**Kishore Ramchandani**
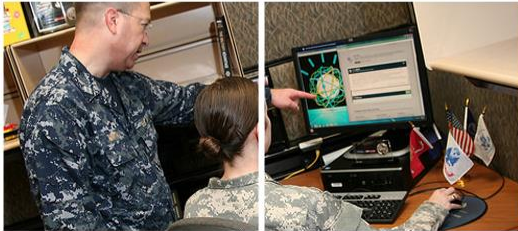Insurance Industry Executive
IBM Analytics

# IBM Analytics

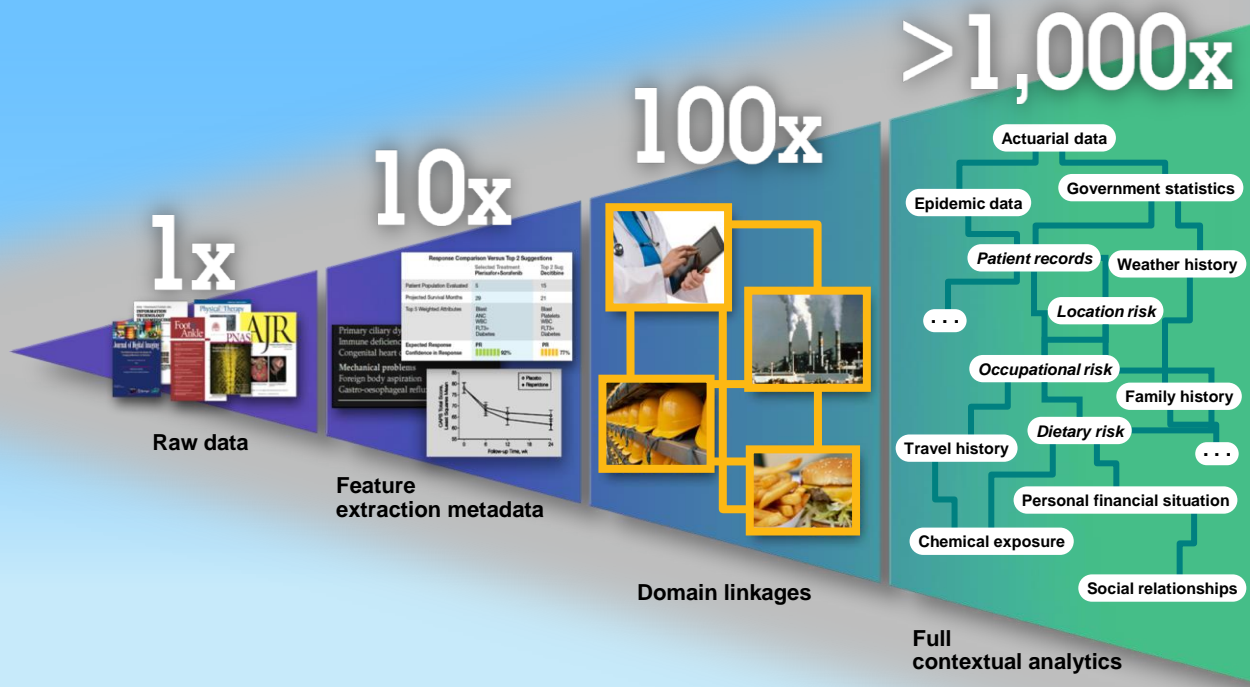# Big Data and Analytics for Insurance

#IBMKnows

# What is Big Data Analytics?

**Big data analytics** is the process of examining **big data** to uncover hidden patterns, unknown correlations and other useful information that can be used to make better decisions.

With big data analytics, data scientists and others can analyze huge volumes of data that conventional analytics and business intelligence solutions can't touch.

