

IBM Watson



# The Rise of Cognitive Computing

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The Watson Group



Computers were created by mathematicians, for mathematicians

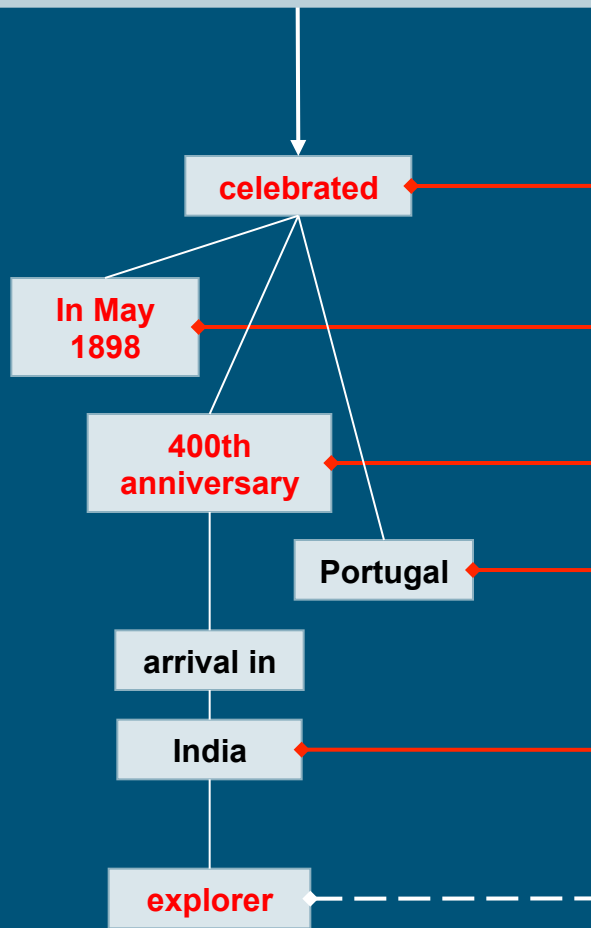
*“No one imagined the extent to which ... the symbolic logic that had been the preserve of the mathematicians would unleash the powers of coded sequences upon the world.”*

George Dyson – *Turing’s Cathedral: The Origins of the Digital Universe*

# Answering complex questions requires more than keyword evidence

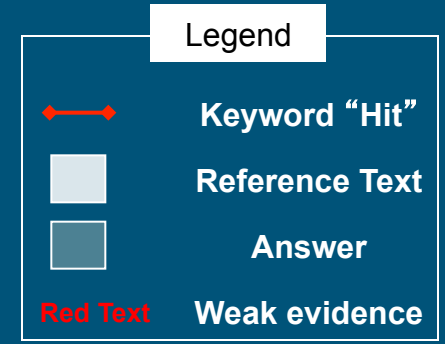
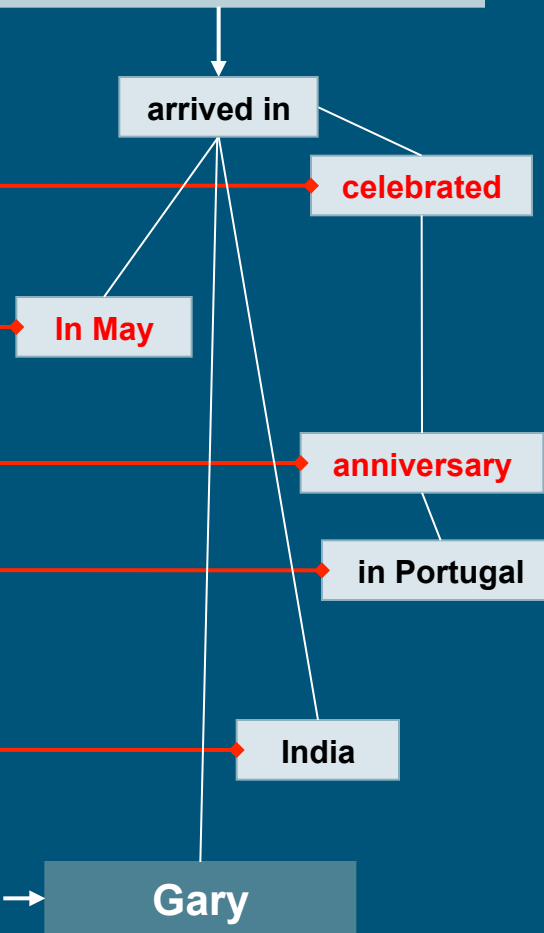
Question:

