

**Peerstone
Enterprise
Software Notes**

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Peerstone's 2004 "Apps & Stacks" research program probes in depth the factors driving the market for enterprise applications and their associated middleware and hardware "stacks".

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Ent Linux to End Win Server Growth

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Executive Summary

Linux is making undeniable inroads into the core enterprise applications stack, of which the biggest component is the worldwide installed base of 800,000 servers running SAP, Oracle and PeopleSoft applications.

Linux is already causing Windows Server growth to slow sharply. We estimate that Windows Server revenue growth will decline from 12%-15% in FY 2004 to 2%-5% in FY 2005.

Beginning in FY 2006 Windows Server will shift from a growth to a mature product, as Microsoft accelerates the transition from an upfront to an annuity revenue model. But pricing pressure from Linux will squeeze margins.

Investors and customers should prepare now for the shift in the Windows Server business model and the attendant change in valuation premium.

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Sizing the ERP Server Installed Base Opportunity

The installed base of servers running Big 3 ERP applications is the largest single revenue prize in the enterprise IT industry today. We estimate the size of this installed base - includes all tiers and instances of all SAP, PeopleSoft and Oracle installations worldwide – at roughly 700,000 to 800,000 server units worldwide,.

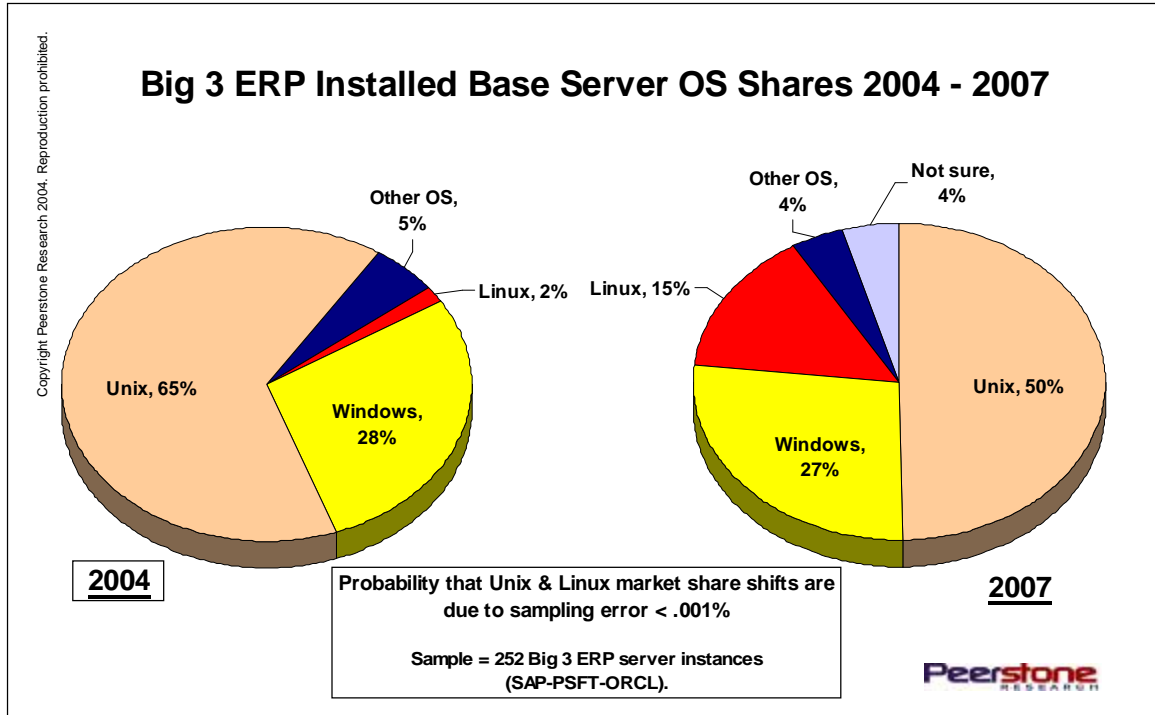
A typical large ERP account may support dozens of individual servers.