# The true value of Big Data is in context



**>1,000x**

Actuarial data

Government statistics

Epidemic data

*Patient records*   Weather history

· · ·   *Location risk*

*Occupational risk*

Family history

*Dietary risk*

Travel history   · · ·

Personal financial situation

Chemical exposure

Social relationships

**100x**

**10x**

**1x**

Raw data

Feature
extraction metadata

Domain linkages

Full
contextual analytics

# Multi-structured Data Mashups provide the Greatest Enterprise Value
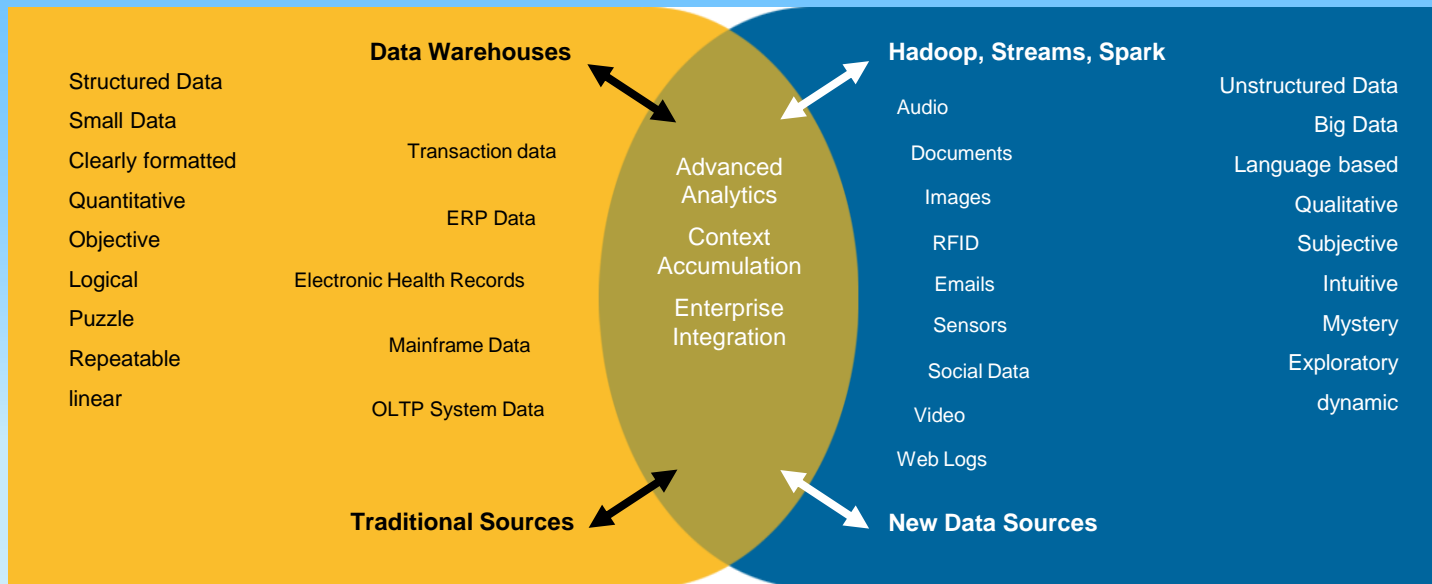
**Systems of Record**
Structured data from operational systems
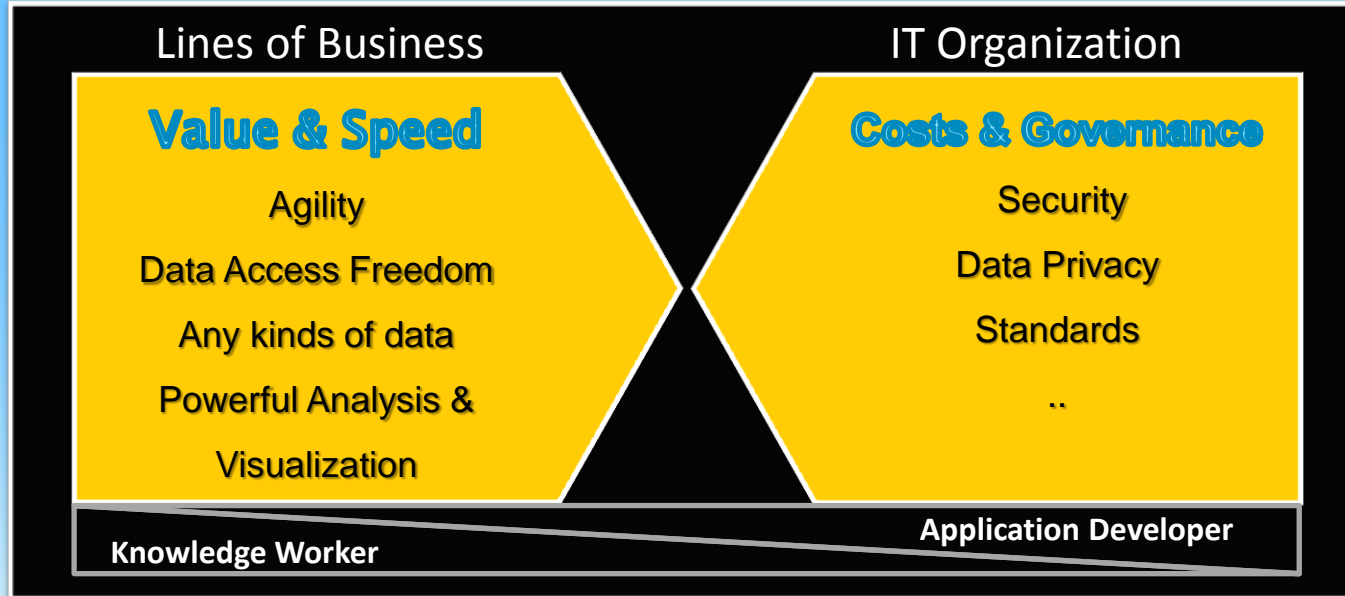**20% of all data generated**

**Systems of Insight**
Diverse data types that combine structured and unstructured data for business insight

**Systems of Engagement**
Data that "connects" companies with their customers, partners and employees
**80% of all data generated**

