Linux: Key to iSeries Growth?

By Thibault Dambrine

For a number of years, Linux has been an up-and-coming technology. One that had more to do with some experiment than a real tool that could be used for doing business.

With time and open source contributions from thousands of programmers, Linux has come to run on practically every computing platform conceivable. There are versions of Linux running on PDA's (Personal Digital Assistant), watches, IBM's big iron mainframes, antiques like Atari computers and even the Mars Rover. The buzz now on Linux is such that it feels like real business use is actually taking traction. We don't see it very often on the desktops or in every day working conditions just yet, but Microsoft does not say anything good about it. This may be the best clue that Linux is worth checking out! Also, there are lawsuits out there over the code within Linux, sign of serious value hidden within.

The Linux wave is moving forward, and with it, software and hardware vendors are jumping into what looks like a growing opportunity. The major computer hardware vendors are in the game. IBM, Dell and HP all have gambled that riding the Linux wave will bring in a lot of new business. So far, they have been on the right track.

Linux growth is now strong enough to warrant serious market research efforts by firms such as Gartner and IDC, something not all would have expected, for software that is essentially a cooperative effort, as opposed to a competitive effort.

In this article, I will explore the dynamics that of the Linux wave. Why is Linux not more visible in the public's eye? Where are the stronger growth areas? More importantly for the readers of this magazine, what does Linux mean for the future of the iSeries platform?

The visible Linux market: The desktop

There is a common perception that despite brilliant reviews and low cost, Linux is still a marginal operating system. Its visibility is still low outside of IT. On the other hand, programmers and more computer-literate professionals often associate Linux with the idea of "the only available OS able to compete on Microsoft Windows turf". With that angle in mind, many are disappointed not to see any kind of Linux revolution happening on the desktops of the world.

With this combination of perceptions and hopes, Linux gives mixed impressions. One could say Linux is not yet a mature technology, but certainly it is one that is evolving faster than all its competitors.

On the desktop front, there are a few good stories of bold Linux progress. In 2001, the City of Mexico, voted to switch its primary desktop operating system from Windows to Linux. Many since have dismissed this change as one that could only fly in a third-world country, where lower computing standards could be acceptable. This third-world argument was recently blown to pieces. In May 2003, the City of Munich, Germany, dumped Windows in favor of Linux for their 15,000 desktop computers. This time, Microsoft CEO Steve Ballmer took a personal trip to plead for a last-minute reprieve. Linux remained the choice, even after his visit.

The two organizations mentioned above share similar characteristics. They are low-risk, low-change, cost-driven public administrations. By contrast, profit driven companies, so far, appear less eager to purchase Linux, at least in large quantities for their desktops. In this position, Microsoft still rules.

The dynamics of Microsoft's dominance of the PC desktops around the world capitalizes on a number of circumstances in its favor. As I see it, they can be summarized in these few words: Inertia, software, marketing and the FUD (Fear Uncertainty and Doubt) factor.

Inertia: Inertia is easy to identify with. It is essentially resistance to change. We all have become comfortable with Windows as our desktop operating system. Any change could be perceived as a useless risk. One could argue however, "What about the time when it was time to upgrade from NT to 2000?" This was a significant effort, both in time and expense. Where was the inertia then? Perhaps Inertia could have been substituted for a widely held perception that there was simply no equivalent for the Windows desktop on the market at the time.

Software: Microsoft has dominated the PC market for many years now, and during this time, a lot of software has been written for this platform in particular. Much of that software is not yet available on Linux and may not be for a while. When one depends on such software, Microsoft' s Windows becomes a base necessity. Sometimes, the boundary between software and hardware is blurry. One of the points that contribute to Microsoft' s success is that most hardware manufacturers ensure they enclose Windows-based drivers (this is software too!) for their peripherals as a must. This is not yet the case for Linux.

Marketing: Microsoft dominates the desktop operating system market because in the mind of the overwhelming majority of consumers, there are little or no alternatives. Awareness of Linux, for the non-technical crowd, is not very strong. Adding to that, a good portion of the PC buying population is not technical. For home systems and small offices, taking a chance on something new is just not worth the effort or the risk. This may change, as more consumer start paying attention to super-cheap Linux deals like the one offered by Wal-Mart. The giant retailer sells Linux PCs for $US 199.98 on its walmart.com online store. In doing so, they are rather unique. Most mass-market PC makers such as Dell or Gateway pre-load Windows on most of the PCs they sell for the home and small business market.