In May 1898 Portugal celebrated the 400th anniversary of this explorer's arrival in India



Supporting Evidence:

In May, Gary arrived in India after he celebrated his anniversary in Portugal



*This evidence suggests "Gary" is the answer BUT the system must learn that keyword matching may be weak relative to other types of evidence*

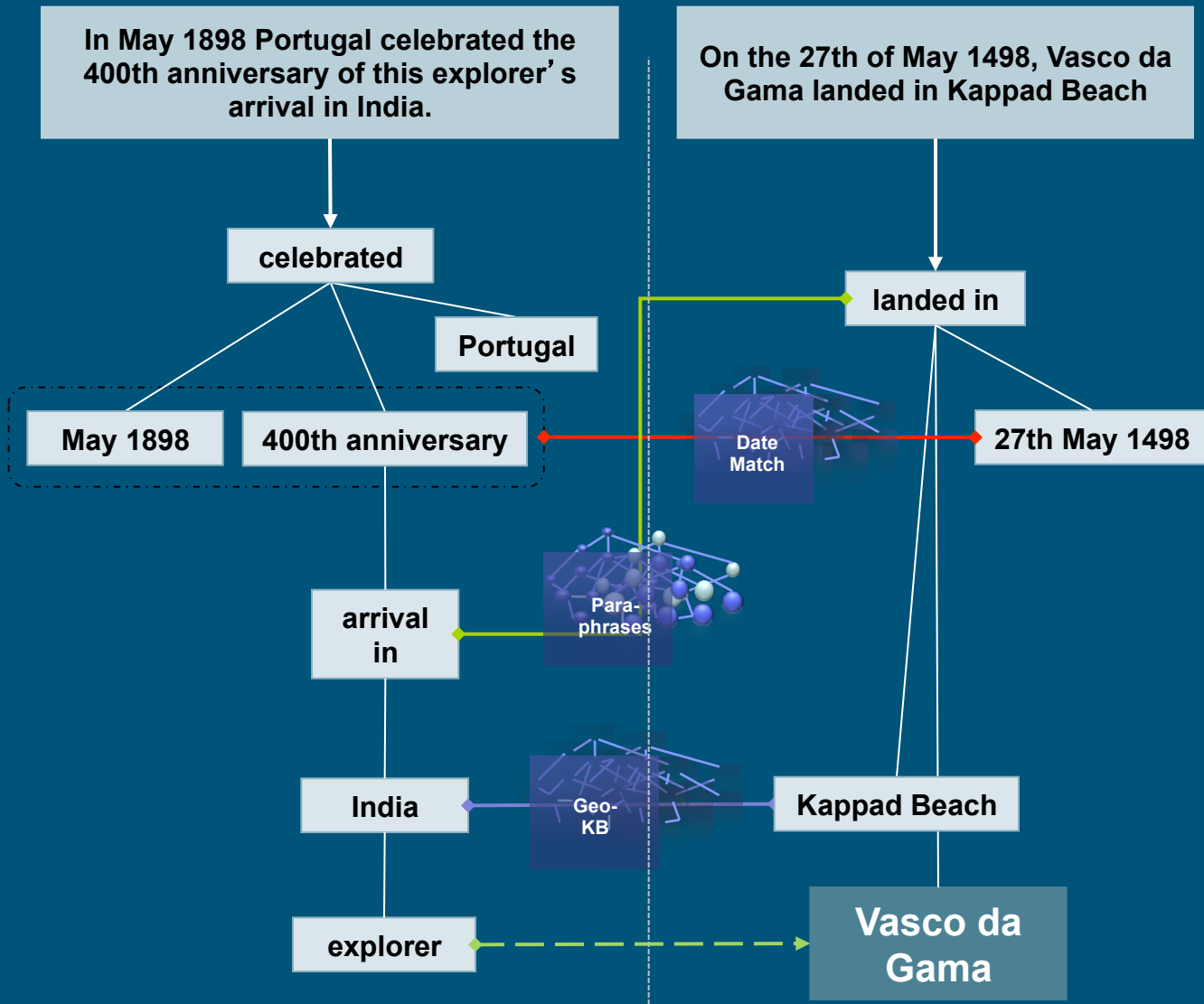
# Watson leverages multiple algorithms to perform deeper analysis

## Question:

In May 1898 Portugal celebrated the 400th anniversary of this explorer's arrival in India.