**Data Warehouses**

**Hadoop, Streams, Spark**

Structured Data

Small Data

Clearly formatted

Quantitative

Objective

Logical

Puzzle

Repeatable

linear

Transaction data

ERP Data

Electronic Health Records

Mainframe Data

OLTP System Data

Advanced Analytics

Context Accumulation

Enterprise Integration

Audio

Documents

Images

RFID

Emails

Sensors

Social Data

Video

Web Logs

Unstructured Data

Big Data

Language based

Qualitative

Subjective

Intuitive

Mystery

Exploratory

dynamic

**Traditional Sources**

**New Data Sources**

IBM Proprietary

# A growing data demand … and organizational tensions



**Data Scientists** seeking data for new analytics models.

**Marketer** seeking data for new campaigns.

**Fraud investigator** seeking data to understand the details of suspicious activity.
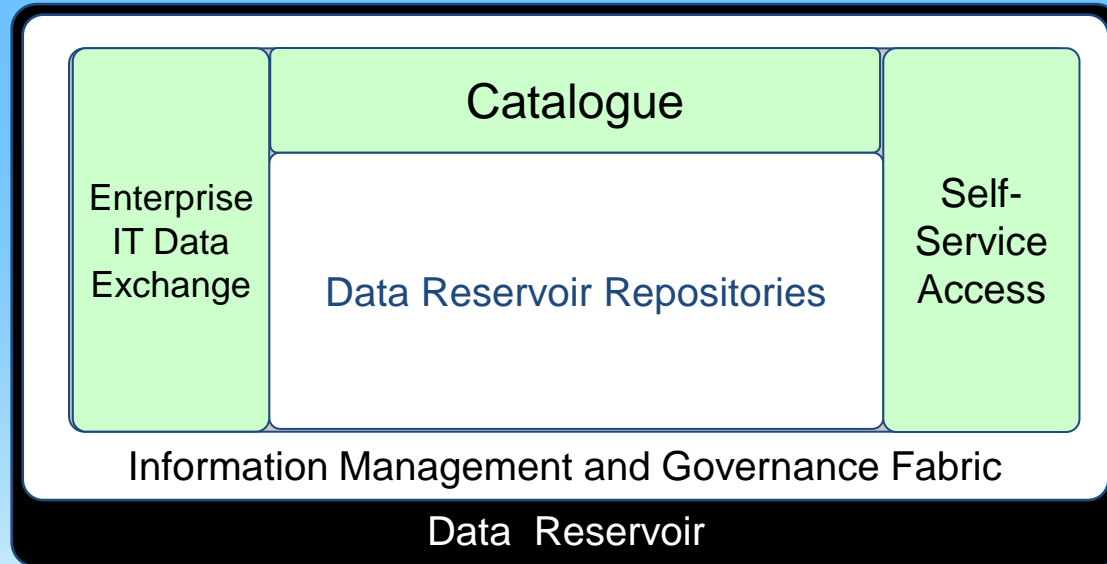
# Why a Data Reservoir

Data Lake

Data Reservoir





- Data flows in "naturally" and just sits there

- Built **to extract value** from the data

# The Data Reservoir subsystems



Catalogue

Enterprise
IT Data
Exchange

Data Reservoir Repositories

Self-
Service
Access

Information Management and Governance Fabric

Data  Reservoir

- ▪ Both a business transformation and a technical solution
- ▪ Provides an agile and self-service operating model
- ▪ Enables trust and confidence across traditional and new data sources

# Consumer expectations and marketplace realities are rapidly changing

Consumers and their intentions are increasingly difficult to understand

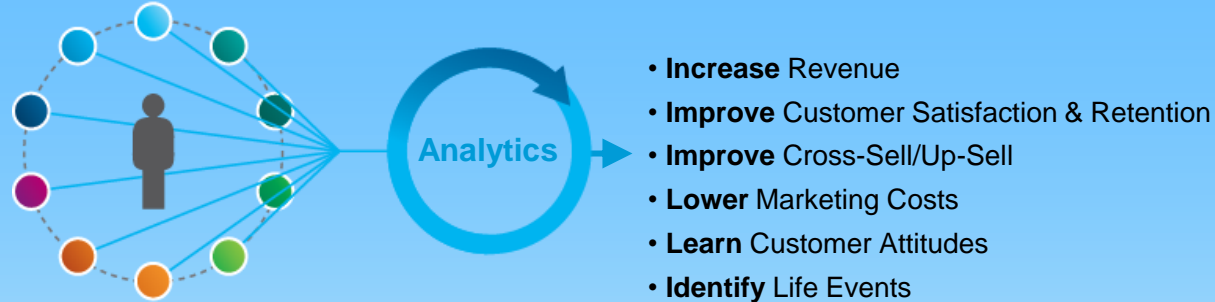Customers demand highly relevant and engaging experiences

**Individual-centered economy**

Consumers expect experiences "my way"

Customers expect to seamlessly interact, research and purchase anywhere, anytime

It is crucial to differentiate and deliver value to your customers

IBM Proprietary

# Customer Analytics for Insurance goes beyond policy and demographic data to develop a deep understanding of customers profitability, preferences and lifecycle needs

**Analytics**

- **Increase** Revenue
- **Improve** Customer Satisfaction & Retention
- **Improve** Cross-Sell/Up-Sell
- **Lower** Marketing Costs
- **Learn** Customer Attitudes
- **Identify** Life Events

## Enables you to

- **Deploy** web and social network analytics as a source of valuable insight

- **Understand** and anticipate customer behavior across all channels

- **Recognize** what products attract each customer segment

- **Manage** the optimal balance between service and cost of delivery

- **Predict** churn risk, customer satisfaction and customer lifetime value

- **Improve** service levels and effectiveness of front-line employees and sales channels

# IBM Analytics Solutions Deliver Speed *and* Flexibility

In Today's Market, Companies Face a Paradoxical Challenge

**"I Need to be Fast"**

Implement new capabilities and drive business results in weeks, not years

**"I Need to be Flexible"**

Customize to organization and GEO specific nuances, and react quickly to market changes

