Power Systems
Designed for Business
<table>
<thead>
<tr>
<th>#</th>
<th>Brand</th>
<th>Brand Value 2011 (SM)</th>
<th>% Brand Value Change 2011 vs. 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Google</td>
<td>153,285</td>
<td>84%</td>
</tr>
<tr>
<td>2</td>
<td>IBM</td>
<td>111,408</td>
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<tr>
<td>3</td>
<td>McDonald's</td>
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<tr>
<td>4</td>
<td>McDonald's</td>
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<tr>
<td>5</td>
<td>Microsoft</td>
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<td>6</td>
<td>Coca-Cola</td>
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<td>7</td>
<td>AT&amp;T</td>
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<td>9</td>
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<td>11</td>
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<td>12</td>
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<tr>
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<td>Walmart</td>
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<tr>
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<td>IBM</td>
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<td>18</td>
<td>HP</td>
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<tr>
<td>19</td>
<td>T-Mobile</td>
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<td>21</td>
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<td>22</td>
<td>SAP</td>
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<td>23</td>
<td>SAP</td>
<td>26,078</td>
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<tr>
<td>24</td>
<td>China Mobile</td>
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<td>25</td>
<td>BlackBerry</td>
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<tr>
<td>26</td>
<td>Toyota</td>
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<td>27</td>
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<td>28</td>
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<td>33</td>
<td>China Mobile</td>
<td>19,542</td>
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<td>41</td>
<td>ExxonMobil</td>
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<td>42</td>
<td>TD</td>
<td>16,931</td>
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<tr>
<td>45</td>
<td>N/A</td>
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<td>0%</td>
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<tr>
<td>46</td>
<td>L'Oréal</td>
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<td>11%</td>
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<tr>
<td>47</td>
<td>Citi</td>
<td>15,674</td>
<td>17%</td>
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<tr>
<td>48</td>
<td>N/A</td>
<td>15,440</td>
<td>19%</td>
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<tr>
<td>49</td>
<td>Accenture</td>
<td>15,427</td>
<td>5%</td>
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<tr>
<td>50</td>
<td>N/A</td>
<td>15,344</td>
<td>12%</td>
</tr>
</tbody>
</table>
Global CIO: The Top 10 Most Influential IT Vendors

#1 IBM    #2 Apple    #3 Facebook    #4 Oracle    #5 Google

- Oct 18, 2010: Smarter Planet, analytics, cloud computing, workload-optimized systems, blazing new hardware, powerful end-to-end stack components, deep and broad services: about the only area in which IBM is not the leader of among the leaders is in a rich mobile strategy. I put Smarter Planet and analytics out in front of this list because IBM, for all of its vast capabilities, has distinguished itself and is continuing to distinguish itself as the IT company that can help your company make the jump from transactions to interactions, from perfecting your past to inventing your future, and from having to react to customers' changing needs to being able to anticipate and meet them.
# 2010 Patent Leadership (18 yrs of Leadership)

<table>
<thead>
<tr>
<th>Company</th>
<th>Patents</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM</td>
<td>5,896</td>
</tr>
<tr>
<td>Samsung</td>
<td>4,551</td>
</tr>
<tr>
<td>Microsoft</td>
<td>3,094</td>
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<td>Canon</td>
<td>2,552</td>
</tr>
<tr>
<td>Panasonic</td>
<td>2,482</td>
</tr>
<tr>
<td>Toshiba</td>
<td>2,246</td>
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<tr>
<td>Sony</td>
<td>2,150</td>
</tr>
<tr>
<td>Intel</td>
<td>1,653</td>
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<tr>
<td>LG Electronics</td>
<td>1,490</td>
</tr>
<tr>
<td>HP</td>
<td>1,480</td>
</tr>
</tbody>
</table>

* Source: IFI Patent Intelligence

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IBM Austin: 950 Patents  
(Tied with Watson Research Lab)  
#1 IBM location for 8th year

