

Digital Intelligence meets
Digital Business:
**Welcome to the
Cognitive Era.**

A new era in technology, a new era in business.



**Where code goes,
where data flows,
cognition will follow.**

We can now confer on every digitized object, product, process and service a kind of thinking ability.

How, and why now?

Data is transforming industries and professions.

The world is being reinvented in code.

Computing is entering a new Cognitive Era.

Data is
transforming
industries and
professions.

CONSIDER:

Data flows from every device, replacing guessing and approximations with precise information. Yet 80% of this data is unstructured; therefore, invisible to computers and of limited use to business.

By 2020,

1.7 MB

of new information will be created **every second** for **every human being** on the planet.

HEALTHCARE DATA

99% **88%**
growth by 2017 unstructured

Healthcare data comes from sources such as:



Patient Sensors



Electronic Medical Records



Test Results

UTILITIES DATA

93% **84%**
growth by 2017 unstructured

Utilities data comes from sources such as:



Utility Sensors



Employee Sensors



Location Data

GOVERNMENT & EDUCATION DATA

94% **84%**
growth by 2017 unstructured

Government & education data comes from sources such as:



Vehicle Fleet Sensors



Traffic Sensors



Student Evaluations

MEDIA DATA

97% **82%**
growth by 2017 unstructured

Media data comes from sources such as:



Video and Film



Images



Audio

The world is
being reinvented
in code.

CONSIDER:

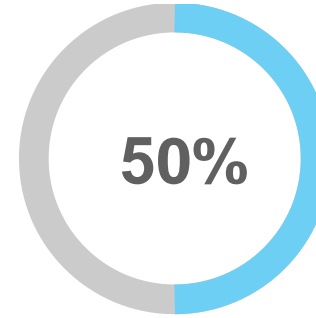
The world is being rewritten in software code, and cloud is the platform on which the new digital builders—from developers to business professionals—are reimagining everything from banking to retail to healthcare.

100,000,000
lines of code in a new car

5,000,000
lines of code in smart appliances

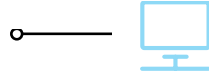
1,200,000
lines of code in a smartphone

80,000
lines of code in a pacemaker



of **B2B collaboration** will take place through **web APIs** next year.

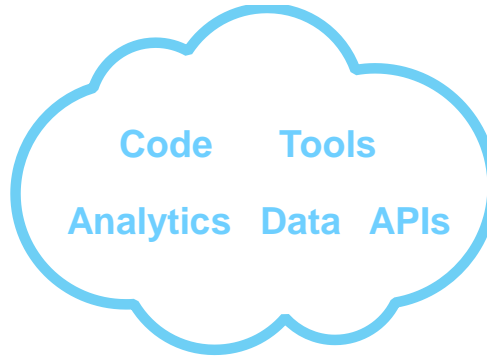
Smart TVs represented 27% of all TV sales in 2012; by 2018, they will represent 82%.



Sensors for **industrial asset monitoring and management** will grow from just over 15M units in 2014 to over 40M units in 2018



Smart LED lighting will grow from 6M units in 2015 to 570M units in 2020, used for safety communication, health, pollution and personalized services.



By 2020, there will be 925M **smart meters** installed worldwide, more than double the 400M in 2014.



By 2017, there will be 1B connected things in **smart homes**, including appliances, smoke detectors and cameras.



Smart traffic sensors and other devices installed in smart cities will grow from 237M units in 2015 to 371M in 2017.



Revenues for **smart grid sensors** will grow ten-fold from 2014 to 2021.



Computing is
entering a new
cognitive era.

CONSIDER:

Cognitive systems can understand the world through sensing and interaction, **reason** using hypotheses and arguments and **learn** from experts and through data. Watson is the most advanced such system.

Today, businesses in

36
countries across.

17
industries are applying cognitive technologies.

There are

350+
Watson ecosystem partner companies, with

100
of those have taken their product to market.

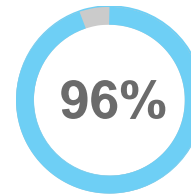
78%

of **business and IT executives** believe that successful business will **manage employees** alongside **intelligent machines**.

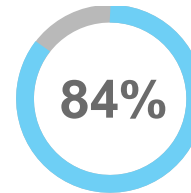
On average there are

1.3B
Watson API calls a month and growing.

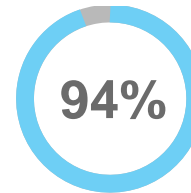
Among C-Suite executives familiar with cognitive computing:



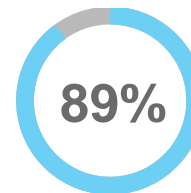
in **insurance** intend to invest in cognitive capabilities.



in **healthcare** believe it will play a disruptive role in the industry, and 60% believe they lack the skilled professionals and technical experience to achieve it.



in **retail** intend to invest in cognitive capabilities.



in **telecommunications** believe it will have a critical impact on the future of their business.

