

Those older versions of IBM i
& POWER were great, but the
time has come to move
up to POWER9!

—

David Spurway
IBM Power Systems CTO, UK & Ireland



IBM Partner Ecosystem



Agenda

- **Some important dates**
- **POWER9 and beyond**
- **Older Power Systems “Heroes”**
 - **POWER5**
 - The Unix Wars, SMT, DLPAR & Micropartitions
 - Facebook, a cruise liner, RISC on Mars & my daughter
 - **POWER6**
 - 5 GHz, WPAR & RAS
 - iPhone, more Facebook, The Troubles end & my second daughter
 - **POWER7**
 - More SMT, eDRAM & Watson
 - The Iraq war ends, One Direction, a coalition government and my son
- **IBM i 7.3, AIX 7.2 & POWER9 are taking on the new world!**
- **A quick look at possible costs**
- **What connects POWER and the Mars rovers?**
- **IBM i Release Roadmap**
- **My Point of View on the Red Hat Acquisition**
- **My Point of View on Cloud**
- **IBM i and Chatbots**

Original End of Service dates

POWER	MTM	Power System	SW Tier	Ann'd	GA	EoM	EoS US	EoS EMEA	EoS AP	EoS Can/LA	EoS Japan
P5	9407-515	i5-515	P05	4/10/07	4/20/07	1/1/09	1/31/19		12/31/18	1/31/19	3/31/19
P5	9405-520	i5-520	P10	10/15/04	11/19/04	7/8/08	1/31/19		12/31/17	1/31/19	3/31/19
P5	9406-520	i5-520	P10	5/4/04	6/11/04	7/8/08	1/31/19		12/31/18	1/31/19	3/31/19
P5	9406-525	i5-525	P10	4/10/07	4/20/07	1/1/09	10/31/20		12/31/18	10/31/20	3/31/19
P5	9606-550	i5-550	P20	8/17/04	9/10/04	12/2/08	10/31/20		12/31/18	10/31/20	3/31/19
P6	8203-E4A	Power 520	P10	1/29/08	2/29/08	5/27/11	3/31/19	3/31/19	3/31/19	3/31/19	3/31/19
P6	9408-M25	Power 520 Express	P10	4/2/08	4/18/08	1/1/09	3/31/19		12/31/18	3/31/19	3/31/19
P6	9409-M50	Power 550 Express	P20	4/2/08	5/23/08	1/1/09	3/31/19	N/A	N/A	N/A	3/31/19
P7	8202-E4B	Power 720	P10	8/17/10	9/17/10	5/25/12	9/30/19	9/30/19	9/30/19	9/30/19	9/30/19
P7	8205-E6B	Power 740	P20	8/17/10	9/17/10	5/25/12	9/30/19	9/30/19	9/30/19	9/30/19	9/30/19
P7	8231-E1C	Power 710 IOC	P05	10/12/11	10/21/11	1/3/14	9/30/19	9/30/19	9/30/19	9/30/19	9/30/19
P7	8202-E4C	Power 720 IOC	P10	10/12/11	10/21/11	1/3/14	9/30/19	9/30/19	9/30/19	9/30/19	9/30/19
P7	8205-E6C	Power 740 IOC	P20	10/12/11	10/21/11	1/3/14	9/30/19	9/30/19	9/30/19	9/30/19	9/30/19

IBM's interesting marketing

My LinkedIn article
“How IBM Power
Systems are like
Batman”

<https://www.linkedin.com/pulse/how-ibm-power-systems-like-batman-david-spurway?articleId=8112406449121429124>



Updated Important dates

Majority of **POWER5**-based IBM iSeries servers will reach End of Service **31/12/2019**

[Announcement letter](#)

Majority of **POWER6**-based IBM System i servers will reach End of Service **31/03/2019**

[Announcement letter](#)

Majority of **POWER7**-based IBM Power System servers will reach End of Service **30/09/2019**

[Announcement letter](#)

Majority of **POWER7+**-based IBM Power System servers physical and microcode upgrades no longer available

Watch out for the future

Upgrade planning - Future hardware

“IBM i support for POWER7 and POWER7+, July 2018

IBM i 7.3 is the last release to support IBM POWER7 and IBM POWER7+ processor-based systems.”