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Power your planet.
Welcome to the Decade of Smart
Many of IBM’s smarter planet initiatives are interconnected

**Water**
Whether too much or not enough, the world needs a smarter way to think about water

**Buildings**
Given their environmental impact, it's time we designed from the earth up

**Cities**
Safe neighborhoods. Quality schools. Affordable housing. Traffic that flows. It's all possible.

**Oil**
Get to the "first" oil faster. Increase recovery rates. Sense and solve problems before they start.

**Intelligence**
Smart thinking about data analysis

**Traffic**
How we get from point A today to point B tomorrow
The transformation to “smarter” solutions requires:

**Smarter Systems**
- Scale quickly and efficiently
- Optimize workload performance
- Flexibly flow resources
- Avoid downtime
- Save energy
- Automate management tasks

**Smarter Software**
- Turn information into insight
- Increase agility
- Connect and collaborate
- Enable business and service innovation
- Manage risk, security and compliance
- Drive enterprise operations effectiveness and efficiency
There is a Greater Need for IT to Help Address Business Challenges

- **Doing more with less**
  Reduce capital expenditures and operational expenses

- **Reducing risk**
  Ensure the right levels of security and resiliency across all business data and processes

- **Higher quality services**
  Improve quality of services and deliver new services that help the business grow and reduce costs

- **Breakthrough agility**
  Increase ability to quickly deliver new services to capitalize on opportunities while containing costs and managing risk
Strategy and Roadmap
IBM Power Systems

- **Power System HW up double digits**
- **Power Systems SW grew over 25%**
- **Portfolio growth in every segment except Blades**
- **Volumes growth in 1st half**
20+ Years of IBM Technology Leadership

IBM Power Systems Technical University Copenhagen 2011

Commercial & Technical Workloads
Virtualization Technologies
Enhanced SMT Support

Performance Leadership
Reliability / Availability / Serviceability

© 2011 IBM Corporation
Power your Planet

Virtualization without Limits

✓ Drive higher utilization
✓ Dynamically scale per demand

Intelligent Energy Optimization

✓ Energy cost reduction
✓ EnergyScale™ technologies

Resiliency without Downtime

✓ Roadmap to continuous availability
✓ High availability systems & scaling

Smarter Systems In Action

Management with Automation

✓ VMControl to manage virtualization
✓ Automation to reduce task time

Power your Planet.
Power System Software highlights:

AIX 7: The most scalable UNIX; new runtime management and compliance features

PowerHA: Integrated with cluster aware AIX; New Director management and Smart Assist application agents

i Solution Editions: Save on configurations for leading ERP apps

Linux: Easy installation or preload; boost Linux application performance 20% with IBM Advanced Toolchain, and simplify image management with Linux containers

Systems Director 6.2: New availability and security features, open interfaces for integration, and Linux support for automated virtual image management, provisioning and relocation

PowerVM: New Virtual I/O capabilities, Suspend/Resume, Shared Storage Pools, Thin Provisioning
Can we design a computing system that rivals a human’s ability to answer questions posed in natural language, interpreting meaning and context and retrieving, analyzing and understanding vast amounts of information in real-time?
Processor Technology Roadmap

- Dual Core
- Chip Multi Processing
- Distributed Switch
- Shared L2
- Dynamic LPARs (32)

- Dual Core
- Enhanced Scaling
- SMT
- Distributed Switch +
- Core Parallelism +
- FP Performance +
- Memory bandwidth +
- Virtualization

- Dual Core
- High Frequencies
- Virtualization +
- Memory Subsystem +
- Altivec
- Instruction Retry
- Dyn Energy Mgmt
- SMT +
- Protection Keys

- Multi Core
- On-Chip eDRAM
- Power Optimized Cores
- Mem Subsystem ++
- SMT++
- Reliability +
- VSM & VSX (AltiVec)
- Protection Keys+