The FUD Factor: FUD stands for "Fear, Uncertainty and Doubt" (see Appendix 1 for the full definition)
In short, it is a way for a competitor to cast doubt on a new product, relying more on emotions than facts to make the argument. One would think that in such a field, FUD arguments would be more subtle than the Coke and Pepsi challenge. Sometimes it is, but not always.

The following examples will give an idea what FUD is all about in the case of Linux:

Microsoft' s web site has a page titled "Get the Facts on Windows and Linux". Its aim is to ensure that the public would know that Windows is cheaper than Linux. This opinion is backed up with a number of studies and expert-written papers. In an industry where the final tab of a project is often higher than the initial projected cost, this could be described as Doubt-inducing "FUD".

One could argue that to offset all this FUD, there is a balance in advertising for Linux products, as competitors such as IBM, HP and Dell promote Linux heavily. On the desktop, it appears the message from Microsoft is still hitting home first.

Bruce Perens, a Linux advocate and one of the founders of the Open Source Initiative puts it best in a few words: IBM' s advertisement targets high level executives, while Microsoft appears to be targeting more technical users. I think that the IBM ad says, "Buy Linux and save your company." The Microsoft ad says, "Buy Microsoft and save your job." Which one would you pick?

Although it is easy to single out Microsoft for using FUD against Linux, They are not the only one using that weapon. To give some perspective, the Microsoft web page about Linux is buried somewhere and you have to look for it to find it. Try the SCO Group' s home page on the Internet (www.thescogroup.com). On the front page, (at time of writing), there is a three-inch by three inch square with "5 Reasons to Choose UNIX instead of Linux" written across. Of the five reasons, the most interesting is the fifth: " SCO UNIX® is Legally Unencumbered". Implying that buying Linux is risky for legal reasons.

Last year, the SCO Group, owners of the rights to the UNIX code, launched a lawsuit against IBM over Linux. They claim that IBM has donated to the Linux community software that was originally taken from UNIX, to which they have the rights. (See Appendix 2)

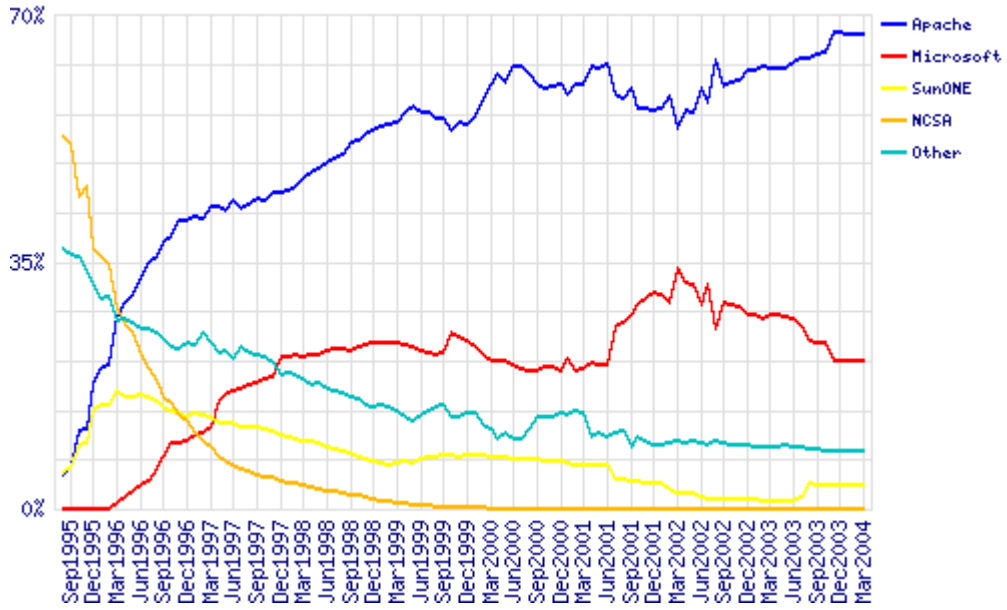
Whether because of inertia or because of FUD, it is easy to see, Linux has not yet overcome the perception hurdles of being a marginal operating system and has not yet reached its potential in the desktop arena.

