



What's New For DDR3

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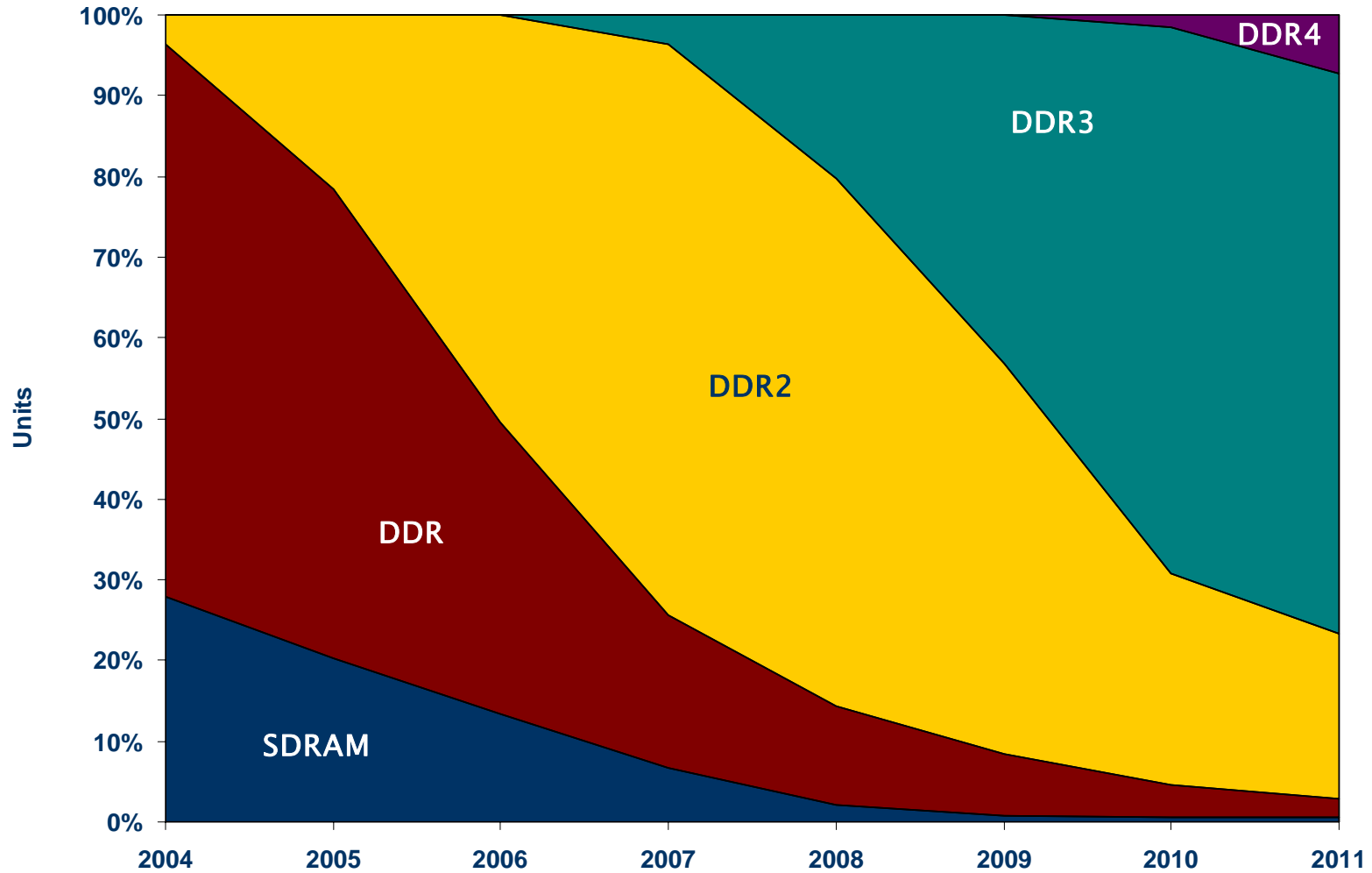
Agenda

- **DDR3 Market Transition**
 - Density, Technology
 - DDR3 Ramp, Micron Plans
- **DDR3 Module Configurations**
 - Standard and High Density
- **DDR3 Component Roadmap**
 - Monolithic and Stacked
- **DDR3 Module Roadmap**
 - UDIMM, SODIMM, RDIMM, FBDIMM2



