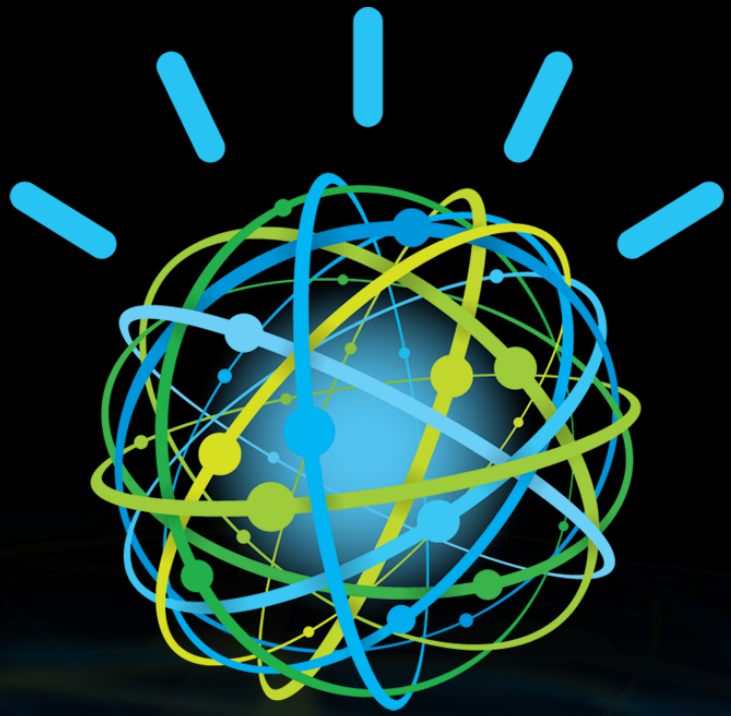
Dejan Podgoršek

ISV & Developer Relations Manager, IBM SEE

IBM PureSystems IDR CEE

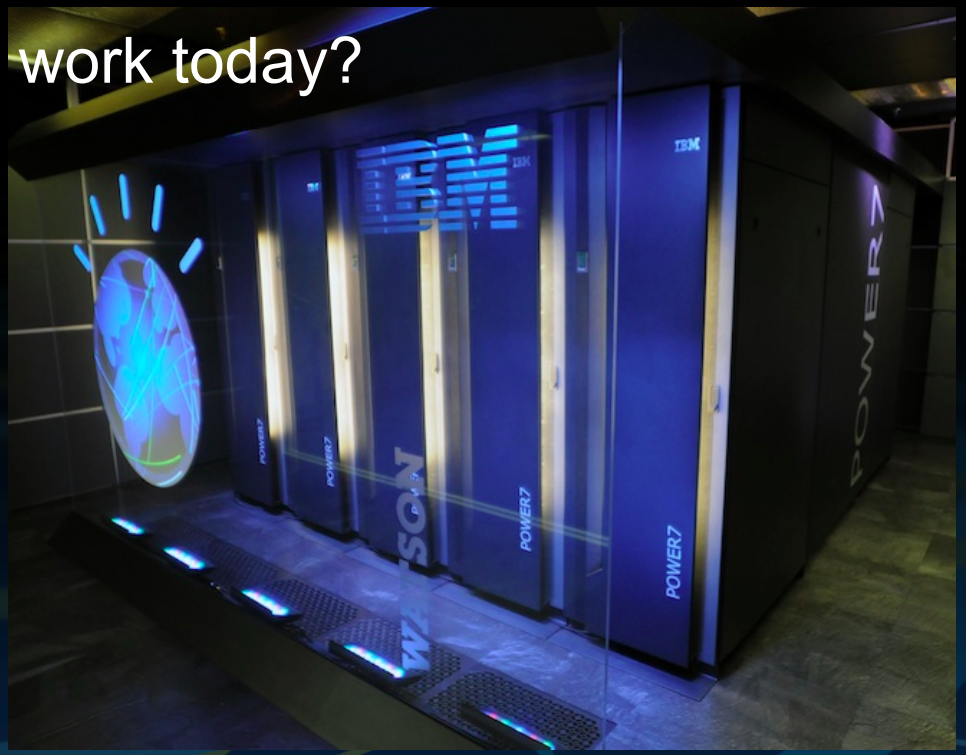
IBM Watson at Work



IBM WATSON

Topics

- Watson: What is it and why is it important?
- How does Watson work?
- How is Watson being put to work today?



IBM

Watson and Jeopardy!

A showcase of our commitment to Research and tradition of Grand Challenges

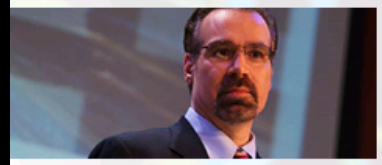
- In 2004, several IBM Researchers noticed the restaurant they were in had fallen silent. They soon discovered the cause: Ken Jennings, who was then in the middle of his 74-game run on Jeopardy!
- Can we design a computing system that rivals a human's ability to …
  - Retrieve, analyze and interpret vast amounts of information?
  - Posed in natural language with speed, accuracy and confidence?
- After 4+ years of development, IBM Research challenged Ken Jennings and Brad Rutter, the two most renowned *Jeopardy!* World Champions, to an exhibition match in February, 2011

JEOPARDY!

America's Favorite Quiz Show

Watson Research team

Tom Rosamilia



Dr. David Ferrucci

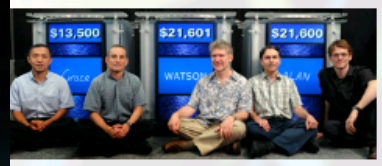
Principal investigator for the DeepQA team responsible for building Watson.