<https://www-01.ibm.com/support/docview.wss?uid=nas8N1022049>

Announced 9th October 2018

S822/S824 will be withdrawn in February 2019

S812/S814 will be withdrawn in May 2019

Support planned for at least 5 years.

http://www-01.ibm.com/common/ssi/ShowDoc.wss?docURL=/common/ssi/rep_ca/2/877/ENUSZG18-0132/index.html&lang=en&request_locale=en

Power Systems Heritage



AS/400
OS/400
48 Bit
1988



RS/6000
AIX
1986



64 Bit
1995

iSeries
pSeries
2000
POWER4
2001



i5/OS
Linux
2004
POWER5
2004

System i
System p
POWER6
2007

Power Systems
IBM i
2008

POWER6
2008



POWER7
2010



POWER8
2014



IBM POWER9 Family

When data-intensive workloads are the bottom line



Mission Critical Data Intensive Workloads for Private Clouds

Entry

Midsize

Enterprise

Big Data Workloads

Enterprise AI Workloads

S922/S914/S924
H922/H924/L922

E950

E980

LC922/LC921

AC922

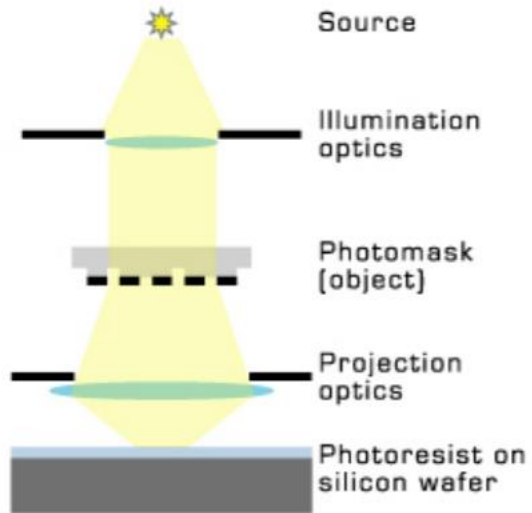
POWER Processor Roadmap

POWER8		POWER9		POWER9'	POWER10
2014 POWER8 12 cores 22nm New Micro- Architecture New Process Technology	2016 Addition of NVLink Enhanced Micro- Architecture With NVLink – 5X Bandwidth	2017 P9 Scale-out 24/12 Cores 14nm New Micro- Architecture New Process Technology PCIe GEN4	2018 P9 Scale-up 12 Cores 14nm New Micro- Architecture New Process Technology PCIe GEN4	2020 P9' 24 Cores 14nm New High Bandwidth Memory Subsystem 2S/4S Server Refresh PCIe GEN4	2021 P10 TBD 7nm New Micro- Architecture New Process Technology PCIe GEN5
Optimized for Data-Centric Workloads CAPI Acceleration / I/O		Scale-Out Datacenter TCO Optimization Acceleration Enhancements to CAPI and NVLINK		Extreme Memory Bandwidth	Extreme Analytics Optimization

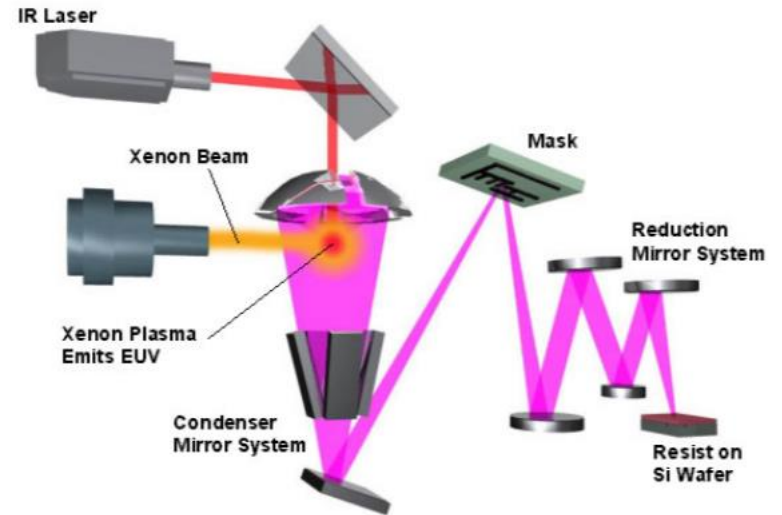
All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.
 Source: <http://www.nextplatform.com/2015/08/10/ibm-roadmap-extends-power-chips-to-2020-and-beyond/>

