What is Watson?
Watson is the computer that battled the greatest Jeopardy! champions of all time on the popular American quiz show in February 2011. It is a workload optimized system that specializes in analyzing natural human language and providing specific answers to complex questions at rapid speed. Watson evaluates roughly 200 million pages of content (equivalent to one million books), written in natural human language, to find correct responses to any given Jeopardy! clue. Watson was named after IBM’s founder, Thomas J. Watson, and is the result of the work of 25 IBM research scientists over the past four years.

Why IBM?
IBM created Watson to help businesses interpret critical knowledge buried in the huge volume of natural language content they face every day. It represents a giant leap forward in enabling computers to more precisely respond to information needs and questions more efficiently. Watson is powered by ten racks of IBM Power 750 servers running Linux, uses 15 terabytes of RAM, 2,880 processor cores, and is capable of operating at 80 teraflops. It is among the finest examples of the $6 billion research and development investment IBM makes annually to advance its innovation initiative.

Why Jeopardy!?
Jeopardy! covers a broad range of topics, such as history, literature, politics, arts and entertainment, and science. The format represents an enormous challenge to a computer, since computers do not understand natural language or subtle meaning, like irony and riddles which are often inherent in the clues given to the contestants. It also represents a challenge to computing systems because in order to win, contestants must provide accurate answers in a matter of seconds. Like the other players, Watson must dig into what it has read and connect the unique language in the clues with the knowledge in its memory, to confidently determine the right answer.

Why Watson now?
Watson is the product of a perfect storm of innovation. In recent years, significant scientific advances have been made in Natural Language Processing and Statistical Machine Learning technologies, critical to a computer’s potential to understand natural language and learn as it goes. Additionally, the ability to run thousands of processes simultaneously on a cluster of very fast machines with access to vast amounts of memory has only recently become possible. The computing power of IBM’s POWER7 systems is critical to Watson understanding the meaning of a question and providing a correct response in just three seconds.

Finally, in recent years, there has been an explosion of digital knowledge in the form of natural language text, making it possible to populate Watson with the information from entire encyclopedias, dictionaries, books, news, movie scripts and more. IBM Research scientists were able to capitalize on this convergence of technology innovation to create Watson.

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What does Watson mean for the future?

Just as the PC, the Internet and search engines have greatly enabled businesses to innovate, Watson now signals a new era in computing, in which computers will be designed and optimized for specific tasks and able to learn on the job. The amount of digital information that is being generated, stored, processed and analyzed each year is increasing at an exponential rate. IDC, the IT market intelligence provider, predicts that the total data volume will reach 35,000 exabytes in 2020, compared to 1,200 exabytes in 2010, representing a 29-fold increase in the next ten years. In order to help businesses take advantage of this increasing amount of available information, systems will need to be designed and built with a far deeper and faster ability to analyze and respond. This offers tremendous opportunity for enterprises across all industries, for example:

**What Watson means for Healthcare**

For healthcare, Watson-like technology will sift through natural language resources available to doctors, including newly published research, medical records and case studies that assist in providing possible diagnosis, and treatments, while also reducing the need for diagnostic testing and its associated costs.

**What Watson means for Retail**

For retail, Watson’s analytical capability to listen and to understand what customers are saying about a retailer’s products, brands and services, will allow businesses to instantly create a personalized customer profile and, in turn, offer sales people real-time access to coaching and personal preference information for their clients.

**What Watson means for Financial Services**

For financial services, Watson will find answers to elusive questions about strategic decisions, risks and market changes. For example, it might create an interactive risk-pricing system using a menu of models that evolve as the system learns, detecting structural breaks in data before they are identified by analysts. The technology might also be used to deliver scenario analysis based not just on event probability or expected loss/gain, but also on more complex company objectives. Imagine asking a computer, “How do I increase my loan book profit margin by ten percent?” or “What actions can I take to strengthen my capital reserves, with minimum impact on my asset base?”

Watson represents a big step in shifting computers from “calculators” to “machines that learn.” For every industry, Watson embodies the power of massively scaled analytics, which makes it possible to see patterns in data that couldn’t be seen before and answer questions that couldn’t be answered before.