Read the bio ›

Algorithms Team

The fifteen IBMers responsible for Watson's DeepQA architecture.

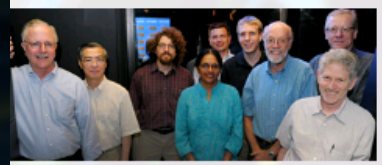
Meet the team ›



Strategy Team

The group working on Watson's game play and betting strategy during a *Jeopardy!* match.

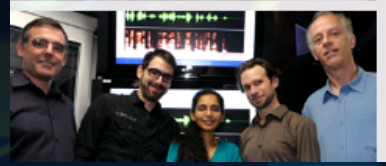
Meet the team ›



Systems Team

The team that designed the complex system of POWER7 cores that power Watson.

Meet the team ›



Speech Team

The IBM researchers who developed Watson's voice and speech recognition capabilities.

Meet the team ›

Annotations Team

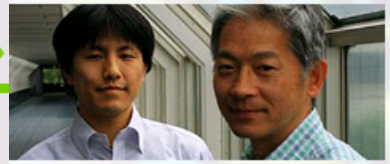
The linguistics team that developed the taxonomy for Watson's search databases.

Meet the team ›

IBM Research - China

The group primarily tasked with how Watson links data from different sources.

Meet the team ›



IBM Research - Tokyo

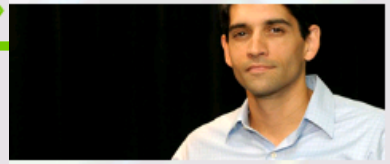
The group that helped to develop the system Watson uses to attach meaning to the words in a question.

Meet the team ›

IBM Research - Haifa

The team responsible for optimizing the search process of Watson's DeepQA architecture.

Meet the team ›



Project Management

The team that managed the relationship between the Watson research team and the *Jeopardy!* production staff.

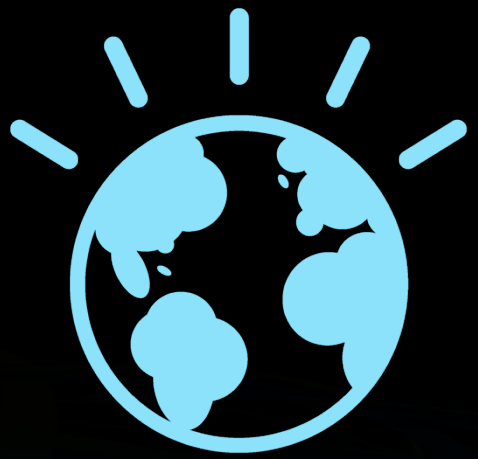
Meet the team ›

Applications Team

The team working to develop systems that apply DeepQA technology to real-world problems.

Meet the team ›

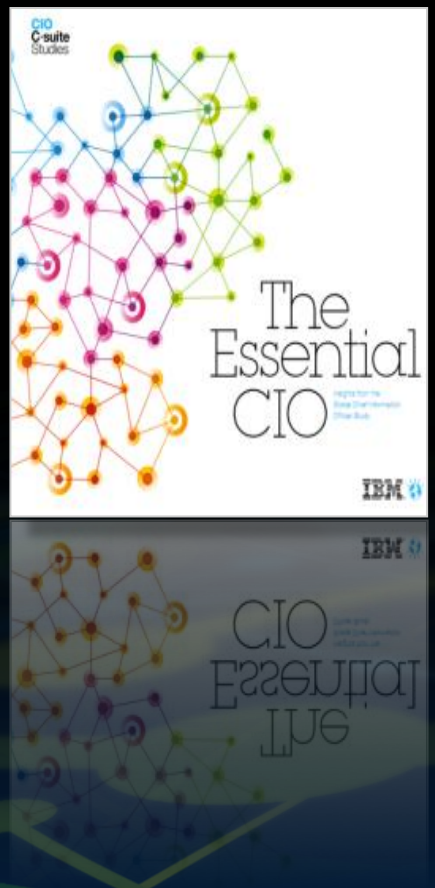
Four years ago, we started working with organizations to build a smarter planet.