POWER4™
180 nm

POWER5™
130 nm

POWER6®
65 nm

POWER7
45 nm

POWER8™

2001

2004

2007

2010

Concept Phase

Power your planet.
IBM POWER Processor Roadmap

IBM Power Systems Technical University Copenhagen 2011

First Core in Industry
- Dual Core
- Chip Multi Processing
- Distributed Switch
- Shared L2
- Dynamic LPARs (32)
- 180nm

2001

Hardware Virtualization for Unix & Linux
- Dual Core & Quad Core Modules
- Enhanced Scaling
- 2 Thread SMT
- Distributed Switch +
- Core Parallelism +
- FP Performance +
- Memory bandwidth +
- 130nm; 90nm

2004

Fastest Processor in Industry
- Dual Core
- High Frequencies
- Virtualization +
- Memory Subsystem +
- Altivec
- Instruction Retry
- Dyn Energy Mgmt
- 2 Thread SMT +
- Protection Keys +
- 65nm

2007

Most POWERful & Scalable Processor in Industry
- 4, 6, 8 Core
- 32MB On-Chip eDRAM
- Power Optimized Cores
- Mem Subsystem +
- 4 Thread SMT++
- Reliability +
- VSM & VSX
- Protection Keys+
- 45nm

2010

Future

More Cores
Larger Cache
4th Gen SMT
Reliability ++
Accelerators +

In development in Austin
Simulation testing

© 2011 IBM Corporation

Power your planet.
POWER6 to POWER7 innovation
eDRAM (Embedded Dynamic RAM)

- L3 — 6:1 latency improvement (vs. external) and 2x BW improvements
- 1/3 space, 1/5 standby power of standard SRAM
- Soft error rated 250x lower than SRAM
- Savings of ~ 1.5B transistors over other RAM
POWER7 Processor Chip

- Cores: 8 (4/6 core options)
- 567mm² Technology:
  - 45nm lithography, Cu, SOI, eDRAM
- Transistors: 1.2 B
  - Equivalent function of 2.7B
  - eDRAM efficiency
- Eight processor cores
  - 12 execution units per core
  - 4 Way SMT per core – up to 4 threads per core
  - 32 Threads per chip
  - L1: 32 KB I Cache / 32 KB D Cache
  - L2: 256 KB per core
  - L3: Shared 32MB on chip eDRAM
- Dual DDR3 Memory Controllers
  - 90 GB/s Memory bandwidth per chip
- Scalability up to 32 Sockets
  - 360 GB/s SMP bandwidth/chip
  - 20,000 coherent operations in flight
POWER7 “Over Clock” Uplift

<table>
<thead>
<tr>
<th>Over Clock</th>
<th>Nominal</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2</td>
<td>3.1</td>
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<tr>
<td>3.4</td>
<td>3.3</td>
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<tr>
<td>3.6</td>
<td>3.5</td>
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<tr>
<td>3.8</td>
<td>3.7</td>
</tr>
<tr>
<td>4.0</td>
<td>3.9</td>
</tr>
<tr>
<td>4.2</td>
<td>4.1</td>
</tr>
<tr>
<td>4.4</td>
<td>4.3</td>
</tr>
</tbody>
</table>
**POWER7 TurboCore Mode**

- TurboCore Chips: 4 available cores
- Aggregation of L3 Caches of unused cores.
- TurboCore chips have a 2X the L3 Cache per Chip available
  - 4 TurboCore Chips  \( L3 = 32 \text{ MB} \)
- Performance gain over POWER6.
  - Provides up to 1.5X per core to core
- Chips run at higher frequency:
  - Power reduction of unused cores.
- With “Reboot”, System can be reconfigured to 8 core mode.
  - ASM Menus
Historically, applications have used homogeneous systems.

In reality, different pieces of code have different needs of performance.