- § It will typically have several high volume transaction database servers on the back end – one for ERP, one for CRM, one for Supply Chain, another for a Data Warehouse, etc. (Oracle pitches a single database architecture, but when volumes are high this requires a multi-server cluster architecture, which amounts to the same thing as far as the size of the server installed base is concerned).
- § In addition, the ERP account will have a number of middle tier servers running the various modules that make up these applications: Accounting, HR, Payroll, Procurement, Project Management, Budgeting, and so forth. The allocation of specific computing tasks to specific servers may or may not be dynamic, depending on the architecture.
- § In front of this middle tier will stand a farm of web servers pumping out the thousands of HTML pages that provide the user interface for most modern ERP modules. These will often be smaller, dual-processor pizza-box servers installed in racks, or even so-called “blades” (which lack their own external network connection or power supply). They will be connected by load balancers and interface with firewalls.
- § There will also be servers running portal and integration broker software (as in SAP Netweaver) that combines data from different modules and back-end databases before serving it up to end users or to other applications. Other servers manage business process workflow and specialized access by mobile devices such as laptops and PDAs (or even RFID chips in the warehouse).
- § Finally, large multi-divisional organizations may have multiple instances of an ERP application installed, one for each major line of business or region – this is especially common among the big SAP accounts.

Obviously, each of these servers has one or more processor chips and an operating system. Contrary to what observers may believe, the ERP server installed base is still largely built on Unix and RISC. The current Peerstone software survey shows that as of mid-2004, traditional RISC-based Unix (Solaris, AIX, HP-UX, Tru64) owns a dominant two thirds share (65%) of this base. Servers using x86 architecture (typically Intel

Xeon, but also AMD Opteron and even some Itanium) now account for 30% of the ERP installed base – 28% for the Windows Server family and just 2% for Linux. See Chart 1 below.

Chart 1



Understanding the impact of ERP product cycles

Today the population of companies running Big 3 ERP applications is growing at about 5% per year – somewhat more for SAP, somewhat less for Oracle and PeopleSoft. The total number of ERP accounts is only a rough proxy for new (i.e. non-replacement) server unit growth, because new ERP installations are likely to use a larger number of smaller servers – spread out over multiple tiers and modules – than older installations.

Undeniably, software license revenue growth for the ERP industry as a whole appears to be at a cyclic low point. Some, led by Oracle’s Larry Ellison, argue that this is because the large account ERP market is simply mature and has little growth potential left in it. Although there is no doubt that most large organizations in the developed economies already have an ERP package, we could point out that, when SAP R/3 was launched in the early 1990s, the vast majority of Fortune 500 companies already had sophisticated mainframe-based accounting and production management software that they had been running for years. Accordingly, we at Peerstone believe there is a more fundamental

reason for today's slowdown in enterprise applications than saturated customer demand, and that is the product cycle of the major vendors and the technology cycle of the industry as a whole.

First, PeopleSoft, Oracle and Siebel are all very, very late in the lifecycles of the software versions they are currently selling. We think this is the major reason for the persistent weakness in their software license revenues over the past few quarters. The only big application vendor who is still posting license revenue growth, SAP, just happens to be in the middle of a major transition to a new generation of middleware (known as Netweaver), and this is definitely not a coincidence.

Second, the enterprise application industry as a whole is going through a wrenching, multi-year technology shift from today's webified client-server architectures (which were built by sticking a web front end on the traditional client-server architecture of the late 90s) to so-called service oriented architectures. SOA, which among the Big 3 ERP vendors and Siebel has been partially implemented so far only in SAP's Netweaver, will ultimately make possible a much less labor-intensive and more flexible deployment of fine-grained business processes tailored to the industry-specific needs of large organizations. When the vendors deliver these products to the market, CEOs and CFOs will step up and buy them in great number. Until then, license revenues will continue to bump along the bottom.

Whatever the cause of the slowdown in ERP license revenue, it is clear that by far the largest portion of server hardware and server OS sales into this market now comes from generational replacement, footprint expansion and version upgrades in the existing server installed base. Peerstone estimates that as much as 25% of the ERP server installed base will turn over in the next 12 months. This amounts to approximately 200,000 unit sales of server hardware and server OS products sold into the installed base on an annual basis, compared to roughly 50,000 units sold into new ERP accounts. Renewal of the ERP server installed base is a critical – indeed, life or death – moment for hardware and systems vendors such as IBM, Sun, Hewlett-Packard, Dell, Microsoft, Red Hat and Novell.