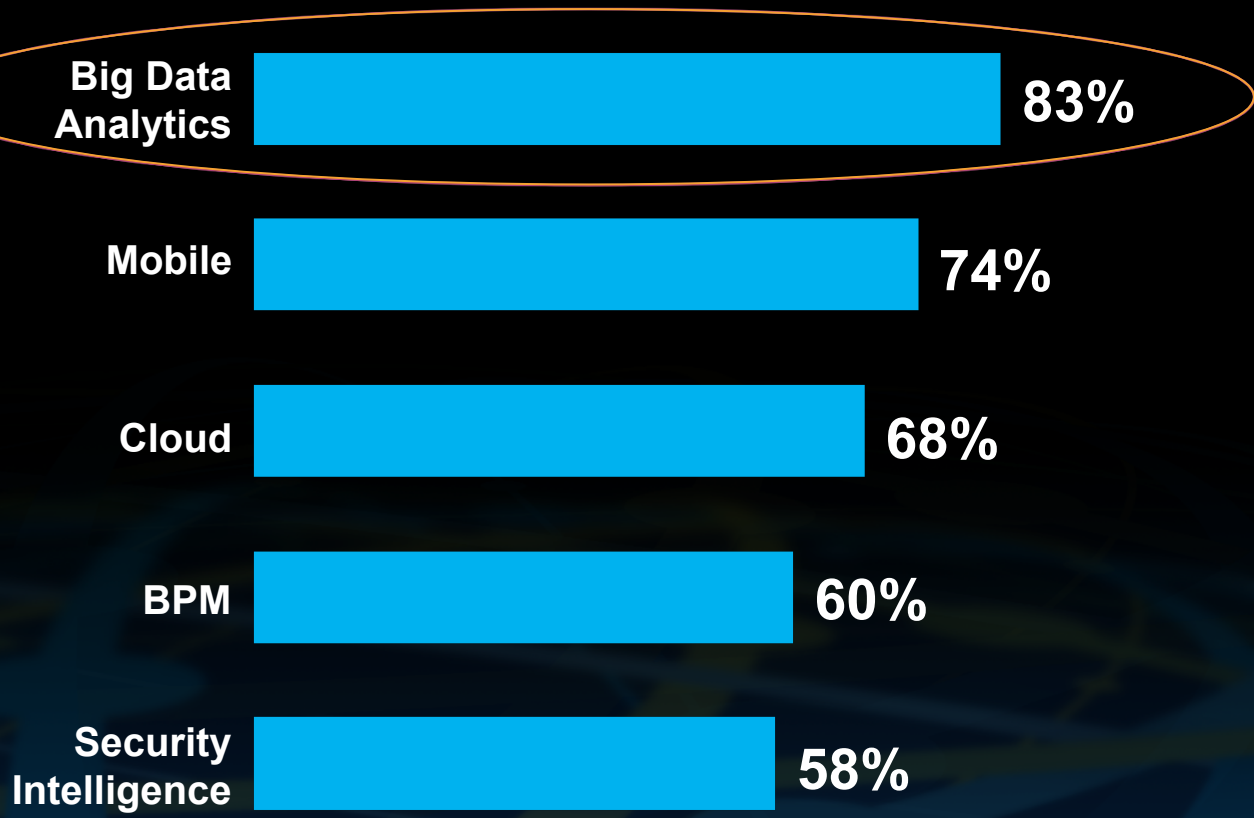


Through thousands of client engagements, we learned that analytics is fundamental to success.

Data is rapidly becoming the foundation for a Smarter Planet

CIOs are turning to innovative technologies to deliver outcomes





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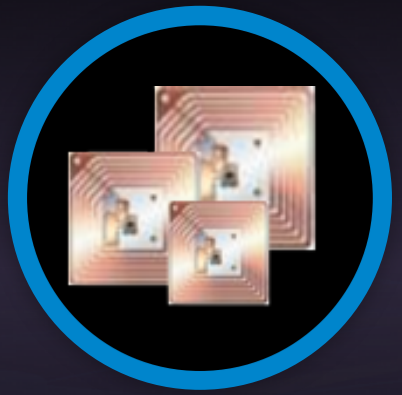
Big Data: Think beyond the traditional data types

Transactional & Application Data

VOLUME

Data at Rest

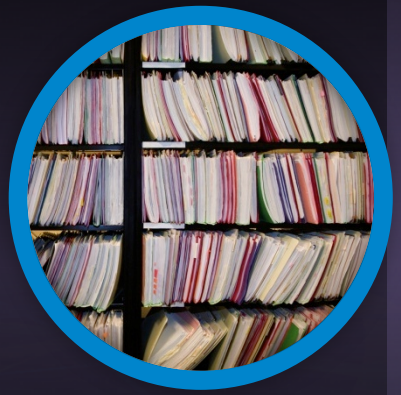
Machine Data



VELOCITY

Data in Motion

Enterprise Content



VARIETY

Data in Doubt

Social Data

VERACITY

Data in Many Forms

IBM WATSON

IBM

Big data analytics creates more opportunities for IBM Watson

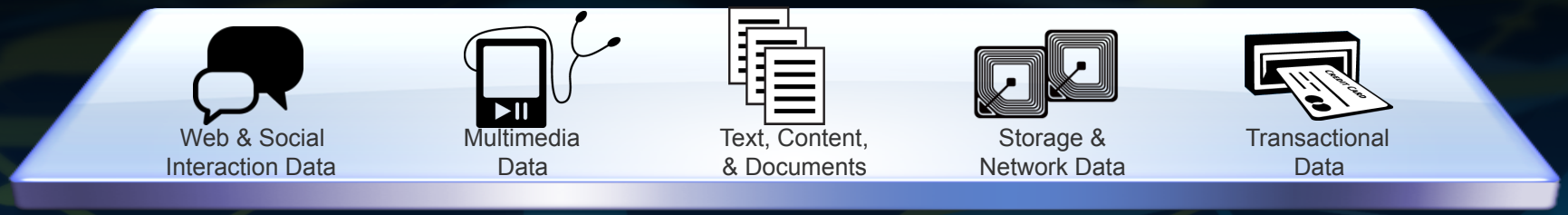
Gain more complete answers
Extend existing analytics to provide additional insights

Using information and analytics in new ways and exciting ways

Create new perspectives
Extend analytics to communities and processes not reached before

Reduce IT Costs
Rethink existing approaches to how data and content is managed, stored and analyzed to reduce infrastructure costs

Uncover new business opportunities
Identify new offerings and new business models that create value



IBM WATSON

Topics

- Watson: What is it and why is it important?
- How does Watson work?
- How is Watson being put to work today?