- Thread 0 Executing
- Thread 1 Executing
- Thread 2 Executing
- Thread 3 Executing
POWER7 introduced four threads per core (SMT-4)

- Requires POWER7 system
  - POWER6 systems support SMT1 and SMT2
  - POWER7 can run in “POWER6 mode”

- SMT-4 Operating System Support
  - AIX 6.1 and AIX 7.1
  - IBM i 6.1 and 7.1
  - Linux

- Dynamic Runtime SMT scheduling
  - Spreads work among cores to execute in appropriate threaded mode
  - Can dynamically shift between modes as required: SMT1 / SMT2 / SMT4
  - LPAR-wide SMT controls
  - ST, SMT2, SMT4 modes

- Mixed SMT modes are supported within the same LPAR

  SMT1: Largest unit of work
  SMT2: Smaller unit of work, greater amount of execution work per cycle
  SMT4: Smallest unit of work, maximum amount of execution work per cycle
Power Systems: Memory Channel Bandwidth Evolution

POWER5
Memory Performance: 2x DIMM
DDR2 @ 553 MHz
Effective Bandwidth: 1.1 GB/s

POWER6
Memory Performance: 4x DIMM
DDR2 @ 553 / 667 MHz
Effective Bandwidth: 2.6 GB/sec

POWER7
Memory Performance: 6x DIMM
DDR3 @ 1066 MHz
Effective Bandwidth: 6.4 GB/sec
The Future of IBM i
The Future of UNIX
Customers are moving to higher value

...as shown by the largest shift of customer spending in UNIX History

UNIX Server Rolling Four Quarter Average Revenue Share

Source: IDC Server Tracker, Dec 2010

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The IBM i Business

More clients run IBM i than any other IBM system platform

- 100,000’s of systems in 100,000+ enterprises
- 115+ countries
  - 40 language translations
  - 51 national language versions
- Cross industry

Wholesale Distribution  Computer Services

Finance  Retail  Insurance

Consumer Package Goods  Travel & Transportation

Agribusiness  Automotive  Construction

Manufacturing  Lodging  Healthcare

Education  Associations  Local Government

Legal Services  Accounting Services
Power is the most reliable platform among UNIX, Lintel and Windows

Downtime (Hours per Year)

IBM AIX POWER
Sun Solaris / SPARC
HP UX 11/ PA RISC
Apple MAC
HP UX 11/ HP Integrity
Red Hat Enterprise Linux x86
Windows Server 2008 x86
Windows Server 2003 x86
Open Source Linux x86

54% of IT executives and managers say that they require 99.99% or better availability for their applications

IBM quality of service
✓ 99.997% uptime*
✓ 2.3X better than next UNIX
✓ >10X better than x86-based platforms

*Source: ITIC 2009 Global Server Hardware & Server OS Reliability Survey Results, July 7, 2009. Fully paper is available at ibm.com/aix
Comparing Security Advisories

Windows® Server 2003

Between 2003 and 2009, Microsoft Windows Server 2003 Enterprise Edition was affected by 179 Secunia issued advisories, 8% of which remain unfixed.


IBM i

Between 2003 and 2009, IBM i V5Rx was affected by 1 Secunia issued advisory which was non critical and has been fixed.

<table>
<thead>
<tr>
<th>Year</th>
<th>OS/400</th>
<th>V5R2</th>
<th>V5R3</th>
<th>V5R4</th>
<th>LIC 5.3.5</th>
<th>LIC 5.4.5</th>
<th>LIC 6.1.1</th>
<th>IBM i 6.1</th>
<th>IBM i 7.1</th>
</tr>
</thead>
</table>

*Power your planet.*
Clients requesting fewer operating system releases; and longer support cycles
  – Major release upgrades can be disruptive for a business

Interim technology refreshes will provide new functions and I/O support
  – Simpler to install on a current release and less disruptive

** IBM i Release 7.2 in 2014**

** All statements regarding IBM’s future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.
AIX 7 – The Future of UNIX
Power Systems marketplace momentum

3,900+

successful Power migrations to date.

