Power Systems Trends and Directions

Steve Will – Chief Architect: IBM i

Agenda

- POWER Systems Portfolio & Messages
- POWER Hardware Portfolio & Directions
- POWER Software Products & Directions
- IBM i-Specific Discussion
- IBM Watson Jeopardy Challenge

Power your planet.

Workload-Optimizing Systems

+

AIX. i for Business Linux

AIX - the future of UNIX

Total integration with i

Scalable Linux ready for x86 consolidation

Virtualization without Limits

- ✓ Drive over 90% utilization
- ✓ Dynamically scale per demand

Dynamic Energy Optimization

- ✓ 70-90% energy cost reduction
- ✓ EnergyScale™ technologies

Resiliency without Downtime

- ✓ Roadmap to continuous availability
- ✓ High availability systems & scaling

Management with Automation

- ✓ VMControl to manage virtualization
- ✓ Automation to reduce task time

Smarter Systems for a Smarter Planet.

The future of UNIX

"For the second year in a row, AIX scored the highest reliability ratings among 15 different server operating system platforms" - ITIC 2009

Total integration with i

"Costs for use of Power Systems and IBM i 6.1 average 41 % less than x86 servers and Microsoft Windows" - ITG 2010

Scalable Linux ready for x86 consolidation

Queensland Motorways replaced legacy Windows x86 traffic management systems with new SAP running Linux on Power

Powering your planet with Power Systems

Smarter Processors
Smarter Systems
Smarter Operating Systems
Smarter Virtualization
Smarter System Management
Smarter Software

POWER7 Portfolio

Major Features:

- Modular systems with linear scalability
- PowerVM Virtualization
- Physical and Virtual Management
- Roadmap to Continuous Availability
- Binary Compatibility
- Energy / Thermal Management

