



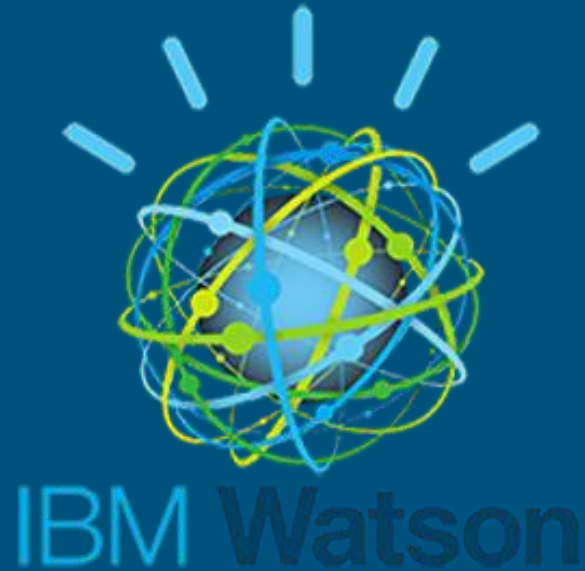
IBM Watson

Ben Sentiff & Ben Glasstone



Overview

- What is a supercomputer?
- Watson's Hardware
- Watson's Software
- Real-world uses of Watson

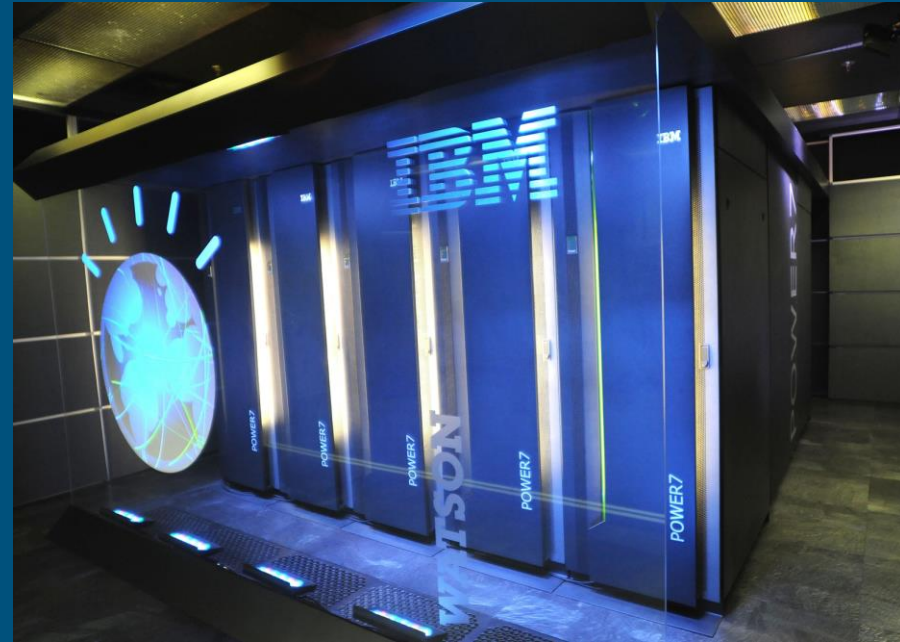


Supercomputers

- A computer with a high-level computational capacity
- Used for scientific and engineering applications
- Performance of supercomputers is measured in FLOPS
- IBM is the largest supercomputer vendor with a total of 153 systems.