The Hidden Part of the Iceberg: The Linux Server Market

Within IT, there are a number of tasks that are daily, vital requirements. They typically have a low profile and carry significant cost. Do you e-mail every day? Do you print every day? Do your customers order your products over the Internet? If so, you probably have an e-mail server, a print server, a file server and a web server kicking around your organization. You also have a number of people who maintain these applications and you probably pay maintenance fees to the software vendors who sold them in the first place.

Focus on the contrast between "replacing Windows with Linux on every desktop in the organization" as a highly visible task, for which one would need the buy-in from the entire organization. Compare this task with "replacing a Windows print server with a Linux print server". As IT manager, new to Linux, which one would you tackle first? Contrary to the desktop environments, which practically each person uses in an organization, these back-office functions have very little visibility, and replacing them is mostly transparent to the end users. This is how in many cases, Linux, with its low cost and “boring is good” reliability has entered commercial service through the back door.

The overwhelming acceptance of Open Source software such as the Apache web server as a reliable business tool is a clear indicator that Open Source software can work for commercial applications. (see graph below). With this in mind, it is not surprising to see so many vendors jumping into the Linux market. Conceivably, Linux could soon follow a curve similar to Apache.



Server Graph Source: Netcraft.com

Replacing an operating system is a decision significantly larger in scope than replacing a web server. Apache web server, built on the Open Source model, is now a proven technology. While Linux is just beginning to gain credibility, it shares with Apache similar characteristics, especially in the way the software is built, and the way it is evolving.

Some market analysts already see this trend happening. Jean Bozman, research vice president in IDC' s worldwide server group said in a recent statement. "Linux server growth continued to accelerate in Q4 [2003], demonstrating that Linux servers are taking on important roles in IT customers' computing infrastructure. What began with edge and Web-centric workloads is branching out to include HPC (High Performance Clusters) and commercial workloads."

Despite the negative news associated with the SCO Group lawsuit and despite Microsoft's overwhelming marketing machine, choosing Linux is gaining perception of being a smart, forward looking business decision. Figures don't lie. Global server sales in 2003 have been good overall, with a 20+ percent growth registered in 2003. Within that mass, Linux server shipments have grown by over 50 percent during the same period of time. Given these numbers, other operating system must have lost market share to Linux. An interesting footnote to these server numbers is that 91 percent of the server sales in 2003 were of the Intel or AMD processor variety costing less than $25,000. Most iSeries sold in the same period of time would more likely fit in the last 9 percent, which is the smaller slice of the pie.

These smaller servers should not be dismissed as glorified PCs however. They would not sell so well if they did not do the job. More importantly, they are more versatile than they ever have been. In recent years, we have heard many times that IBM will be using essentially the same hardware for both the iSeries and the pSeries. While they may have been first to think of this idea, IBM is not alone anymore. In a recent interview with PC Magazine, Michael Dell says: "The interesting thing is when we design and architect a server, we don' t design it for Windows or Linux, we design it for both. We don' t really care, as long as we' re selling the one the customer wants. If a server goes down the production line, it doesn' t really know what OS it has on it until the customer says, I want this OS. It could be Novell, SUSE, or whatever."

In fewer words, while the server business is good and Linux is growing aggressively, it remains a very competitive, if not cutthroat market.

What does this mean for the iSeries?

IBM has whole-heartedly bought into and invested its own code (sometimes at its own risk, see Appendix 2) in the Linux operating system. Being a big Linux proponent however is no magic recipe for success. The question, for this magazine' s audience is, "will all these new Linux opportunities, combined with IBM's Linux partitioning efforts on iSeries make a difference?" Is the iSeries market effectively starting to grow and ride on the Linux wave?

As with PCs who have preceded them, component, software and method standardization tend to make today' s servers interchangeable commodities. Taking a strictly Linux perspective, once a company has taken the decision to run Linux for a business process, the next question becomes what server will that application be hosted on? There is no shortage of candidates.