IBM

Brief History of IBM Watson

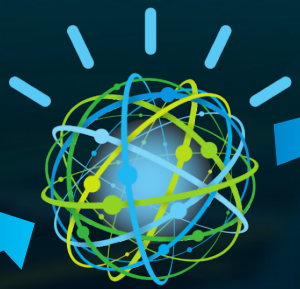
IBM Research Project *(2006 –)*

Jeopardy! Grand Challenge *(Feb 2011)*

Watson for Healthcare *(Aug 2011 –)*

Watson for Financial Services *(Mar 2012 –)*

Watson Industry Solutions *(2012 –)*



R&D

Demonstration

Commercialization

New IBM Division

Expansion

Cross-industry Applications

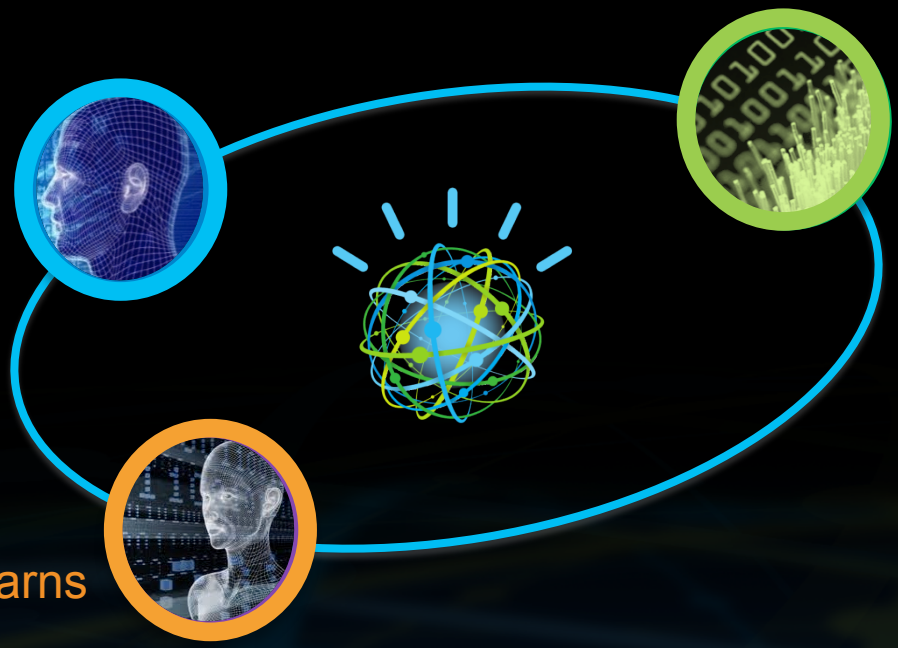
IBM WATSON

IBM

IBM Watson is a Cognitive System that operates on Big Data

1 Understands natural language and human communication

2 Generates and evaluates evidence-based hypothesis



3 Adapts and learns from user selections and responses

…built on a massively parallel architecture optimized for IBM POWER7

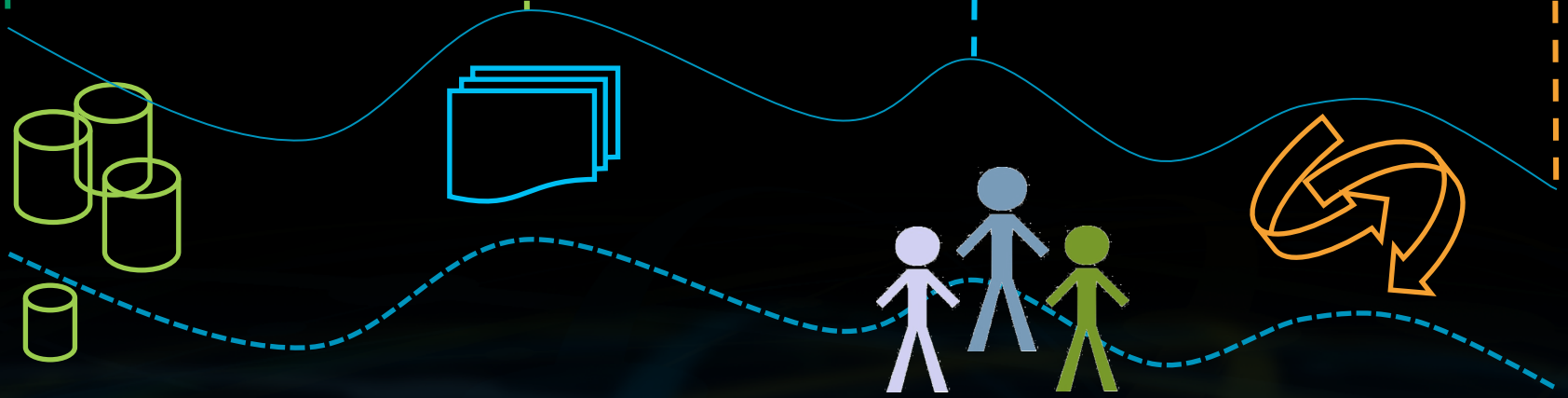
IBM WATSON

Businesses are "dying of thirst in an ocean of data"

90%
of the world's data was created in the last two years

80%
of the world's data today is unstructured

20%
amount of data traditional systems leverage today



1 in 2
business leaders don't have access to data they need

83%
of CIOs cited BI and analytics as part of their visionary plan

2.2X
more likely that top performers use business analytics

IBM WATSON

Healthcare industry is beset with some of the most complex information challenges we collectively face

- Medical information is doubling every 5 years, much of which is unstructured
- 81% of physicians report spending 5 hours or less per month reading medical journals

