

Server Call Highlights Linux, Unix & Mainframe Markets

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■ Call w/Timothy Prickett Morgan of Computerwire & IT Jungle

We hosted a conference call with Timothy Prickett Morgan, President & Editor-In-Chief of "IT Jungle" & Principal Analyst, Server Platforms & Architecture at Computerwire. The conference call focused on the future of Unix, Linux, x86 & x64 server architectures.

■ Linux May Gain Ahead of Longhorn Server OS in '07

Morgan estimates that Linux approximates 14% of the server install base & believes that its share can grow to approximately 1/3 of the market over time. HP may stand to gain from this shift with a broad product line that supports multiple OS' but it must balance the cannibalization of higher margin products.

■ "T-Rex 2" a 3Q Launch For IBM?

After yrs of decline, mainframes stabilized over the last few years. After a tough 1H05, we could see a pickup later in the yr as Morgan believes IBM is set to release a new mainframe as early as 3Q05 (we had expected 4Q). "T-Rex 2" is expected to outperform prior generations & could be priced more attractively in an attempt to drive consolidation & an upgrade cycle.

■ Unix Install Base Big, Watching Opteron

Unix servers only comprise about 8% of the market yet make up approximately 36% of server revenue due to software & services. Morgan was upbeat about the prospects for 32/64 bit processors in Unix, but we note these processors could cut into higher margin sales.

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Upbeat About Linux; Mainframes Not Dead Yet With New Products From IBM

We hosted a conference call with Timothy Prickett Morgan, President and Editor-In-Chief of "IT Jungle" and Principal Analyst, Server Platforms & Architecture at Computerwire. The call focused on key issues facing Unix, Linux, x86 and x64 server architectures. Mr. Morgan provided useful insights into the current market dynamics for the major IT Hardware companies under our coverage, including: IBM (IBM), Hewlett Packard (HPQ), Dell (DELL), and Sun Microsystems (SUNW).

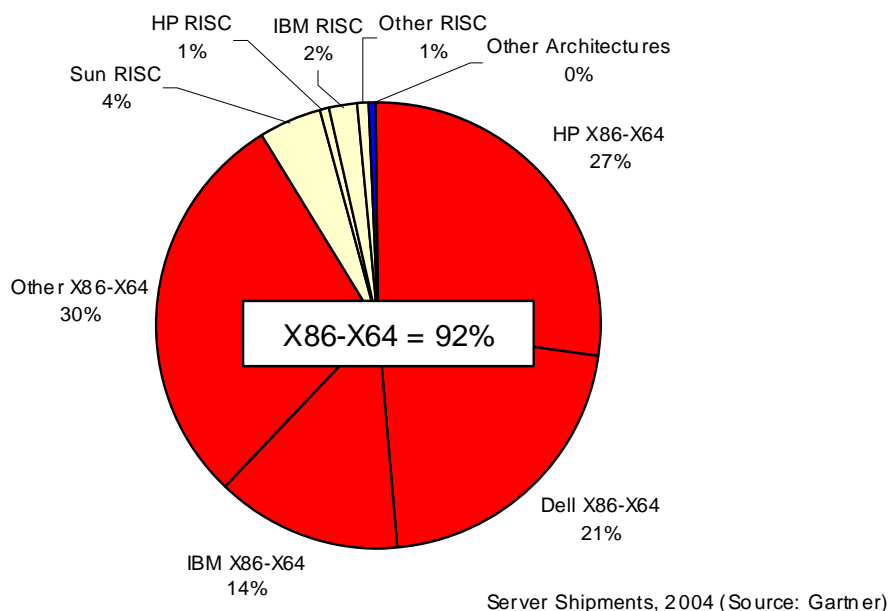
Mr. Morgan was relatively upbeat about the future of the Linux server market, which he thinks could amount to about a third of the market over the next several years (this is more aggressive than our forecasts). However, he noted that determining a clear "winner" in servers was not as cut and dry as it might seem given the install base for Windows, Unix and Mainframes. Although 92% of server shipments are x86 architecture or next generation x64 systems (64-bit versions of the x86 architecture), Mr. Morgan noted that this architecture only comprises 47% of total market revenue. This phenomenon is important since it indicates that the current server install base plays a prominent role in decision making for current server "ecosystems" that include software and services.