Power 795

Power 780

Power 770

Power 750

Power 720 / 740

Power 710 / 730

HPC BlueWater

BladeCenter
PS700 / PS701 / PS702

PowerHA

PowerVM

IBM Systems Director

AIX

for Business

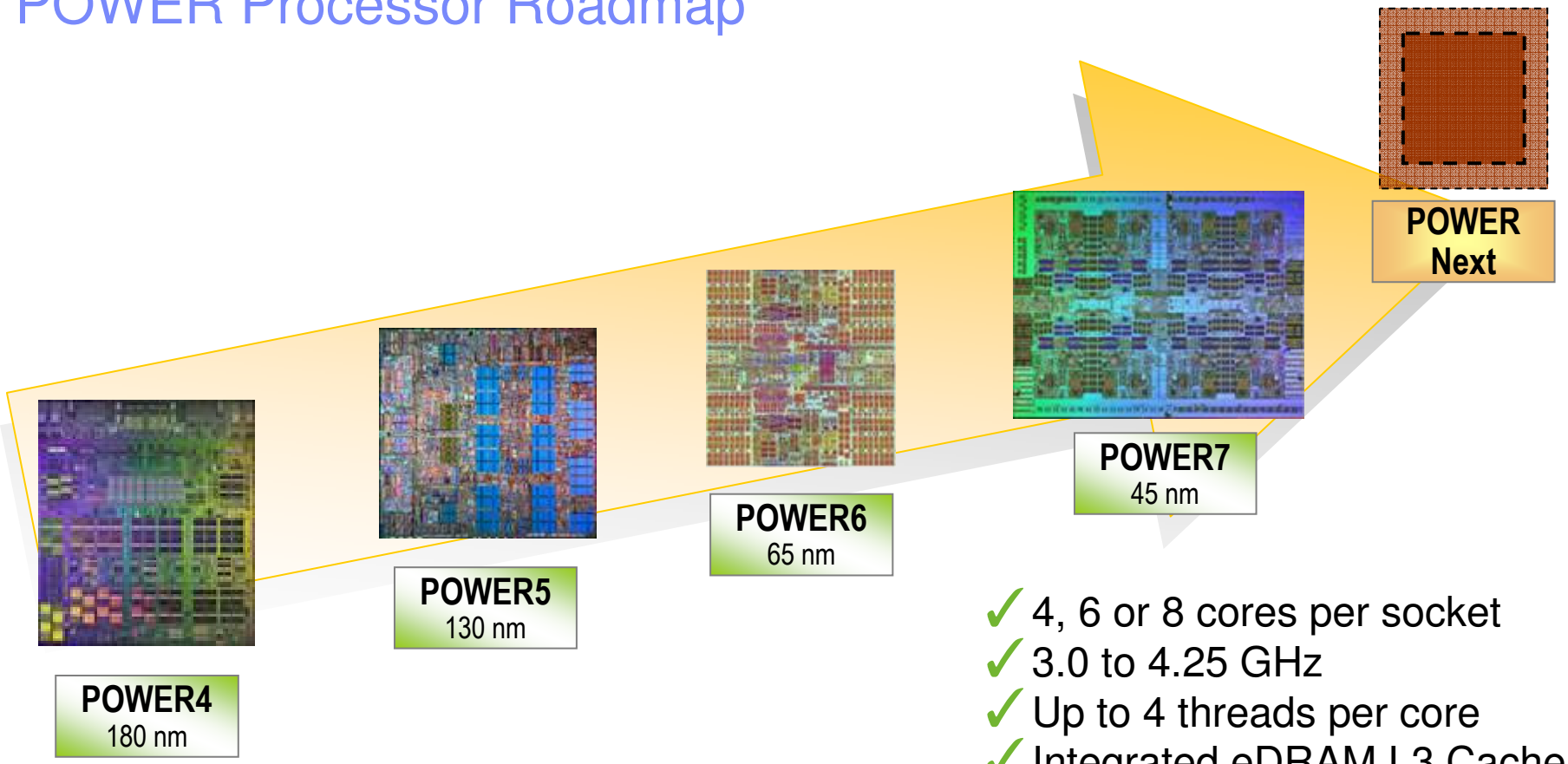
Linux

AIX 7.1

IBM 7.1

Power 755

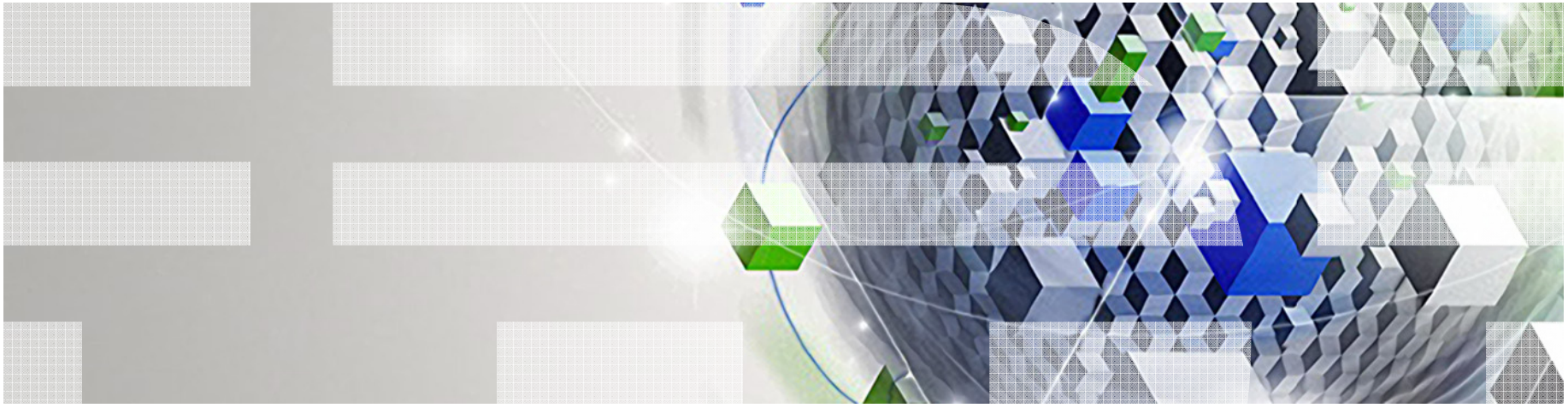
POWER Processor Roadmap



- ✓ 4, 6 or 8 cores per socket
- ✓ 3.0 to 4.25 GHz
- ✓ Up to 4 threads per core
- ✓ Integrated eDRAM L3 Cache
- ✓ Dynamic Energy Optimization

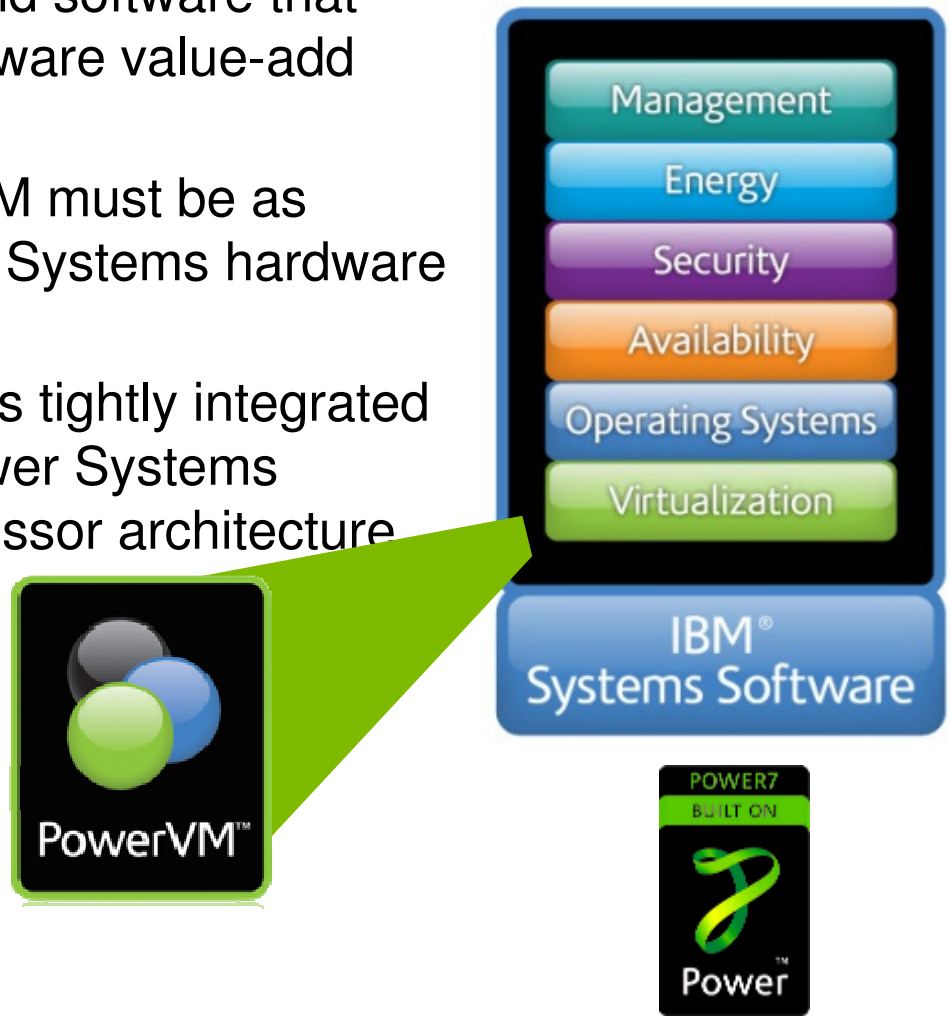
2001 2004 2007 2010

POWER Software
PowerVM, PowerHA, Management



PowerVM: Foundation of Power Systems value stack

- PowerVM comprises firmware and software that anchors the Power Systems software value-add 'stack'
- As the foundation layer, PowerVM must be as robust and reliable as the Power Systems hardware platform
- PowerVM's design and delivery is tightly integrated with the latest innovations in Power Systems platforms and the POWER processor architecture



- ***PowerVM is used by >60% of clients running POWER6-based servers***
- ***PowerVM is used by >80% of clients running POWER7-based servers***

VMControl Editions: Adds value to PowerVM

VMControl	VMControl Express Edition	VMControl Standard Edition	VMControl Enterprise Edition
Virtualization Capabilities	**Manage** resources	**Automate** virtual images	**Optimize** system pools
PowerVM	AIX, IBM i for Business, Linux	AIX, Linux	AIX, Linux
Create/manage virtual machines (x86, PowerVM and z/VM)	✓	✓	✓
Virtual machine relocation	*✓	✓	✓
Capture/import, create/remove standardized virtual images		✓	✓
Deploy standard virtual images		✓	✓
Maintain virtual images in a centralized library		✓	✓
Create/remove system pools and manage system pool resources			✓
Add/remove physical servers within system pools			✓

** VM relocation is not supported for IBM i workloads*

PowerHA SystemMirror

Power Systems High Availability Solution
For mission critical application availability through planned and unplanned outage events

Editions Targeted at data center or multi-site deployments

Shared Storage Clustering Technology Designed for automation and minimal IT operations.

