EEE for Backplane PHYs in Blade Server Environment

For IEEE 802.3 EEE SG

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Data Center Power & Cooling

- Customer concerned about power density of Blades.
- Many DCs only populating ½ rack due to power and cooling limitations.
- Price per kVA and Cost of Cooling rank very high in importance for DC Managers.
- A present average of 8-12kVA / rack growing annually at 5-8%
  - Would like to slow or reverse this trend

Server Shipments Forecast

Worldwide Blade Server Shipments by Socket Capability, 2005–2010 (000)

	2005	2006	2007	2008	2009	2010	2005–2010 CAGR (%)
1	19.7	14.1	26.2	40.7	60.8	88.4	35.0
2	465.0	620.4	988.4	1,496.2	2,142.2	3,001.9	45.2
4	18.2	24.5	37.7	57.0	87.9	147.5	52.0
Total	502.9	659.0	1,052.4	1,593.9	2,290.9	3,237.8	45.1

Note: See Table 2 for key forecast assumptions.

Source: IDC, 2006

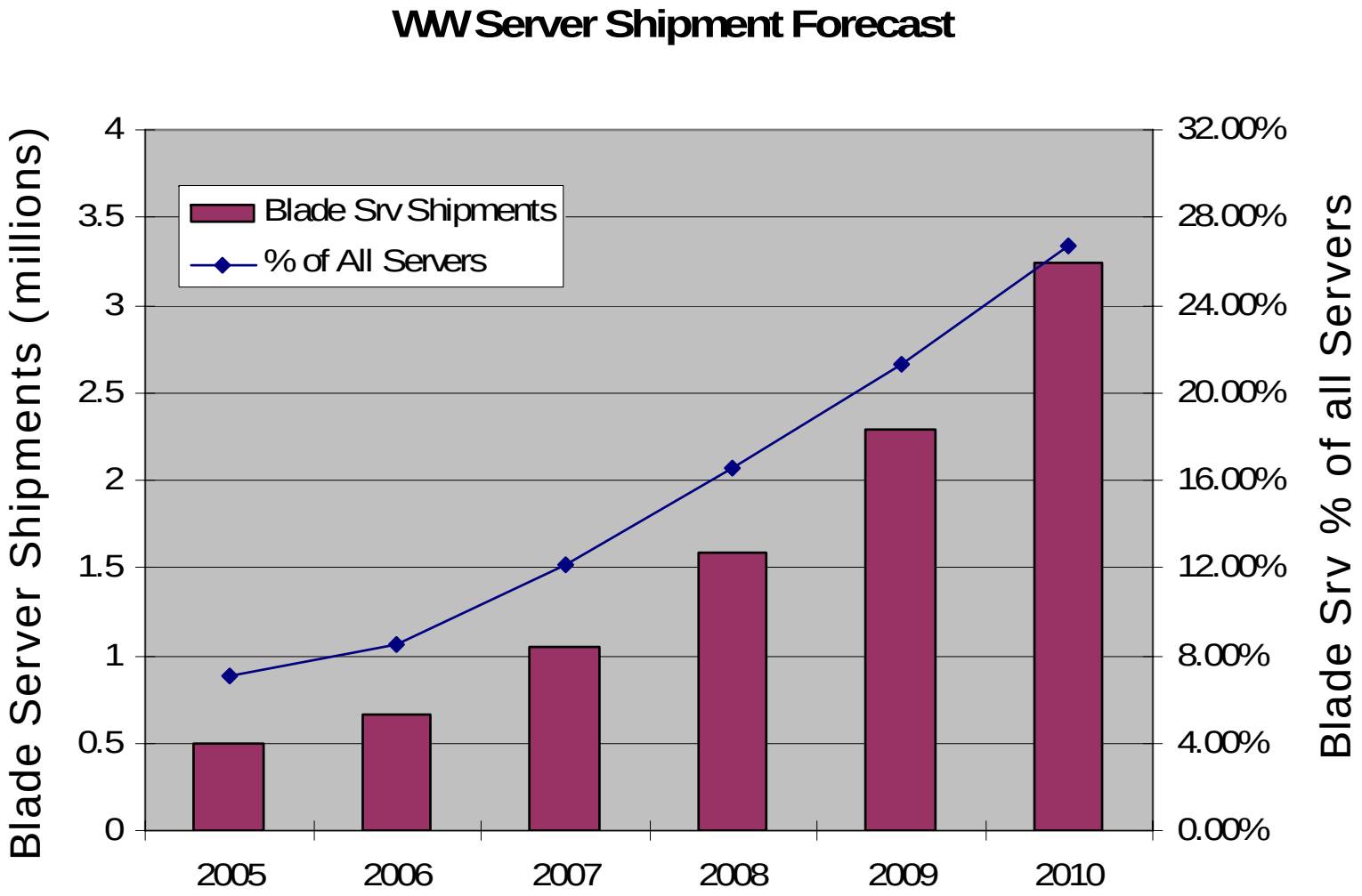
Worldwide Server Shipments by Operating Systems and IDC Class, 2005–2010

	2005	2006	2007	2008	2009	2010	2005–2010 CAGR (%)
Volume server	6,828,010	7,565,574	8,490,487	9,506,858	10,590,091	11,978,760	11.9
Midrange enterprise server	199,677	169,184	166,054	163,602	160,747	154,755	-5.0
High-end enterprise server	9,779	7,398	7,346	7,372	7,413	6,913	-6.7
Total	7,037,466	7,742,156	8,663,887	9,677,831	10,758,251	12,140,428	11.5

Note: See Table 1 for key forecast assumptions.

Source: IDC, 2006

Blade Servers Growing



Server Blade Environment

- Blade Servers have same components and similar usage to Rack Mount Servers
- Higher density =>more power / rack.
- Asking all server component vendors for power saving features.
- If EEE good for 10Gb-T -> 1Gb-T PHYs in Rack Servers then good for 10Gb-KR to 1Gb-KX on Blade Servers

Power Savings Potential for 10G-KR

- 10Gb KR PHY about 1.1 - 1.5W
- 1Gb KX mode: 0.6 - 0.8W
- MAC XAUI + PHY ~ 2W per link
- x 2 Links per Server Blade ~4W
- x 14-16 Blades per Enclosure =60W.

KR changes similar as 10Gb-T

- Backplane PHYs AutoNeg based on 10GBase-T & Clause 28.
- Uses same Clause 45 MDIO logical device interface for AutoNeg.
- > 90% common AutoNeg variables and register mapping.
- Same Next Page mechanism and Advertisement exchanged prior to link.
- AutoNeg changes made to support EEE on 10GBase-T directly applicable to 10GBase-KR.

Conclusion

- High Percentage of DC Servers will be Blade Servers.
- AutoNeg changes made to support EEE on 10GBase-T directly applicable to 10GBase-KR.
- Although power saving per link small, every little bit helps. Need to do our part.