**Packaged Applications**

**Flexible Architecture**

## IBM Industry Analytics Solutions
*A Pre-integrated Solution Based on a Solid and Open Foundation*

IBM Proprietary

# IBM Industry Analytics - A New Breed of Solution
*Delivering Immediate Value*

## Industry Data Sources

## IBM Industry Analytics Solutions

### End-to-End Pre-built Capabilities

**Data Preparation**

- Data models
- Data connectors

**Pre-built Analytics**

- Analytic models
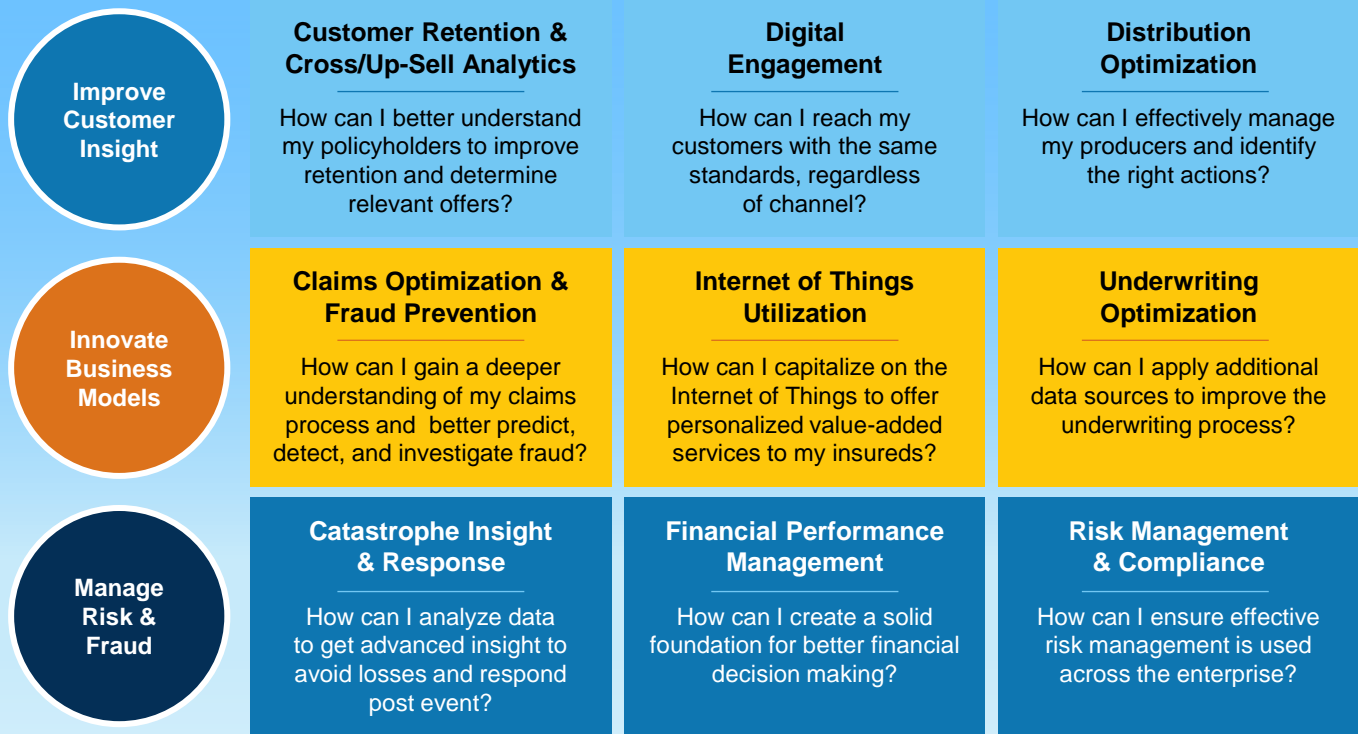- Predictive insights
- Business metrics

**Insight Delivery**

- Dashboards
- Interactive apps
- APIs & services
- Application integrations

## Business Users

IBM is also investing $3B over the next four years to help clients and ecosystem partners build IoT solutions

IBM Proprietary

# Analytics Improves Outcomes for Insurance - Business Use Cases

**Improve Customer Insight**

### Customer Retention & Cross/Up-Sell Analytics

How can I better understand my policyholders to improve retention and determine relevant offers?

### Digital Engagement

How can I reach my customers with the same standards, regardless of channel?

### Distribution Optimization

How can I effectively manage my producers and identify the right actions?

**Innovate Business Models**

### Claims Optimization & Fraud Prevention

How can I gain a deeper understanding of my claims process and better predict, detect, and investigate fraud?

### Internet of Things Utilization

How can I capitalize on the Internet of Things to offer personalized value-added services to my insureds?

### Underwriting Optimization

How can I apply additional data sources to improve the underwriting process?

**Manage Risk & Fraud**

### Catastrophe Insight & Response

How can I analyze data to get advanced insight to avoid losses and respond post event?

### Financial Performance Management

How can I create a solid foundation for better financial decision making?

### Risk Management & Compliance

How can I ensure effective risk management is used across the enterprise?

# With IBM's partnership with the Weather Company - we are providing Actionable insights across Insurance, Energy & Utilities and other industries