PowerHA SystemMirror

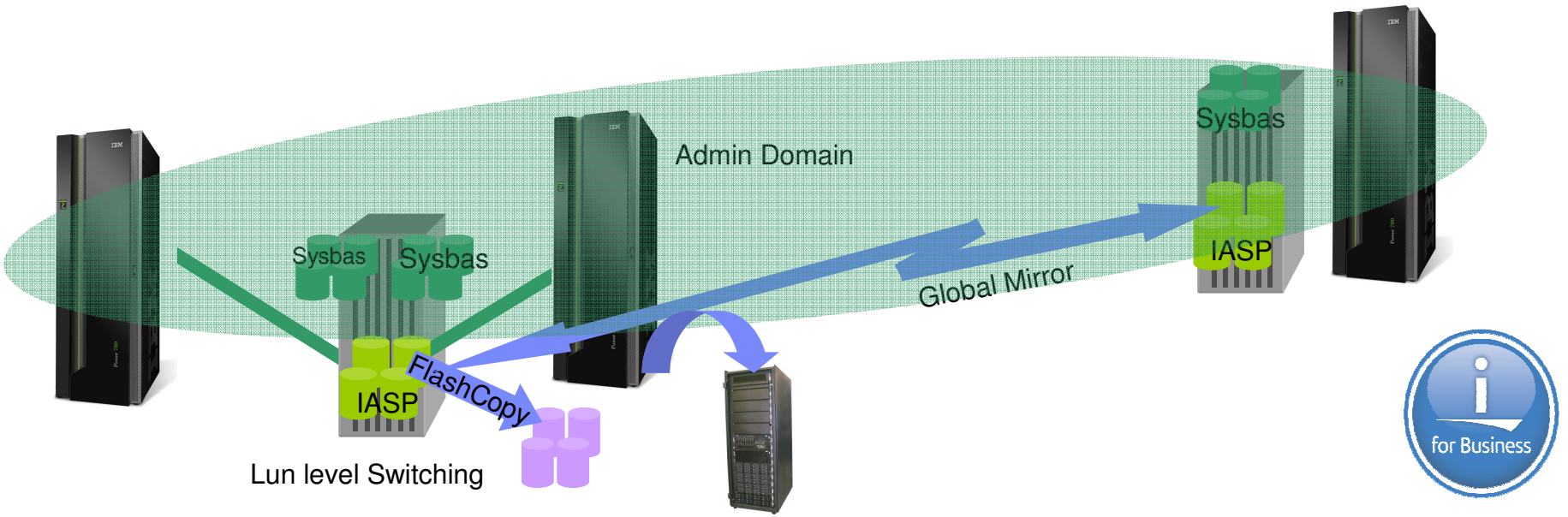
- Complete IBM Power Systems integrated end to end solutions for HA DR
  - Focus: 24x 7 Application availability through planned or unplanned outage events
  - Deeply integrated extension of AIX and IBM i (implemented in SLIC and the OS)

- Clustering technology
  - Clustering provides the applications a complete resiliency infrastructure
  - Cluster monitors and manages primary and secondary resources for HADR operations

- Storage based data resiliency
  - Data resiliency is an extension of the host system storage management architecture
  - Storage volumes are either switchable or mirrored between nodes in the cluster
  - Hardware based replication services for Multi-Site Operations
    - Host Based Replication (geomirroring for IBM i, or GLVM for AIX)
    - Storage Base Replication (Metro Mirror or Global Mirror)
- Overall solution characteristic
  - Automation, minimal IT operations involvement
  - Data between primary and secondary nodes always in sync always ready for a failover event

IBM Systems Storage™ & PowerHA SystemMirror

With The Advanced Copy Services for PowerHA on i



- Integrated DS8000/D6000 and PowerHA SystemMirror cluster
- Single point of control for both storage and HA/DR operations
- Space efficient FlashCopy
- Reliable on demand role swap operations

PowerHA™

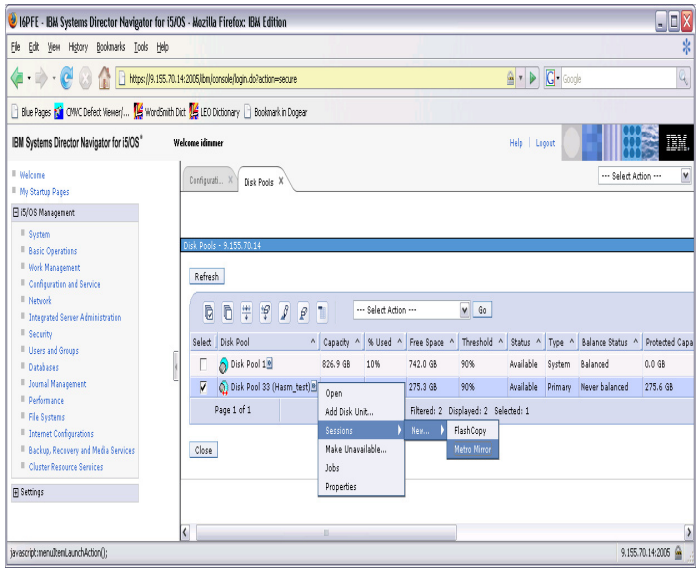
Power HA SystemMirror Strategy
Simplification-Usability-Reliability

- **Deep Integration with AIX and IBM i**
  - Cluster Aware AIX
  - Cluster Aware i (HASR)
  - Cluster wide OS operations
  - SLIC or kernel based technology

- **Ease of deployment & ease of use**
  - Systems Director based management
  - Advanced Copy Services for PowerHA