## Supporting Evidence:

On the 27th of May 1498, Vasco da Gama landed in Kappad Beach



**Legend**

- Temporal Reasoning
- Statistical Paraphrasing
- GeoSpatial Reasoning
- Reference Text
- Answer

*Stronger evidence can be much harder to find and score...*

- Search far and wide
- Explore many hypotheses
- Find judge evidence
  - Many inference algorithms

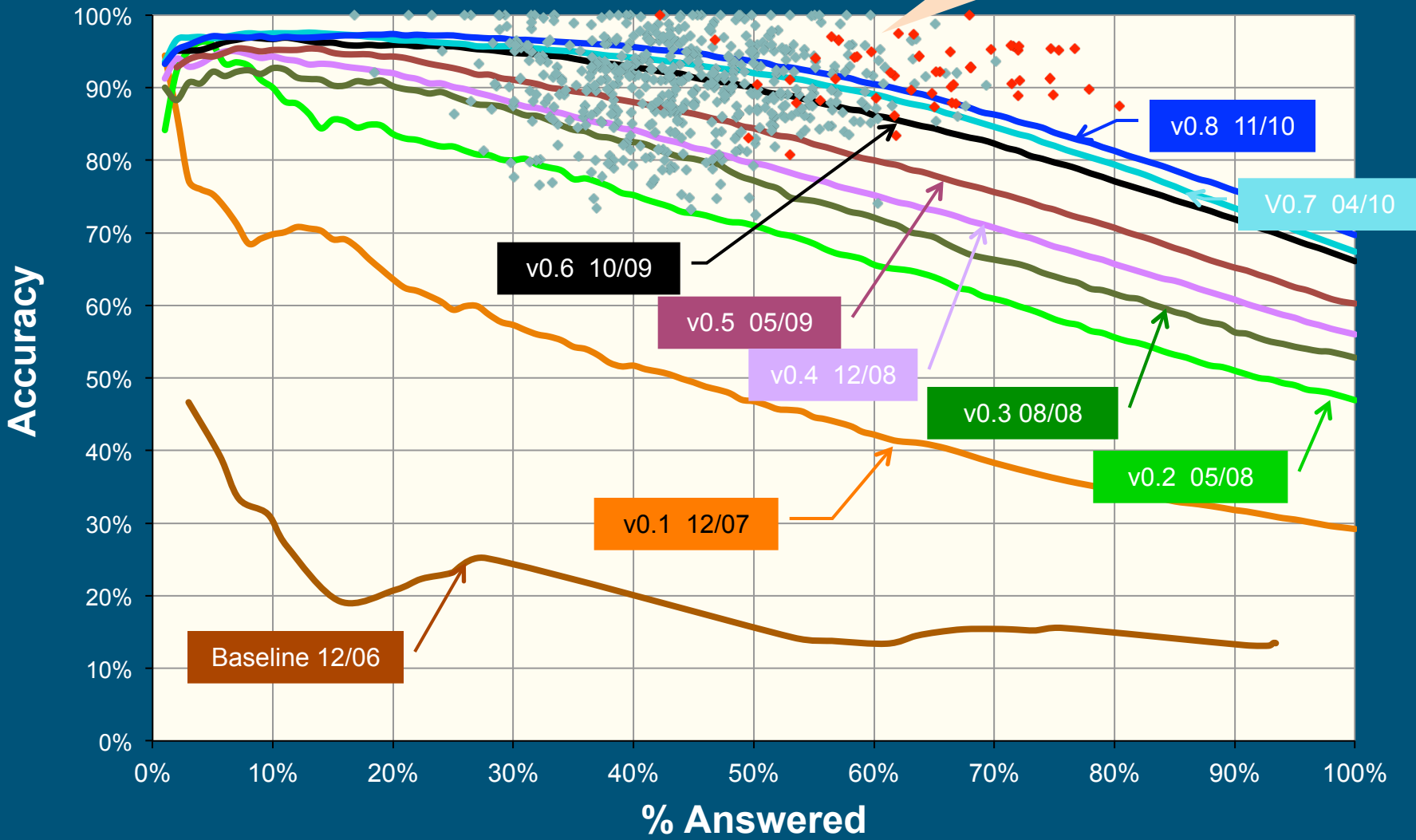
# What It Takes to compete against Top Human Jeopardy! Players