- The pace is accelerating:
  500+ migrations to Power in 2009,
  over 1,000 in 2010, over 330 in 2Q 2011
- Most come from HP-UX or Oracle/Sun Solaris, along with some x86 consolidations
- 1Q competitive wins were roughly 2/3 from Oracle/Sun and 1/3 from HP

“Ellison drops iceberg in front of HP’s unsinkable Itanic
Oracle users rush for the lifeboats”

JSC Riamata Banka migrates from Oracle DB on Sun SPARC to DB2 on Power...achieves 3 to 30 times faster query responses and reduces costs 20-30%

“IBM has become a key technology partner for NACG, providing support during a difficult period of total transformation of our IT infrastructure.”

- David Booth, CIO
  North American Construction
IBM Protects Your Investment with Continuous Commitment

- IBM announced a $5 billion investment in new facilities
- Same fabrication line makes Power Systems and System z chips
- Nano-technology used for CPU manufacturing
  

- Twenty years executing and delivering the product line on schedule, as planned: 1990 – 2010 (POWER1 – POWER7)
What about Cloud?
Power Systems Cloud Solutions – Entry points at any level

**Cloud Foundation**
Industrial strength virtualization coupled with automated resource balancing and virtual image management

- POWER7 systems, PowerVM, Systems Director & VMControl

**Entry Cloud**
Basic cloud functions including simple self service interface and infrastructure with automated provisioning

**Advanced Cloud**
Integrated service management platform with automated IT service deployment, full lifecycle management, metering & chargeback

**Cloud Capabilities**

- IBM Starter Kit for Cloud
- Cloudburst on Power & IBM Service Delivery Manager

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POWER Roadmap towards Cloud Enablement

Past
- Physical systems
- Internal storage
- Static resource partitions
- Manual setup
- Physical media install

Present
- Virtual resources
- External storage with VIOS and SAN
- Dynamic resources for partitions
- Network install and backups
- Scripted partition creation

Future
- Partition mobility
- Image (partition) provisioning/cloning
- Virtualized everything
- Automation

Power your planet.

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Analytics on Power Systems - Performance Redefined
Analytics and Business Intelligence

- REPORTING WHAT HAPPENED?
  Query/Reporting

- ANALYSIS WHY DID IT HAPPEN?
  OLAP

- PREDICT WHAT WILL HAPPEN?
  Data Mining

- MONITOR WHAT JUST HAPPENED?
  Dashboards/Scorecards

Historical Data (Data Warehouses/Marts)  Real-Time Data (ODS)

Source: The Data Warehousing Institute, Smart Companies in the 21st Century, July 2003
But the problem is....

1 in 3

Business leaders frequently make decisions based on information they don’t trust, or don’t have

1 in 2

Business leaders say they don’t have access to the information they need to do their jobs

And yet.....

83%

of CIOs cited “Business intelligence and analytics” as part of their visionary plans to enhance competitiveness

Power your planet.
You have some options

- **Smart Analytics Systems 770/77100**
  - Most proven Large Enterprise Data Warehouse and Analytics Solution
  - Best of Bread, all the attributes of Power and AIX apply
  - Entry 7700 config includes 20 TB of storage (after RAID)

- **COGNOS BI or TM/1 (not COGNOS Express for AIX)**
  - Power and AIX approach

- Customized Solution in a LPAR or on separate box

- **DB2 InfoSphere Warehouse in AIX**

- **Netezza?**
  - Data Warehouse appliance based on x86

- **What about SMB i clients?: DB2 WebQuery**
IBM Cognos Business Intelligence

Inform
- Reports
- Dashboards
- Real-Time Monitoring
- Mobile

Engage
- Ad Hoc Query
- Trending and Drill Down
- Statistical Analysis

Align
- Scorecards
- Collaboration

COGNOS BI

Unified workspace
All time horizons
Progressive Interaction

Cognos Collaboration
Cognos Real-time Monitoring
Cognos TM1
Cognos Statistics
Cognos Mobile

