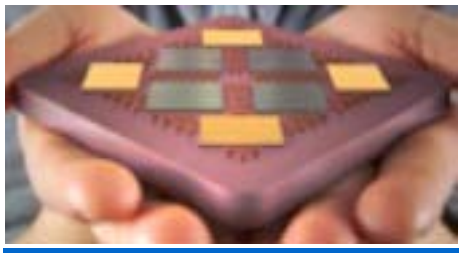
THE IBM I5:
MULTIPLE PERSONALITIES IN THE BEST POSSIBLE WAY

Platform Independence via Hardware is No Longer an Oxymoron

by Anura Gurugé, Editor at Large

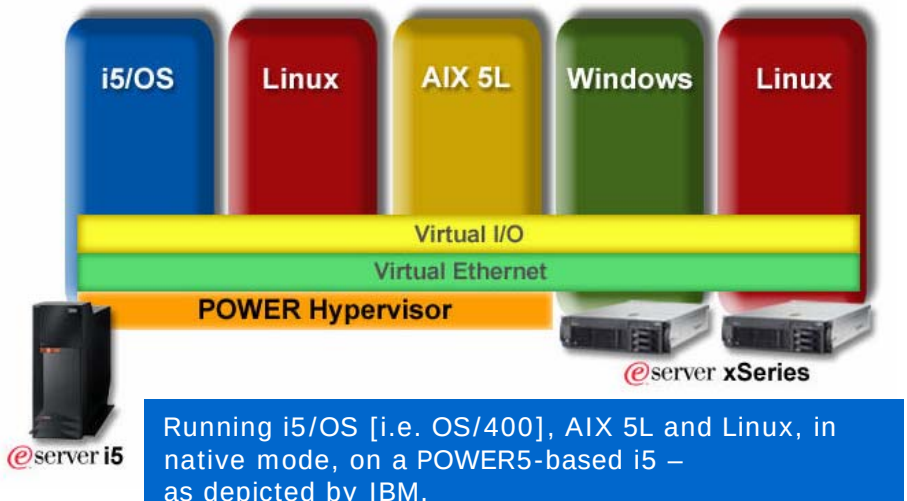
The IBM i5 systems, the latest "AS/400s", introduced on May 3, 2004, are special – not because they are the first machines to contain the much serenaded POWER5, but because they are the first machines that let you run, AIX 5L, "OS/400" and Linux, concurrently. This may, at first blush, not appear to be that special, until you mull over it a bit. Then it sinks in. What we have here is a machine that at the same time is both an AS/400 and an uncompromised pSeries Unix server.



IBM's 64-bit POWER5 processor, the 5th generation of POWER, with a staggering 1TB memory capability, and the promise of being even mightier than the record breaking POWER4(+).

Running multiple, disparate operating systems on a single machine is not new. VM/370 heralded this over 30 years ago. But that was about running different mainframe OSs on a single mainframe. It wasn't a way to converge different platforms. In 1991, with MVS/ESA OpenEdition, which allowed some Unix applications to be run on a mainframe alongside MVS mainframe applications, IBM for the first time explored the possibility and promise of a multi-personality machine. The OpenEdition approach was always, at best, a compromise, even a novelty. It was never meant to be an unrestricted, *bona fide* AIX-compliant Unix implementation. Then for the last few years IBM has been promoting Linux on all platforms, including mainframes and iSeries [i.e. AS/400s], but Linux isn't AIX 5L either.

It is the *native* AIX 5L capability of the i5, which at present consists of a low-end Model 520 and a high-end Model 570, both of which are due to start shipping as of mid-June 2004, that makes it so special. This picture from IBM should help reinforce the notion that in the case of an i5,



Running i5/OS [i.e. OS/400], AIX 5L and Linux, in native mode, on a POWER5-based i5 – as depicted by IBM.

AIX 5L, OS/400 and Linux run in native POWER mode.