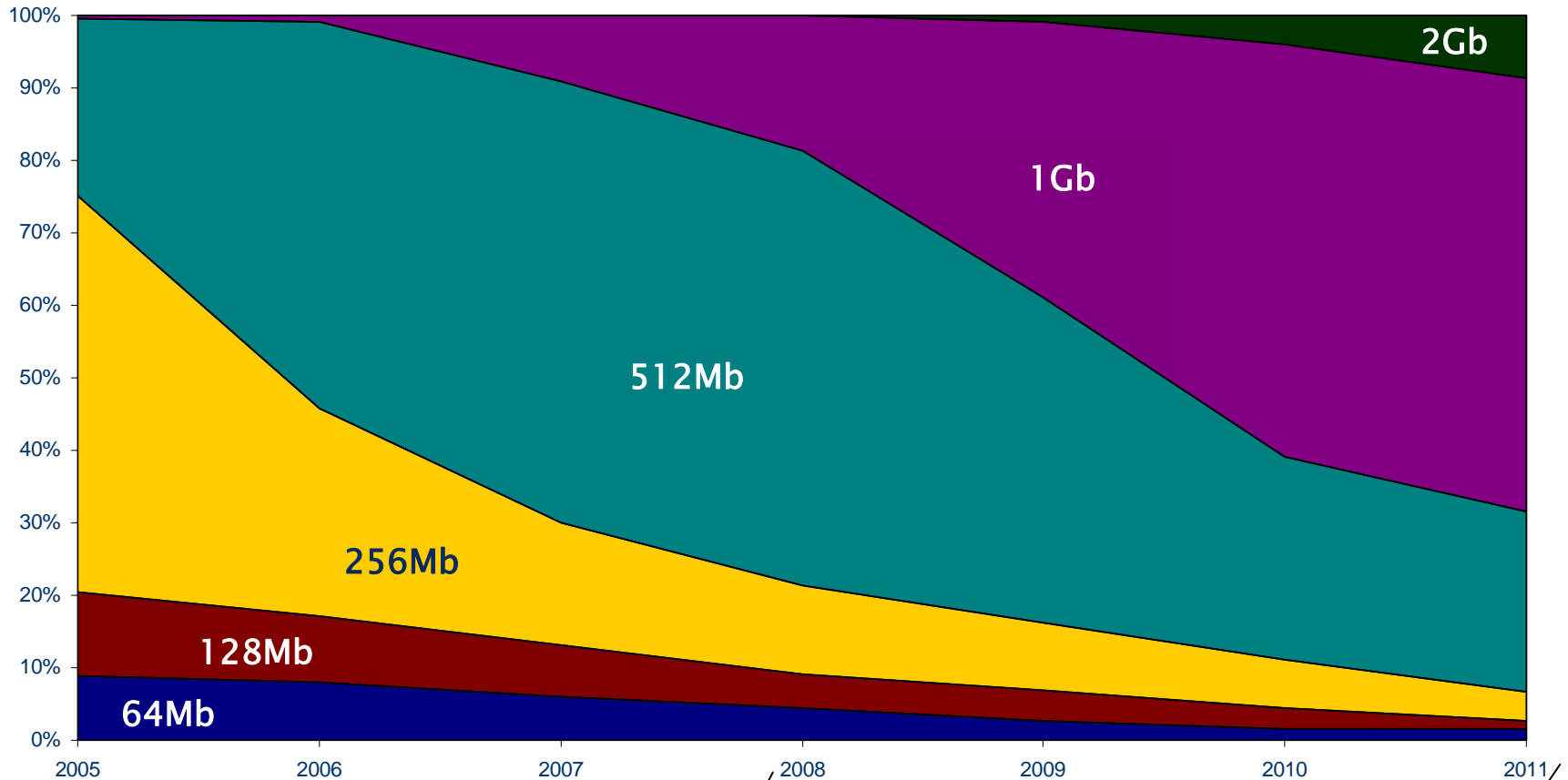
DDR3 Market Transition

DRAM Technology Trends



Source: IDC, iSuppli Q306

DRAM Density Trends



**Micron 1Gb/512Mb
cost-per-bit parity
by the end of 2007**

**Micron 2Gb/1Gb
cost-per-bit parity
by the end of 2011**

Source: IDC, Isuppli, Gartner, Micron Q107

DDR3 Production Mix Forecast

- Micron is ready when market ramps
 - Limited production until 2Q08 ramp
- DDR3 ramp expectations (percent of industry output)

	2007	2008	2009	2010
DDR	14%	3%	2%	1%
DDR2	83%	78%	64%	31%
DDR3	3%	19%	34%	68%

DDR3 Performance Timeline

- DDR3 server speed/latency timeline
 - ▶ Is 15ns tAA desirable at higher speeds if price is lower?

2007			2008			2009			2010			2011		
Speed	Latency	tAA(ns)	Speed	Latency	tAA(ns)	Speed	Latency	tAA(ns)	Speed	Latency	tAA(ns)	Speed	Latency	tAA(ns)
1066	CL7	13.125	1333	CL8	12	1600	CL10	12.5	1866	CL13	13.91	2133	CL13	12.19
	CL8	15		CL9	13.5		CL11	13.75		CL12	12.84		CL14	13.13
800	CL5	12.5	1066	CL7	13.125	1333	CL8	12	1600	CL10	12.5	1866	CL13	13.91
	CL6	15		CL8	15		CL9	13.5		CL11	13.75		CL12	12.84
			800	CL5	12.5	1066	CL7	13.125	1333	CL8	12	1600	CL10	12.5
				CL6	15		CL8	15		CL9	13.5		CL11	13.75
						800	CL5	12.5	1066	CL7	13.125	1333	CL8	12
							CL6	15		CL8	15		CL9	13.5