Following the ecosystem theme, Morgan noted that IBM was set to launch a much faster and cheaper version of its T-Rex mainframe next quarter (earlier than expected), which could help driver further consolidations and the purchase of software and services tied to the system – prolonging its useful life. We believe a potential mainframe cycle is key to IBM's fortunes as its services margins face pressures and the company attempts to execute a major restructuring program predominantly in Europe.

Morgan also noted bright prospects for 32/64 bit processors like AMD's Opteron, which he felt could also amount to a third of the server market eventually as the software market evolves. We believe that HP may be able to benefit from this trend over time, but only if it does not cannibalize its higher-end Unix sales at a faster pace.

Chart 1: Server Market Unit Share by Vendor and Processor

Takeaway: Unit Shipments Dominated by X86



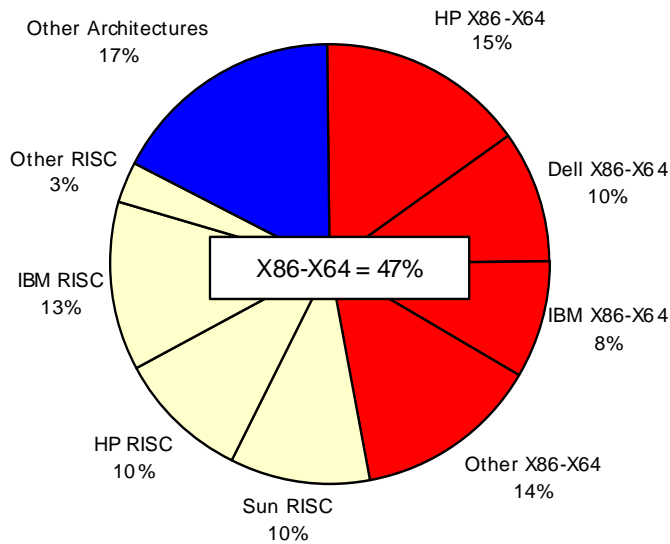
Source: Gartner

The call also highlighted that when analyzing the server market and trying to determine a “winner,” the revenue generation from the installed base is extremely important, even more so than unit shipments. According to Morgan, the server ecosystem, which represents how much revenue the install base generates, is estimated to be approximately \$124 billion (almost the same size as the Windows ecosystem). The following is a breakdown of the estimated ecosystem: HP - \$20 billion; HP partners - \$20 billion; Sun - \$9 billion; Sun partners - \$30 billion; IBM - \$15 billion; IBM partners - \$30 billion (amounts represent estimates from early 2004). The ecosystem analysis shows how important Unix and mainframe cycles are to IBM, HP and Sun since sales of the hardware are only a small part of the total pie.

We believe that a key problem for hardware vendors within the Linux market is that the vendor may lose control of some key pieces of the ecosystem, in addition to having lower hardware margins, which adversely impacts mix. Based on the chart below, this mix shift is only in the early stages—which should benefit Dell.

Chart 2: Server Market Revenue Share by Vendor and Processor

Takeaway: RISC and Other Architecture Still the Majority of Server Revenues



Server Revenues, 2004 (Source: Gartner)