1 in 5
diagnosis that are estimated to be inaccurate or incomplete

1.5 million
errors in the way medications are prescribed, delivered and taken in the U.S. every year

44,000 -98,000
# of Americans who die each year from preventable medical errors in hospitals alone

Putting the pieces together at point of impact can be game changing

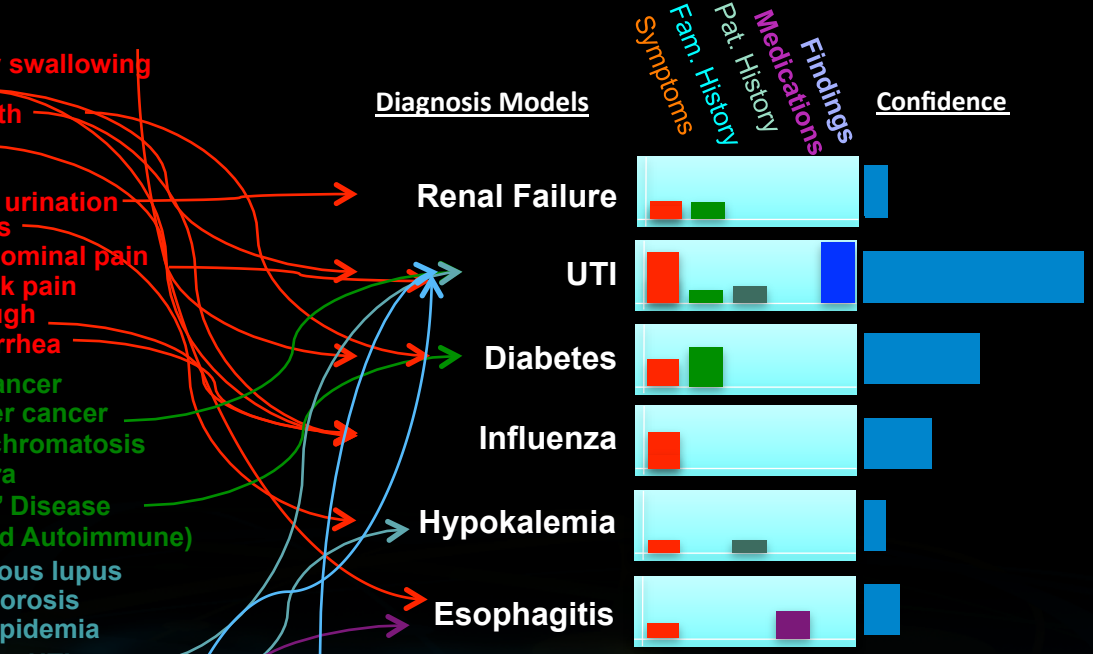
Symptoms
- difficulty swallowing
- fever
- dry mouth
- thirst
- anorexia
- frequent urination
- dizziness
- no abdominal pain
- no back pain
- no cough
- no diarrhea

Family History
- Oral cancer
- Bladder cancer
- Hemochromatosis
- Purpura
- Graves' Disease (Thyroid Autoimmune)

Patient History
- cutaneous lupus
- osteoporosis
- hyperlipidemia
- frequent UTI
- hypothyroidism

Medications
- Alendronate
- pravastatin
- levothyroxine
- hydroxychloroquine

Findings
- urine dipstick: leukocyte esterase
- supine 120/80 mm HG
- heart rate: 88 bpm
- urine culture: E. Coli



Most Confident Diagnosis: UTI

- Extract Medications
- Use database of drug side-effects
- Together, multiple diagnoses may best explain symptoms
- Extract Findings: Confirms that UTI was present