## IBM Watson

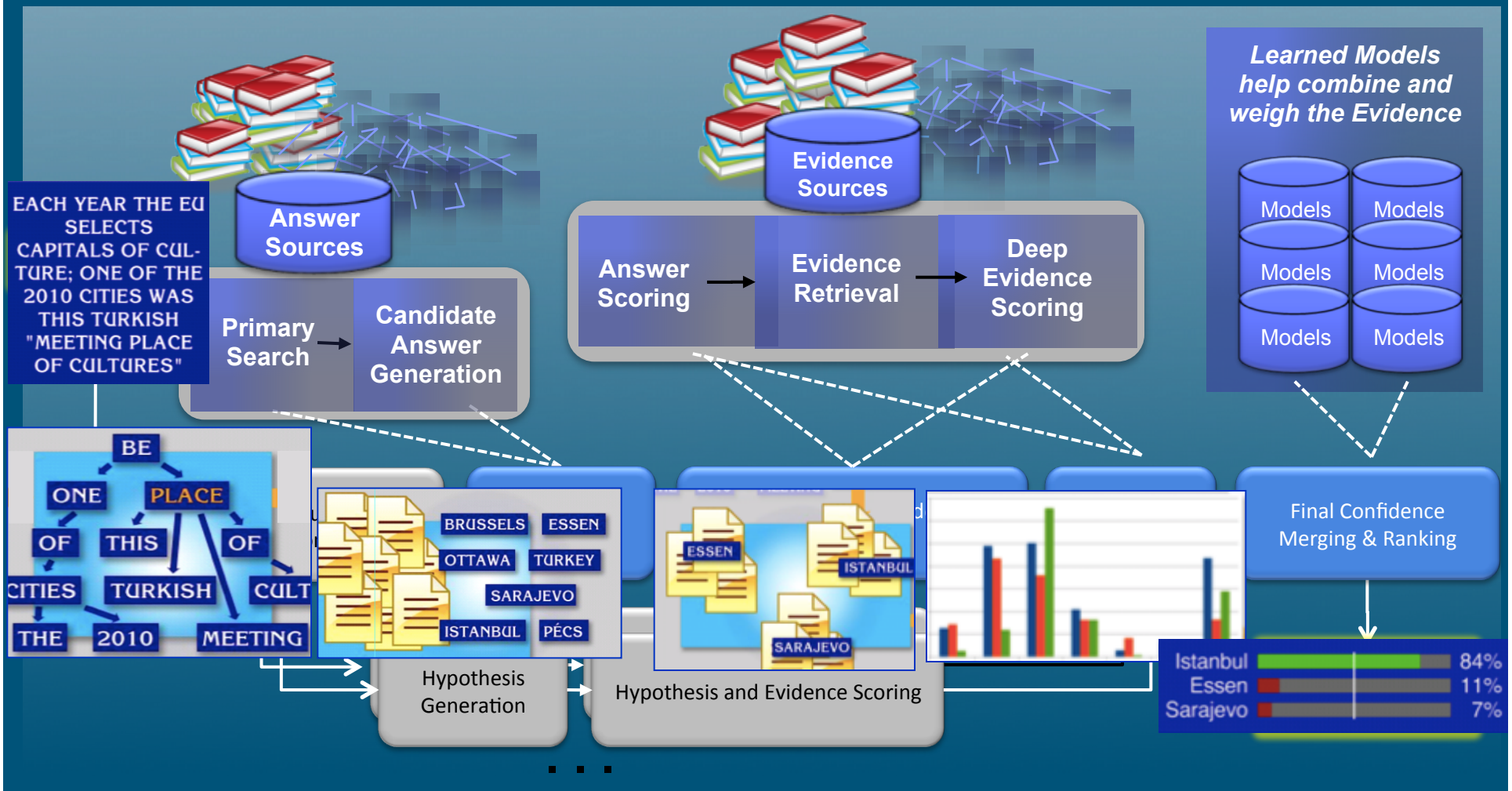
Top human players are *remarkably good*.

