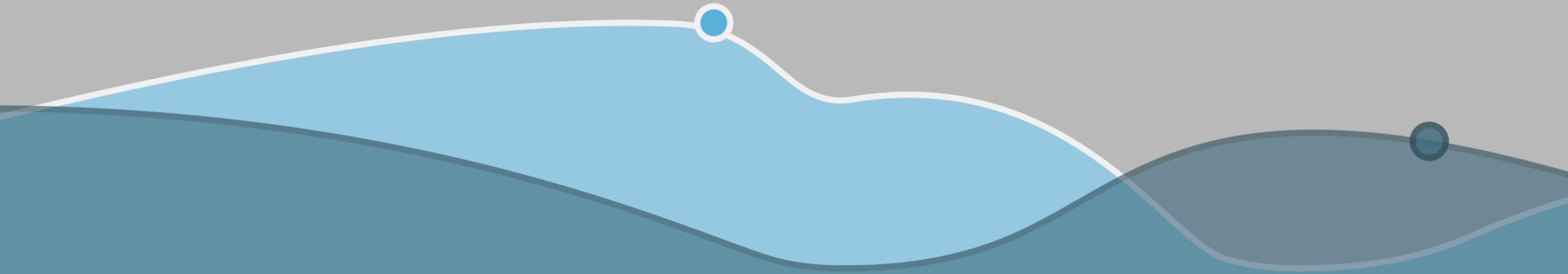




# Cortana Analytics Workshop

Sept 10 – 11, 2015 • MSCC



# The “Big Data” of the Cortana Analytics Suite

Lance Olson  
Partner Group Program Manager



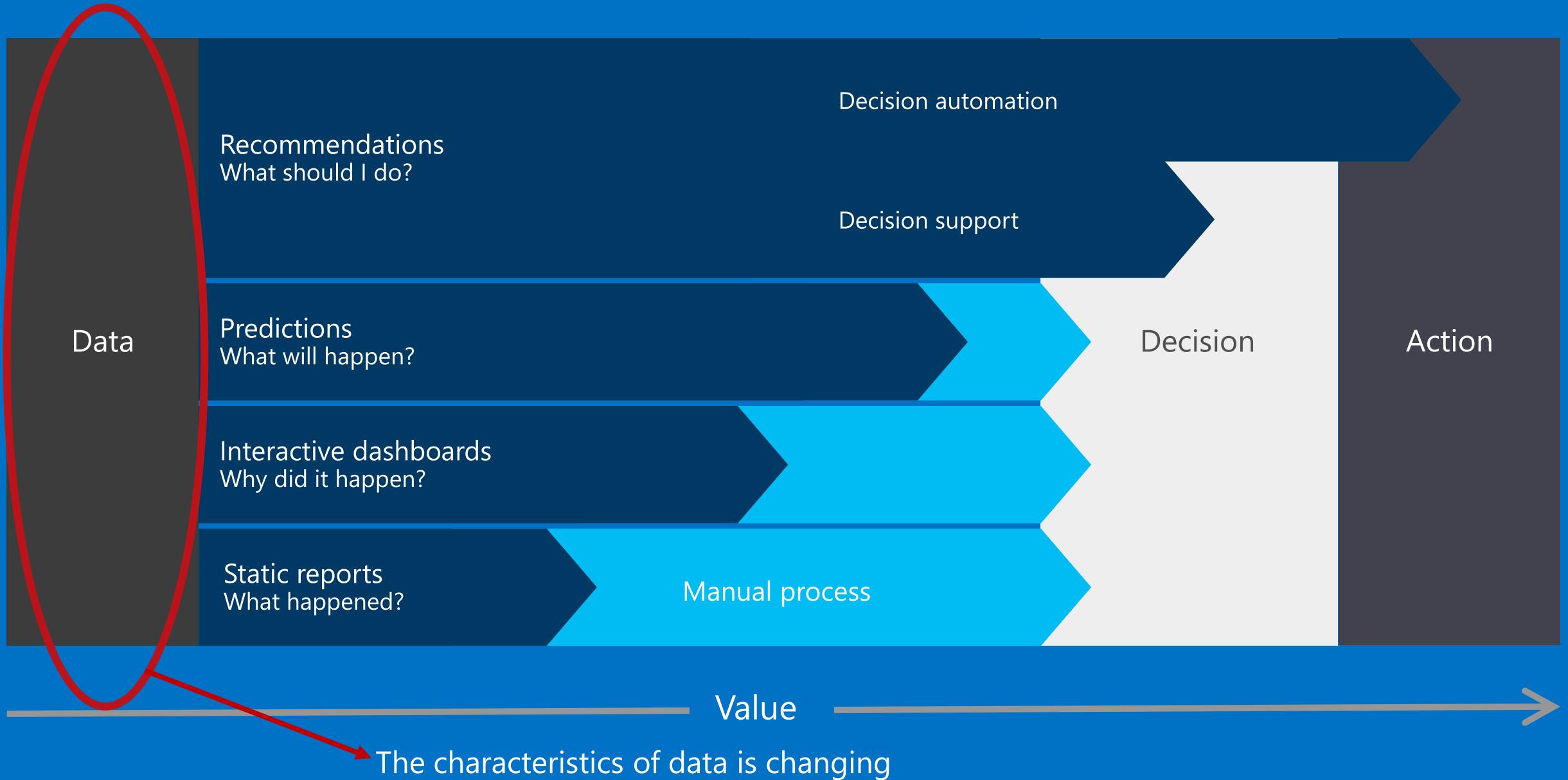
# Agenda

Big Data As Part of Cortana Analytics

Business Scenarios For Big Data

What To Do Next

# From data to decisions and actions

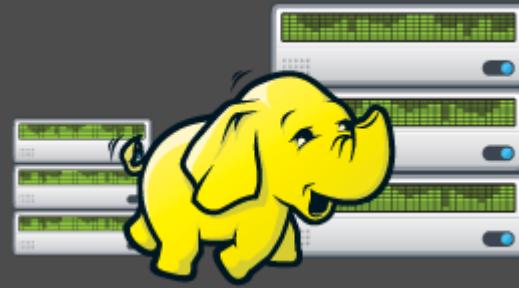


# The Characteristics of Data Is Changing



Data complexity: variety and velocity

# Let's Talk About Hadoop



Apache Open Source Project  
Highly scalable distributed file system (HDFS)  
Distributed processing on data nodes