Lithography - Economy of scale

UV – Lithography 193 nm



eUV – Lithography 13 nm



Extreme ultraviolet (EUV) lithography

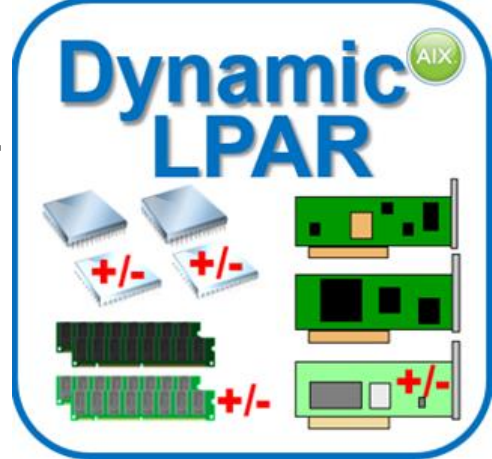
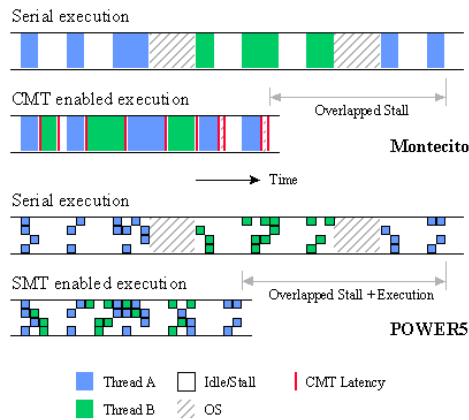
“For both the 7nm and 5nm nodes, IBM and its alliance partners at the SUNY Poly Colleges of Nanoscale Science and Engineering in Albany, NY relied heavily on transistor and interconnect patterning driven by Extreme Ultraviolet (EUV) lithography.”



My Career History

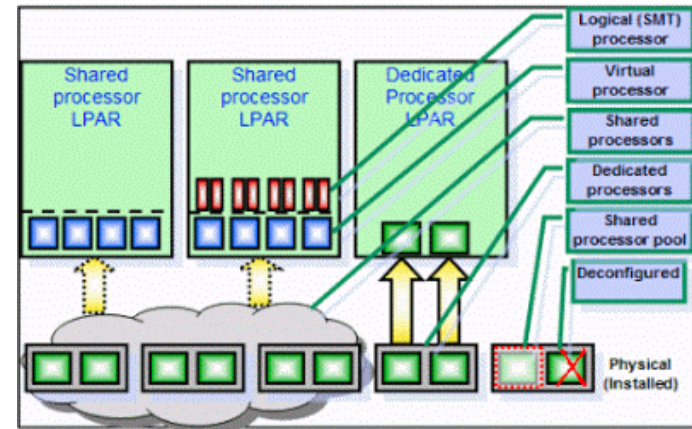
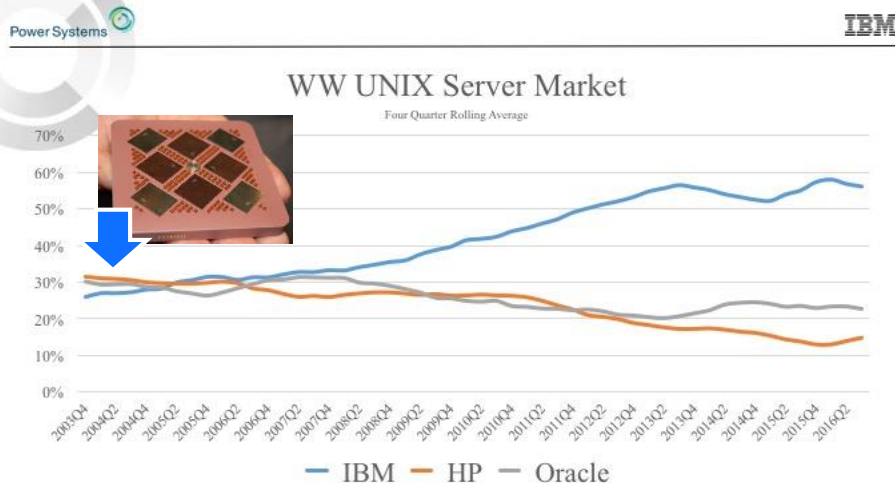
Date range	Role
July 1995 – December 1996	RS/6000 Support Specialist
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January 2000 – September 2004	RS/6000 Technical Specialist
September 2004 – March 2006	STG Product Services Team Leader – pSeries
March 2006 – December 2006	System p Technical Services Manager
January 2007 – December 2007	System z Technical Sales Specialist
January 2008 – October 2008	System p & System z Presales Technical Specialist
October 2008 – December 2009	Logicalis Senior Enterprise Technical Specialist
January 2010 – May 2011	Logicalis Technical Architect
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POWER5 brought the fight to Sun and HP. (Announced 2004)