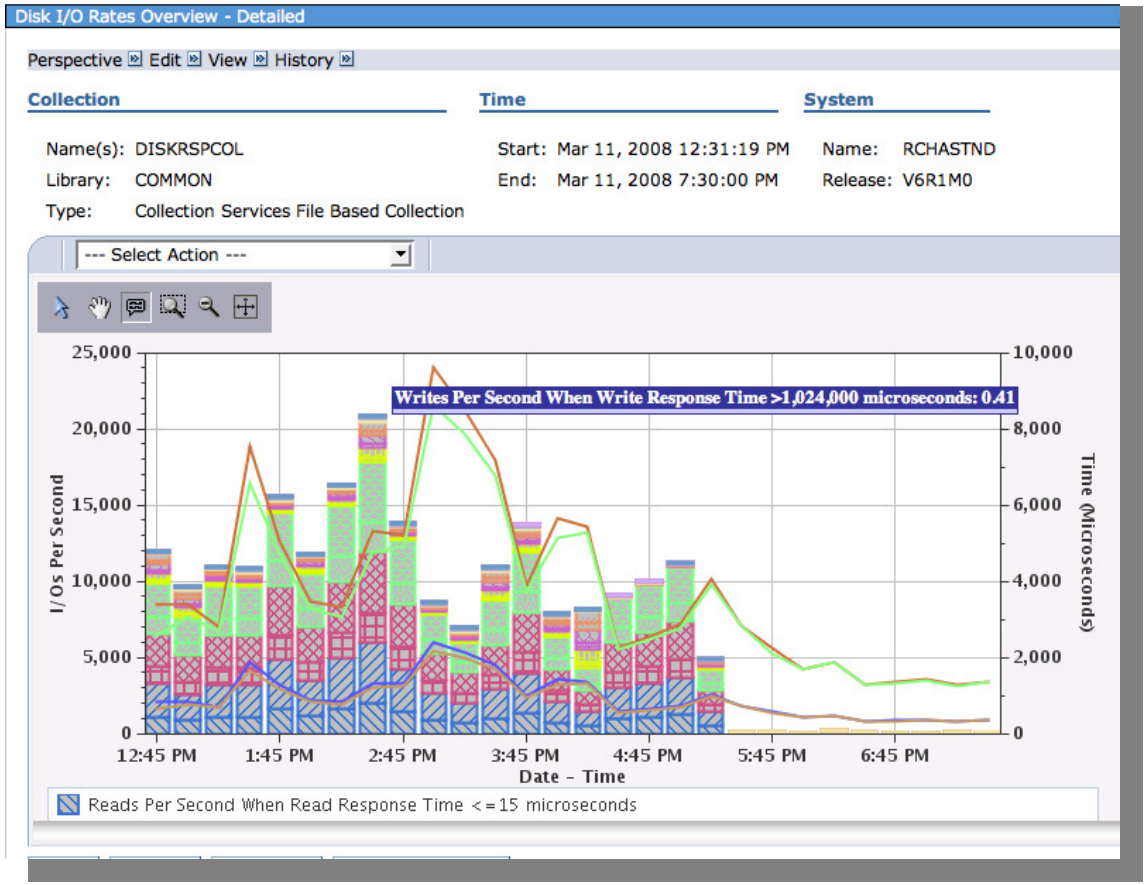
- **Multi-Site & Disaster Recovery**
  - Optimized for IBM Storage

- **Solution Package Optimization**
  - Standard and Enterprise Editions



Systems Management Cornerstones

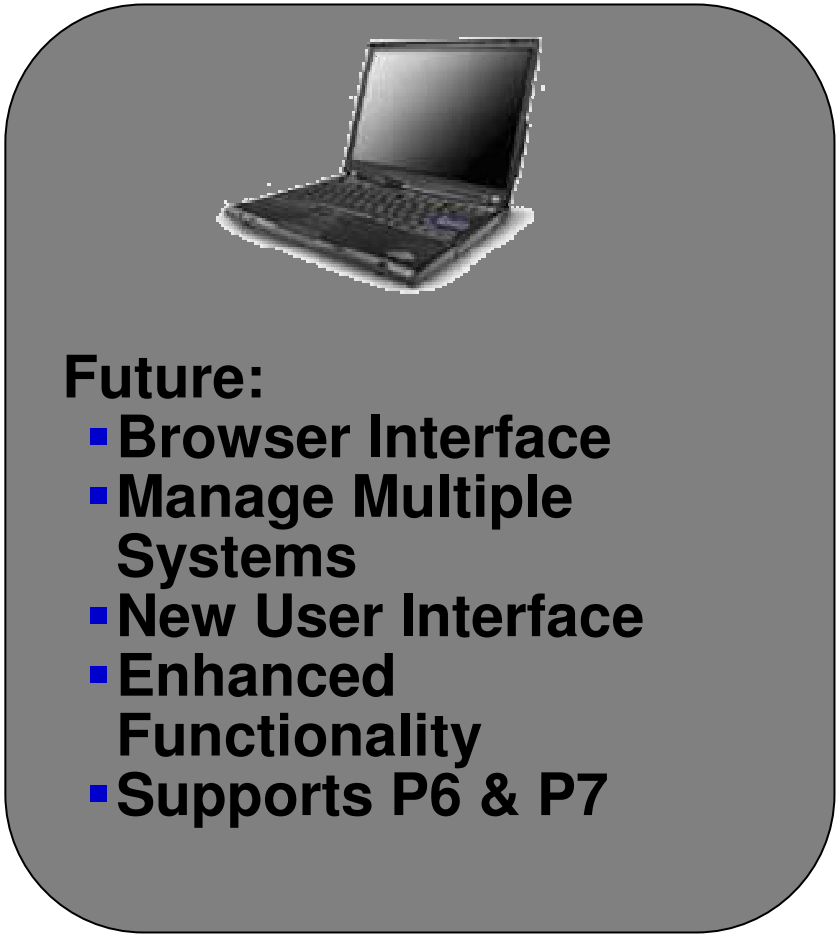
- **Systems Director Navigator for i**
  - Strategic, Browser-Based
  - Manage a single IBM i system or partition
  - IBM i 5.4, 6.1 or 7.1 system
  - Includes Performance Data Investigator