DDR3 Market

- Market segments introductions
 - ▶ Desktop – mid 07
 - ▶ Notebook– 1H08
 - ▶ Server – 2H08
- Micron DDR3 products
 - ▶ 1Gb x4, x8, x16 samples – now
 - ▶ 1Gb x4, x8, x16 production ramp starts – 2Q07
 - ▶ 2Gb x4, x8 samples – 3Q07
 - ▶ 2Gb x4, x8 production ramp starts – 1Q08

Collateral and Supporting Information

- Marketing data sheets
 - ▶ Component (1 Gb; x4x8x16) – 2Q07
 - ▶ Module (UDIMM) – 2Q07
 - ▶ Module (SODIMM) – 2Q07
 - ▶ Module (RDIMM) – 3Q07
 - ▶ Module (FBDIMM2) – 1H08
- Component simulation
 - ▶ DDR3 web-based point to point simulator – now
 - ▶ Verilog model– now
 - ▶ IBIS model – now
 - ▶ Spice model – now
- Standardization status
 - ▶ Component specification expected – 2H07
 - ▶ Modules specifications (UDIMM, SODIMM, RDIMM) expected – 2H07



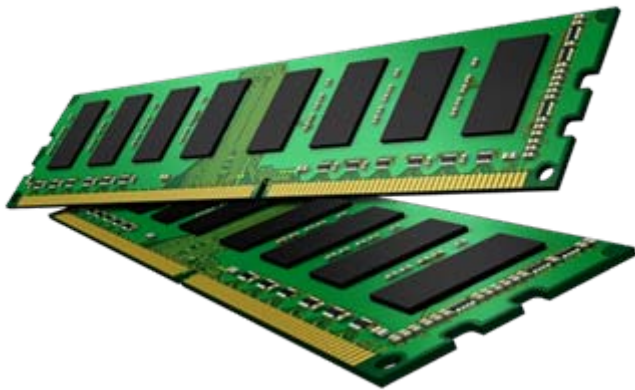
Modules

DDR3 Modules

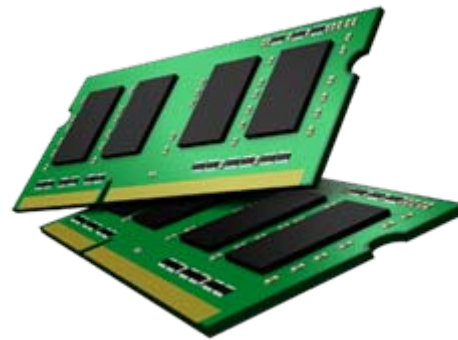
- UDIMM
- RDIMM
- SODIMM



RDIMM

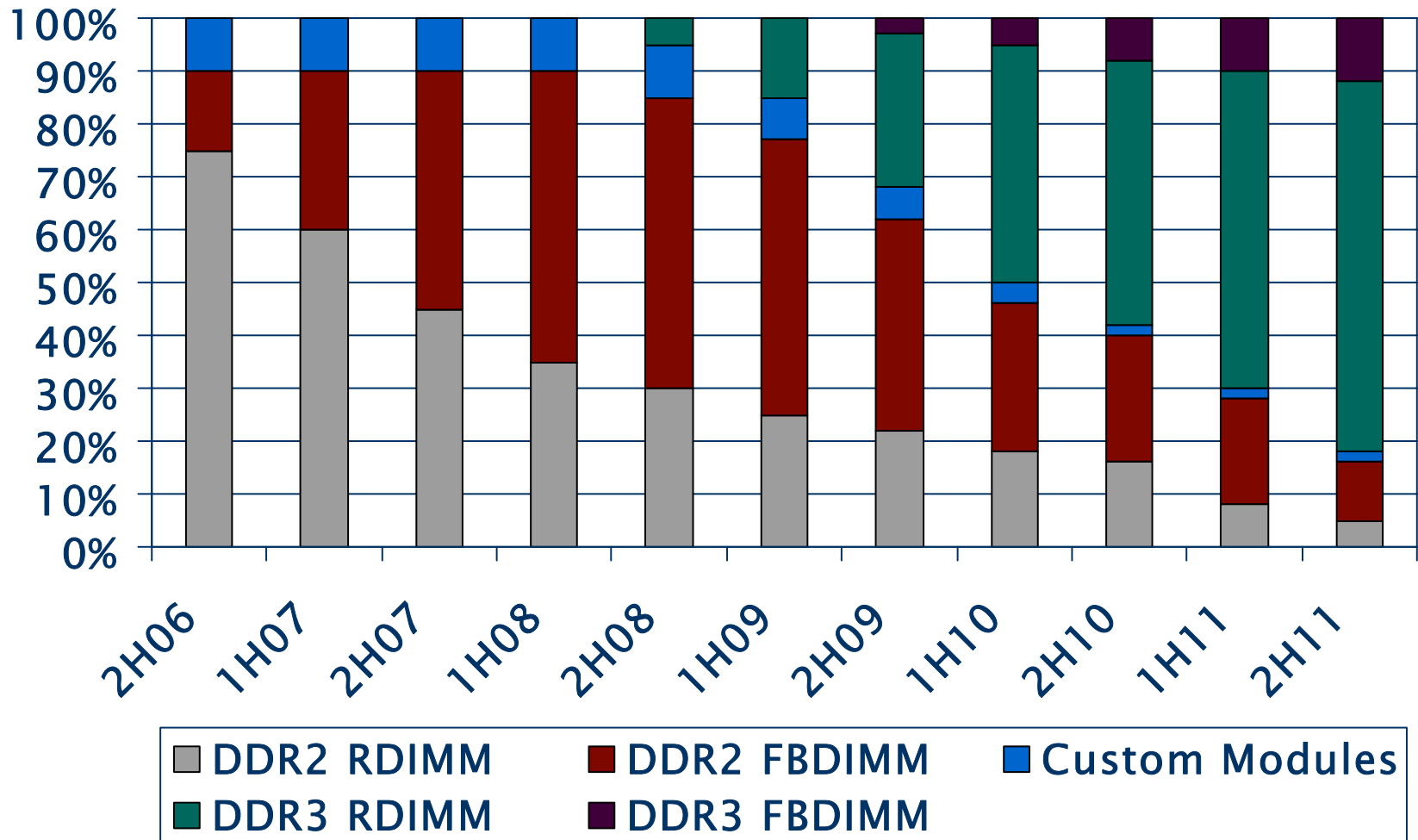


UDIMM

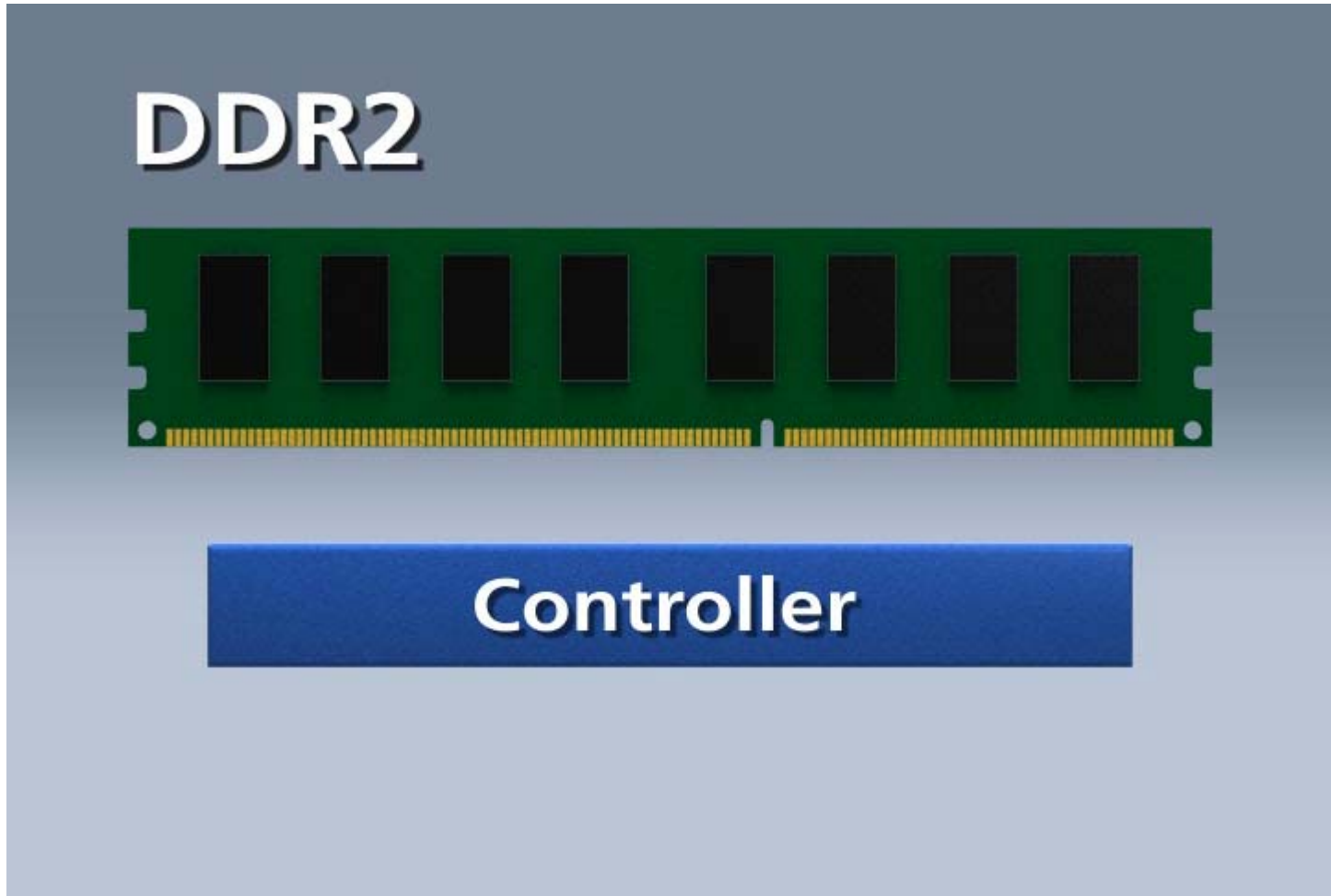


SODIMM

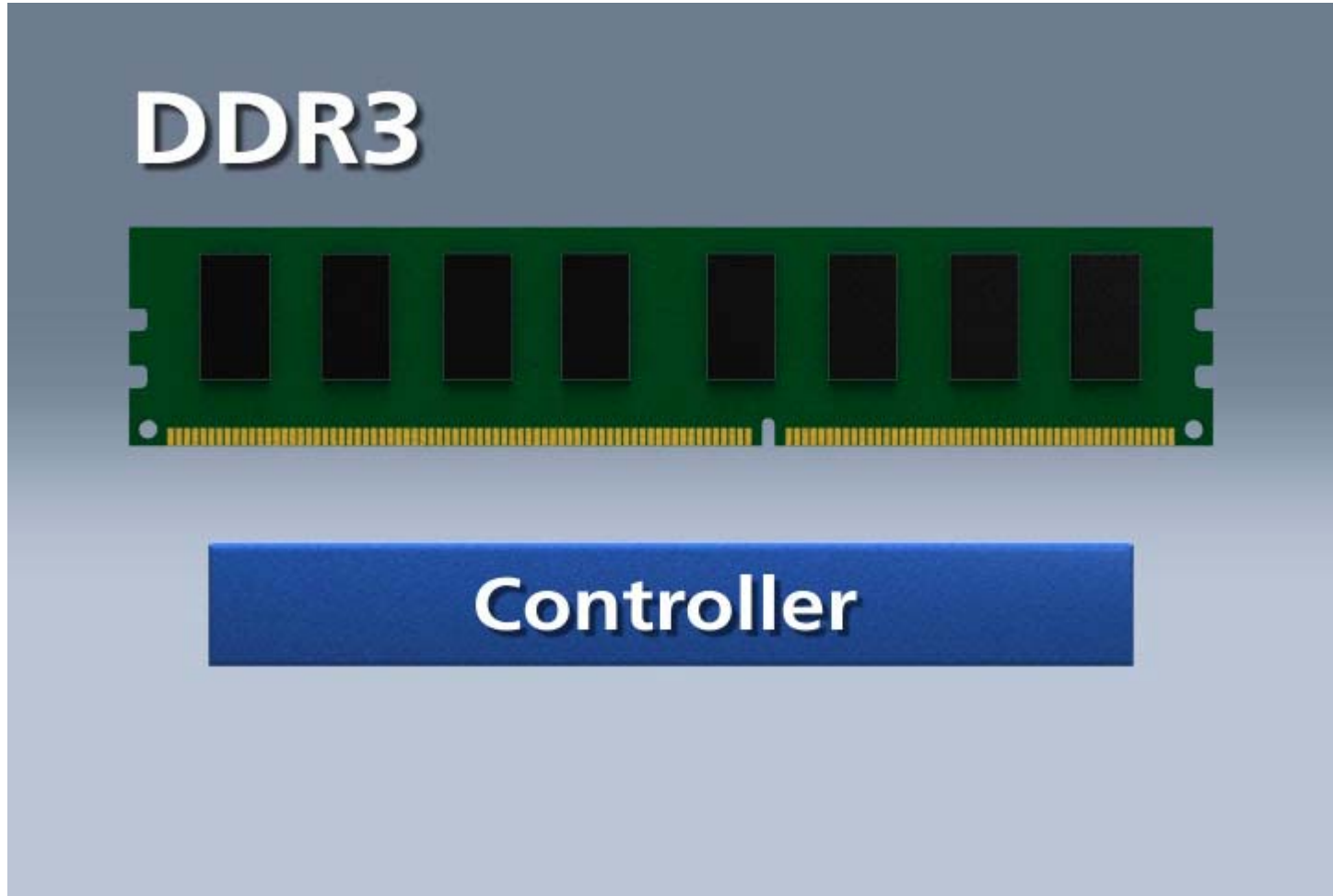
Server Module Trends (DDR2 and DDR3)