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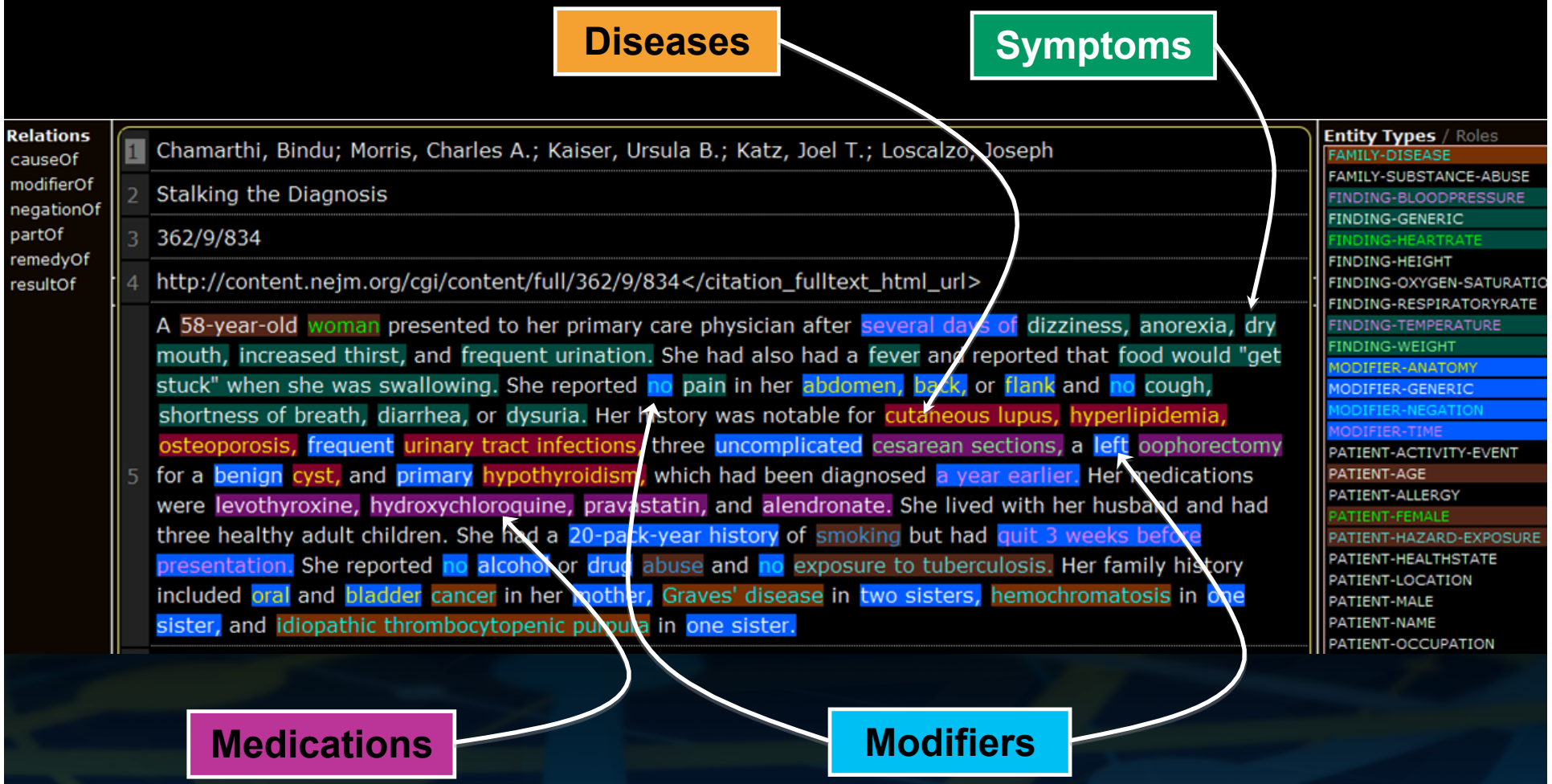
Watson technology is rooted in linguistics and deep semantics

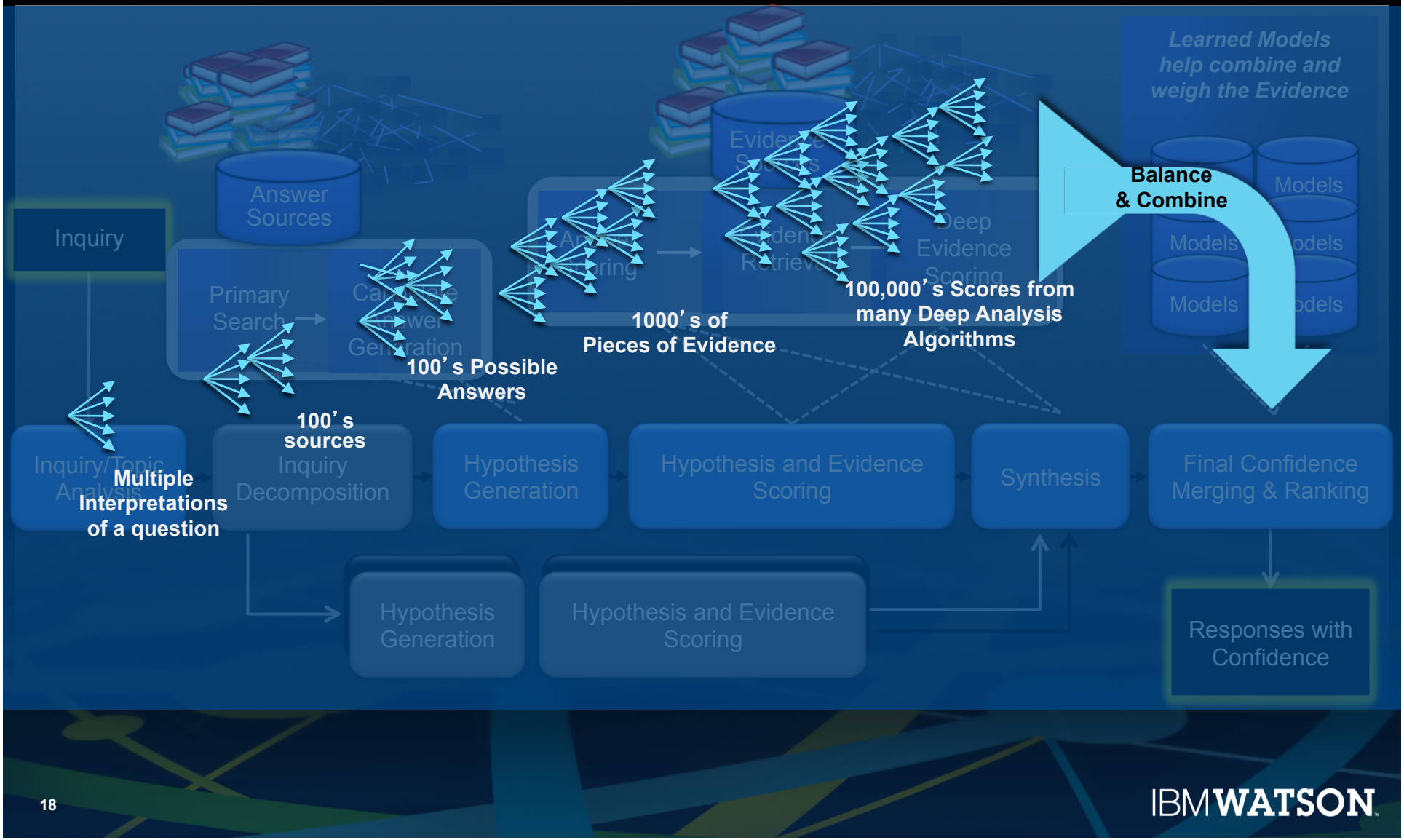


IBM WATSON

VIDEO CLIP

IBM WATSON

How Watson Works: DeepQA Architecture



IBM WATSON

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Watson Team had a fast start in 2012 but much work still remains