Each dot – actual historical human Jeopardy! game performance



# DeepQA: The architecture underlying Watson

*Generates many hypotheses, collects a wide range of evidence and balances the combined confidences of over 100 different analytics that analyze the evidence from different dimensions*



Watson was created by linguists, to understand language

*“The limits of my language are the limits of my mind. All I know is what I have words for.”*

Ludwig Wittgenstein – *Tractatus Logico-Philosophicus*

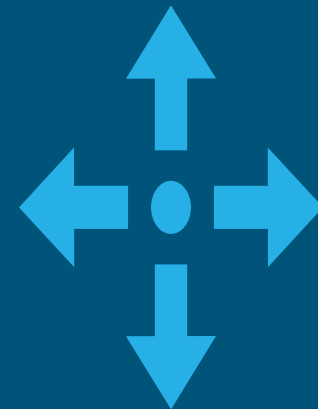
## Bringing Watson to market



Transforming industries and professions.



Advancing cognitive computing across the enterprise.



Delivering the cognitive experience to the masses.



## Watson in healthcare

A data-rich, societally important field helping Watson change how medicine is:

- Taught
  - Cleveland Clinic
- Researched
  - MD Anderson
- Practiced
  - Memorial Sloan-Kettering, Community Cancer Care Centers
- Paid
  - WellPoint & Utilization Management



## Watson Engagement Advisor

- Transforming the customer experience
  - Reduce client turnover
  - Maintain existing client relationships
  - Build advocacy
  
- Growing top-line revenue
  - Engage the under-engaged
  - Personalize the experience
  - Omni-channel always-on environment
  
- Improving bottom line results
  - Increase first call resolution
  - Faster resolution through evidence based insights
  - Reduce operation costs by empowering agents and advancing self-service



## Watson Discovery Advisor

Helps people discover new insights by synthesizing information in seconds

- Initial client focus in Pharma, Education and Publishing



## Bringing Watson to market



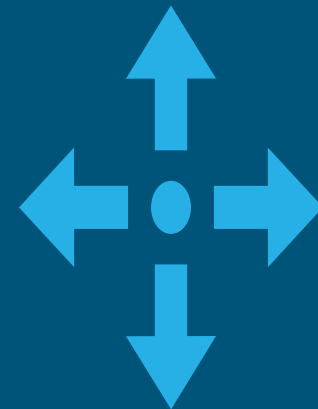
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## Watson Analytics

Uses natural language, cognitive capability on front end, to help users do math, and ask questions about data

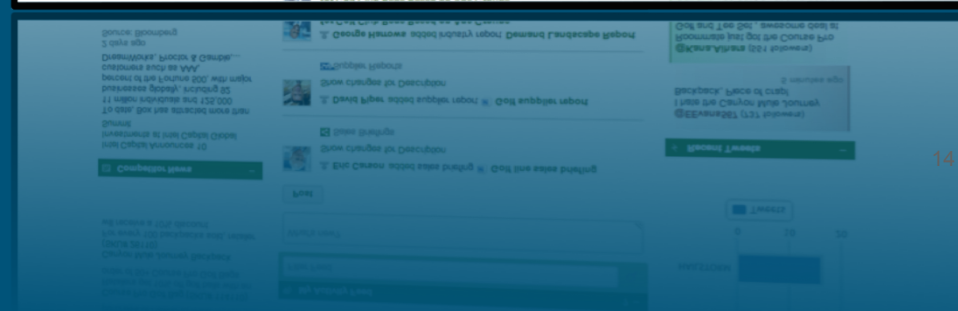
- Enables anyone to independently discover new patterns to inform better decisions
- Targeted horizontals: Sales and Marketing
- Cloud-based model supports adoption for departmental groups by enabling quick startup and evaluation



## Watson Explorer

A visualization exploration engine to help people understand what's in their data

- Find, extract and deliver content regardless of format or where the data resides
- Helps improve the return on all types of information including:
  - Structured data
  - Unstructured content
  - Semi-structured