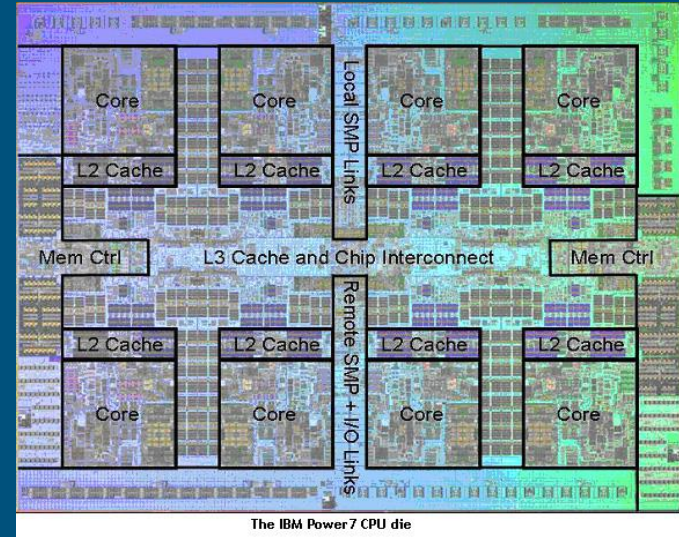
Hardware Specs

- 90 IBM Power 750 servers
 - 3.5 GHz POWER7 8-core processor
 - 4 Threads per core
 - 2880 simultaneous threads
- 16TB of RAM
- 80 TeraFLOPS
- 500GB/sec or 1million books/sec
- \$34500 per Power 750 server
- ~\$3million worth of hardware



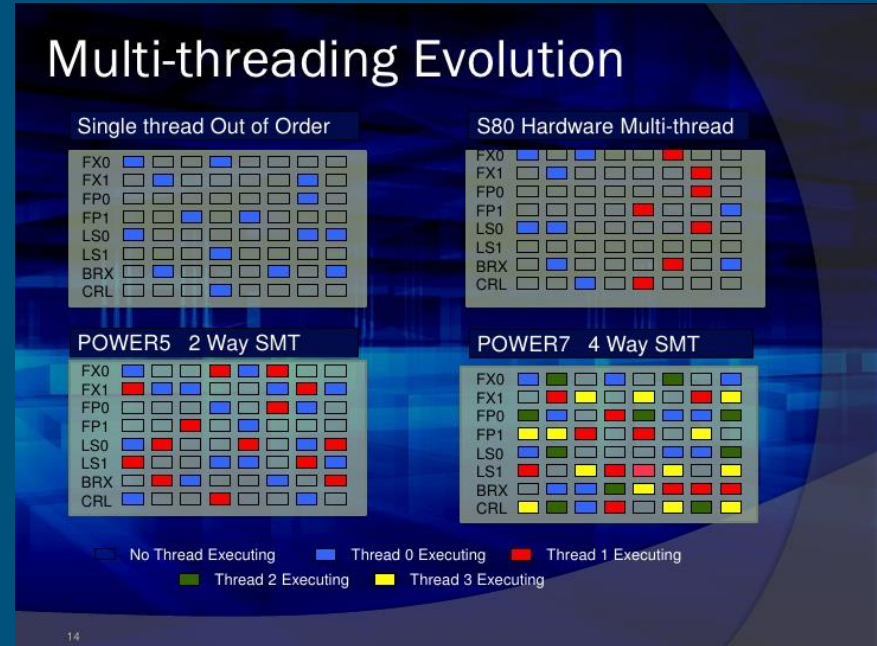
IBM POWER7 Architecture

- Superscaler Symmetric Multiprocessor
- Processor designed for supercomputers
 - Hardware-coherency fabric of up to 256 CPUs
- Cache
 - L1 cache
 - 32KB/core
 - L2 cache
 - 256KB/core
 - L3 cache
 - 32MB accessible by all cores
 - Embedded DRAM (eDRAM)