<https://www.realworldtech.com/super-heavyweights/8/>

https://www.ibm.com/developerworks/community/blogs/aixpert/entry/Quick_Intro_to_the_AIX_Best_Bits?lang=en



<http://powervm.blogspot.com/2008/09/virtual-systems-overview-featuring-physp.html>

IBM i5/OS V5R3 Highlights



Proof of Entitlement is
via an electronic Proof of
Entitlement (ePoE)

Linux can be started and
stopped via iSeries
Navigator



The Web Administration GUI included in the IBM HTTP
Server for iSeries adds support for:

WebSphere Application Server Base Edition with easy-
to-use wizards for creating HTTP and application server
instances, deploying J2EE applications, and management
of HTTP and application servers and their applications.

IBM Director Multiplatform Server option of the
Virtualization Engine™, PM iSeries support for a
multipartition, multi-OS type (including OS/400, Linux
and AIX® 5L)



What else was going on back in 2004?

Facebook first launched to Harvard Students

RMS Queen Mary 2 cruise liner christened

facebook



My first child was born!



Mars Spirit and Opportunity Rovers landed on Mars



What connects POWER and the Mars rovers?

Both Spirit and Opportunity Rovers run:

BAE RAD6000 (25MHz Max): This is a radiation hardened version of the IBM RS/6000 Processor (RSC). Cost is around \$200,000-\$300,000

As mentioned earlier, IBM Power Systems used to be called RS/6000, and still runs on the same RISC processor architecture



AndyBuick
@AndyBuick

Follow

Replying to @D_Spurway

My first roll within IBM Microelectronics was support on PowerPC750's [#happydays](#)

1:48 PM - 29 Nov 2018



David Schor
@david_schor

Follow

In case anyone was wondering, InSight's system command and data handling subsystem runs on the classic IBM RAD750 microprocessor (a radiation-hardened PowerPC 750 CPU) operating at @ 115.5 MHz. InSight has two of those CPUs as two fully redundant systems.



NASA InSight  @NASAIInSight

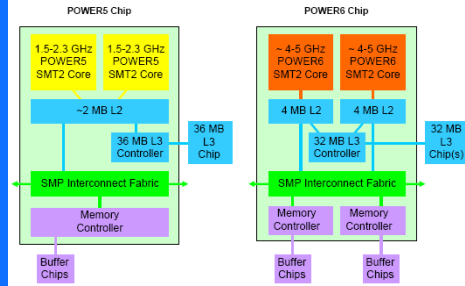
Time to fire up my rockets for final descent. Less than a minute to touchdown! #MarsLanding

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POWER6 jumped up the pace! (Announced 2007)

4-5 GHz clock speeds!