For more information: http://www.ibm.com/software/data/cognos/?S_CMP=ba_hp

© 2011 IBM Corporation
DB2 Web Query for IBM i Enhancements

Enhance Query/400 with 5x performance improvements and BI

- Seeding the market
  - Over 35,000 Base Licenses shipped to IBM i clients
  - Drive new workloads and currency on OS (5.4 and up) and POWER7
  - Extend DB2 Web Query into business intelligence with dashboards, OLAP, or self service ad-hoc reporting

- What’s New
  - DB2 Web Query for i Oracle JDEdwards Adapter
    - Seamless access to ERP application data in DB2 for i
    - Empower end users with new intuitive user interface

- Features / Business Value
  - Completely integrated IBM i solution consisting of a BASE product with optional features that can extend the solution into full blown business intelligence.
  - Simplify and provide seamless access to data locked away in application databases. The new adapter for Oracle JDEdwards applications provides this while adhering to application security.

- Client Benefits
  - Provide real-time business intelligence applications for Oracle JDEdwards applications leveraging DB2 for i.
  - Improve Query/400 performance up to 5 times through enablement of DB2 for i query processing
  - Leverage existing IBM i on Power integrated environment and more modernized report authoring tools to minimize I/T staff required to support the BI infrastructure and empower end users with self service reporting.

IBM develops hypervisor that would become VM on the mainframe

IBM announces first LPAR on the mainframe

IBM announces LPAR on POWER™

IBM intro’s POWER Hypervisor™ for System p™ and System i™

IBM announces POWER6™, the first UNIX® servers with Live Partition Mobility

Power is virtualization without limits
The Power to Consolidate and Virtualize

5 mins
Time to add a new virtual machine to support business growth

“With PowerVM, we went from 95% to only 5% of our time managing or reacting to our environment. And, saved the business hundreds of thousands of dollars in licensing and application fees.”

Nigel Fortlage,
Vice President of IT,
GHY International
Thin provisioning optimizes storage utilization

- **How it works:**
  - When a new VM is created, the amount of physical storage used is less than the amount defined for the virtual workload, resulting in optimal storage utilization across the shared storage pool.
  - Additional storage is delivered dynamically when workloads expand and released when workloads contract.

- **Client benefits:**
  - Automates optimized storage utilization
  - More cost-efficient use of storage resources
  - Integrates multiple storage subsystems
Enhanced virtualized networking boosts flexibility

- **How it works:**
  - The virtualized network switch functionality within the VIOS will include support for SNMP, networking QoS, dynamic VLAN and MAC access control lists

- **Client benefits:**
  - Tighter integration
    - More sophisticated controls for monitoring and tuning network traffic between virtualized workloads
  - Optimized performance
    - Control over networking QoS (quality of service) rules for specific LPARs can fine-tune the performance of network-sensitive workloads
  - Improved security
    - Support for MAC-based access control lists (ACLs) allows admins to impose higher levels of protection for specific workloads
Suspend/resume simplifies administration

- **How it works:**
  - Suspend/resume is the process of ‘freezing’ a VM and saving the complete system state, and then restarting the workload exactly where it left off, without data loss
  - After suspension, the server resources are freed up for use by other workloads
  - The entire VM system state is stored in a set of files and can be resumed on the same server or on a different system after migration