The Big 3 ERP server market is worth over \$8 billion per year

How much is this ERP server market worth in terms of annual hardware and software revenue? We make the following broad brush assumptions to arrive at a ball park answer to this question:

- § \$3.75 billion in one-time server hardware sales per year, based on 250,000 server hardware units at an ASP of \$15K (averaged over unit prices ranging from as little as \$1500 for a blade used in

a web server farm up to \$300K-\$500K for a 64-way multiprocessor box used for a high volume back-end database).

- § \$2.25 billion in incremental storage system revenue driven by the server sales (40-60 ratio).
- § \$300 million per year in recurring maintenance and support contracts on the server and storage hardware (5% of purchase price).
- § \$375 million per year in recurring server OS annual subscriptions. Given the multiplicity of opaque and incompatible server OS license pricing schemes practiced by the various vendors, we have resorted to the expedient of normalizing everything into a hypothetical annual subscription revenue stream of \$1500 per server OS instance, based on published Red Hat, Sun and Microsoft documents.
- § \$2 billion in one-time professional services delivered around the installation and integration of the server and storage hardware and operating systems (assuming a 1-to-3 ratio of professional services to hardware sales, limited to those services that are directly related to server systems and excluding broader application-oriented consulting).
- § Grand total for annual server system sales into the worldwide ERP market: \$8 billion per year in one-time sales of hardware (75%) and professional services (25%) per year, plus \$675 million in annual recurring revenue from support contracts or deferred software license payments.

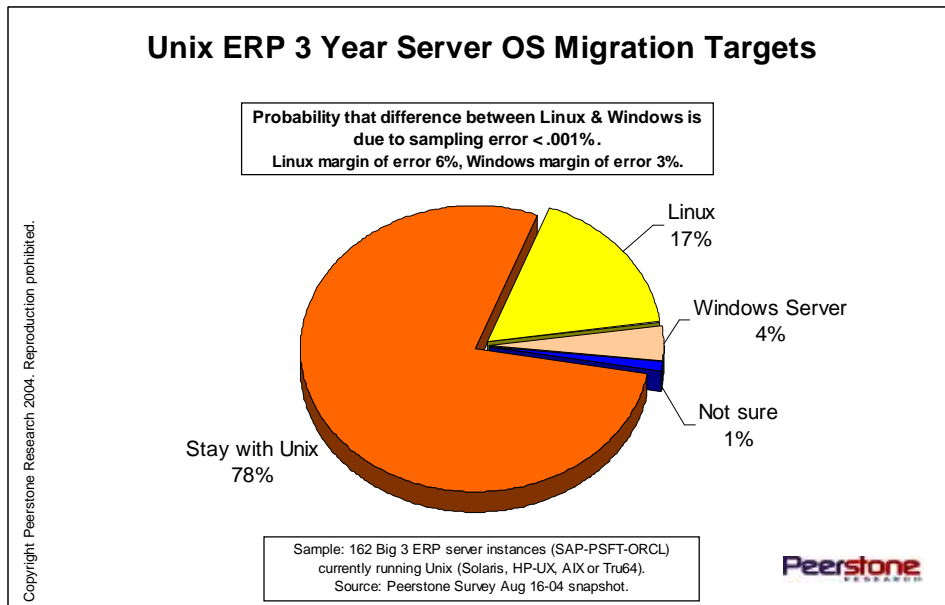
What our survey says about ERP server OS migration

While Unix still owns the lion's share of the ERP installed base, we know this is changing and will one day cease to be true. Just as water flows down hill, enterprise application customers continuously seek to migrate their mission-critical portfolios to cheaper operating platforms. Since the late 1990s an increasing number of customers have been moving from expensive RISC hardware to cheaper Intel – and now AMD – boxes. There is nothing new in this trend. Customers did the same thing when they moved from R/2 on mainframes to R/3 on first generation Unix RISC machines in the early 1990s. Like gravity, this movement is a force of nature. Nothing can stop it or even slow it down for long. What is new however is that x86 bound customers now have a choice. Until last year the only server OS that ran on x86 hardware and was supported by the Big 3 ERP vendors was sold by Microsoft – first Windows NT, then the Windows Server family. Now Linux – in both the Red Hat and Novell Suse distributions – is a credible alternative. As our survey data shows,

it is beginning to push its way slowly but inexorably into the ERP installed base.