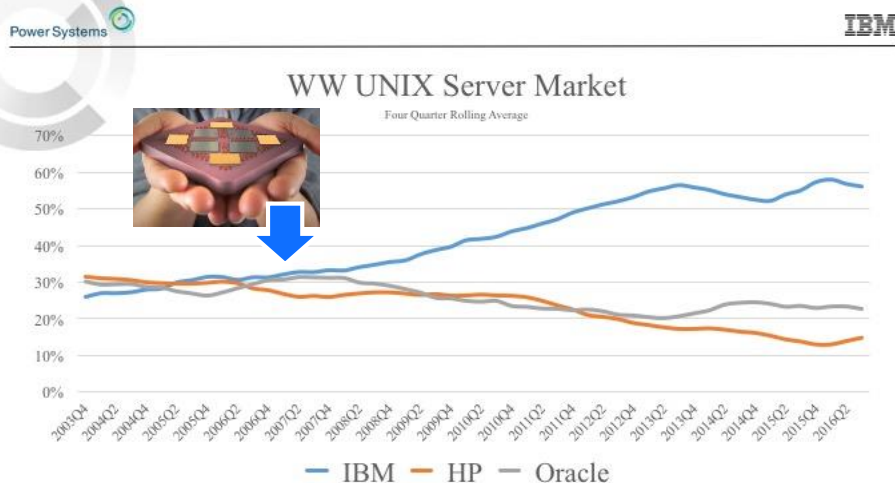


<https://support.scinet.utoronto.ca/Manuals/JUMP-AIX-POWER6-AppsPerformanceTuning-wp032008.pdf>

WPAR AIX Workload Partition



https://www.ibm.com/developerworks/community/blogs/aixpert/entry/Quick_Intro_to_the_AIX_Best_Bits?lang=en



Highest reliability (other than Mainframe)



IBM i5/OS V5R4 Highlights (Announced 2006)



Improved application portability with new Java(TM) Virtual Machine



Simplified application development with free-format SQL in RPG applications



iSeries Access for Windows, which includes the iSeries Navigator and Operations Console functions, now also runs on AMD 64-bit and Intel Extended Memory 64 Technology (EMT64T) processors.



V5R4 delivers one of the first major databases to satisfy all of the core components of the 2003 SQL Standard, demonstrating the i5/OS commitment to open standards.



What else was going on back in 2007?

Steve Jobs launched the first iPhone



Facebook launches m.Facebook & Facebook ads



Two daughters now!



Paisley and McGuinness sworn in as power-sharing revived



IBM i 6.1 Highlights (Announced 2008)



i5/OS V6R1 partition that can host storage of another i5/OS V6R1 partition, reducing costs and simplifying creation of i5/OS test and development environments

New storage space snapshots can improve system availability by backing up virtual i5/OS, AIX®, Linux™, and Windows® environments while they are active.

With i5/OS V6R1, IBM uses machine interface (MI) architecture to significantly improve programs.

...all MI programs created for previous releases must be converted in order to run on i5/OS V6R1. MI programs include Integrated Language Environment® (ILE) and original program model (OPM) programs.

To convert a program, its creation data (a subset of observability) must be available.

Introduction of a high availability solution from IBM, High Availability Solutions Manager for i5/OS

System i™ High Availability Solutions Manager (HASM) delivers:

Complete high-availability solution based on independent auxiliary storage pools (IASPs) using cross-site mirroring (XSM), Metro Mirror, Global Mirror, FlashCopy®, and system administrative domain

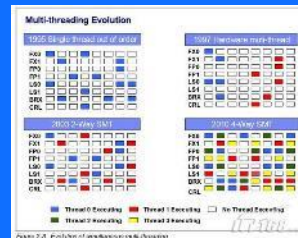
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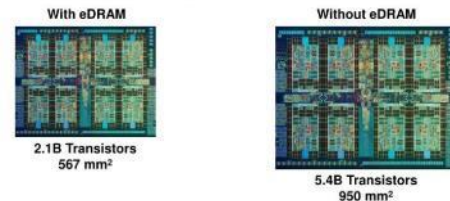


AIX 7.1 & POWER7 change the focus (Announced 2010)