Big Data and Weather Video
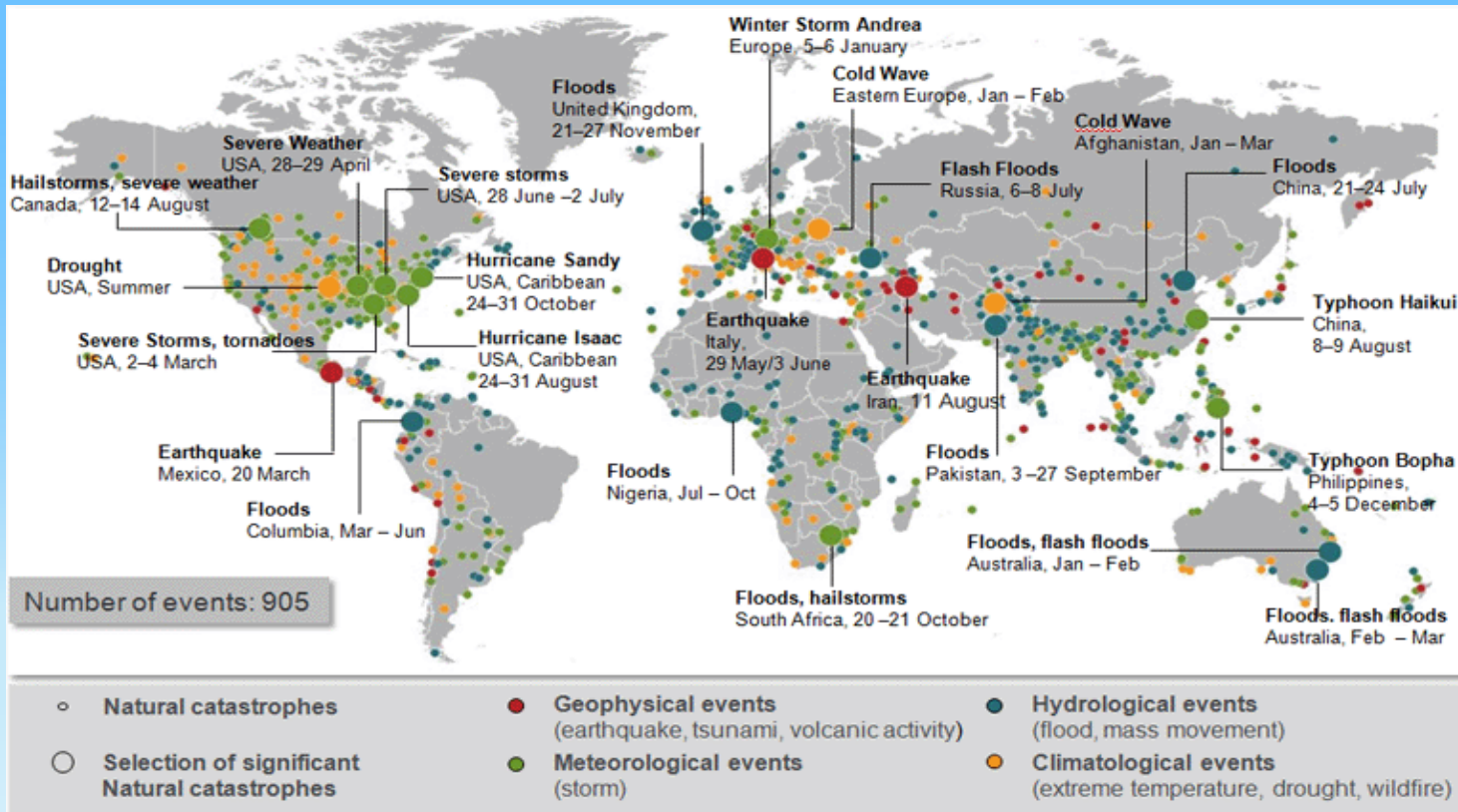


IMAGINE IF YOU COULD MAP THE ATMOSPHERE

Now imagine a company

IBM Proprietary

© 2015 IBM Corporation

# Catastrophes Significantly Impact the Insurance Industry

**World Natural Catastrophe Losses, 2012**

IBM Proprietary
© 2015 IBM Corporation

# Weather is the single largest driver for the costliest natural catastrophes

| Year | Event | Region | Insured loss US$m (in original values) |
|------|-------|--------|----------------------------------------|
| 2005 | Hurricane Katrina | USA | 62,200 |
| 2011 | EQ, tsunami | Japan | 35-40,000 |
| 2008 | Hurricane Ike | USA, Caribbean | 18,500 |
| 1992 | Hurricane Andrew | USA | 17,000 |
| 1994 | EQ Northridge | USA | 15,300 |
| 2004 | Hurricane Ivan | USA, Caribbean | 13,800 |
| 2011 | EQ Christchurch | New Zealand | 13,000 |
| 2005 | Hurricane Wilma | USA, Mexico | 12,500 |
| 2005 | Hurricane Rita | USA | 12,100 |
| 2011 | Floods | Thailand | 10,000 |

# IBM and the Weather Company will transform how insurers understand the impact of weather on the business and take action



| Insurance | Insurance |
|---|---|
| **Proactive Alerting  to reduce claims while providing value to policyholders** | **Real Time Catastrophe Impact Analysis** |
| *Advanced insight into impending storms has the potential to save millions of $$ annually per year in hail-prone areas* | *Weather disasters cost insurance companies an average of $Billions a year in claims -  Insightful data allows insurers to conduct advanced analysis to mitigate risk  in areas with the highest risk exposure based on forecasting* |

# IoT has the potential to transform the Insurance industry

**Pay claims and benefits after a loss …**

**… proactively prevent losses**

**Key Shift:**

**Insurers as experienced risk mitigators**

Improved health regimen compliance through smart pills, home monitoring, Facebook coaching

Development of systems that can detect imminent collisions and take evasive action

Professional risk manager through management of home and property systems and provision of services / utilities

New home sensors to track the temperature, wind speed, humidity, and mechanical vibrations

Insurer as fitness partner via smart apps and measurement hardware – pedometers, smart fridges, connected scales

Tailored elderly assistance: Smart carpets that detect falls, augmented hearing, Google Glass, financial transaction monitoring and intercept