Tree Topology



Fly-by Topology



UDIMM

- UDIMM & ECC UDIMM

- ▶ 4GB

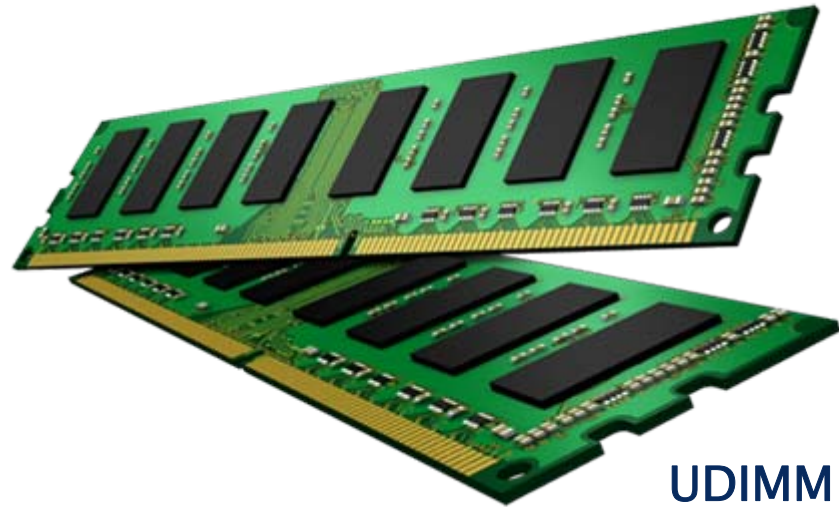
- 2Gb DR x8

- ▶ 2GB

- 1Gb DR x8
- 2Gb SR x8

- ▶ 1GB

- 1Gb SR x8



UDIMM

SODIMM

- SODIMM

- ▶ 2GB

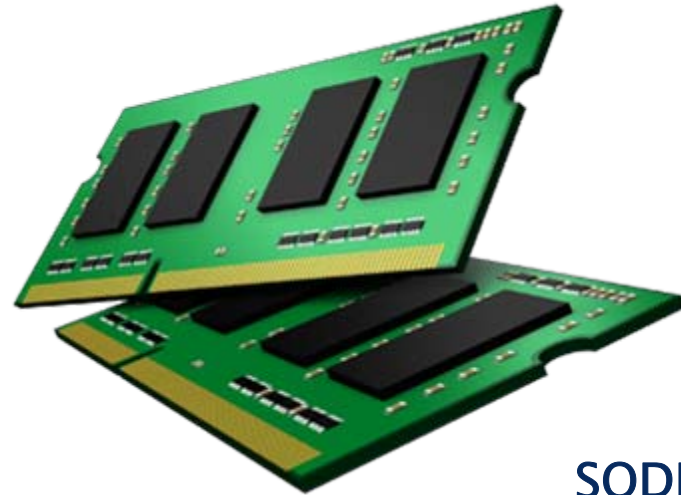
- 1Gb DR x8
- 2Gb SR x8

- ▶ 1GB

- 1Gb SR x8
- 1Gb DR x16

- ▶ 512MB

- 1Gb SR x16



SODIMM

RDIMM

- 16GB
 - 2Gb Quad Rank, x4 TwinDie 38mm
- 8GB
 - 2Gb DR x4 30mm TwinDie
 - 1Gb QR x4 TwinDie
- 4GB
 - 1Gb Planar, 30mm, DR x4
 - 2Gb SR x4
- 2GB
 - 1Gb SR x4
 - 2Gb SR x8
- 1GB
 - 1Gb SR x8