- **Client benefits:**
  - Resource balancing – suspend low-priority or long-running workloads to allow more urgent processes access to server resources temporarily
  - Simplified maintenance – administrators can perform system updates or CEC upgrades without having to spend time on workload shutdown/startup processes
  - Debug/forensics – a workload can be temporarily suspended and a copy made for offline analysis for security or performance purposes
## New PowerVM Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Function</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shared Storage Pools</strong> (Enhanced)</td>
<td>Creates pools of storage that can be used by virtualized workloads. This facility enables key functions like linked clones, snapshot/rollback and storage mobility.</td>
<td>Improves storage utilization, reduces storage infrastructure costs, decreases time to provision new VMs and reduces administration costs.</td>
</tr>
<tr>
<td><strong>Active Memory De-duplication</strong></td>
<td>Detects and removes duplicate memory pages in Active Memory Sharing configurations.</td>
<td>Optimizes physical memory usage for LPARs in Active Memory Sharing configurations. Allows more partitions to fit on a system if memory is constrained.</td>
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<td><strong>Network Balancing</strong></td>
<td>Network traffic is balanced across multiple shared ethernet adapters in HA environments</td>
<td>Improved utilization of shared ethernet adapters in HA environments and better performance.</td>
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<tr>
<td><strong>Live Partition Mobility Performance Improvements</strong></td>
<td>Improvements in network components and this doubles the number of data movers from 4 to 8.</td>
<td>Allows Live Partition Mobility to operate faster which enables quicker system evacuation for maintenance activities.</td>
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</tbody>
</table>
Post GA 7.1: Technology Refresh 3 – October 2011  *New*

**DB2**
- Security – Simplify Authentication with new keyword
- SSD Asynchronous Table & Index Movement
- DB2 Monitoring Tool Improvements – Filters
  - Error Cases, Client IP Addresses, Group & User Profiles
- ISV and Advanced User requests
  - Smaller SQL Statements in SQL Packages
  - Improved ALTER TABLE Performance
  - Administration Information available through SQL

**Application Development**
- Native archive and un-archive API supports creating and restoring archive files specifically .zip files

**Virtualization**
- Thin Provisioning for DS8700 and DS8800 storage servers, and for VIOS Shared Storage Pools allows configurations set up with a smaller amount of real disk storage
- Virtual Partition Manager is enhanced to create IBM i partitions
  - For POWER6 and POWER7 Express Servers that do not have an external management console.
  - Enhancement to IBM i 7.1, the ability to create up to four IBM i partitions will be enabled in VPM.
- IBM i mirroring algorithms are enhanced to take into consideration any N_Port ID Virtualization (NPIV) attached disks.

**System and I/O Support**
- Bus level statistics for 12x loops
- Ethernet link aggregation improves throughput and reliability for up to 8 links
- Share physical Ethernet connections across partitions with Ethernet layer-2 bridging

**IBM i for Business Intelligence**
- New solution from IBM
- Low-cost value built solution (IBM i with Power System)
- Builds on popular DB2 Web Query
- Start with Operational Reporting and optionally grow into Data Warehousing

**IBM i Cbu for HA**
- New solution from IBM
- Low-cost value built solution (IBM i with Power System)
- Combines existing CBU Editions with PowerHA

**IBM DB2 Web Query for i**
- Standard Edition bundle to provide customers with a complete query reporting solution in a single, simplified ordering package.
- New interface that allows users to generate URLs to query reports for report

**PowerHA SystemMirror for i**
- Support replication through V7000
- Support replication through SVC server
- Metro Mirror, Global Mirror and FlashCopy support

**Application Runtime Expert**
- Automate servicing of applications using scripting, CL commands and SQL queries

**Zend Server Community Edition**
- PHP environment preloaded with IBM I
- New extensions and toolkit for accessing DB2 for i
# IBM i System Support

<table>
<thead>
<tr>
<th>Servers</th>
<th>IBM i 5.4</th>
<th>IBM i 6.1</th>
<th>IBM i 7.1</th>
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IBM i Investment Themes for 2011-2013

- **Solutions enablement**
  - Focus on ISV solutions integration
  - Invest in language & database standards currency

- **Simplified management**
  - Integrate IBM i performance tooling with virtual I/O server
  - Automate with Systems Director Management Console

- **Resilient systems**
  - Simplify administration of PowerHA for mid-sized companies
  - Broaden storage area network integration

- **Cloud computing**
  - Deliver VM image management, mobility, automation
  - Extend storage virtualization features