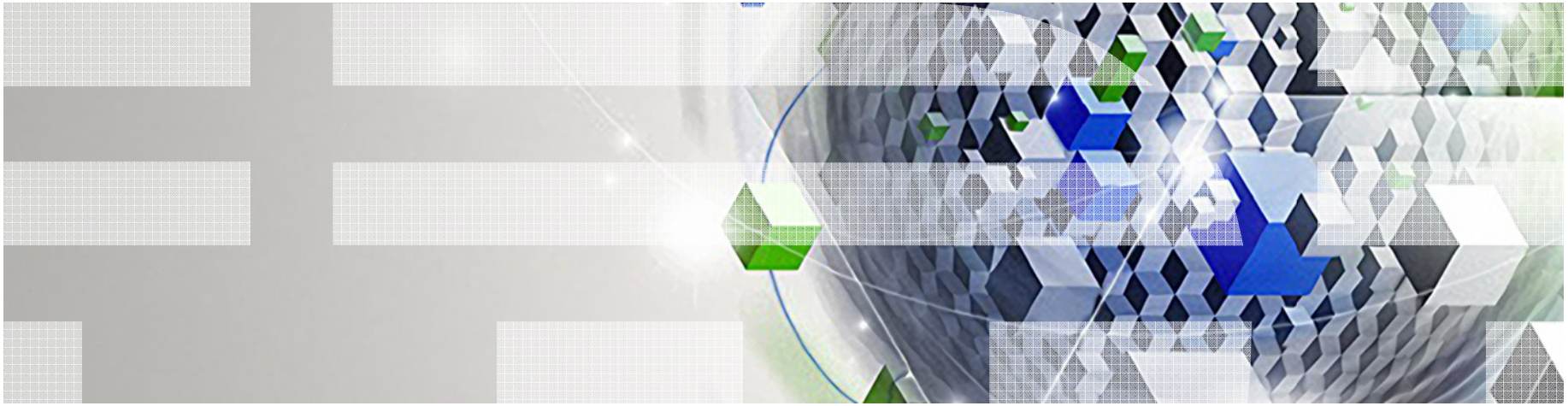
- **Systems Director**
  - Strategic, Browser-Based
  - Manage multiple systems or partitions
  - Code and Fix Distribution
  - Image Management with VMControl

IBM® Systems Director

Future Management Console



IBM i Specifics



The IBM i Marketplace at a Glance

115+ Countries

100,000s clients

80% SMBs
20% Large Enterprises

20+ Industries

Top Countries

1. United States
2. Italy
3. Japan
4. Germany
5. Spain
6. France
7. UK
8. Canada

Top ISVs

- SAP
- Oracle JD Edwards
- Infor
- Lawson
- IBS
- Vision
- Misys
- Silverlake
- Jack Henry…..

Top Industries

1. Wholesale Dist.
2. Retail
3. Computer Services
4. Insurance
5. Retail Banking
6. Consumer Package
7. Travel & Transportation
8. Automotive

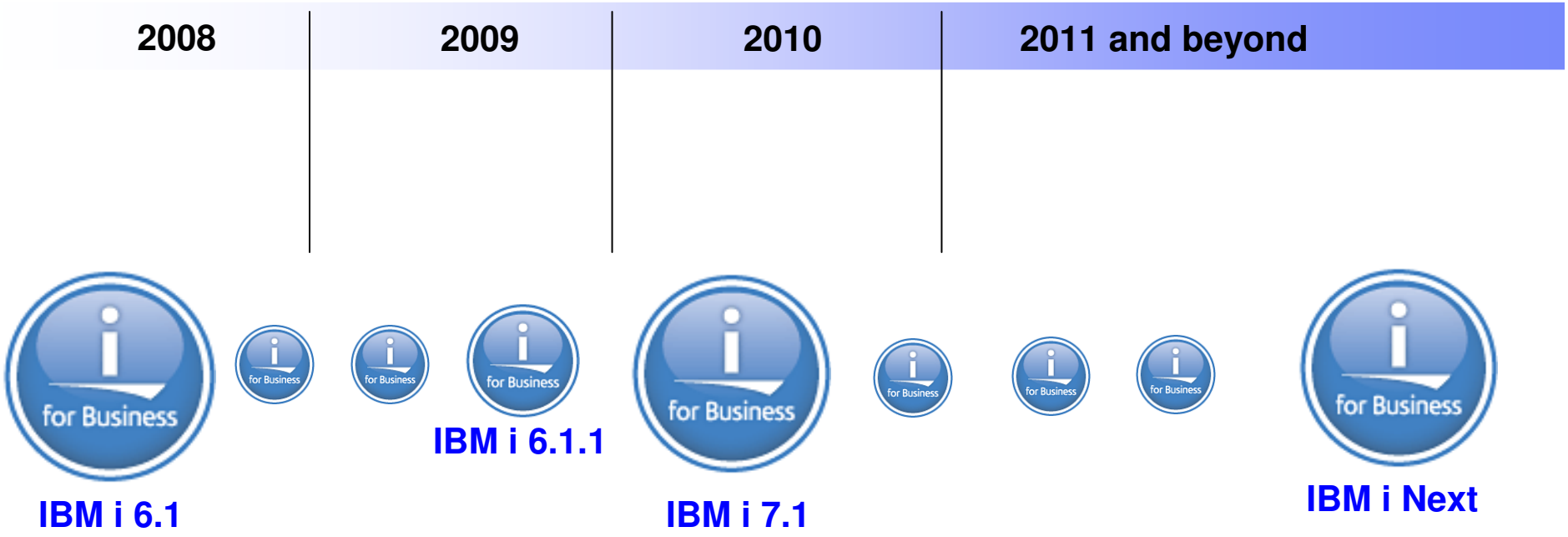
IBM i has more clients than any other IBM system platform

Power Systems and IBM i

- 50% of revenue from SMB
- 94% of IBM i shipments
- 720/740 are typically best fit for IBM i

- 50% of revenue from large enterprises
- Scales to 32-core partitions and beyond
- 770 is typically best fit for IBM i

IBM i Roadmap



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

The New Value Proposition of IBM i on Power Systems ….for AS/400 / iSeries Clients