# Cognitive computing can also provide capabilities for insurers to exploit new opportunities

### Engage

- Acts as a tireless agent providing expert assistance to human users

- Carries a conversation naturally, e.g. in human language

- Understands consumers from past history and enriches interactions with context- and evidence-based reasoning
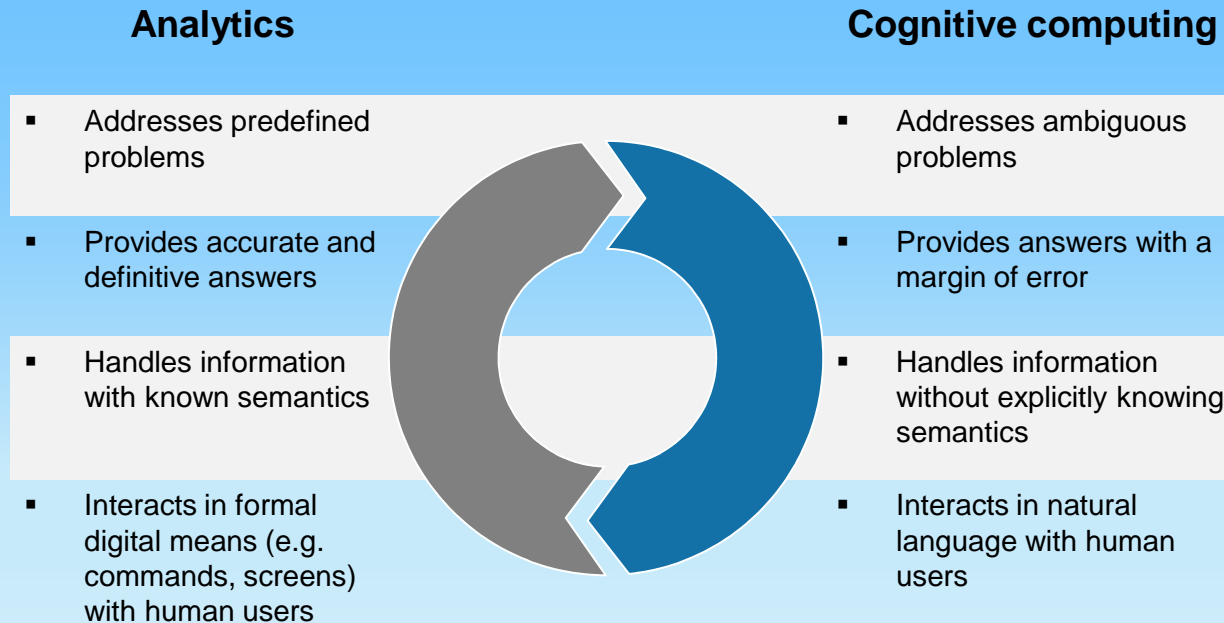
### Discover

- Helps people discover insights far above human levels

- Finds insights and connections, understands the vast amounts of information available

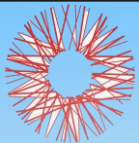- Visualizes possibilities and validates theories like experts
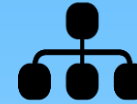
### Decide

- Offers evidence-based recommendations

- Evolves continually towards more accuracy based on new information, outcomes, and actions

- Provides traceability to audit why a particular decision is made

IBM Proprietary

# Cognitive computing builds on traditional analytics

## Analytics

- Addresses predefined problems

- Provides accurate and definitive answers

- Handles information with known semantics

- Interacts in formal digital means (e.g. commands, screens) with human users

## Cognitive computing

- Addresses ambiguous problems

- Provides answers with a margin of error

- Handles information without explicitly knowing semantics

- Interacts in natural language with human users

IBM Proprietary

NUCLEUS
RESEARCH

# The Value of Pre-Built Industry Analytics Solutions

**Accelerate time to value by** **57%**

**Reduce initial consulting costs by** **65%**

**Ongoing support and maintenance costs reduced by** **33%**

IBM Proprietary

**IBM Analytics**

# Insurance Industry Analytics Services & Solutions

# EXAMPLES

#IBMKnows

IBM ⊙

# Behavior Based Customer Insight for Insurance – A closer look

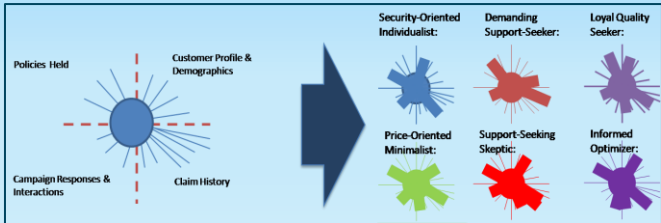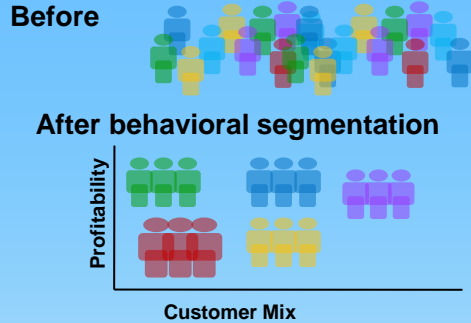**Behavioral Based Customer Segmentation**

**Validate whether an insurer's customer base accurately reflects their target segments:**
Create behavior based customer segments in the customer base to gain insights on opportunities and risks.
Helps insurer prioritize customer groups for more personalized interactions, offers and brand positioning

**Approach:**
Use enterprise and 3$^{rd}$ party data to create segment profiles

**Before**

**After behavioral segmentation**

Profitability

Customer Mix

**Use Cases:** Establish unique customer segments for risk profiling, marketing, cross and up-selling and retention programs



Policies Held
Customer Profile & Demographics
Campaign Responses & Interactions
Claim History

Security-Oriented Individualist:
Demanding Support-Seeker:
Loyal Quality Seeker:
Price-Oriented Minimalist:
Support-Seeking Skeptic:
Informed Optimizer:

Customers are assigned to behavior-based segments based on their policies, their campaign responses & other interactions, their claim history, and their profile & demographics.

IBM has a library of pre-defined data-driven segmentation out of the box that can be used as indicators for future segmentation. The solution allows clients to create new segmentation types.