Servers of all types, from all vendors are increasingly using identical components and yield similar performance. They all talk to other devices using TCP/IP, they use CPUs and disk drives manufactured by the same two or three companies and they can all be managed and backed up with the same types of utilities. In this context, the capacity and power to price ratio has become a critical consideration. Differentiating one server from another by its features has become more difficult. Brand name is becoming less and less of a consideration, unless a company would have existing agreements with a particular vendor.

In a market crowded with look-alikes, the iSeries does stand out in some unusual ways:

1: iSeries can consolidate several servers on a single computer with Linux partitions. At the high end of the product line, an iSeries server can support up to 31 Linux partitions. At the low end, a 1-way server can support up to 9 Linux partitions. Each partition can dynamically be adjusted for size and CPU capacity.

2: Capacity on Demand: iSeries provides customers with peakish requirements some extra oomph and flexibility with On/Off Capacity on Demand. With this feature, iSeries processors can be activated temporarily or permanently and dynamically allocated to Linux partitions.

3: Painless hardware upgrade. On a large number of servers, upgrading the hardware means expensive porting, re-compiling and downtime cost. Upgrading an iSeries from one model to another is painless by comparison. Software built for the iSeries interacts with a layer of Microcode, which itself interacts with the hardware. Change the hardware, keep the original software. This has been one of the hallmarks of this computer's unique architecture for many years. It still is today a great feature.

Let' s put these features in the Linux context. Earlier, I discussed how low profile background Linux applications such as print servers and web servers are typically the commercial entry point for Linux. There is a growing segment of Linux servers hosting applications with more raw computing power requirements than average, such as data warehousing, where large volumes of data can be processed or simulations, where large amounts of calculations need to be performed in a short period of time. To support these computing power hungry applications, one emerging solution is Linux clusters.

Linux clusters allow one to aggregate the power of n individual processors and use them as a team. In effect, as a cluster, they behave as a single computer and allow distribution of the tasks to execute between the available processors. Linux clusters also can be used for parallel processing, load balancing and fault tolerant processing.

In such cluster situations, the number n is completely variable. How variable? One of the better known Linux clusters is the one which Google operates every day as a very successful web search engine. At time of writing, Google ' s Linux cluster processes over 200 million queries per day, searching the world' s largest web page index (over 3 billion pages) index for every query. Google uses a Linux cluster of over 10,000 individual servers.

Imagine a scenario where a company would run a cluster of 100 Linux servers. With each of them being individual Intel boxes. This would effectively mean 100 pieces of hardware to maintain. In a 100 Linux server scenario where an iSeries solution would be used instead, such a company could divide the number of boxes to maintain by a factor of 31. Would you rather manage 100 pieces of hardware or just 4? This is the power available today within the iSeries.

While partitioning and power-on-demand features give the iSeries some fantastic potential, one aspect of the iSeries/Linux combo does look somewhat awkward. From the cost angle, Linux running on iSeries look a bit like an odd couple. IBM does not give iSeries away. This is generally regarded as premium hardware. On the other hand, Linux can be downloaded from the Internet for free. Free-bee OS running on high-zoot box - are the squatters invading the Trump Tower? It could be an easy argument to make, but it would not hold water for very long. Linux is actually a very stable, high quality OS. In this case, as in Apache' s, low cost does not mean low value.

Intel/AMD server based Linux clusters typically do have an immediate hardware cost advantage. In the long run however, the iSeries is relatively cheap to run, requiring less attention than most servers and fewer people to keep it going. Where 100% hardware reliability is critical, iSeries servers also have earned a reputation second to none.

Beyond just reputation, I found at least one vendor (COMMON policy dictates they cannot be named here) offering high availability solutions (HA) for iSeries Linux clusters. They describe their particular product, in the following terms: One that can be used to cluster-enable iSeries Linux partitions, so that if one Linux partition goes down, another partition -located either on the same machine or, ideally, in a separate iSeries - automatically takes over.

Clustering software for Linux, like Linux itself is also widely available as open source material. This means that anyone can download it, use it, and even contribute enhancements to it.

These are all great distinguishing features. But the question keeps coming back: will this be enough? Will these characteristics, combined with the Linux wave be the ones that will take the iSeries to mainstream status?