When your business thinks, you can **out**think. And build cognitive industries: cognitive healthcare, supply chains and much more.

Advantages of Cognitive Business:

Deeper human engagement.

Elevated expertise.

Cognitive products and services.

Cognitive processes and operations.

Intelligent exploration and discovery.

ADVANTAGES OF COGNITIVE BUSINESS:

Deeper human
engagement

Deeper human engagement

Cognitive experiences deliver more fully human interactions based not solely on structured data like geolocation and transaction history, but layering in the nuances of tone, sentiment, emotional state, environmental conditions and personal relationships.

WHERE WE ARE NOW:

By 2018,

50%

of **customer service agent interactions** will be influenced by real-time analytics.

96%

of **unhappy customers** don't complain, however,

91%

of those will simply **leave and never come back.**

THE POSSIBILITIES OF COGNITIVE:



Go Moment, a Watson ecosystem partner, launched Ivy—a **guest engagement platform**—to help hotels anticipate and react to service failures, welcome guests, measure and help staff improve satisfaction and deliver instant service.

Results: Ivy is on track to serve 20M hotel guests in 2016.



Gwinnett County Public Schools used data on student performance, learning style and instructional materials to develop **tailored learning experiences** that can direct each student to appropriate post-school opportunities and red-flag warning signs.

Results: Since 2011, graduation rates have increased by 7.4%.

ADVANTAGES OF COGNITIVE BUSINESS:

Elevated expertise

Elevated expertise

Cognitive learning makes expertise accessible on a new scale by making it easy for any professional to keep pace with knowledge from the entire field and learn from the best in the world.

WHERE WE ARE NOW:

In the US, **businesses spent**

\$156B

on **employee training** in 2011. Yet,

90%

of new skills are lost within a year.

By 2035, there will be a gap of

13M

qualified workers in healthcare.

6x

—how much more effective the best **transplant surgeon** is than average.

8x

—how much more effective the best **Nordstrom sales associate** is than average.

9x

—how much more effective the best **Apple developer** is than average.

10x

—how much more effective the best **line cook** is than average.

300x

—how much more effective the best **technologist at Google** is than average.

THE POSSIBILITIES OF COGNITIVE:



Bumrungrad
International

Watson for Oncology is trained by the **best** doctors and can also read medical notes, MRIs and scientific research.

Results: Doctors from Bumrungrad International Hospital use Watson to bring the world's best expertise to 1M+ patients in S.E. Asia.

ROSS

ROSS Intelligence is helping law firms improve the quality and reduce the cost of delivering legal services, helping to expand access to justice for the 80% of Americans who can't afford legal representation today. Currently being piloted in the bankruptcy departments of twenty of the world's biggest law firms, ROSS allows lawyers to **get answers to their toughest legal research questions.**

Results: ROSS can help cut legal research time from hours to seconds.

Cognitive products and services

Cognitive products and services

Cognitive products and services can sense, reason and learn so they can adapt and develop new capabilities not previously imaginable.

WHERE WE ARE NOW:

By 2018

50%

of all consumers will **regularly interact** with services based on cognitive.

Apps with advanced and **predictive analytics are growing**

65%

faster than apps without predictive functionality.

Decision management platforms will expand at a CAGR of

60%

through 2019, in response to the need for **greater consistency and knowledge retention.**

THE POSSIBILITIES OF COGNITIVE:

A Leading Broadcast Network

A leading broadcast network worked with IBM to use look alike modeling techniques to grow viewership of its Over The Top (OTT) player. The company is now able to **generate more accurate results with ratings** predictions and compress what would be weeks worth of analysis into minutes.

Results: This network was able to triple viewership on its OTT player, and their data scientists can now focus more of their time on new marketing programs and new content development.

 **elemental path.**

Elemental Path, a Watson ecosystem partner, developed **Cognitoy**, a dinosaur toy, that answers its playmate's questions, and even learns their sense of humor by listening to and adapting its personality to play differently with each child.

Results: Cognitoy is able to take on a unique personality that evolves over time based on the child's interactions and helps her learn rhyming, spelling, vocabulary, mathematics and more.

Cognitive processes and operations

Cognitive processes and operations

Cognitive systems bring more certainty to business by extracting real-time information from workflows, context and environment to enhance forecasting and decision-making.

WHERE WE ARE NOW:

\$5B

is **wasted every year** by hospitals due to poor coordination among supply chain partners related to implantable devices alone.

The average billion-dollar company spends almost

1,000

person-hours a week managing its suppliers.

THE POSSIBILITIES OF COGNITIVE:

A Retailer

A retailer **improved supply chain demand** forecasting by combining in-store data with data from unstructured sources outside their firewall, such as Twitter sentiment, local events and weather patterns. This allowed Watson to then understand, predict and act upon behavior that would previously have seemed random.