Both Microsoft and the Unix vendors – particularly Sun – stand to suffer greatly if Linux breaks into the ERP stack in a big way. Therefore their sales and marketing departments are working overtime to create the impression that this is not happening and cannot happen. Marketing materials on the Microsoft and Sun web sites acknowledge the growth of Linux in the enterprise but portray it as confined mostly to edge server or single-purpose roles (“disaggregate workloads”, in Microsoft’s terminology). For example, web server farms. However, we can now assert with confidence that enterprise customers are beginning to abandon their de facto restriction of Linux to edge functions. As Chart 2 below shows, about one in five ERP shops now running Unix *expects* to migrate to some other OS in the next three years. And almost four out five of those who expect to migrate say they will go to Linux. These are statistically robust results from Peerstone’s current enterprise software survey with an extremely small probability of major sampling error.

Chart 2



Whether or not the ERP customers we surveyed will *actually* migrate from Unix to Linux is of course another question, the answer to which depends on the ability of the Unix vendors to come up with new defensive measures dramatically more effective than those they have used until now. Sun management is making bold and sweeping claims to this effect. They argue that a dramatic shift is underway from 32 bit to 64 bit architectures in the Intel world, led by AMD’s Opteron, and that 64 bit Solaris 10 will profit from this shift. Customers looking for cheaper hardware than Sparc who might have migrated to Linux on Xeon will now go to Solaris on Opteron. We will evaluate the credibility of this

claim against our recent survey results on ERP stack processor architectures in a subsequent research note. But for now we simply observe that since Sun owns only about a third of the Unix ERP installed base, its new strategy could at best shave a few percentage points off the share of customers planning to abandon Unix. It will certainly do nothing to shift those who do leave Unix towards Windows Server rather than Linux. For again, the most important finding in our recent survey work is not that customers are leaving Unix for cheaper platforms – we already know that has been happening for years – but rather that the vast majority of those who are leaving now say they will go to Linux rather than Windows Server.

Linux penetration of the ERP stack will accelerate

Linux is becoming a credible server OS for more and more Big 3 ERP customers because they believe that Linux:

- (1) Has achieved rough technological parity with Unix and Windows Server (or will come close enough that the remaining gap won't matter);
- (2) Runs on cheaper hardware than Unix, and is cheaper to acquire than Windows Server;
- (3) Is more secure than Windows Server;
- (4) Enjoys the active technical support and strategic commitment of IBM and Oracle.

While points (1) and (2) are contested by Sun and Microsoft, there is broad agreement among the subset of our survey respondents favorable to Linux that they are true.

Point (3) is interesting because there is no obvious technical reason why Linux should be more secure than Windows Server. The security issues that have persistently dogged Windows appear in part to be a sociological phenomenon, driven by widespread anti-Microsoft sentiments in the hacker sub-culture – sentiments that unfortunately motivate a criminal minority to put their animus into practice. Microsoft very rightly argues that security is everyone's concern, and then goes on to suggest that as Linux market share grows it too is likely to be struck by hacker attacks. We find evidence in our surveys that some ERP users subscribe to this view, which is certainly plausible. But it is hard to tell whether they have arrived at this conclusion spontaneously or had it suggested to them by Microsoft. In any event, we are not sure that the prediction of rising Linux insecurity will pan out. If it is true that the recurring virus and back-door attacks on Microsoft code are motivated primarily by ideology and resentment, then it may not follow that Linux

will be subject to a similar wave of attacks, precisely because the angry individual hackers who attack Microsoft are much more likely to have strong pro-Linux convictions. Clearly the jury will be out on this issue for some time.

Point (4) is not open to doubt. Although the role of IBM in promoting Linux is well known, Peerstone survey data shows that Oracle's engagement in the Linux camp is having a profound impact on customer attitudes, not only in its ERP installed base but also among its far more numerous database customers. Oracle's approach to Linux is more directive and less agnostic than IBM's. While IBM is telling customers "we support Linux, along with AIX, OS/400, OS/390, z/OS and Windows Server, take your pick", Oracle is telling them "we're going to Linux for everything, you should too".

