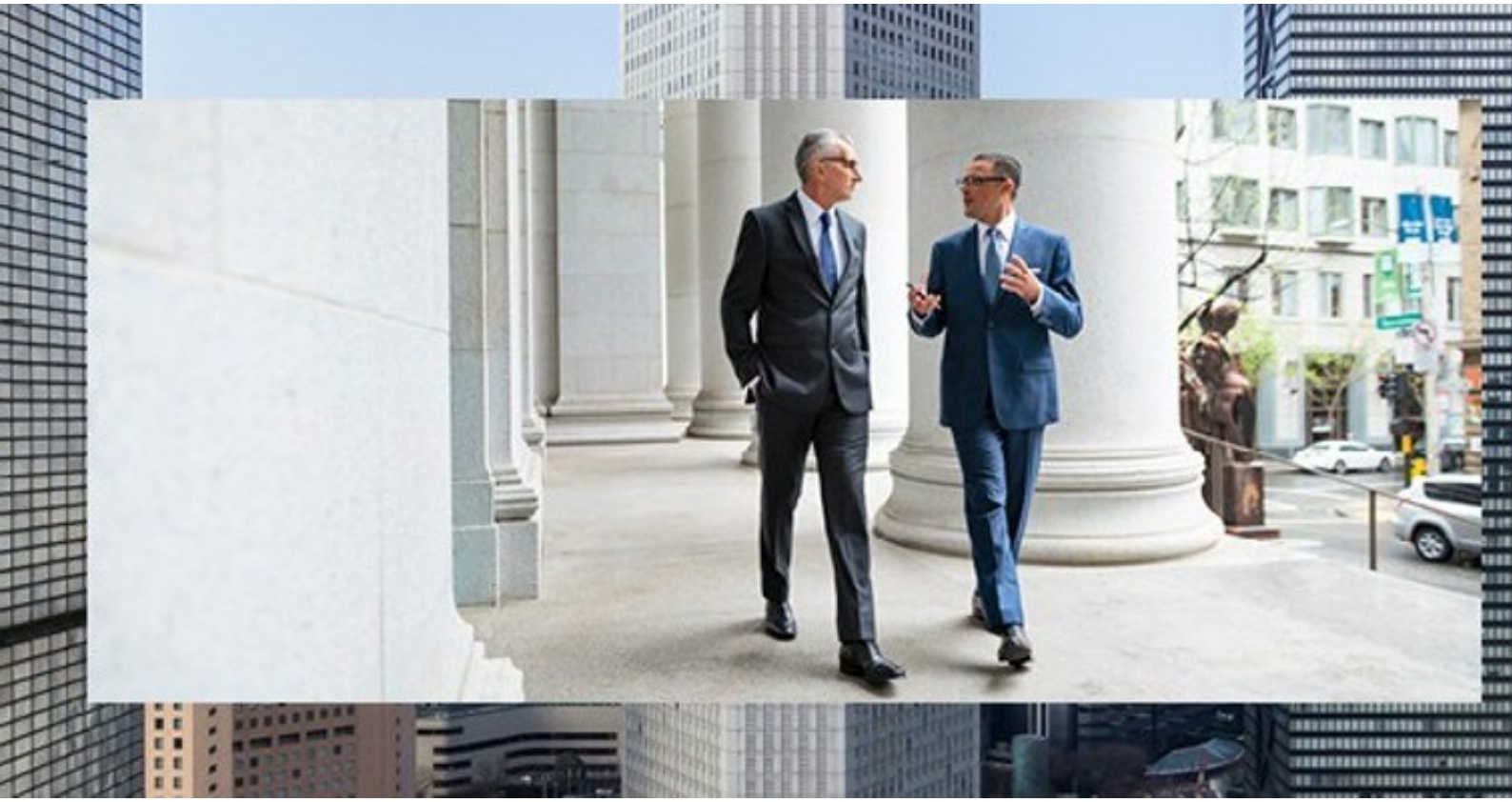


Server memory population rules for HPE ProLiant RL300 Gen11

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Introduction

This paper provides an overview of HPE DDR4 Server Memory and its use in HPE ProLiant RL300 Gen11 servers using the Ampere™ Arm®-based processor family. HPE Server Memory offers the best combination of pricing, quality, reliability, and compatibility to help your business achieve powerful results with right-sized, affordable solutions. It also provides superior performance over third-party memory when used in HPE servers. In addition, this white paper reviews the rules, best practices, and optimization strategies that should be used when installing HPE DDR4 Server Memory in HPE ProLiant RL300 Gen11 servers using Ampere processors.