More threads per core
with SMT4

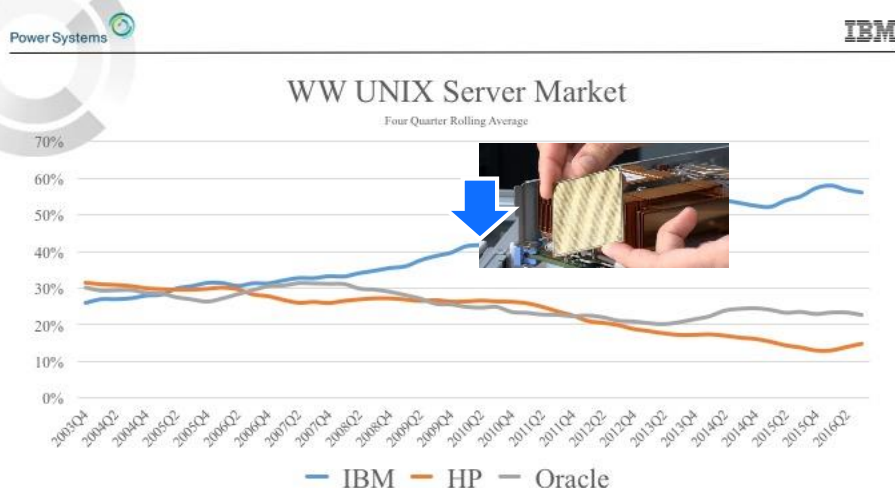


eDRAM saves space



<http://www.redbooks.ibm.com/redbook/s/pdfs/sg248079.pdf>

<http://www-07.ibm.com/tw/imc/seminar/download/2010/TW0AL02M-02.pdf>



IBM Watson, built on POWER7



IBM i 7.1 Highlights (Announced 2010)



The integrated DB2 database for IBM i is enhanced with support for XML, enabling clients to store and search XML documents within DB2 for i and to create XML documents from relational data.

IBM i storage management further leverages SSD technology by automatically moving data that is accessed most frequently to SSDs to help clients improve application performance.

Zend Server Community Edition for i is preloaded



The Integrated Web Application Server is enhanced to support the latest versions of Java available with IBM i 7.1.

(Steve Will's 2018 Blog on [IBM i and Java Support](#))



What else was going on back in 2010?

The last US combat brigade leaves Iraq, ending Operation Iraqi Freedom

SPEECH EXCERPTS



Obama: 'Operation Iraqi Freedom Is Over'

Aug 31, 2010 5:41 PM CDT

One Direction formed



And then there were three!



David Cameron and Nick Clegg formed coalition government



IBM i 7.3, AIX 7.2 & POWER9 are taking on the new world!

Google has POWER9 in production



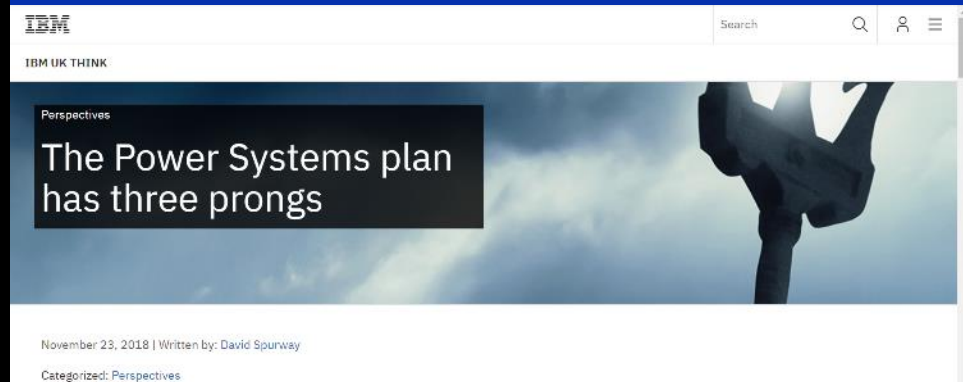
Machine Learning with PowerAI



Can be many times cheaper than public Cloud



There is a plan!



<https://www.linkedin.com/feed/update/urn:li:activity:6473248463709708288>

Back in 2015, I did some comparisons...

Largest POWER5 (for 9406-520 server) was 7100

Largest POWER6 (for 9408-M25 server) was 8300

If we divide the 4-core IBM Power S814 CPW rating by the number of cores, we get ~9875 CPW

Therefore, potentially, an IBM Power S814 could easily replace any of these servers with a single core licensed

How about an S914?

4-core CPW = 52,500

So, roughly 13,125 CPW with a single core!