## Data Volumes



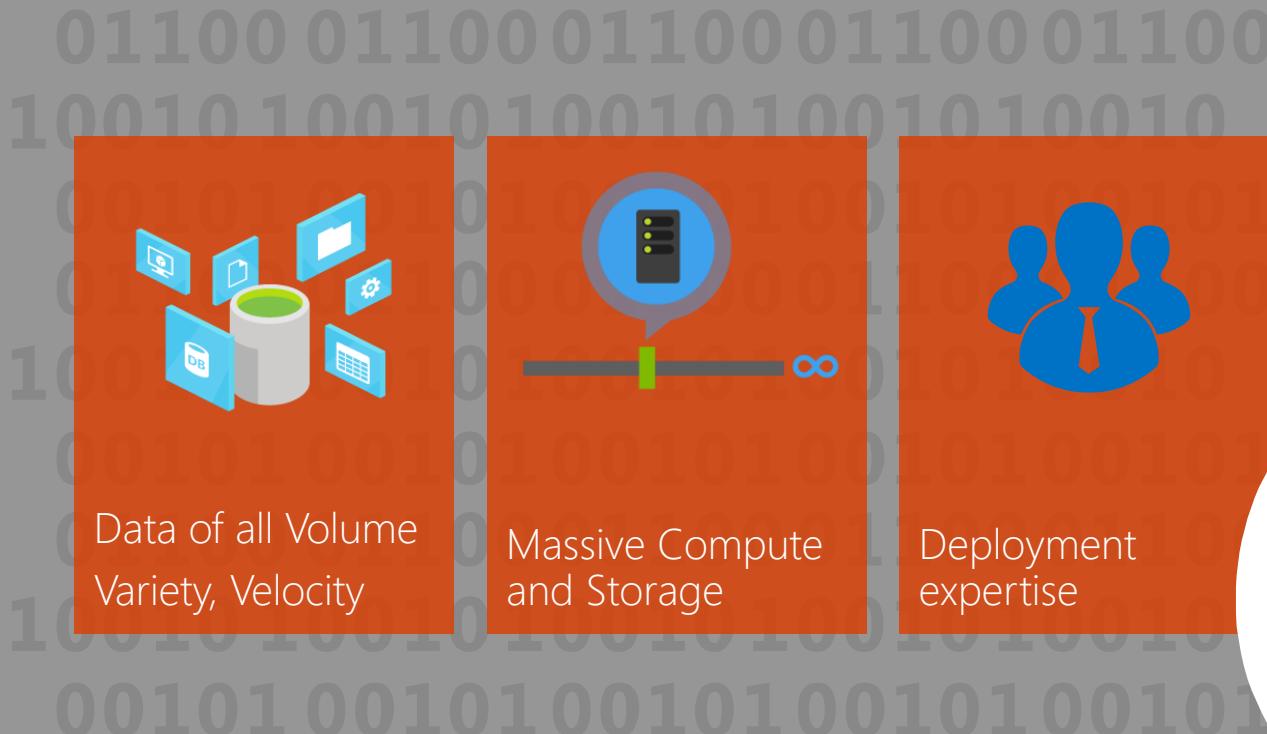
## Data Variety



## Data Velocity



# Why Cloud + Hadoop?

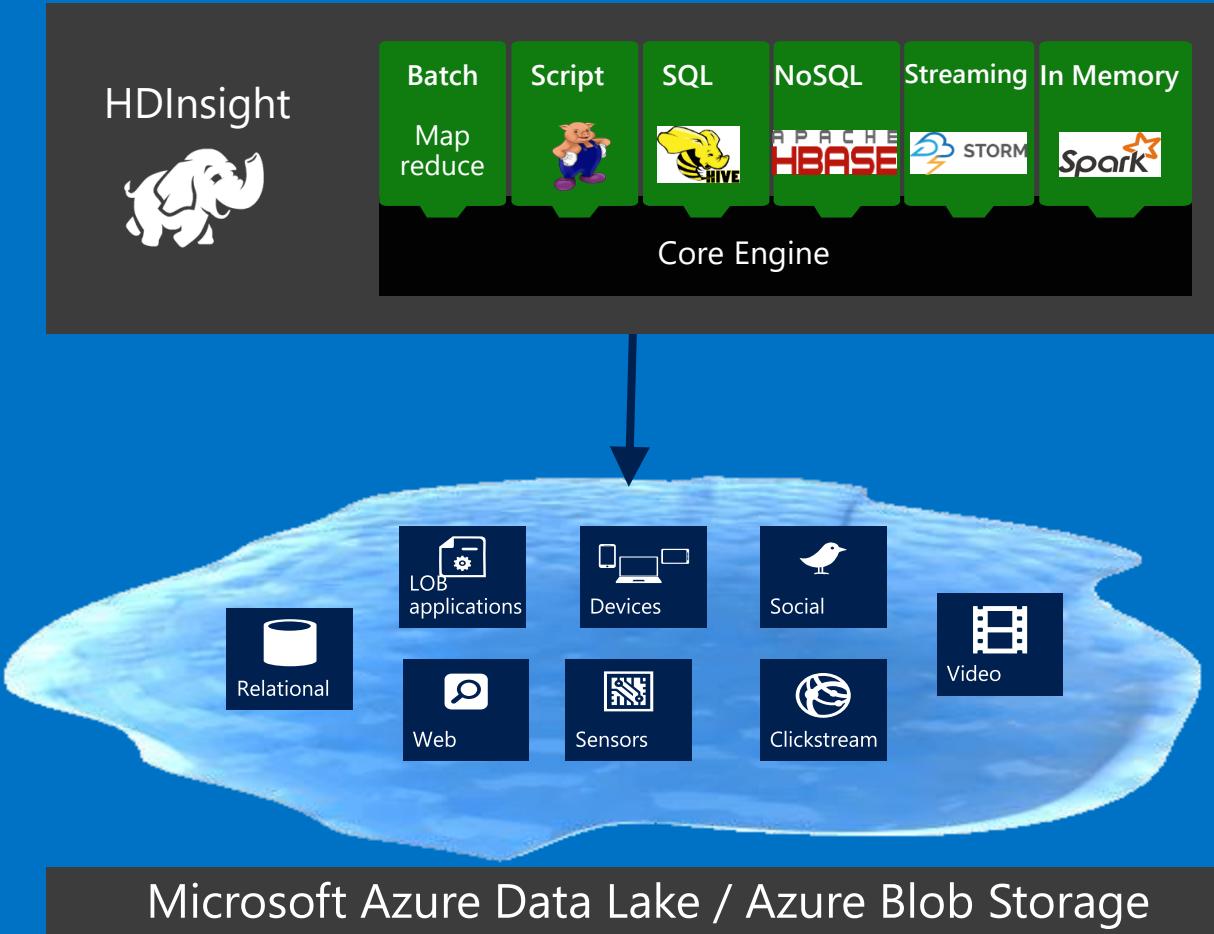


# Cortana Analytics Suite

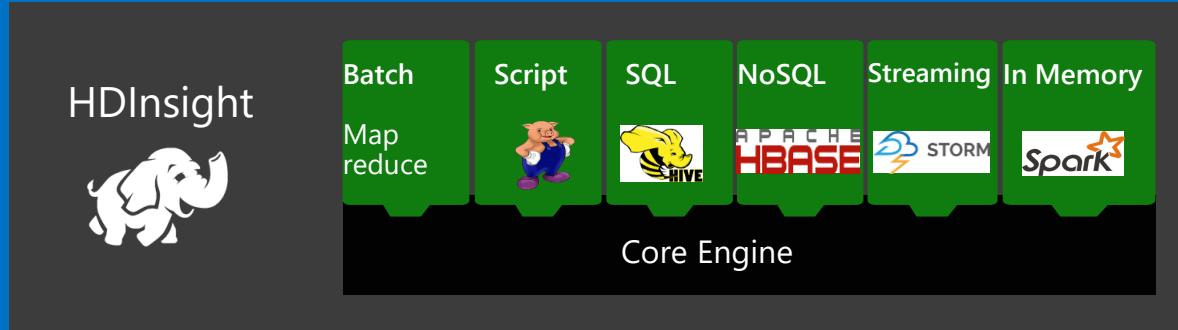
## Big Data and Advanced Analytics



# Big Data as part of Cortana Analytics

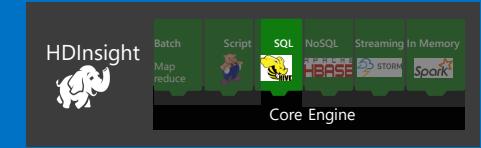