They will help differentiate this server, no question, but it may not be enough to give the iSeries the potential it could conceivably reach. As far as the iSeries is concerned, I would say there is still a missing ingredient in the mix, one that IBM has in my opinion, not invested in enough. That ingredient is simply "people".

Even to an un-educated eye, it is easy to see in most iSeries user groups, the age of the average iSeries-based worker is closer to 40+ than 20+. How will new iSeries server sales be sustained without new streams of programmers who understand this technology?

The "IBM Scholars iSeries program", colleges and universities worldwide teaching iSeries curriculum sounds like the right answer to this question - until you dig under the covers. What it boils down to is a great idea with a tepid execution. Somewhat disappointing, knowing the vast resources available within IBM.

In Canada, where I write from, no university institutions teach iSeries in this country. None. Zip. Not a single one. There are some colleges teaching iSeries in this country. I found 13 of them, but 5 provinces out of 10 still have not a single institution teaching iSeries skills. In the United States, the situation is a bit more substantial: I counted 36 universities out of some 230+ institutions teaching iSeries technology in 44 states. Re-reading this, one can only think - Hmmm, 36 universities out of how many in the USA?

Take a look outside. China, with 1.3 billion people, has less than 20 universities teaching iSeries. This is close to one iSeries teaching institution per seventy-five million souls. India, the controversial hotbed of cheap outsourcing for IT services, has a similar population-to-schools teaching iSeries ratio.

Perhaps there are more schools out there teaching iSeries technology, but IBM is either not aware of them or not telling the world about them in the web page they setup to showcase their iSeries education partners.

The question remains. How many more universities worldwide could teach on iSeries? Why is the iSeries not taught at MIT, Berkeley, McGill or Oxford? Is the iSeries not worthy?

This all begs the question: What do all the other universities teach in their Computer Science department?

The answer is quite simply: "not iSeries".

By contrast, from the naked eye, Microsoft, Sun, and HP are much more aggressive in planting their systems to major universities. Microsoft is present in most schools. The fact that these schools do not teach the iSeries did not happen by accident.

In the previous (and first) issue of COMMON.CONNECT, there was an interview feature with Al Zollar, the General Manager of the IBM eServer iSeries. One of the questions asked in this interview was:

"What about attracting new applications to iSeries?"

I invite Mr. Zollar to answer a question of my own:

"What about attracting new people to the iSeries?"

New server features and Linux on the iSeries are wonderful news, but business, at the end of the day, is about people, not machines. The perception of the iSeries as an aging technology is reinforced every day by the fact that there are few younger people learning it or finding much incentive to learn it.

In Conclusion

In the Linux perspective, many still struggle with the idea of acquiring "something for nothing". Questions come to mind. Where is the accountability? Who is on the hook if it breaks? Linux, a value-packed Operating System, which can be downloaded for free by anyone with an Internet connection, falls in this paradoxical category.

Commercial distributors like Red Hat and SuSe are changing this less-than-solid perception with chargeable packaged Linux "distributions", also known as “distros”. Still, to many, these Linux “distros” look a lot like bottled water vs. water from the tap for the versions downloadable for free from the Internet – somewhat better but mostly the same stuff. Perhaps this is also one of the factors that explain why Linux Desktop is not yet the Microsoft desktop eater some of us would like to have seen.

The server market is revealing to be the true proving ground for Linux. Linux is not just a fad and chances are, this operating system will become the mission-critical operating system of choice as the years go by. Being an Open Source, collaborative development piece of software, this Operating System is evolving daily and it will not stop anytime soon. It is hard to guess how far it will go but Linux may well change the OS landscape the way the Internet has changed our way of communicating.

The iSeries is doing well on innovative server features and its ability to support Linux. Not too many systems offer such elegant partitioning solutions. One wonders however if these new bells and whistles will be enough to raise the iSeries profile to a hopeful goal of being an unavoidable server consideration for hosting Linux within 3 years? (note: this is a goal I formulated) Despite all these iSeries innovations, in technical circles, one still too often hears the perception of the iSeries being a stable but "old" technology. One of the big factors contributing to this perception is the aging of the [human] iSeries programming population.

More than anything else, what the iSeries needs is new blood.

I would like to see Operating System courses taught on the iSeries in every major university in North America and around the world. Java courses, Linux courses, partitioning theory, Apache, SQL, TCP/IP, Linux cluster building, memory management, single level storage, all these courses taught at an advanced level on iSeries.