Costs, from that view in 2015

In 2015, new IBM Power S814, 4-core, with IBM i 7.2 and Internal disk ~£31k List Price

Running through the PSAT Tool to get a rough selling price give ~£20k

Quick compare back in 2015:

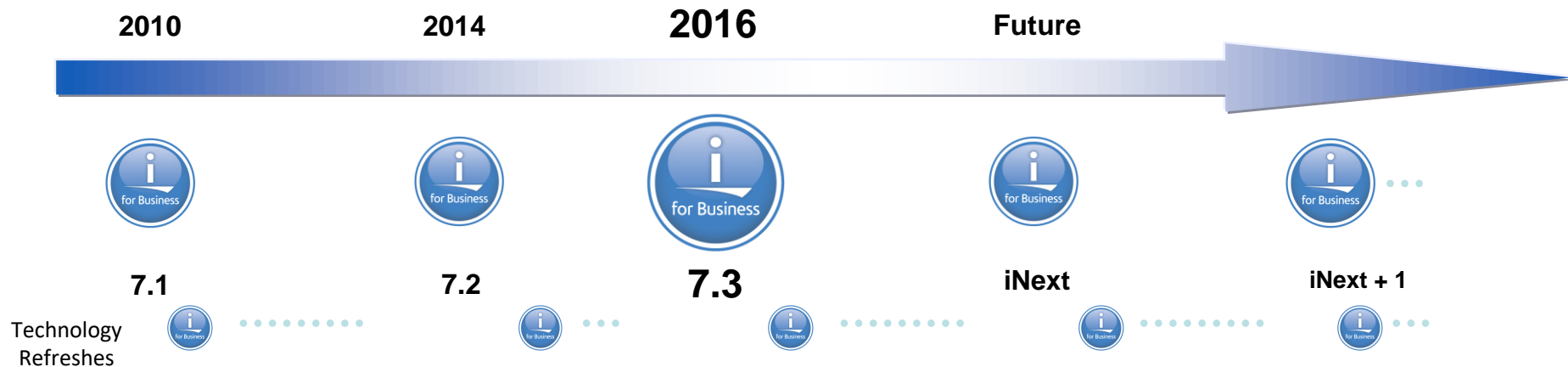
- eServer i5: ~£6.8k HWMA + ~£6.5k SWMA = ~£13k
=> ~£7k for new, faster server
- IBM Power System 520: ~£2.3k HWMA + ~£13k SWMA = ~£15k => ~£5k for new, faster server

Today, new IBM Power S914, 4-core, with IBM i 7.3 and Internal disk ~£31k List Price.

As End of Service is reached, Service Extensions might be possible, but will add considerably to HWMA.

Also, availability of parts becomes an increasing problem...

IBM i Release Roadmap



- Two or Three Major Releases supported.
- Two Future Major Releases under development.
- Semi-annual new function for the most recent releases.

My Point of View on the Red Hat Acquisition

<https://www.redhat.com/en/about/company#>

Red Hat's view of itself:

We are Red Hat

Our mission is to be the catalyst in communities of customers, contributors, and partners **creating better technology the open source way**.

WHO WE ARE

The world's leading provider of open source, enterprise IT solutions

More than 2 decades ago... ...create a better foundation for the future of IT—Red Hat® Enterprise Linux®.

But that was just the beginning.

Today, we deliver a comprehensive portfolio of products and services using the same open, collaborative business model and an affordable, predictable subscription.



<https://www.networkworld.com/article/3319441/linux/analysts-look-at-the-ibmred-hat-deal.html>

An independent view:

“Gazing through the financial microscope, IBM seems to be making a wager on a small portion of Red Hat — **OpenShift** (RedHat’s comprehensive and self-contained Kubernetes solution) — to help catch up in the cloud market. And this could be one of those marriages made in heaven. OpenShift hasn’t been marketed as well as Kubernetes itself. At the same time, its use by some of the big names — Barclays to UPS and Hilton to Lufthansa — has demonstrated its effectiveness, agility, and resilience. IBM may be able to employ its global outreach to encourage mainframe and legacy **clients to adopt OpenShift as their cloud platform** and help Red Hat reach markets that it has struggled with in the past.”



POWER9: A Cloud Everywhere Solution

Optimized for private, public, hybrid or multi-clouds

PowerVM is built in, so every POWER9 workload is virtualized, mobile and cloud-ready

PowerVC is pre-selected in POWER9 scale-out server orders, to speed private cloud deployments

Easily upgradable to the new PowerVC for SDI for maximum flexibility in cloud configurations

Optionally deploy IBM Cloud Private for an innovative container-based Power cloud solution

Integrate with Power public cloud providers such as IBM Cloud for Skytap Solutions

POWER9 Multi-Cloud Benefits

- Rapid provisioning of workloads
- Mobility for dynamic optimization
- Simplified workload recoverability
- Integration with multi-cloud managers
- VM or container-based cloud models
- Cloud-optimized user experience

PowerVM
PowerVC



Cloud accelerates business transformation

Innovate with the latest technology from any source

Access more types of data, analytics & AI, anywhere

What percentage of enterprise workloads have moved to date?