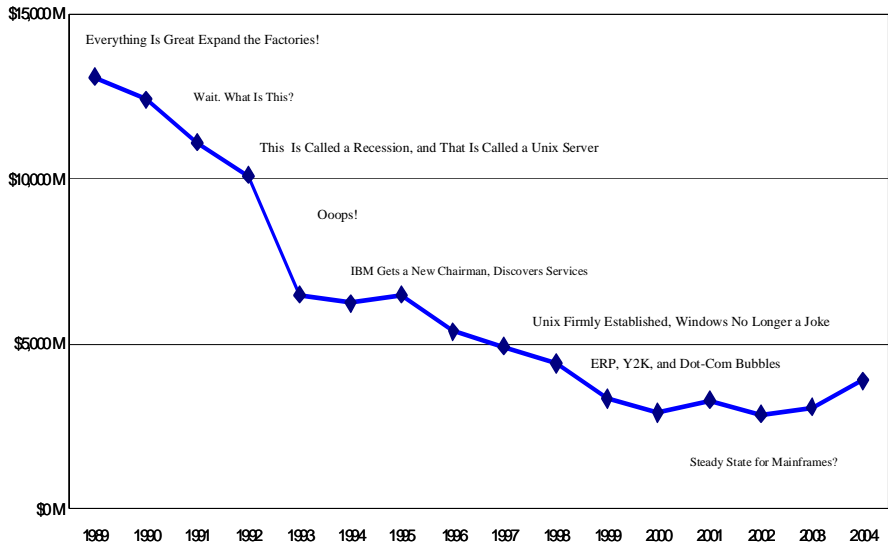
Source: Gartner

Other Key Takeaways From the Call Included:

1. **"T-Rex 2" May Come Early:** After years of decline, mainframe sales have stabilized in 2003 and 2004. After a very weak 1Q05 and what should be a weak first half, we believe mainframes could see a modest pickup later in the year as IBM seems set to release new products as early as 3Q (originally expected in 4Q). In 1Q05 sales of IBM mainframes sales fell 16% y/y, which was below expectations despite an aging mainframe cycle as deals were pushed out. Morgan noted that this miss was due in part to customer's expectation that a new mainframe could be on its way. We believe that the miss also showed that the T-Rex cycle that began in 2003 has waned.

Chart 3: Historical Mainframe Sales

Takeaway: Mainframe Sales Stabilized This Decade After a Steep Fall, but After a Weak 1Q05—Can Growth Be Resumed?



Source: Computerwire and IT Jungle

Mr. Morgan expects T-Rex2 to significantly outperform the first generation with 2x the clock speed (500-600 MIPS) than what it was two years ago, as well as more flexibility, with users being able to activate up to 38 of the spare processors within the mainframe. IBM is expected to price the new servers aggressively in an attempt to drive consolidation and trigger an upgrade cycle. With software ready for the machines, we believe IBM’s mainframes are poised to begin a new but more modest cycle. We will also need to keep an eye on how quickly the company will be able to raise yields in order to meet expected demand.

2. **Linux Should Gain Share Ahead Of Longhorn Server OS:** We agree with Morgan, who is upbeat about the prospects for Linux growth. In fact, a shift toward Linux could occur ahead of a Longhorn server OS launch in 2007. Although this switch is expected to take some time, the process clearly has already begun as IT Jungle estimates that Linux comprises approximately 14% of the installed base of the worldwide server market and believes that Linux share can grow to approximately one third of the market.