But we believe the biggest near-term change in enterprise attitudes towards Linux will not stem from reinforcement of the positives listed above, but from a weakening of the two most important negatives currently hanging over Linux. These are:

- § A higher total cost of ownership (TCO) than one would expect for a nominally free operating system, due to the high cost and relative scarcity of experienced Linux system administrators. This is an extremely important factor, and it is the most common reason our ERP survey respondents spontaneously mention for not moving to Linux.
- § Fear, uncertainty and doubt caused by SCO's legal assault on Linux intellectual property.

Peerstone believes that both of these factors are likely to be significantly weakened in the coming 12 months. Labor costs, and therefore Linux TCO, will inevitably come down as supply catches up with demand. There are a lot of smart, experienced IT folks worried about their careers right now, and their incentive to acquire skills in segments where demand exceeds supply is very strong. As for SCO's court case, we believe it has little if any substance, and will sooner or later succumb to IBM's vast legal resources and "hang tough" strategy.

When these two negatives diminish in importance, the move to Linux will accelerate.

Forecasting the impact of Linux on Microsoft

The fundamental issue for Microsoft is that if Linux continues to grow in the ERP stack it will inevitably put a ceiling on the growth of Windows Server. Since new installations account for only about 20% of server OS unit sale opportunities per year in the current ERP market, Microsoft

cannot rely exclusively on new ERP accounts to drive Windows Server growth. Much more important, it needs to retain a substantial share of the migration traffic off Unix in the existing ERP account base. But this will likely not be possible. We believe that Windows Server continues to capture over half of green field ERP installations, particularly among smaller accounts who are unlikely to even consider expensive RISC hardware. However, true green field ERP sales into large organizations are increasingly rare, except in certain historically underserved verticals (Higher Education, Government) and in certain geographies (Asia, Latin America).

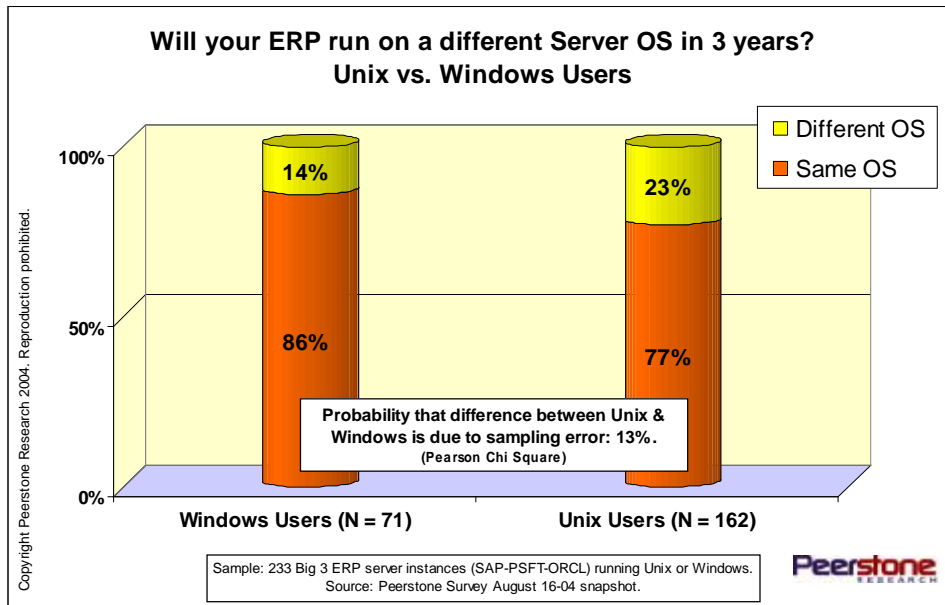
Critically, as chart 2 above shows, there is compelling evidence to believe that Microsoft's share of ERP Unix migrations will drop sharply over the next three years. We estimate that this share will drop from over 90% in 2003 to less than 20% by 2007. If we assume optimistically that Microsoft's share of new ERP installations will decline more slowly, from a hypothetical 50% in 2003 to 25% in 2007, this means that the total lost opportunity for Microsoft in the ERP market will amount to 40,000 to 50,000 high end server OS unit sales per year by 2007. Given the much larger overall volume of Windows Server sales in all application segments, this represents a painful but certainly not a crushing loss. But it is magnified by the fact that ERP is a proxy for all the other core enterprise application markets (including high-end custom development), and even more by the fact that every lost sale for Windows Server by definition shuts out the rest of the Microsoft stack components, particularly SQL Server and .NET.