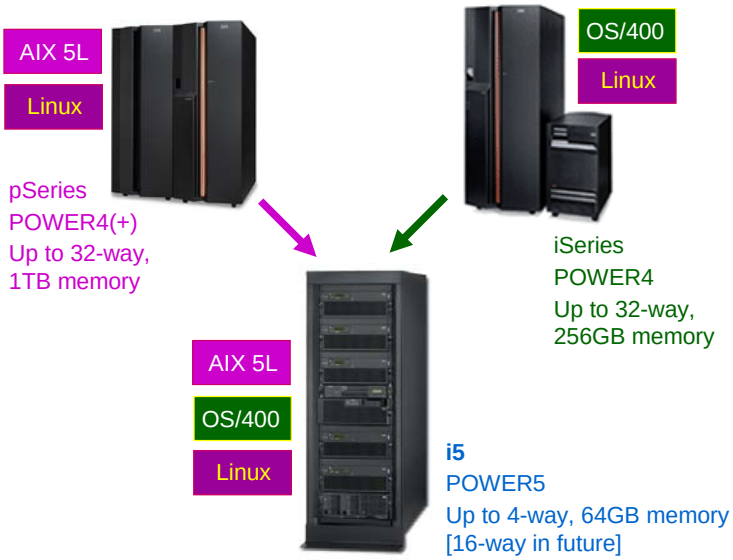
IT COULD ALSO BE A P5

What we cannot afford to lose sight here is that POWER4(+) processors, the predecessor of the new POWER5, are the basis for IBM's increasingly popular, 'market-tilting' pSeries Unix servers that are spearheaded by the irrepressibly swift p690. [REFER TO THE UNIX/LINUX SECTION OF IT IN-DEPTH FOR MORE DETAILS.] The first POWER4-based pSeries server, which happened to be the p690, was announced in October 2001.

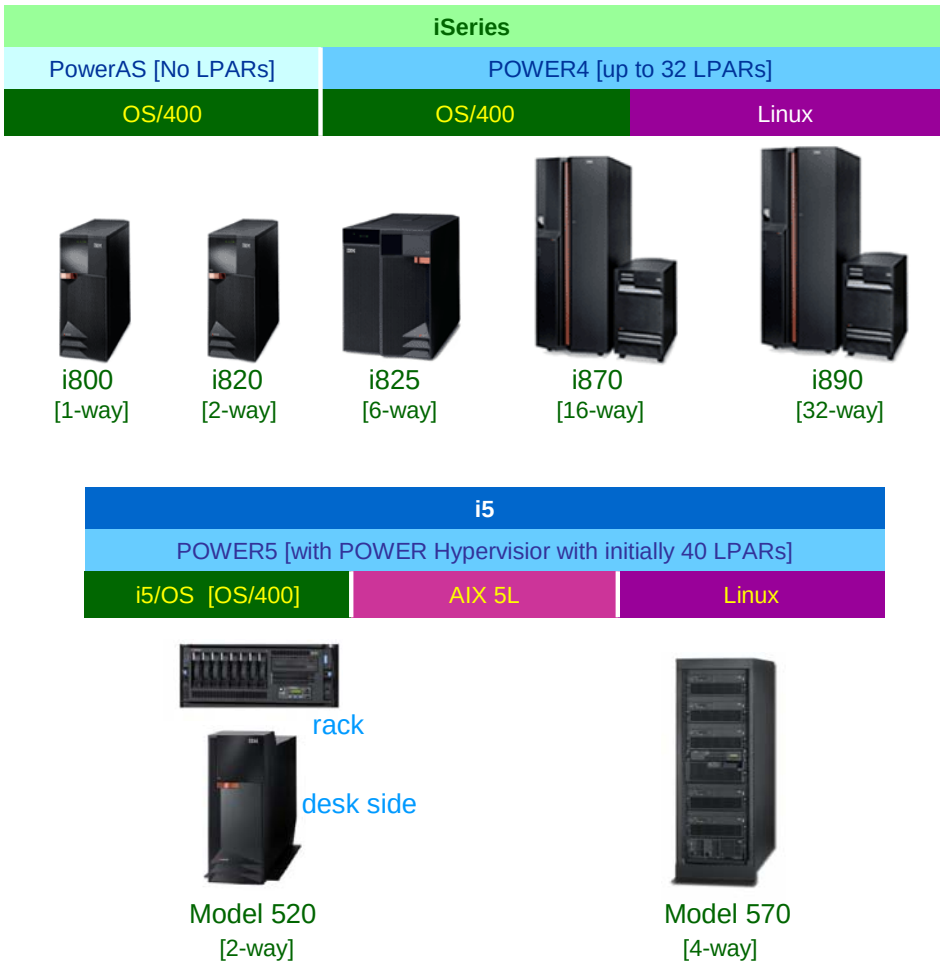
By contrast, POWER4 is relatively new vis-à-vis the iSeries, with the first POWER4-based iSeries machines, viz. i825, i870 and i890, being introduced in January 2003. *Thus a POWER5-based i5 can also be thought of as being a genuine pSeries machine.* Having the 'POWER Hypervisor' between the POWER5 processors and the AIX 5L OSs does not in anyway detract from this.

The term 'hypervisor', as something more powerful than a 'supervisor' [which is a generic term for a basic operating system], was popular in the 1970s in the IBM world to characterize the multi-OS virtualization capability of VM/370. The POWER Hypervisior should, however, not be thought of as a revamped VM.