Chart 4: Server Revenue and Shipment Growth From 2002-2004

Server Revenues Over Time		Growth		Growth	
	2002	2003	2002-2003	2004	2003-2004
HP X86-X64	\$5,108 M	\$6,628 M	29.8%	\$7,559 M	14.0%
Dell X86-X64	\$3,217 M	\$3,976 M	23.6%	\$4,756 M	19.6%
IBM X86-X64	\$2,838 M	\$3,393 M	19.5%	\$4,175 M	23.0%
Other X86-X64	\$5,220 M	\$5,833 M	11.8%	\$6,698 M	14.8%
Sun RISC	\$6,522 M	\$5,417 M	-16.9%	\$5,083 M	-6.2%
HP RISC	\$5,741 M	\$5,706 M	-0.6%	\$4,815 M	-15.6%
IBM RISC	\$5,873 M	\$6,435 M	9.6%	\$6,310 M	-1.9%
Other RISC	\$1,550 M	\$1,475 M	-4.8%	\$1,412 M	-4.3%
Other Architectures	\$7,024 M	\$7,261 M	3.4%	\$8,700 M	19.8%
TOTAL	\$43,093 M	\$46,123 M	7.0%	\$49,509 M	7.3%
Server Shipments Over Time		Growth		Growth	
	2002	2003	2002-2003	2004	2003-2004
HP X86-X64	1,319,830	1,530,739	16.0%	1,833,484	19.8%
Dell X86-X64	852,332	1,105,251	29.7%	1,407,978	27.4%
IBM X86-X64	557,447	751,457	34.8%	924,170	23.0%
Other X86-X64	1,397,804	1,619,804	15.9%	1,971,086	21.7%
Sun RISC	271,917	273,410	0.5%	301,832	10.4%
HP RISC	69,141	64,126	-7.3%	58,423	-8.9%
IBM RISC	98,993	118,082	19.3%	132,837	12.5%
Other RISC	39,298	40,279	2.5%	52,903	31.3%
Other Architectures	5,039	53,524	962.2%	31,824	-40.5%
TOTAL	4,611,801	5,556,672	20.5%	6,714,537	20.8%
Source: Gartner					

Source: Gartner

In terms of hardware sales (not software), we believe HP and Dell may stand to gain the most from this mix shift to Linux, with HP having a broader product line that supports multiple operating systems. However, HP needs to be careful that the mix to Linux doesn't cannibalize its Unix business faster than upcoming cost cuts can absorb, which could impact margins. We also note that we will have to keep an eye on Dell, as the company is closely tied to Windows architecture and Intel products. However, we continue to believe that Dell is well positioned to benefit from the continued rapid growth of the x86 based server architecture given about 12-14% of its server sales go into Linux environments. We estimate that the size of the Linux server market is about \$4.5 billion currently, growing about 30% long-term.

- Unix Benefiting From Large Install Base, But Vendors Need Share Gains Long-term:** According to IT Jungle, shipments of Unix based servers only comprise approximately 8% of total server shipments however make up approximately 36% of the worldwide server revenue. Morgan believes Unix continues to benefit from a large install base, which is difficult to rip out and replace even with the rise of Linux. As stated above, the server ecosystem (how much revenue the current install base generates) is the primary metric to keep an eye on with the rise of Linux given its impact on profits. We believe that Unix revenue will remain in decline over the long-term, with share gains the key driver of growth for vendors like IBM.

In terms of Intel’s Itanium, HP’s processor of the future, Morgan noted what we have witnessed in many discussions – that the chip has somewhat of a “stigma” in the marketplace that HP needs to overcome if it is to be successful long-term. HP is currently migrating all of its Unix servers to Itanium (DEC Alpha, PA-RISC and Tandem Non-stop), which could create some opportunities for competitors if it is not managed carefully. We note that HP’s Unix sales topped our expectations last quarter, but largely due to 9% y/y growth in its HP-UX (PA-RISC) based servers—rather than upside in Itanium.

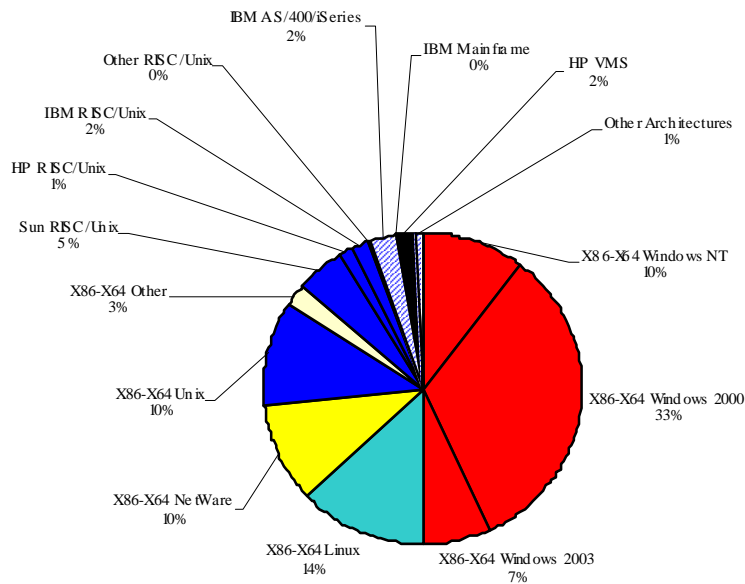
Chart 5: Worldwide Server Installed Base