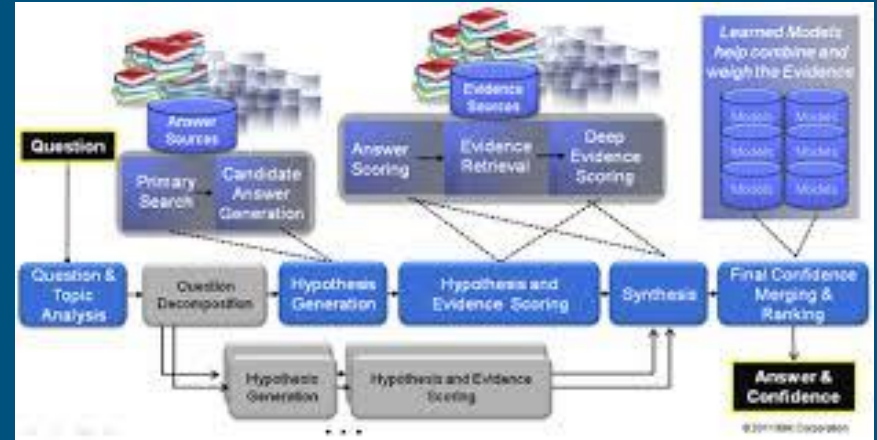
IBM POWER7 Architecture

- Simultaneous Multithreading
 - POWER7 offers 3 types
 - 1,2,4-way SMT
 - Intelligent Threading
- Flexible processor packaging
 - TurboCore mode
 - MaxCore mode
- Two DDR3 memory controllers
 - 4 channels each
 - Operates at 6.4GHz
 - Address up to 32 GB of memory or a total of 256 GB with all channels



Software Specs

- IBM's DeepQA
 - Hypothesis Generation
 - Hypothesis Scoring
- Apache UIMA
 - Unstructured Information Management
- SUSE Linux Enterprise Server
- Apache Hadoop
- Mostly written in Java, C++ and Prolog



Why was Watson created?

- IBM research manager Charles Lickel watched Jeopardy at a restaurant.
- Thought the challenge of playing Jeopardy with an IBM system was unique.
- IBM research executive Paul Horn backed Lickel up and pushed for the department to take up this challenge.
- By 2006 Watson was up and running, “learning” new information to prepare for the challenge.

Jeopardy Challenge

- In 2008, a challenge was set up between Watson, Ken Jennings, and Brad Rutter.
- In 2010, mock set was created, tests were run
- On January 13th 2011, a 15 question practice match was conducted.
- On January 14th 2011, the official matches were run
- The first match wasn't aired until February 14th 2011

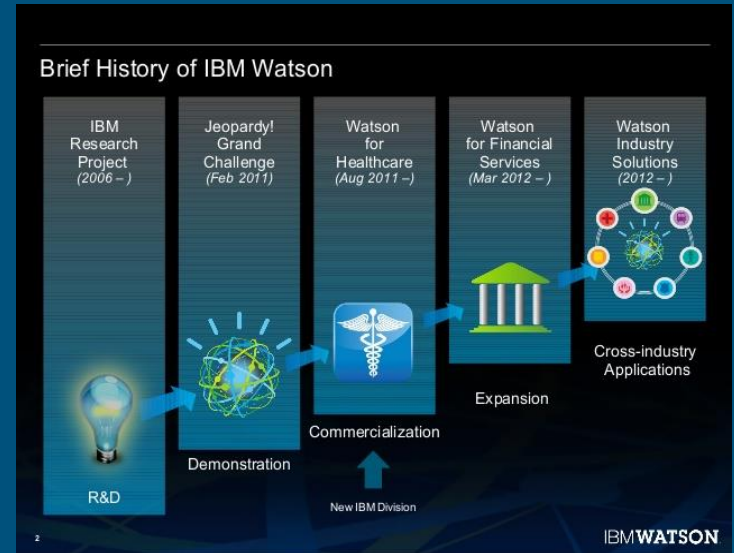


Jeopardy Challenge

- Watson hunted for Double Jeopardy questions.
- Watson won the first match despite incorrectly answering two questions.
- Watson duplicated Jennings incorrect response.
- Incorrectly answered the final jeopardy question.

Moving forward with Watson

- January 19th 2014, IBM Watson Group formed to develop new cloud delivered services.
- IBM partner program Chatterbot.
- Teaching Assistant at Georgia Tech
- August 2016, Watson used for weather forecasting



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