RDIMM

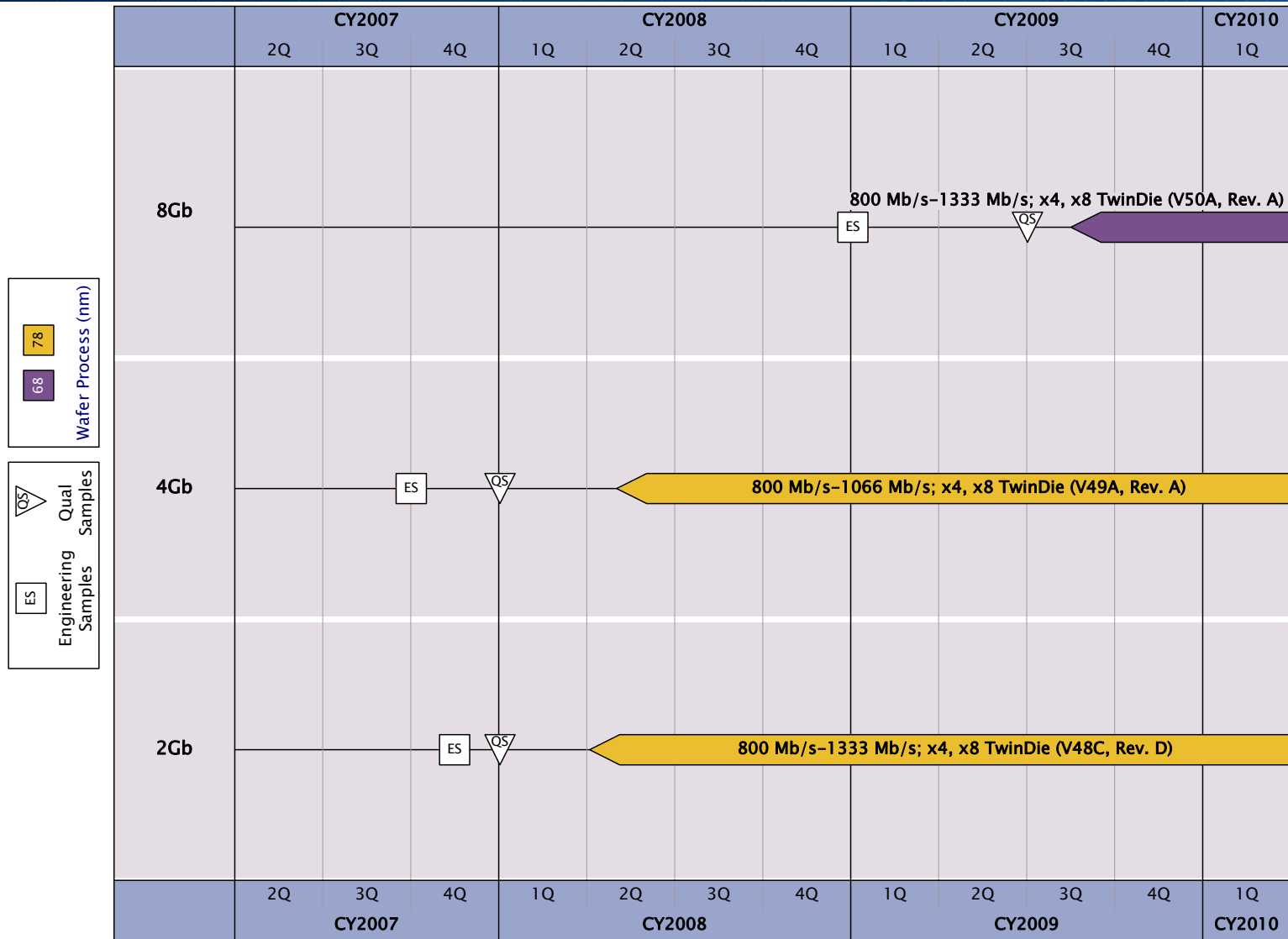


High Density Planar
RDIMM



Component Roadmap

1.5V DDR3 TwinDie Road Map



Note: Speeds are shown in data rates

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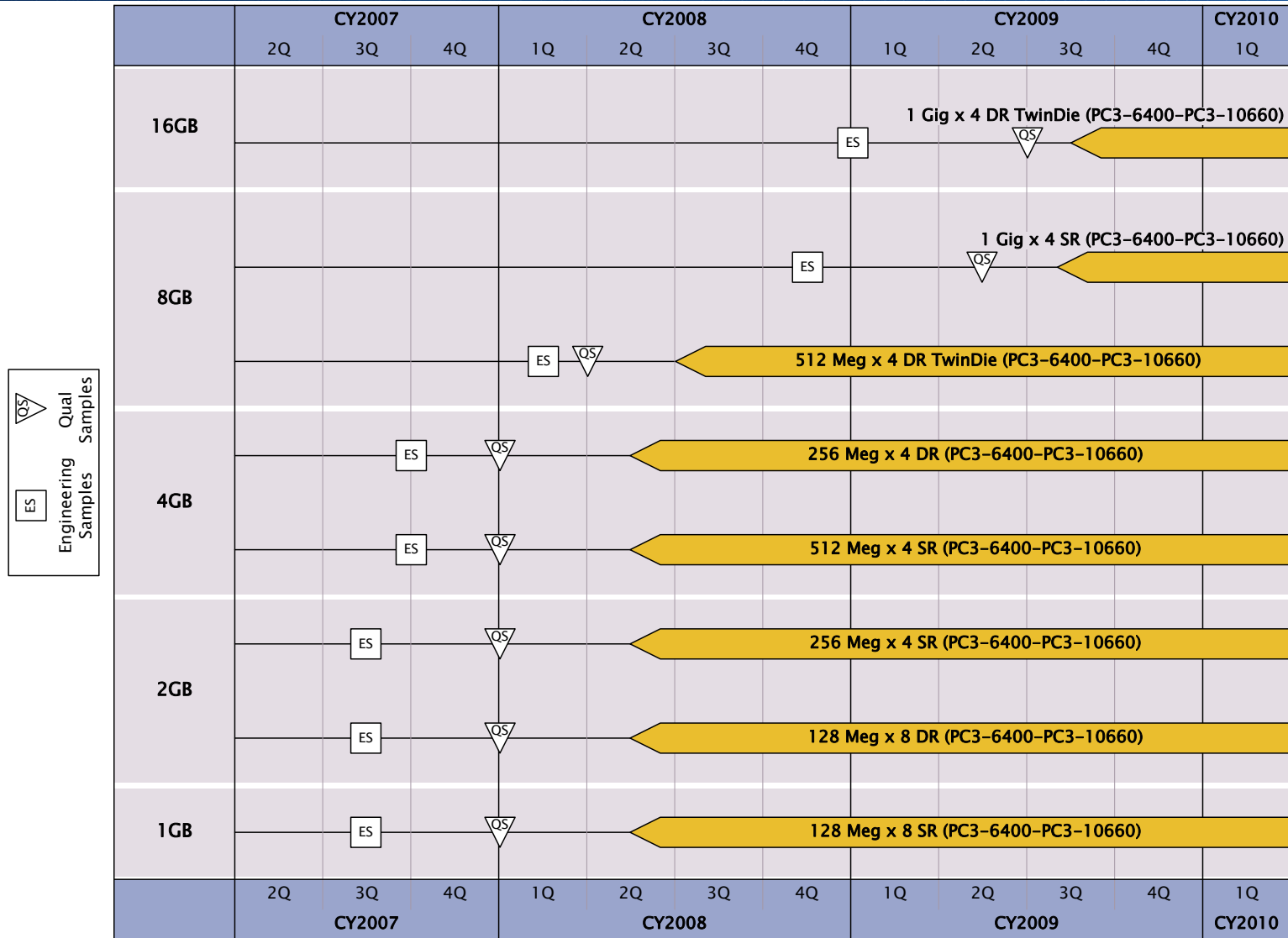
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Module Roadmaps