Populating HPE DDR4 Server Memory in HPE servers

The high-level memory system architecture for HPE servers using Ampere Arm-based processors is different from that of other HPE servers with Intel® or Advanced Micro Devices (AMD)-based processors. HPE ProLiant RL300 Gen11 servers with Ampere processors offer eight memory channels per CPU with up to two DIMM slots per channel (16 DIMM slots per CPU).

Table 1. HPE DDR4 memory SKUs for HPE ProLiant servers

DIMM type			**RDIMM**		**LRDIMM**
HPE SKU P/N	P56425-B21	P56427-B21	P56429-B21	P56431-B21	P56435-B21
SKU description	HPE 16GB 1Rx4 PC4-3200AA-R Memory Kit	HPE 32GB 1Rx4 PC4-3200AA-R Memory Kit	HPE 32GB 2Rx4 PC4-3200AA-R Memory Kit	HPE 64GB 2Rx4 PC4-3200AA-R Memory Kit	HPE 256GB 8Rx4 PC4-3200AA-L 3DS Memory
DIMM rank	Single rank (1R)	Single rank (1R)	Dual rank (2R)	Dual rank (2R)	Octal rank (8R)
DIMM capacity	16 GB	32 GB	32 GB	64 GB	256 GB
Voltage	1.2V	1.2V	1.2V	1.2V	1.2V
DRAM depth	2G	4G	2G	4G	4G
DRAM width (bit)	x4	x4	x4	x4	x4
DRAM density	8 Gb	16 Gb	8 Gb	16 Gb	16 Gb
CAS latency	22–22–22	22–22–22	22–22–22	22–22–22	26–22–22
DIMM native speed (MT/s)	3200	3200	3200	3200	3200
Maximum capacity (GB)					
16-slot servers	256	512	512	1024	4096
HPE Server Memory speed (MT/s): Ampere processors					
DIMM per channel	3200	3200	3200	3200	3200
2 DIMM per channel	3200	3200	3200	3200	3200

Population rules for HPE servers using Ampere processors

HPE systems support a variety of flexible memory configurations. For optimal performance and functionality, you should follow the rules outlined in this document when populating HPE servers using Ampere processors with HPE DDR4 Server Memory. Violating these rules may result in reduced memory capacity, performance, or error messages during boot. Table 2 summarizes the overall DIMM population rules for HPE servers using Ampere processors.

Table 2. DIMM population rules for HPE servers using Ampere processors

Category	Population guidelines
Homogeneous configurations only	Any single memory DIMM can only be "mixed" within the same server with the identical HPE SKU part number. If multiple DIMMs are installed, they must be the identical part number.
Performance	To maximize performance in a majority of the potential applications, it is recommended to load the channels similarly whenever possible.
DIMM types and capacities	The maximum memory capacity is a function of the number of DIMM connectors on the platform: the largest DIMM capacity qualified on the platform and the number and model of qualified processors installed on the platform. Registered DIMMs (RDIMMs) and load-reduced DIMMs (LRDIMMs) are the only DIMM type currently supported.
DIMM speed	The maximum memory speed is a function of the memory type, memory configuration, and processor model. HPE memory from previous generation servers is not compatible with the current generation. Certain HPE Server Memory features such as memory authentication and enhanced performance may not be supported.

DIMM connector location

In general, memory population order follows the same logic for all HPE servers — although the physical arrangement may vary from server to server.

