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
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**
- Structured Data
- Small Data
- Clearly formatted
- Quantitative
- Objective
- Logical
- Puzzle
- Repeatable linear

- Transaction data
- ERP Data
- Electronic Health Records
- Mainframe Data
- OLTP System Data

**Hadoop, Streams, Spark**
- Audio
- Documents
- Images
- RFID
- Emails
- Sensors
- Social Data
- Video
- Web Logs

**New Data Sources**
- Unstructured Data
- Big Data
- Language based
- Qualitative
- Subjective
- Intuitive
- Mystery
- Exploratory dynamic

**Traditional Sources**
- Traditional Sources

**Advanced Analytics**
- Context Accumulation
- Enterprise Integration

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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 flows in “naturally” and just sits there
- Data Reservoir: Built to extract value from the data
The Data Reservoir subsystems

- 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

Consumers expect experiences "my way"

Customers demand highly relevant and engaging experiences

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

It is crucial to differentiate and deliver value to your customers
Customer Analytics for Insurance goes beyond policy and demographic data to develop a deep understanding of customers profitability, preferences and lifecycle needs

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

**Analytics**

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

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

IBM is also investing $3B over the next four years to help clients and ecosystem partners build IoT solutions
## Analytics Improves Outcomes for Insurance - Business Use Cases

<table>
<thead>
<tr>
<th>Improve Customer Insight</th>
<th>Customer Retention &amp; Cross/Up-Sell Analytics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>How can I better understand my policyholders to improve retention and determine relevant offers?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Innovate Business Models</th>
<th>Claims Optimization &amp; Fraud Prevention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>How can I gain a deeper understanding of my claims process and better predict, detect, and investigate fraud?</td>
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</table>

<table>
<thead>
<tr>
<th>Manage Risk &amp; Fraud</th>
<th>Catastrophe Insight &amp; Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>How can I analyze data to get advanced insight to avoid losses and respond post event?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Digital Engagement</th>
<th>Internet of Things Utilization</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>How can I reach my customers with the same standards, regardless of channel?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distribution Optimization</th>
<th>Underwriting Optimization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>How can I effectively manage my producers and identify the right actions?</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>Financial Performance Management</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>How can I create a solid foundation for better financial decision making?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Risk Management &amp; Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>How can I ensure effective risk management is used across the enterprise?</td>
</tr>
</tbody>
</table>

© 2015 IBM Corporation
With IBM’s partnership with the Weather Company - we are providing Actionable insights across Insurance, Energy & Utilities and other industries

IMAGINE IF YOU COULD MAP THE ATMOSPHERE

Now imagine a company
Catastrophes Significantly Impact the Insurance Industry

World Natural Catastrophe Losses, 2012

Source: Insurance Information Institute
Weather is the single largest driver for the costliest natural catastrophes

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

Source: © 2012 Munich Re, Geo Risks Research, NatCatSERVICE. As of July 2012.
IBM and the Weather Company will transform how insurers understand the impact of weather on the business and take action.

<table>
<thead>
<tr>
<th>Insurance</th>
<th>Insurance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Proactive Alerting</strong> to reduce claims while providing value to policyholders**</td>
<td><strong>Real Time Catastrophe Impact Analysis</strong></td>
</tr>
<tr>
<td>Advanced insight into impending storms has the potential to save millions of $$ annually per year in hail-prone areas</td>
<td>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</td>
</tr>
</tbody>
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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 …

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

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

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

… proactively prevent losses

Key Shift: Insurers as experienced risk mitigators

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

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

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
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
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%
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.

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

Approach:
Use enterprise and 3rd party data to create segment profiles

Before

After behavioral segmentation

Profitability
Customer Mix

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.

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

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.

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

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.
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

Probabilistic weather forecasts are an input to a risk profile model

Create risk profiles by region to evaluate weather impact

Develop multivariate models to quantify impact of severe weather on claims

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

Internal Policy data by region

<table>
<thead>
<tr>
<th>Location</th>
<th>% of premiums</th>
<th># of policy holders</th>
<th>Historical Claims</th>
<th>Call Center Trends</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>9.6%</td>
<td>45k</td>
<td>$4.2M</td>
<td>18%</td>
</tr>
<tr>
<td>NY</td>
<td>9.6%</td>
<td>24k</td>
<td>$3.4M</td>
<td>20%</td>
</tr>
<tr>
<td>TX</td>
<td>9.2%</td>
<td>10k</td>
<td>$2.5M</td>
<td>16%</td>
</tr>
<tr>
<td>Others</td>
<td>72%</td>
<td>15k</td>
<td>$10M</td>
<td>18%</td>
</tr>
</tbody>
</table>

Simulate weather scenarios based on forecast probabilities

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

**Improve assessment of riskiness with weather data**

1. Include weather data
   - High resolution (5 min. x 500 m²)
   - Rain, snow, ice, temp, and fog

2. Distinguish risky behavior
   - Who are the riskiest and safest customers?

**Telematics related offerings**

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