## Bringing Watson to market



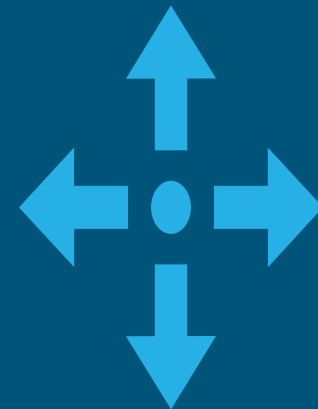
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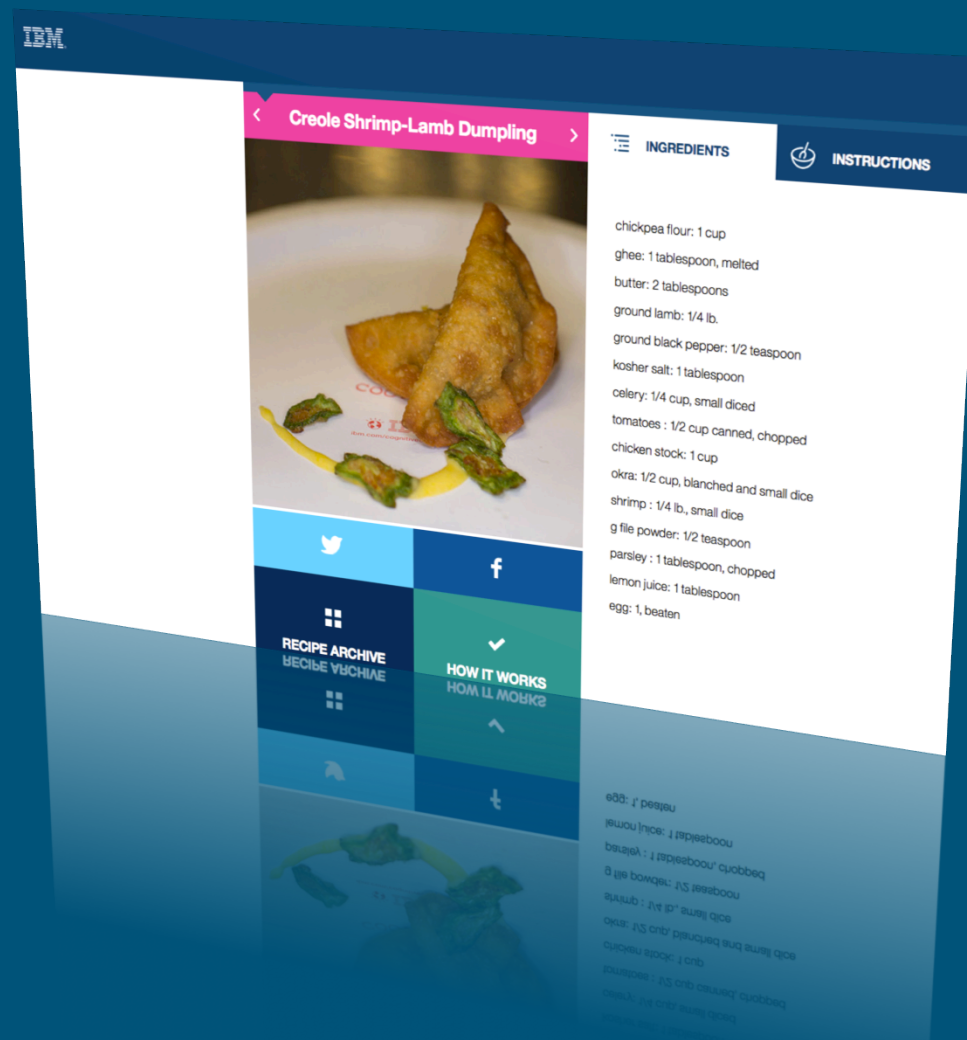
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Delivering the cognitive experience to the masses.

## Watson Cognitive Cooking

Demonstration of the utility of cognitive computing to amplify human creativity

- Working with the Institute of Culinary Education in NY
- Ingested 30,000+ Recipes
- Learned the basics of different types of dishes
- Understands the chemistry of taste
- Evaluates 6 quintillion combinations of ingredients to discover new, delightful and compelling recipes based on cuisine, type and main ingredient





In 20 years, cognitive systems will be to computing what transaction processing is today

- Amplify human creativity
  - Inspiring us to new alternatives to decision options
  - Bringing the breadth of all human knowledge to the tip of our tongue
- Learn their behavior through formal and informal training processes
- Interact with humans on our terms – in the language of humans
- Demonstrate their expertise through trust and depth of character
- Evolve strategies of success – adapting to ever changing knowledge and understanding



# IBM Watson Group