Based on our survey data and the market model sketched in the preceding paragraphs, Peerstone estimates that overall revenue growth for Windows Server will decline from an estimated 12%-15% in FY 2004 to around 2%-5% in FY 2005. The decline is likely to be sharper in the later quarters of the fiscal year, and will continue into FY 2006.

In its defense of Windows Server's growth prospects, Microsoft cites several factors:

- § It expects to reap significant business as customers pay to upgrade older Windows NT installations to Windows Server – and our ERP survey respondents confirm that this is the case;
- § It is still going after Unix migrations, though it acknowledges that this is where Linux growth will come from;
- § It says there is little evidence so far of head-to-head competition between Windows Server and Linux. In other words, few if any customers are converting existing Windows installations to Linux.

Chart 3



We agree that the last point is currently valid. However, chart 3 above shows that roughly 14% of Big 3 ERP customers now running on Windows Server expect to move to another OS in the next three years, compared to 23% who expect to migrate off Unix¹. Unlike the other results cited in this note, this observed difference between Windows and Unix is only marginally significant (with a fairly large 13% chance that it is due to sampling error). But we expect it will firm up as our sample size increases, because it seems to us quite plausible to believe that Windows customers are less likely to change server operating systems than those running Unix.

Nevertheless, it is apparent that a least a trickle of the Windows Server ERP install base is beginning to flow away, and its most likely destination is Linux. There is as yet no reason to think this trickle will become a river or even a stream in the future, but the issue is obviously of the highest possible concern for Microsoft. Though only a handful of ERP shops running Windows Server are thinking about Linux today, if Microsoft allows a significant price gap to open up between its product and the major enterprise Linux distributions this will change.

Are Microsoft executives in denial about the progression of Linux in the core enterprise stack? While they are certainly acutely aware of the menace Linux represents, it seems they are not prepared to acknowledge that any fundamental change in strategy may be necessary. They are still working on the assumption that basic blocking and tackling will carry the day. Microsoft has a unique marketing culture propelled by an unequalled concentration of very smart, hard working people who are used to grinding out victory after victory. After all, this is

¹ The slight difference between charts 2 and 3 is due to rounding errors.

how they unseated Novell Netware in the 1990s from a position of incredible dominance in the LAN server market and installed Windows NT in its place. For the past decade they have been vigorously applying the same method to Unix in the enterprise, and until now they have known sustained success, although Unix – unlike Netware – is still a formidable opponent. So it is hardly surprising that they now have trouble switching perspectives and admitting that they themselves have become the legacy system challenged by a relentless newcomer whose culture is as alien as its technology.

Microsoft's basic stance appears to be that surging customer interest in Linux is all a misunderstanding. In particular, Microsoft says that customers underestimate:

- § both the TCO and the TCA (total cost of acquisition) of Linux compared to Windows Server
- § the extent of the security risks that Linux is likely to face in the future

We have already discussed the TCO and security issues above. What is particularly interesting is Microsoft's claim about Linux acquisition costs. Microsoft's web site offers a piece of research commissioned from Bearing Point which purports to show that under reasonable assumptions an enterprise will spend far more to put Red Hat Linux on its servers than Windows Server. Based on survey data which shows that a typical large enterprise will have 522 servers and 5,742 clients, Bearing Point finds that:

- § Red Hat Linux subscriptions for such an enterprise would cost about \$2 million over five years;
- § Windows Server (including server licenses, client licenses, support, and upgrades) would cost the same customer only \$1.3 million over the same period.