Jeopardy System	→ Watson @ YE 2012	→ Watson Next gen
Single user	100s of concurrent users	10s of thousands concurrent users
2-3 sentences input	20 Pages of input e.g. EMR, Articles	Inference chaining, WatsonPath
5+ days to retrain	Few hours to batch ingest and train	Dynamic content ingestion
Evidence not present	Evidence externalized, HC Oncology	HC USMLE, Telco, FSS content
Text-only input	Both text and tables as input	Text, tables and images as input
Q&A model	Q&A + Basic Conversation model	Q&A + Stateful Conversation + G2
Basic security	HIPAA & FFIEC compliant datacenter	Multi-tenet cloud, ISV support
Purpose-built system	Blue washed, Baby Watson Appliance	PaaS for Cloud based assembly

Watson Innovations: Three classes of Cognitive Services

Ask

- Leverage vast amounts of data
- Ask questions for greater insights
- Natural language inquiries
- e.g. Next generation Chat

Discover

- Find the rationale for given answers
- Prompt for inputs to yield improved responses
- Inspire considerations of new ideas
- e.g. Next generation Search → Discovery

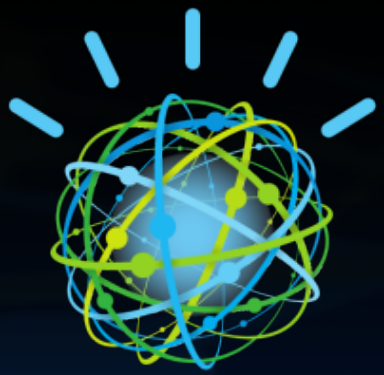
Decide

- Ingest and analyze domain sources, info models
- Generate evidence based decisions with confidence
- Learn with new outcomes and actions
- e.g. Next generation Apps → Probabilistic Apps

IBM WATSON

Topics

- Big Data, Watson, and why are they important?
- How does Watson work?
- How is Watson being put to work today?

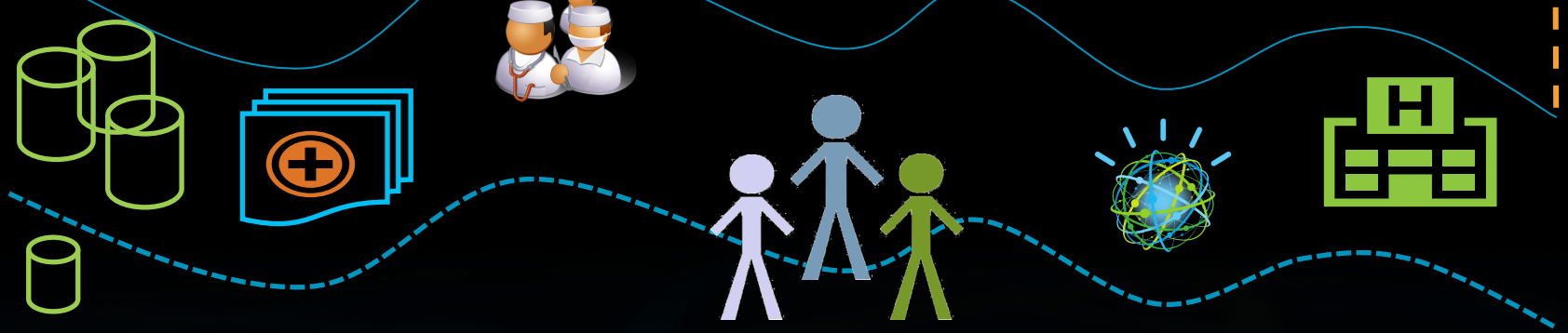


In 2012, Watson became smarter, faster, and more scalable

6
Instances of Watson deployed in the last 12 months

90%
Nurses follow Watson's Recommendations

75%
Reduction in time to market with new cancer therapies



Smarter

605,000 pc. evidence
2M pages of text
25,000 training cases
14,700 clinician hours