DDR3 RDIMM Road Map



Notes: SR = single rank; DR = dual rank

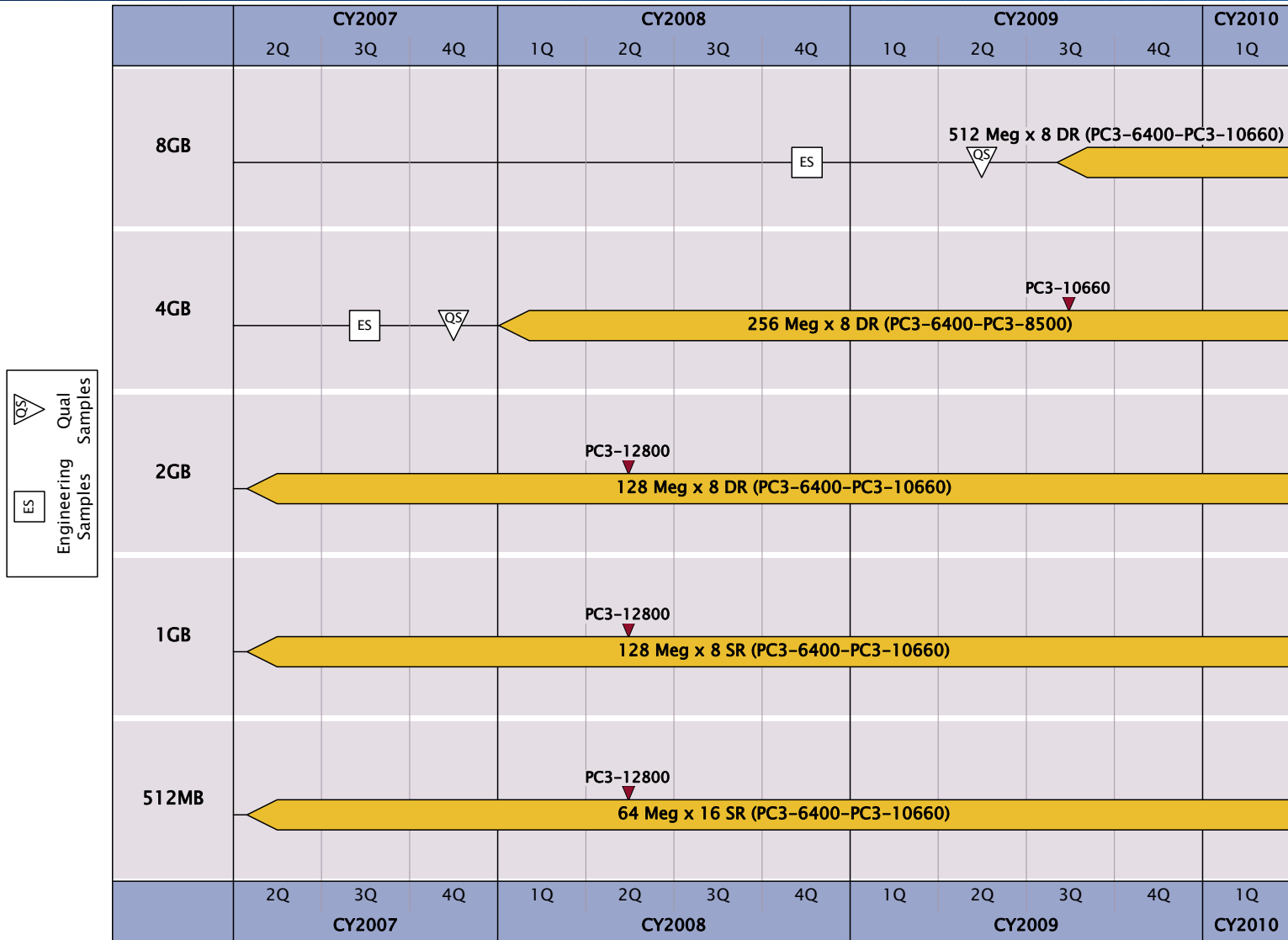
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DDR3 UDIMM Road Map



Notes: SR = single rank; DR = dual rank

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