Results: After using Watson in their supply chain, the retailer reduced demand-forecasting errors by 50%.



Engineers at **Woodside** are training Watson to **collate 30+ years of engineering experience** in managing liquid gas facilities to create a cognitive advisory service to help employees across the organization resolve problems faster, improve process flow and achieve better operational outcomes.

Intelligent exploration and discovery

Intelligent exploration and discovery

Cognitive discovery changes the odds for high-stakes research by enabling companies to mine insights from vast amounts of data, and uncover patterns and opportunities that would be virtually impossible to find through traditional methods.

WHERE WE ARE NOW:

The cost of new drug development has increased

145%

over the last decade.

42%

of CXOs believe that rigid and insufficient analytics tools are a **major barrier**.

600PB

of data are associated with **finding, simulating, extracting and moving** shale hydrocarbons.

THE POSSIBILITIES OF COGNITIVE:

Baylor
College of
Medicine

Baylor College of Medicine used Watson to help analyze **70,000 scientific articles** identified from 23M candidate documents. In just a few weeks, the Baylor Knowledge Integration Toolkit (KnIT), powered by IBM Watson, accurately targeted seven proteins that modify p53, an important protein related to many cancers.

Results: This type of discovery has typically taken the entire life science industry seven years to accomplish before Watson.



Repsol is using cognitive to help its engineers quickly analyze an enormous amount of data—including journal papers, seismic imaging data and reservoir models—while also considering real-time factors like economic and geopolitical news when evaluating potential new oil fields.

Results: Repsol teams are able to make better decisions that reduce the risk and uncertainty of future oil field acquisitions, and maximize the yield of existing oil fields.

**Becoming a Cognitive Business
is a journey.**

**Leaders can capitalize on all the
foundational work they've done
to deploy cloud, analytics, mobile,
social, security.**

BECOMING A COGNITIVE BUSINESS

1. A cognitive strategy

Determine what data you need, which experts will train the system; where you must build more human engagement; which products, services, processes and operations should be infused with cognition, and which parts of the unstructured 80% of data you most need to focus on to make discoveries for the future.

2. A foundation of data and analytics

Collect and curate the right data—data you own, data from others, data available to all; both structured and unstructured. Apply cognitive technologies to this data in order to sense, learn and adapt, thereby creating competitive advantage.

3. Cloud services optimized for industry, data and cognitive APIs

The building blocks for products and services are code, APIs and diverse data sets. The platform you choose to develop on, and the agile development culture and methods you embrace, will be critical to your success.

4. IT infrastructure tuned for cognitive workloads

Architect a new kind of IT core—a heterogeneous infrastructure that serves as the backbone of your enterprise. Do this rapidly and affordably by harmonizing technologies from public, private and hybrid cloud with distributed devices, IoT instrumentation and your existing systems.

5. Security for a Cognitive Era

As cognition makes its way into cars, buildings, roadways, business processes, fleets, supply chains—securing every transaction, piece of data, and interaction becomes essential to ensure trust in the entire system—and in your brand and reputation.

Cognitive Business is powered by IBM Watson.