# Azure HDInsight Introduction – Make Big Data Easier

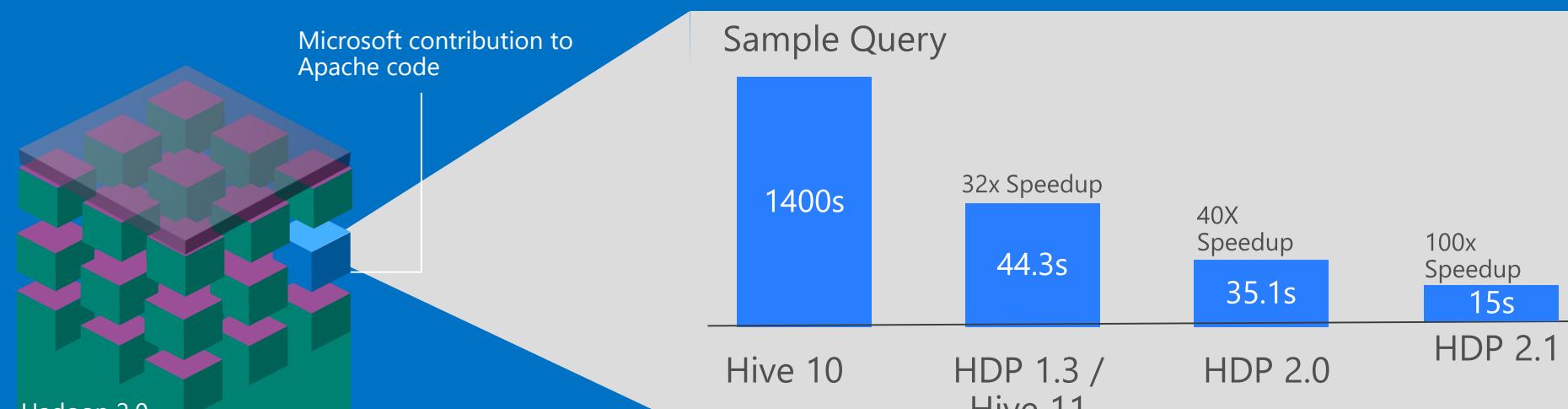


- Microsoft's cloud Hadoop offering
- 100% open source Apache Hadoop
- Built on the latest releases for Hadoop
- Up and running in minutes with no hardware to deploy
- .NET and Java skills and deep integration to Visual Studio
- Utilize familiar BI tools for analysis including Microsoft Excel
- 99.9% Enterprise Service Level Agreement

