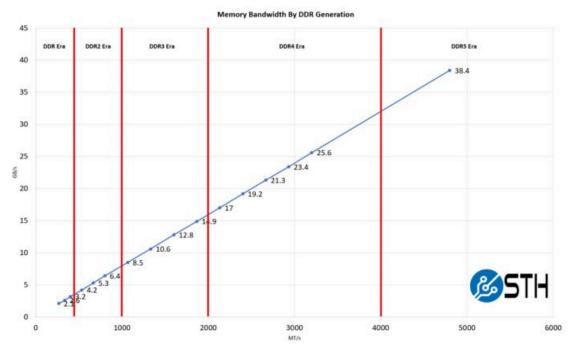
Guide DDR DDR2 DDR3 DDR4 and DDR5 Bandwidth by Generation

By Eric Smith - February 4, 2023



DDR DDR2 DDR3 DDR4 And DDR5 Memory Bandwidth By Generation 1

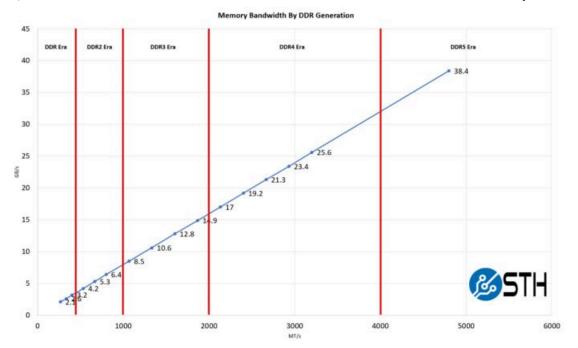
We have been creating a few cheat sheets lately to understand generations of systems over time. A big part of that is so that we have them for STH's reference. We figured instead of just using them internally, we would share them externally as well. In this one, we are going to quickly have the DDR, DDR2, DDR3, DDR4, and DDR5 GB/s and MT/s numbers by generation.

Guide DDR DDR2 DDR3 DDR4 and DDR5 GB/s Bandwidth by Generation

Here is a hopefully simple table with the memory bandwidth for a single channel DIMM by generation:

Generation	Common Name	MT/s	GB/s
DDR	DDR-266	266	2.1
DDR	DDR-333	333	2.6
DDR	DDR-400	400	3.2
DDR2	DDR2-533	533	4.2
DDR2	DDR2-667	667	5.3
DDR2	DDR2-800	800	6.4
DDR3	DDR3-1066	1066	8.5
DDR3	DDR3-1333	1333	10.6
DDR3	DDR3-1600	1600	12.8
DDR3	DDR3-1866	1866	14.9
DDR4	DDR4-2133	2133	17.0
DDR4	DDR4-2400	2400	19.2
DDR4	DDR4-2666	2666	21.3
DDR4	DDR4-2933	2933	23.4
DDR4	DDR4-3200	3200	25.6
DDR5	DDR5-4800	4800	38.4

In a system, there are often many memory channels, and one does not achieve peak bandwidth on all platforms and scenarios, but it is still interesting to look at. For some sense, here is what the above looks like charted:



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When folks in the industry say that DDR5-4800 found in AMD EPYC 9004 Genoa and 4th Gen Intel Xeon Scalable Sapphire Rapids is a big deal, this is why. Memory bandwidth per DIMM gets a ~50% boost. That is why we say that AMD EPYC Genoa, with 50% more memory channels, has the capability to do more than 2x the DDR4-3200 "Rome/Milan" generation bandwidth. Likewise, the Intel Xeon Sapphire Rapids may have eight memory channels (omitting that technically DDR5 is two 40+8 channels while DDR4 is 72+8), it has 50% more theoretical bandwidth than the previous-gen Ice Lake Xeons.

Final Words

If folks have more that they think we should add, we can look into it. We will probably update this when servers use faster DDR5 memory later in 2023 or in 2024. Still, we hope having a little chart like this is something that our readers find useful. We have the chart just to bookmark for our team.

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Eric has been in the IT industry for over 15 years and specializes in infrastructure projects.