# Behavior Based Customer Insight for Insurance – A closer look

**Life Event Prediction**

**Approach:**
**Internal and external data to identify Life Events likelihood across segments**

**Determine customer life events across the lifecycle of the customer relationship**
Create a life event prediction approach to identify key life moments for the customer. Helps insurer improve products, pricing, engagement models and targeted offers and messaging

Probability of life events, financial events, peer group comparisons
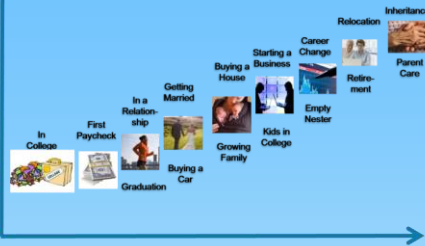


**Uses Cases:** Establish life events patterns and predictions to improve engagement, and interactions to drive customer loyalty and profitability
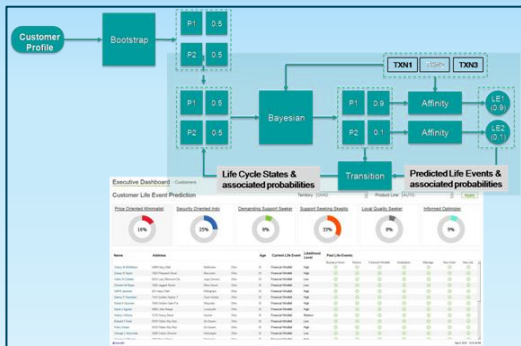


Life events are:
- recognizable
- often predictable
- often multi-generational
- an attrition risk
- a product opportunity
- a relationship changer

IBM has a library of pre-defined life events based on a learning algorithm that takes input from the customer peers profile and continuously refines the probability of life events based upon multiple data sources

23

**Risk Analytics**

# Insurers can use weather data to predict future and incident property claims and determine portfolio risk on a real-time basis
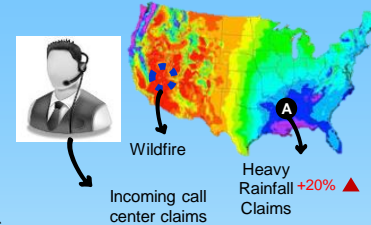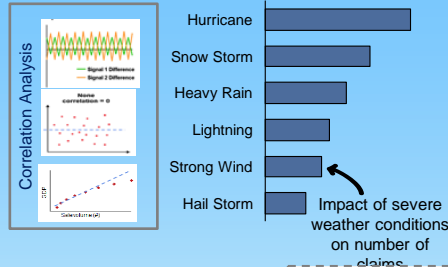
### Weather forecast by geo code

Heavy rain
Lightning
Hurricanes

*Probabilistic weather forecasts are an input to a risk profile model*
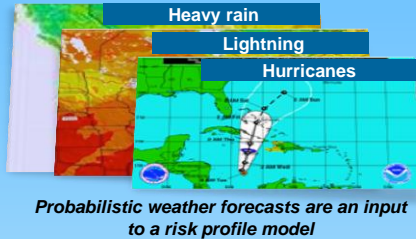
### Internal Policy data by region

| Location | % of premiums | #of policy holders | Historical Claims | Call Center Trends |
|----------|-----------|----------|----------|--------|
| **CA** | 9.6% | 45k | $4.2M | 18% |
| **NY** | 9.6% | 24k | $3.4M | 20% |
| **TX** | 7.2% | 10k | $2.5M | 16% |
| **Others** | 72% | 15k | $10M | 18% |

*Illustrative*

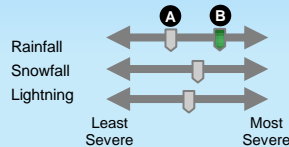### Create risk profiles by region to evaluate weather impact

*Develop multivariate models to quantify impact of severe weather on claims*

Correlation Analysis

Hurricane
Snow Storm
Heavy Rain
Lightning
Strong Wind
Hail Storm

Impact of severe weather conditions on number of claims

*Leverage models and call center volume to determine claims in real-time and future*

Wildfire
Incoming call center claims

A

Heavy Rainfall Claims  +20% ▲

*Simulate weather scenarios based on forecast probabilities*

Rainfall
Snowfall
Lightning

Least Severe — Most Severe

| California ▾ | Wk 12 ▾ | | | | |
|--------------|--------|--------|--------|--------|----------|
| **Policy Type** | **Potential Claims** | | **Confidence score** | | **% Change** |
| | Ⓐ | Ⓑ | Ⓐ | Ⓑ | |
| **Homeowners** | $1.2M | $1.8M | 90% | 95% | +20% ▲ |
| **Commercial Property** | $1.3M | $2M | 60% | 75% | +13% ▲ |
| **Workers Compensation** | $1.0M | $1.0M | 50% | 55% | Same ▶ |