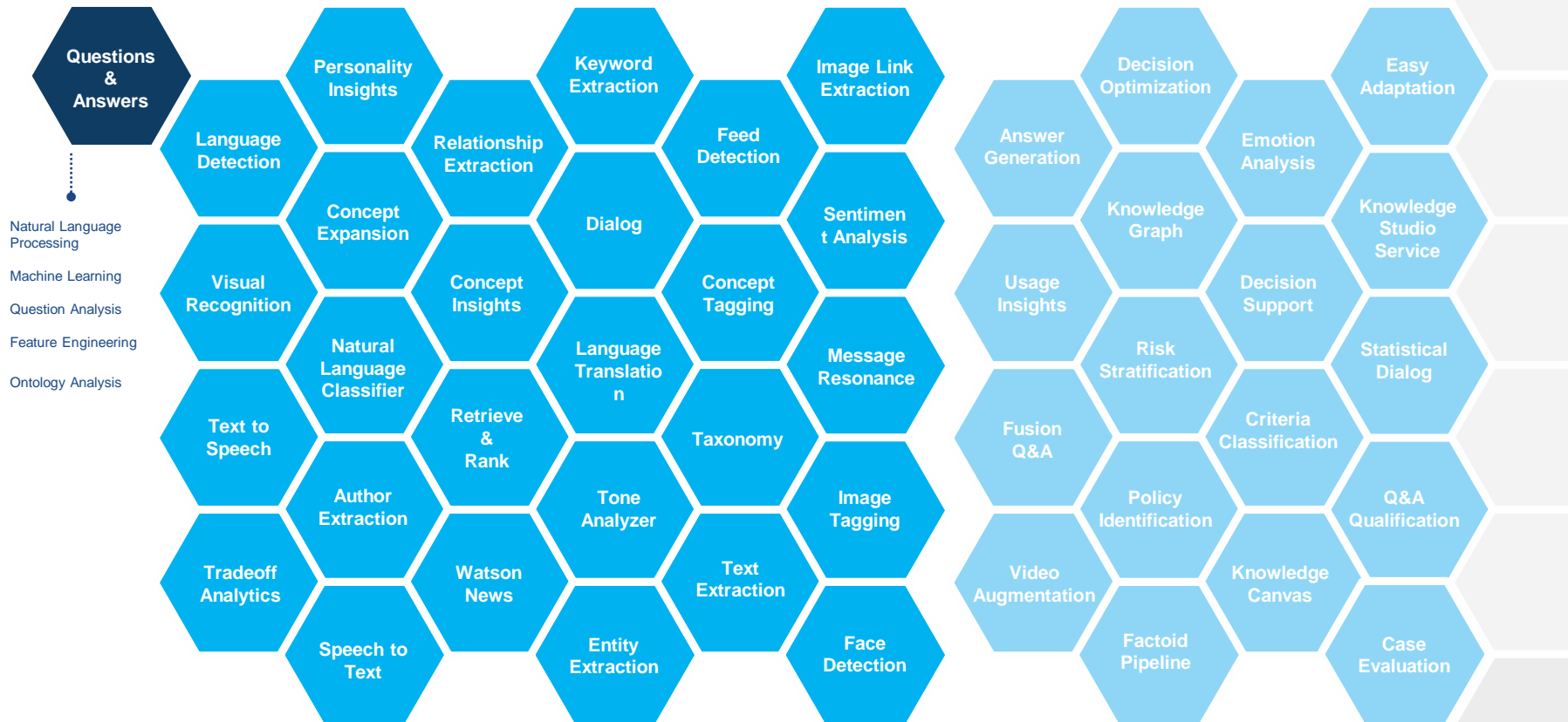
Watson is a cloud-based, open platform of expanding cognitive capabilities. With Watson, you can build cognition into digital applications, products and operations.

IBM WATSON

The Watson that competed on *Jeopardy!* in **2011** comprised what is now a single API—**Q&A**—built on **five underlying technologies**.

Since then, Watson has grown to a family of **28 APIs**.

By the end of 2016, there will be nearly **50 Watson APIs**—with more added every year.



IBM WATSON

These APIs are underpinned by
50 technologies:

Anaphoric Co-referencing
Colloquialism Processing
Content Management -- Versioning
Convolutional Neural Networks
Curation
Deep Learning
Dialog Framing
Ellipses
Embedded Table Processing
Ensembles and Fusion
Entity Resolution
Factoid Answering
Feature Engineering

Feature Normalization
Focus and Spurious Phrase
Resolution
HTML Page Analysis
Image Management
Information Retrieval
Knowledge (Property) Graphs
Knowledge Answering
Knowledge Extraction Annotators
Knowledge Validation and
Extrapolation
Language Modeling
Latent Semantic Analysis

Learn To Rank
Linguistic Analysis
Logical Reasoning Analysis
Logistical Regression
Machine Learning
Multi-Dimensional Clustering
Multilingual training
n-Gram Analysis (word
combinations and distance)
Ontology Analysis
Pareto Analysis
Passage Answering
PDF Conversion
Phoneme Aggregation

Question Analysis
Question-answering Reasoning
Strategies
Recursive Neural Networks
Rules Processing
Scalable Search
Similarity Analytics
Statistical Language Parsing
Support Vector Machines
Syllable Analysis
Table Answering
Visual Analysis
Visual Rendering
Voice Synthesis

IBM WATSON

These technologies draw on **five distinct fields of study:**

Big Data & Analytics

Data Mining,
Optimization,
Text Analytics

Artificial Intelligence

Machine Learning,
Natural Language
Processing,
Algorithms & Theory

Cognitive Experience

HCI, Speech,
Translation, Machine
Vision, Visualization

Cognitive Knowledge

Knowledge
Representation,
Ontologies, Semantics,
Context

Computing Infrastructure

High Performance
Computing, Distributed
Systems, Programming
Models & Tools

What differentiates IBM.

We have the most sophisticated cognitive technology.

Watson is much more than artificial intelligence. It is a problem solving system that combines massive data processing power with reasoning and learning capabilities to surface insights and solutions on a scale that we never thought possible.

We have designed an open platform where leaders everywhere can innovate with cognitive.

Accessible on the cloud through a number of APIs, Watson provides companies and organizations with the flexible building blocks and data connections to bring sophisticated new ideas to reality.

We bring IBM's expertise in industries and professional domains to every cognitive endeavor.

We not only create advanced technology like Watson; we help clients apply it within the context of an industry or profession to produce meaningful outcomes.