Worldwide Server Installed Base, Early 2004		
X86-X64 Windows NT	2,000,000	
X86-X64 Windows 2000	6,200,000	
X86-X64 Windows 2003	1,300,000	
X86-X64 Linux	2,500,000	
X86-X64 NetWare	2,000,000	
X86-X64 Unix	2,000,000	
X86-X64 Other	500,000	16,500,000
Sun RISC/Unix	960,000	
HP RISC/Unix	240,000	
IBM RISC/Unix	310,000	
Other RISC/Unix	90,000	1,600,000
IBM AS/400/iSeries	450,000	
IBM Mainframe	20,000	
HP VMS	375,000	
Other Architectures	150,000	995,000
TOTAL	19,095,000	
Source: IT Jungle		

Source: IT Jungle

Morgan noted that IBM is on track to release a refresh of parts of its POWER5 product line and that the company is not necessarily focused on speed, but rather on providing more dynamic applications at attractive price points. We believe IBM needs to generate double-digit revenue growth in its Unix business this year in order to demonstrate its ability to gain share from Sun and HP. In terms of Sun, Morgan noted that making Solaris free in order increase its install base was a good move, but may have been too little too late. Also, Morgan noted that its decision to co-develop its next generation UltraSPARC chips with Fujitsu should have been done long ago. We believe that Sun still faces the challenge of a mix shift to lower-end servers, while losing share of the Unix “ecosystem.”

Chart 6: Worldwide Server Installed Base By Architecture



Server Installed Base, Early 2004 (Source: IT Jungle)

Source: IT Jungle

- Opteron Poised For Significant Growth:** Mr. Morgan was upbeat about the potential for Opteron to gain share and he believes this type of processor could grow to 30%+ of the market over the next few years as Intel improves its offerings as well. While Opteron may see strong growth in coming years, Morgan notes that the chips are mostly still being used in testing rather than live environments as companies want to ensure their reliability before integrating them into mission critical systems. Dell has stated that it will not offer Opteron and we believe IBM would prefer to broaden its own product offerings on POWER. As a result, we feel HP (and somewhat Sun) stands to benefit most from Opteron growth as the company continues to focus its efforts on providing customers with a broad array of server offerings across a number of architectures. Again, the key will be whether the mix toward lower-margin Opteron servers comes at the expense of other higher margin Unix sales.

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Source: UBS; as of 31 March 2005.

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Companies mentioned

Company Name	Reuters	Rating	Price	Price date/time
Apple Computer Inc. ^{8,16}	AAPL.O	Buy 2	US\$40.56	27 May 2005 19:35 EDT
Dell Inc. ^{4a,6a,6b,6c,7,16,22}	DELL.O	Buy 1 (RRD)	US\$40.31	27 May 2005 19:35 EDT
EMC Corporation ^{4b,6b,6c,7,16,22}	EMC.N	Buy 1 (RRD)	US\$14.16	27 May 2005 19:35 EDT
Hewlett-Packard Co. ^{4b,6b,7,16}	HPQ.N	Neutral 2	US\$22.77	27 May 2005 19:35 EDT
IBM Corp. ^{2,3,4a,5,6b,6c,7,16,22}	IBM.N	Buy 1	US\$77.10	27 May 2005 19:35 EDT
Network Appliance ^{4a,6a,6b,7,16}	NTAP.O	Buy 1	US\$28.94	27 May 2005 19:35 EDT
Sun Microsystems ¹⁶	SUNW.O	Neutral 2	US\$3.87	27 May 2005 19:35 EDT

Source: UBS. EDT: Eastern daylight time.

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