Improve return on existing investments

What percentage of enterprise workloads
have moved to date?

20%

Source: McKinsey research



Enterprises are reconsidering a pure public cloud strategy

38% of enterprises have moved workloads from the public cloud back to their data centers

More than half (52%) did so because of pricing and cost concerns *



Program Approved UK Power Cloud Providers

Blue Chip Customer Engineering Ltd

<https://www.bluechip.co.uk/blue-chip-cloud>



CSI Ltd

<https://www.csilt.co.uk/infrastructure/powercloud/>



L3C Ltd

<https://l3c.cloud/services/l3c-i-series-cloud/>



Meridian IT Ltd

<http://www.meridianit.co.uk/managed-cloud-services.html>



SCC Plc

<https://www.scc.com/>



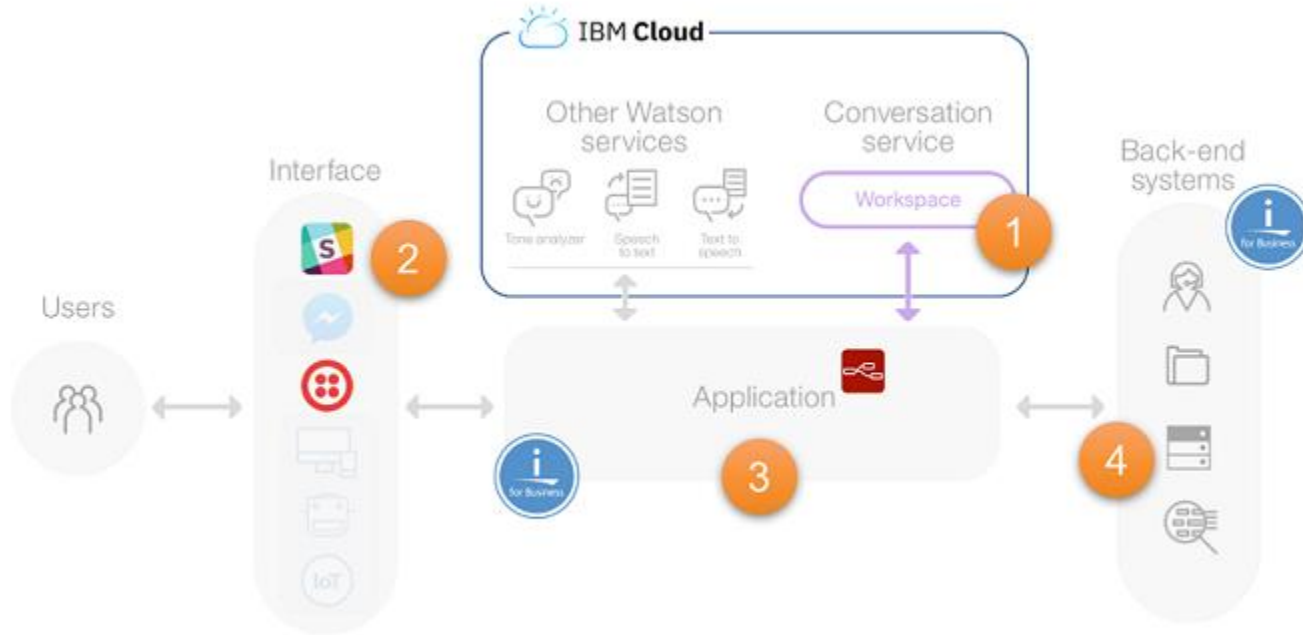
<https://ibmpowercloud.co.uk/>

Combine new “AI” with traditional “iron”



Automate resolution of mundane Helpdesk tickets with Pepper, IBM Watson & IBM i

Build an enhanced IT help desk chatbot on IBM i with Watson Assistant



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Questions?

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Thank you!

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