Faster

240% faster
75% smaller
Runs on single server

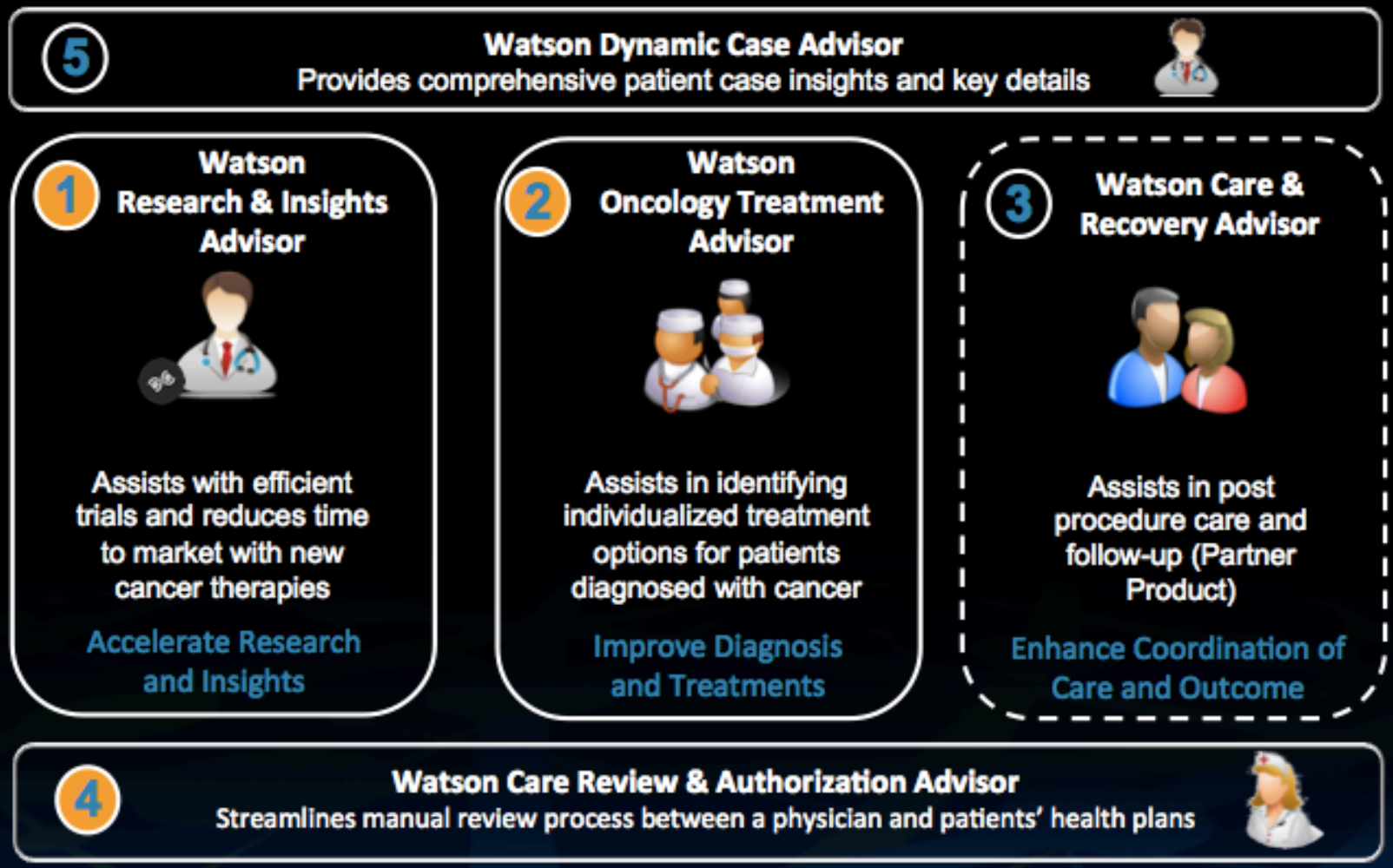
Scalable

Scales on demand
Millions of Trx. per month
In Cloud or on premise
PC, tablet or smartphone

[1]Based on preliminary pilot results, may not be representative of all situations

IBM WATSON

Watson Healthcare Solution Suite



All Watson products delivered in a Cloud or On-premise configuration

Available Now

IBM WATSON

Our "3E Roadmap" to deliver Watson at Scale

Establish (2012) → **Extend (2013)** → **Embed (2013+)**

High Value — Watson Healthcare Advisors

- Accelerate clinical research & insights
- Improve patient diagnosis & treatment
- Chronic diseases/cancer segment

WellPoint · Memorial Sloan-Kettering Cancer Center · MD Anderson Cancer Center · Cleveland Clinic

High Volume — Watson Client Engagement Advisors

- Reduce $190B in labor spend
- Improve engagement and outcomes
- Healthcare, FSS, Telco segments

USAA · ANZ · Sprint

Synergy — Watson Integration Across the Portfolio

Smarter Care · Smarter Commerce · Smarter Workforce

Deliver the Watson Platform at Scale

High Scale

- Scalable, high throughput version of blue-washed Watson core
- Improved ingestion tooling, learning models delivered via Platform
- Deployed as an appliance or a cluster in Cloud

First Commercial Launch: IBM Watson for Client Engagement

- Watson Platform V3+
- SmartCloud and ISV synergy
- Limited availability in 2013

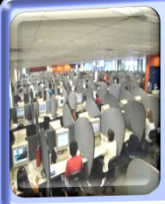
IBM Office of the CIO

What's Next?
Our High Volume Play around Contact Centers

Imagine if call center agents could find better answers to customer questions 50% faster.

That's exactly what a major provider of financial management software did.

"Contact centers of the future will improve precision and personalization, transforming centers from a cost orientation to a strategic assets."
- Leading Telco Supplier



271B calls come in to call centers annually costing $600B

61% of all unresolved calls could have been resolved with better access to information

50% of all incoming calls require escalation or go unresolved

Sources: Contact Babel US Contact center decision makers guide 2010; GCC Global Call Center Report 2007, BenchmarkPortal Industry Benchmark Reports 2004-2011, IBM analysis. Aberdeen Group. The Contact Center in a Profit-centric Service Organization May 2011

Watson is ushering in a new era of computing . . .

Tabulating Systems Era

Programmable Systems Era

Cognitive Systems Era

cog·ni·tive: of or pertaining to the mental processes of perception, memory, judgment, learning, and reasoning.

1900 1950 2011

. . . enabling new possibilities and outcomes

Thank you!