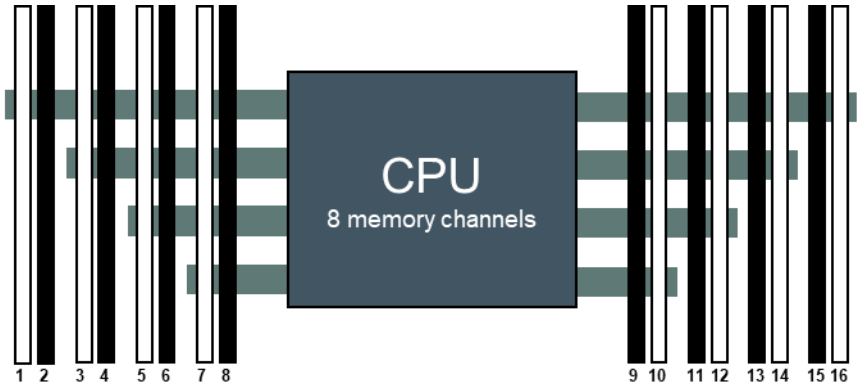


Figure 1. DIMM slot locations for a 16-slot HPE ProLiant RL300 single-socket system

Population guidelines for HPE memory DIMMs in HPE ProLiant RL300 Gen11 servers

Table 3 shows the DIMM population order for HPE ProLiant RL300 servers. There are 16 DIMM slots available to be populated, however, only the following number of total DIMMs is supported — 1 DIMM, 2 DIMMs, 4 DIMMs, 8 DIMMs, or 16 DIMMs. No other total number of DIMMs is supported.

For a given number of DIMMs, populate those DIMMs in the corresponding numbered DIMM slots on that row illustrated in Table 3.

Table 3. Population guidelines for HPE memory DIMMs in HPE ProLiant RL300 Gen11 servers

	HPE ProLiant RL300 Gen11 servers DIMM population order															
1 DIMM	1															
2 DIMMs	1															16
4 DIMMs	1		3											14		16
8 DIMMs	1		3		5		7			10		12		14		16
16 DIMMs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Homogeneous HPE memory DIMM configurations

HPE servers using Ampere processors do not support any heterogeneous memory configurations. Mixing DIMMs within a server is not supported. Therefore, it is only permissible to configure multiple DIMMs within servers using Ampere processors using the same memory SKU number (a homogeneous memory configuration).

In addition to the requirement of being homogeneous (using the same DIMM), here are some additional rules regarding the use of multiple DIMM configurations:

1. Any single memory SKU can only be mixed within the same server with the identical HPE SKU part number.
2. The five SKUs in Table 3 are the only DIMMs supported in HPE servers using Ampere processors. The table illustrates which DIMMs can be mixed with each other, and which cannot.
3. The number of DIMMs installed must match one of the entries on Table 2. Other configurations are not supported.

Table 4 shows homogeneous mix configuration supported based on these rules. Note that it is only permissible to use the same DIMM (same SKU number) and that mixing memory SKUs within a server is not permitted.

Table 4. Homogeneous population guidelines for HPE memory DIMMs

P/N	Description	P56425-B21 16GB 1Rx4 3200 MT/s RDIMM	P56427-B21 32GB 1Rx4 3200 MT/s RDIMM	P56429-B21 32GB 2Rx4 3200 MT/s RDIMM	P56431-B21 64GB 2Rx4 3200 MT/s RDIMM	P56435-B21 256GB 8Rx4 3DS 3200 MT/s LRDIMM
P56425-B21	HPE 16GB 1Rx4 PC4-3200AA-R Memory Kit	Yes	No	No	No	No
P56427-B21	HPE 32GB 1Rx4 PC4-3200AA-R Memory Kit	No	Yes	No	No	No
P56429-B21	HPE 32GB 2Rx4 PC4-3200AA-R Memory Kit	No	No	Yes	No	No
P06031-B21	HPE 64GB 2Rx4 PC4-3200AA-R Memory Kit	No	No	No	Yes	No
P06035-B21	HPE 256GB 8Rx4 PC4-3200AA-L 3DS Smart	No	No	No	No	Yes

Conclusion

HPE Server Memory for HPE servers using Ampere Arm-based processors is the best option for high performance without sacrificing stability or reliability.

Resources

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