This is certainly a surprising and compelling argument in favor of Windows Server, if the details of the comparison withstand scrutiny. However, there are some odd assumptions in the Bearing Point model that make its conclusions difficult to credit. The prices used are not list prices but those obtained by Bearing Point after blind queries to Microsoft and Red Hat sales reps. The overall discount obtained for Microsoft software licenses and support services in this example is 47%, that for Red Hat only 24%. But the discount gap is actually far more extreme when we drill down specifically to server OS license costs. Here Bearing Point states, based on its sales inquiries, that a large enterprise buying Windows Server can expect to obtain 85% off software license list price (one wonders why Microsoft would want to post this document on its public web site). But the model assumes the same customer would obtain no better than 30% off from Red Hat.

Well, maybe so. Many market participants – not least Sun and Microsoft – readily accuse Red Hat of acting like an arrogant monopoly. Even if it were confirmed that Microsoft is routinely offering discounts a whopping 55 percentage points better than Red Hat for similarly sized deals, we think competition from Novell's Suse Linux as well as Sun and Microsoft will force Red Hat's premium pricing down quite rapidly. But the pricing information in Bearing Point's model can be used to obtain a radically different comparison if certain assumptions are modified. As a thought experiment, we plugged Bearing Point's numbers into a hypothetical large SAP scenario (considered in isolation rather than as part of an enterprise wide server OS choice) and obtained the following results:

- § For a SAP installation consisting of 20 servers and 10,000 clients, Red Hat over five years would cost \$208K;
- § For the same SAP installation under Windows Server, the five year costs would be \$605K.

So, even assuming much higher discounts from Microsoft than from Red Hat, it is not always clear that Windows Server has a lower TCA. For some ERP customers it might actually be as much as three times more expensive than Linux. We of course acknowledge that this is a somewhat artificial comparison based on Bearing Point's somewhat artificial price data. But our survey shows that while many ERP customers report higher Linux TCO due to higher labor costs, they do not say that Windows Server's cost of acquisition is lower than – or even comparable to – that of Linux. Perhaps these customers are simply misinformed, as Microsoft suggests. But if so, it will take a tremendous amount of blocking and tackling on Microsoft's part to change their minds. At the same time, the cost of Linux acquisition and ownership will be a moving target, due to competition and labor market changes. Bottom line: we think that, barring a radical shift in business model, Microsoft will find it extremely tough to make its case against Linux based on price.

There are three major arenas in which the Linux vs. Windows Server battle will unfold over the next few years:

- § First, the Unix leavers. They are already leaning to Linux rather than Windows, and as Linux labor costs come down the Unix skills bias in favor of Linux will probably make it impossible for Microsoft to recapture its lost ground here. In losing the Unix migration market Microsoft will lose the biggest historical source of Windows Server growth in the enterprise applications stack. In fact, the progressive marginalization of Microsoft in this segment means that the real action here will be between Linux and Solaris on x86, as Sun battles to keep its installed base. The loss of this space will also have a large downstream impact on SQL Server revenue and market share growth.

- § Second, new enterprise application installations. Here we believe Windows Server will continue to hold its own, but Linux competition will pressure its pricing model and its margins, putting a ceiling both on growth and profitability.
- § Third, the Windows NT and Windows Server installed base. As argued above, this segment is not seriously challenged by Linux today and, if Microsoft takes appropriately aggressive defensive measures, it may never be. The incentive to convert from an upfront license to an ongoing subscription revenue model will become all the greater as Microsoft gradually shifts the sales and marketing focus of Windows Server from new account growth to installed base preservation.

In some ways Windows Server is in the same position today as Solaris was two years ago. Linux was looming on the horizon, but Sun executives weren't ready to concede that it could ever rock their universe. Now Sun has announced that it will open source Solaris and is adopting a pricing scheme on x86 hardware that closely resembles Red Hat's subscription model. Although we doubt that Microsoft will be pushed to the point of contemplating open source for Windows Server, we think that an alignment on the Linux pricing model is inevitable within the next two to three years.

Bottom line: Windows Server is about to undergo a painful transition to a low-growth mature product where annuity revenue streams displace license sales. Microsoft is more than capable of executing this transition successfully. But the resulting franchise will not command the same premium it did in the era of growth. Investors and customers need to adjust their models accordingly.

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