**Personalized Offerings**

# Enhancing insurance telematics with weather data provides an innovative way to profile riskiness of driving behavior

**Improve assessment of riskiness with weather data**

**Telematics related offerings**

Sunny Day: 70mph
**Low Risk**

Rainy: 70mph
**Moderate Risk**

Snowy: 70mph
**Crazy**

**1. Include weather data**

- High resolution (5 min. x 500 m$^2$)
- Rain, snow, ice, temp, and fog

**2. Distinguish risky behavior**

*Who are the riskiest and safest customers?*

**$ Safe Driver Discounts**
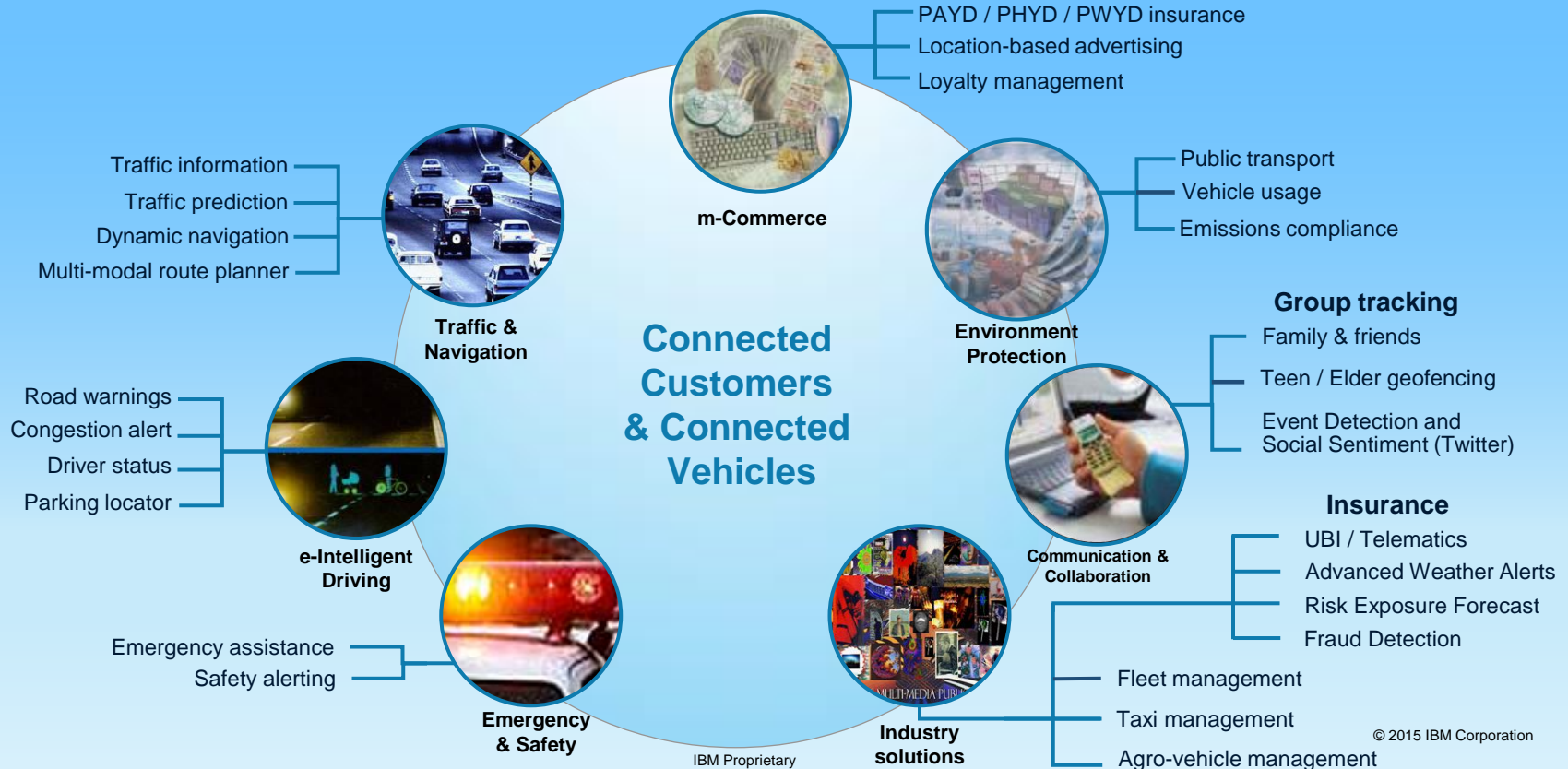Reward customers for safe driving behavior in bad weather

**Telematics + Alerts**
Use dynamic location from telematics device with severe weather alerts to provide increasingly relevant alerts

**Real-time Assistance**
Send assistance when an accident is detected by a telematics device

IBM Proprietary

# IBM and geospatial-temporal data augmented by external data from other industries create added value services and insight-driven solutions

**Connected Customers & Connected Vehicles**

PAYD / PHYD / PWYD insurance
Location-based advertising
Loyalty management

**m-Commerce**

Traffic information
Traffic prediction
Dynamic navigation
Multi-modal route planner

**Traffic & Navigation**

**Environment Protection**

Public transport
Vehicle usage
Emissions compliance

**Group tracking**
Family & friends
Teen / Elder geofencing
Event Detection and Social Sentiment (Twitter)

Road warnings
Congestion alert
Driver status
Parking locator

**e-Intelligent Driving**

**Communication & Collaboration**

**Insurance**
UBI / Telematics
Advanced Weather Alerts
Risk Exposure Forecast
Fraud Detection

Emergency assistance
Safety alerting

**Emergency & Safety**

**Industry solutions**

Fleet management
Taxi management
Agro-vehicle management

MULTI-MEDIA PURO

# With IBM Industry Analytics Solutions

**Get Started & Go Faster**

**With Fewer Resources**

**Using Proven Expertise**

**Act on Your Insights**

# Spark Technology Center based in San Francisco

- Focal point for IBM investment in Spark
  - Code contributions to Apache Spark project
  - Build industry solutions using Spark
  - Evangelize Spark technology inside/outside IBM

- Agile engagement across IBM divisions
  - **Systems**: contribute enhancements to Spark core, and optimized infrastructure (hardware/software) for Spark
  - **Analytics**: IBM Analytics software will exploit Spark processing
  - **Research**: build innovations above (solutions that use Spark), inside (improvements to Spark core), and below (improve systems that execute Spark) the Spark stack

    *Goal: To be the #1 contributor and adopter in the Spark ecosystem*