VM, originally developed by MIT in the late 1960s, was essentially a powerful and sophisticated emulator that set out to emulate multiple instances of a real machine. The POWER Hypervisior,



which is an integral component of IBM's 'Virtualization Engine' technology, is not meant to be an emulator *per se*. [REFER TO THE CURRENT TECHNOLOGY ARTICLE IN IT IN-DEPTH FOR MORE DETAILS.] Instead, its overriding goal is to provide and manage dynamic server partitioning, the so called logical partitions [LPARs], and resource [e.g. processor,



memory] movement across LPARs – with different OSs running on each LPAR.

The Unified Mid-Range

So what we have here is a machine that can be both a pSeries AIX server as well as a iSeries OS/400 mini, and furthermore be both at the same time. In addition, in marked contrast to iSeries machines running both OS/400 and Linux LPARs, there is no longer a prerequisite that each machine must have an OS/400 based 'primary partition' for system management functions.

> The start price for the Model 520 is $9,995 while that for the 570 is $85,200. The 570, despite the POWER5, is not the most powerful or biggest 'iSeries' machine as can be seen in the table on page 4. It, for the time being, comes in between the i825 and i870. But that will change – soon.

Instead, i5 machines come with a hardware management console – which happens to be a separate Linux workstation. Thus it would possible to have an i5 that was just running AIX 5L or Linux. That is the magic. Down the road, and it will take some time for this iconoclastic notion to fully sink in, IT professionals will not have to make a distinction or decision between iSeries machines and pSeries machines.

A single i5 will be able to do it all, and moreover provide extremely fast, memory-to-memory, inter-LPAR communications, using standard IP protocols, à la the mainframe HyperSockets capability. This permits extremely fast data interchange between LPARs – and in this case between applications running on different OSs. Thus a corporate portal server implemented on AIX 5L can plug into a SCM application running on OS/400 while using a Web server deployed on Linux all on a cross-memory basis. This is networking at its fastest.

A Smorgasbord of Applications

It is this best-of-breed, cross-platform application mix-and-match possibilities that make the i5 so intriguing. OS/400 and AIX are noted for their rich and diverse repertoire of applications, in particular vertical industry applications. The OS/400, given its long and distinguished heritage, is reputed to have the largest base of commercial applications of any of the software platforms. I have heard claims as large as 40,000 for the number of available OS/400 applications. Even if in reality the number is but a quarter of that, it still would not be shabby. AIX, a well respected Unix brand, does not lag far behind either.

Given the unprecedented wealth of applications that it can support, the i5 has applicability, at a minimum, to six rather distinct IT market sectors:

1. existing iSeries [and AS/400] customers who need to upgrade their hardware
2. existing iSeries [and AS/400] customers who want to easily complement their OS/400 applications with some Unix applications
3. iSeries customers who are currently using Windows or Unix platforms for their Web server related software
4. Unix customers who would like to have affordable and near effortless access to the OS/400 repertoire of applications without in anyway sacrificing their Unix capabilities
5. Windows server customers exasperated with the never ending security exposures on Windows that want to move to a more versatile and secure platform – which also happens to support Windows
6. potential Linux customers who can now have the option of keeping their cake and eating it too.

THE BOTTOM LINE

The i5 is really the next chapter in the ongoing holy grail quest for true platform independence as espoused by Java, XML and Web services. I like to think of it as hardware Java. There are limitations [e.g. lack of support for 'MVS' applications] but this is definitely a big step in the right direction.

In summary, here are some of the key reasons, that you should consider, as to why I contend that the i5 is special and noteworthy:

- a *bona fide*, uncompromised Unix server that is also a genuine AS/400 – or *vice versa*.
- ability to easily mix-and-match, best of breed OS/400, AIX, Linux and Windows applications on the same hardware platform – with cross-memory data interchange.
- flexible and consistent dynamic partitioning across OSs with the ability to non-disruptively transfer resources [e.g. processor capacity or memory] between partitions.
- unprecedented opportunity for server consolidation – particularly with the 'modular' Model 570
- potential for greatly simplifying data center complexity and cost by eliminating the clutter of disparate hardware platforms.

	iSeries			i5	
	i825	**i870**	**i890**	**520**	**570**
Market sector	Medium- to large enterprises			Small/Medium	Medium/Large
Processor	**POWER4**			**POWER5**	
Max. n-way	6	16	32	2	4
Capacity on Demand	Yes				
IBM's Commercial Workload (CPW) benchmark (max)	6,600	20,000	37,400	6,000	**11,700**
Max. LPARs	Up to 10 LPARs per processor			Initially 40 – 254 in future	
Operating Systems	OS/400, Linux, Wndows			AIX 5L, i5/OS, Linux, Windows	
Memory Max.	48GB	128GB	256GB	32GB	64GB
Disk storage - Max.	58TB	144TB		19TB	39TB
LAN ports	96	128		36	128
Twinax devices	5,400	7,200			
Comm. lines	320	480		192	320
PCI card slots	263	672		90	173
Integrated Windows servers	36	48		18	36