- **Leadership technology with trusted roadmap**
  - *#1 RISC/EPIC systems; $3.2B invested in POWER7*
- **Single hardware platform**
  - *Same hardware price, same I/O options, faster access*
- **Expanded software options**
  - *PowerVM virtualization, PowerHA resiliency*
  - *Run AIX and Linux applications*
- **Preserved integrated value proposition of IBM i**
  - *With no disruption to customers and their applications*

PowerVM™ PowerHA™ for Business

✓ ***Preserved the strategic value of integrated IBM i applications***

✓ ***Lowered the strategic risk of AS/400 proprietary platform***

IBM i Strategic Themes - Technology

- Enable Applications to Adopt Key Current Technology
- Fully Functional Cloud/SaaS Delivery & Implementation
- DB2 – Advanced XML support; Anticipation of Standards
- PowerHA SystemMirror for i – Speeding Adoption
- DB2 WebQuery – Simplify Quick Business Intelligence
- Future POWER Systems & I/O – Support/Exploit

Built on Low TCO, Ease of Use, High Quality and Stability
Protecting Customer Investments into the Future

IBM i and Software as a Service

- Over 90 ISVs currently offer SaaS solutions on IBM Power Systems with IBM i
  - Lowers cost of solution acquisition
  - Lowers cost of ongoing maintenance

- Unique technology that is core to IBM i enables ISV to deploy SaaS with little change to their applications
  - Low cost for ISV to offer SaaS solution
  - Multiple deployment models available today for varied customer needs without the need for complicated cloud computing technology

IBM i has an Active, Passionate Community

For Your Information

- "i Can" by Dawn May
  - http://ibmsystemsmag.blogs.com/i_can/
  - To share the "hidden gems" within IBM i.
  - **Recent topics:**
    - **"Detach Spooled Files from Jobs"**
    - **"Automate Monitoring with Watches "**
    - **"The Secret History Log Enhancements"**

DawnMayiCan
On Twitter

- "You and i" by Steve Will
  - http://ibmsystemsmag.blogs.com/you_and_i/
  - Directly communicate with the i community
  - Strategy, architecture, announcements, and news.
  - **Related topics:**
    - **"Layers of i"**
    - **"The 'New' Value of Single Level Store"**
    - **"Expanded Solution Editions for IBM i"**

Steve_Will_IBMi
On Twitter

#ibmi
On Twitter

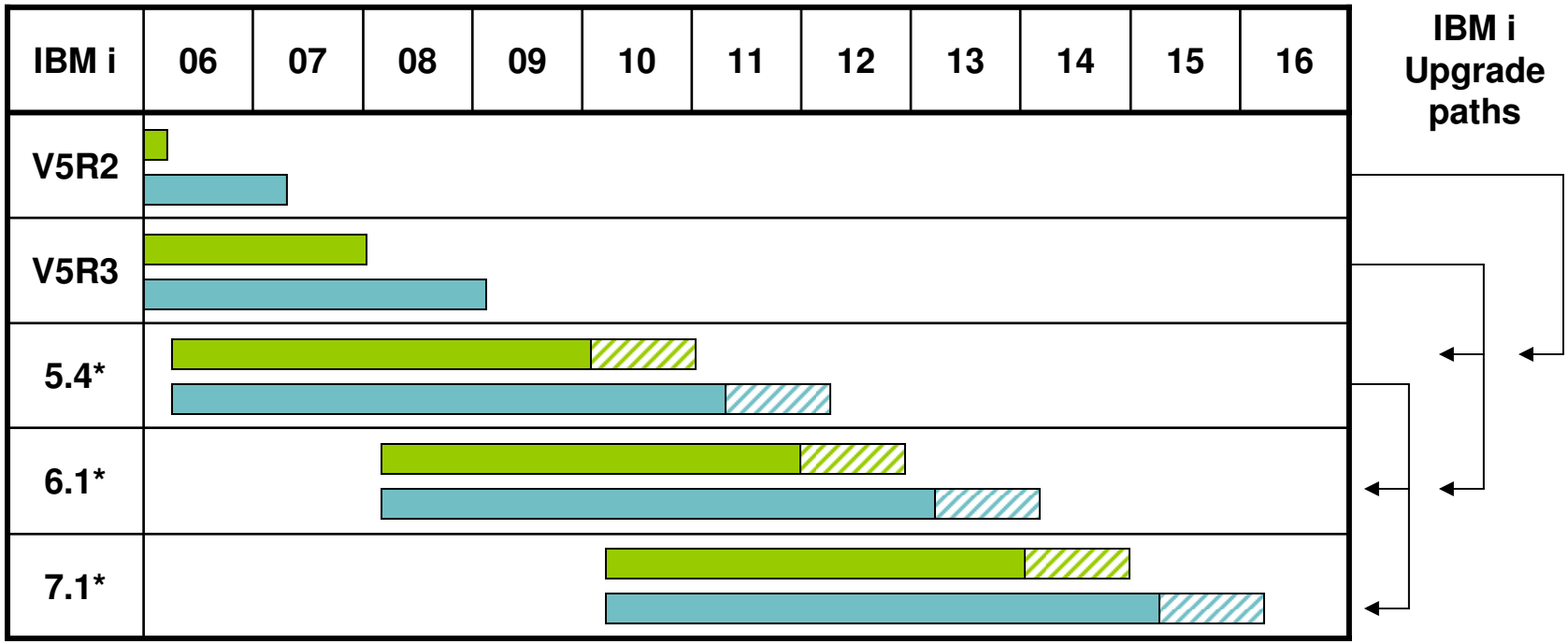
- Webcast "Why i?" presentation: www.youtube.com/user/lugoffice

IBM i System Support

Servers	IBM i 5.4	IBM i 6.1	IBM i 7.1
POWER7 750, 770, 780		✓	✓
POWER6 JS12, 22, 23/43, 550* 560		✓	✓
POWER6 520, 550*, 570, 595	✓	✓	✓
POWER5+ 515, 525	✓	✓	✓
POWER5 520, 550, 570, 595	✓	✓	✓
800, 810, 825, 870, 890	✓	✓	
270, 820, 830, 840	✓		