I would like to see news-making, ground-breaking research projects designed and developed on iSeries around the world. I would like to see younger generations discovering new possibilities and bringing new ideas to the iSeries architecture.

The System/38, ancestor of the AS/400 and the iSeries was born from the ideas of a young Ph.D. named Frank Soltis.

Who will be the next Frank Soltis?

Will there be a next Frank Soltis?

Do you hear me Mr. Zollar?

Appendix 1: FUD

F.U.D. stands for Fear, Uncertainty and Doubt.

"Companies with an established and well-defined market usually use FUD when a competitor launches a product that is both better and cheaper than the product they sell.

Unable to retaliate with their own product improvements or with facts to back up their claims of being better than the new-comer, they cast doubt on the new product by spreading gossip to cast doubt over the competitors offerings and make people think twice before using it.

Many people cite Gene Amdahl as coining the phrase when he left IBM to start his own company thus making himself IBM' s FUD target. This is somewhat ironic, in the IBM/Linux context.

"FUD is the fear, uncertainty, and doubt that IBM sales people instill in the minds of potential customers who might be considering [Amdahl] products." The idea, of course, was to persuade them to go with safe IBM gear rather than with competitors' equipment. This implicit coercion was traditionally accomplished by promising that Good Things would happen to people who stuck with IBM, but Dark Shadows loomed over the future of competitors' equipment or software.

Appendix 2: The SCO's Billion Dollar Gamble

Background:
Unix was invented in the sixties by AT&T' s Bell Labs, and the Unix ideas have spread widely since then. Linux works in many ways identically to Unix, making it relatively easy to translate Unix software to Linux.

AT&T sold the UNIX intellectual property to Novell Networks, which in turn sold it to the Santa Cruz Operation.

Caldera International, a seller of Linux, then acquired from SCO the rights to UNIX and two SCO products, OpenServer and UnixWare.

In 2002, Caldera changed its name to SCO Group to reflect the fact that most of its revenue came from its SCO business and not from the Linux products.

The Case:
In March 2003, SCO, owner of the UNIX code, launched a lawsuit against IBM, the leading proponent of Linux as a viable business operating system. In this suit, SCO, seeks one billion dollars in damages, claiming that IBM has illegally contributed code to Linux that was taken straight out of the UNIX operating system. In June of the same year, it filed an amended complaint, adding more claims against IBM and tripling damages to at least $3 billion.

On December 19th 2003, the SCO Group sent warning letters to companies known to be Linux users. This is the second such round of letters that SCO is sending. The first one was in May 2003, when it sent similar letters to 1,500 companies, warning them that the Linux Organization had violated its intellectual property rights.

Here is the point of contention: SCO owns the rights to the UNIX operating system. It asserts that Linux, is really a variation of the UNIX operating system. Further more, they claim that IBM illegally contributed UNIX code in the Linux operating system. That being the case, it should not be distributed for free as it violates SCO' s intellectual property right. In effect, they should get royalties.

Many industry experts think that this is a court gamble, not unlike the case of the woman who sued McDonald' s Corporation for one million dollars for serving her coffee too hot. There is a chance, as in the McDonald case, that the plaintiff, SCO could also win.

Would any IT manager considering options when buying a server want to also consider the risk of having to pay royalties or worst, penalties to SCO because they chose Linux? Obviously not, but this lawsuit is real and there will be a judgement. In the meantime, there is uncertainty. This type of event is what drives the fear and uncertainty in the FUD factor.

Would this type of news stop individual home users from purchasing Linux? Not likely. Would it be a decision factor a CIO would consider before making a strategic choice? It could very well be!

In March 2004, the SCO Group launched its first individual lawsuits against enterprise Linux users, targeting DaimlerChrysler and vehicle parts retailer AutoZone.

The fact remains, the FUD factor continue to play an adverse role in Linux' s growth in the IT market.

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His website, www.tylogix.com, contains links to all his past articles and a number of free published iSeries utility programs.
Best known for its iSeries FTP automation reference pages, tylogix.com also has many links to Internet sites useful to iSeries programmers, such as IBM on-line manuals and job search engines.

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