* Specific models

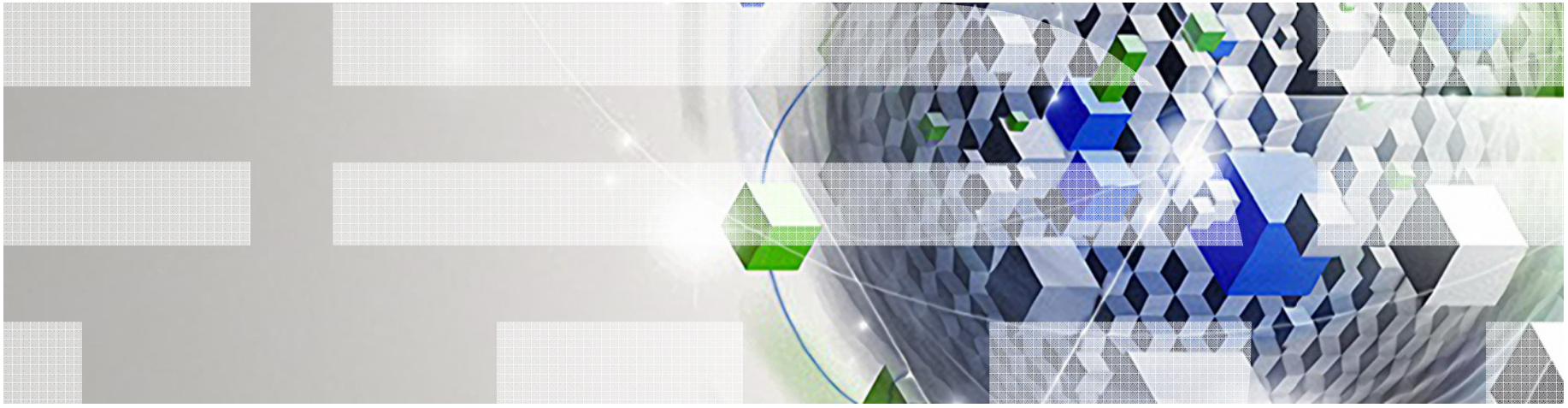
Extending the IBM i Life Cycle



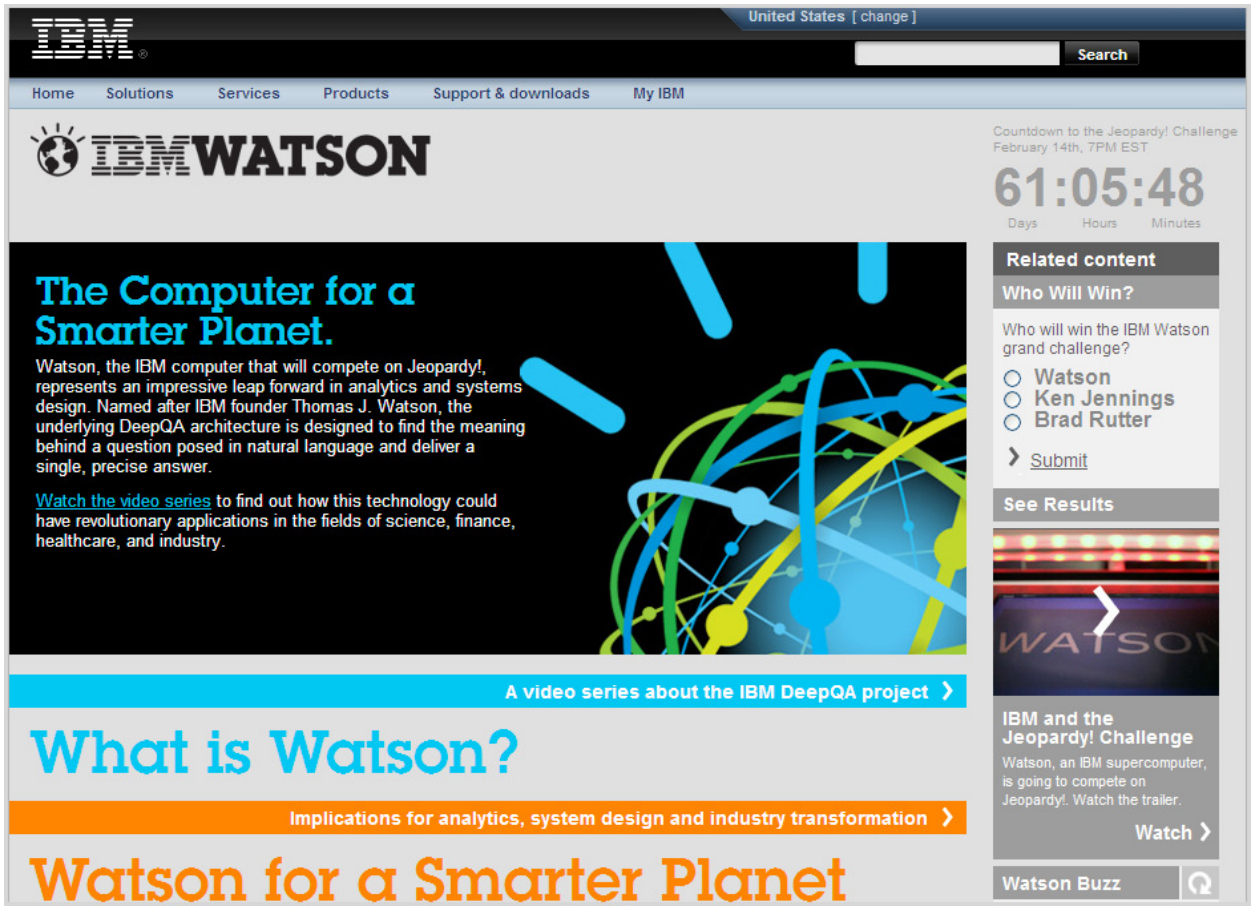
Marketing
Service
New Dates

*The projected date for the next marketing and service of IBM i releases is based on current IBM planning assumptions. Note that it is IBM's current practice to support an IBM i release until the next two releases have been made available, plus twenty four months. This presentation contains information about IBM's plans and directions. Such plans are subject to change without notice.

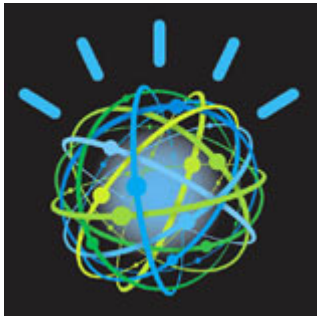
Watson and Power Systems



Watson



Jeopardy! Challenge



IBM WATSON

POWER7™
BUILT ON
Power™

Power 750

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Computer vs. 'Jeopardy' Stars

By BRIAN STELTER
Published: December 13, 2010

An I.B.M. supercomputer system named after the company's founder, Thomas J. Watson Sr., is almost ready for a televised test: a bout of questioning on the quiz show "Jeopardy!" I.B.M. and the producers of "Jeopardy!" will announce on Tuesday that the computer, Watson, will face the two most successful players in "Jeopardy!" history, Ken Jennings and Brad Rutter, in three episodes that will be broadcast the week of Feb. 14. One million dollars will be on the line; if Watson wins, the money will be donated to charity. "Jeopardy!" producers said the computer qualified for the show by passing the same test that human contestants must pass.

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Tuesday 14 December 2010

The Telegraph

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USA

US game show to pit man against machine

The US television game show 'Jeopardy!' will pit two of its most successful champions against a machine in an attempt to show that a computer can mimic human intelligence.

Ken Jennings, left, and Brad Rutter, two of the most successful contestants on the game show Jeopardy! Photo: AP

2:55PM GMT 14 Dec 2010

Ken Jennings and Brad Rutter will play two games against 'Watson', a computer program developed by IBM's artificial intelligence team.

The competition, due to take place in February, is reminiscent of when IBM developed a chess-playing computer to compete against chess champion Garry Kasparov in 1997. The computer won a six-game series by two wins to one with three draws.

'Watson' is named after Thomas J Watson, the IBM founder.

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Watson FAQ

1. What is Watson?

- For more than three years IBM scientists have been working on a workload optimized system, codenamed “Watson”, running IBM Deep Question Answering (QA) software on IBM POWER7 processors. The intent was to develop a computing system that is able to understand complex questions and answer with enough precision, confidence, and speed to compete on Jeopardy!
- The name Watson was selected to honor the founder of IBM, Thomas J. Watson.

2. Why Jeopardy?

- Jeopardy! is a quiz show covering a broad range of topics, such as history, literature, politics, arts and entertainment, and science. Jeopardy! poses a grand challenge for a computing system due to its broad range of subject matter, the speed at which contestants must provide both accurate responses and determine a confidence they are correct and because the clues given to contestants involve analyzing subtle meaning, irony, riddles, and other complexities.

3. Who is Watson competing against?

- Watson will be playing against two of the most well-known and successful Jeopardy! Champions - Ken Jennings and Brad Rutter - in a two-match contest to be aired over three consecutive nights beginning on February 14, 2011.
- The contestant with the two-day highest cumulative score will receive $1 million with second place earning $300,000 and third place $200,000. Brad Rutter and Ken Jennings will donate 50 percent of their winnings to charity. IBM will donate 100 percent of its winnings to charity.

4. How does Watson use POWER7?

- The IBM POWER7 processor behind Watson is specifically designed to meet the demands of workloads, like IBM’s DeepQA natural language processing technology.
- POWER7 is an ideal system for running thousands of analytical tasks at once, which is what the Watson DeepQA software requires. In order to answer a Jeopardy! question in under three seconds, the system run thousands of breakthrough analytical tasks at once.
- Watson uses POWER7 to deliver massive parallelism of multiple complex tasks that execute simultaneously on individual processor threads. Watson relies on multiple IBM Power 750 servers clustered together, each with four processor sockets with eight POWER7 cores per socket, and four threads per core. Combined, they make a workload optimized system that can answer questions posed in natural language in seconds. No other system in the world can do this.
- While the Power 750 server provides excellent capabilities to support the IBM Watson Deep QA software, the Power 750 server was not specially designed for Watson. In fact, the same Power 750 servers are ideal for running many types of analytical tasks and available today to help answer practical business challenges across many industries, such as healthcare, financial services, and call center environments.

Watson FAQ

5. Will the rules be the same as the regular Jeopardy! game show?

- Yes the rules of the game will be almost exactly the same. Every effort has been made to create a level playing field, right down to Watson's hand-button that is attached to a mechanical device mounted on the podium - which Watson must use to physically depress the button and ring in to answer, just like the other contestants.
- Watson cannot respond to video or audio clues and the producers have agreed to omit them, just as they have with contestants who are visually or hearing impaired.
- Watson even took and passed the same Jeopardy! contestant test that humans take to qualify to play on the show.

6. What will Watson look like?

- Rather than wheeling servers out onto the stage, Watson's will have an on-stage 'avatar' projected above a contestant's podium. The projection shares the graphic structure and tonality of the IBM smarter planet logo – a global map display with its halo of thought rays – that is further designed to depict the interior processes of the computer that powers it.

7. When will the broadcast be aired?

- The broadcast will run for three night from February 14-16.
- IBM also plans to enable IBMers to host or participate in "viewing parties" at home or in their communities, with clients at a variety of IBM sites, or in conjunction with a number of US universities.

8. Won't Watson have an unfair advantage by being hooked up to the Internet?

- Watson will not be connected to the Internet or any outside source of information.
- Just like the human contestants, Watson will be self-contained and will answer – or not – based on the confidence level of the learned information it has at hand. Watson will rely on the learning and knowledge it has amassed from a wide variety of natural language text sources.

9. What makes this match different than playing against an Internet search engine?

- A web search engine has access to an immense source of information and is designed to return a ranked list of web pages containing the data the user may be trying to find. Rather than provide an answer, search engines return possible sources for the answer, based on popularity and page ranking. The user must still analyze these recommendations and determine for themselves what the best answer is.
- Watson by comparison, uses QA technology to analyze the structure and wording of the question being asked, and in a matter of seconds formulates an answer that it has the highest level of 'confidence' is correct. Watson answers 'natural language' questions, which can contain puns, slang, jargon and acronyms that must all be evaluated as part of Watson's confidence in returning an answer.