# Hive to do SQL-Like Queries



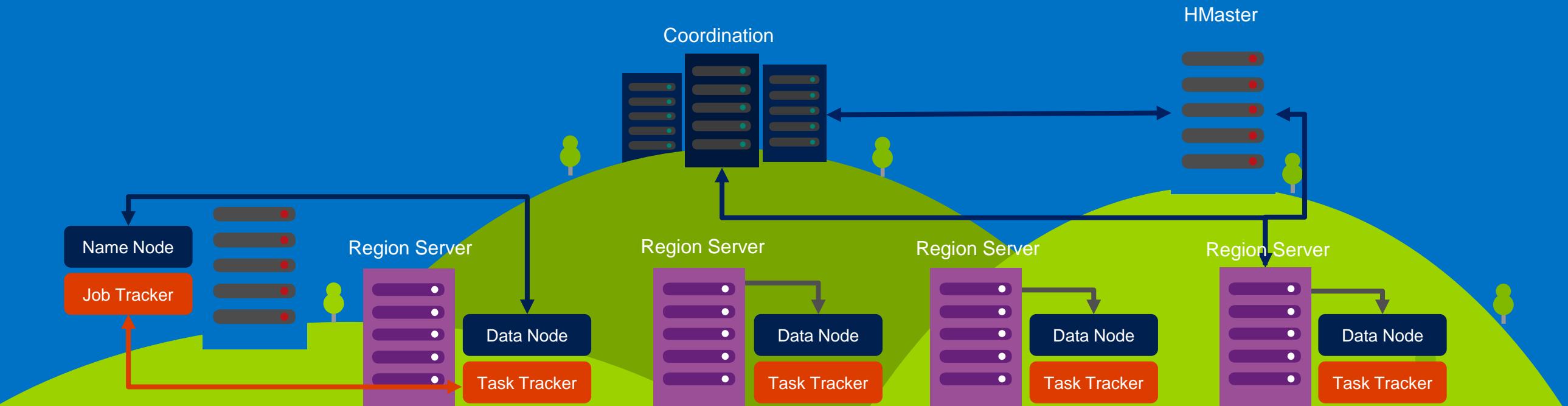
- HDInsight provides easy-to-use graphical query interface for Hive
- HiveQL is a SQL-like language (subset of SQL)
- Hive structures include well-understood database concepts such as tables, rows, columns, partitions
- Compiled into MapReduce jobs that are executed on Hadoop



# HBase to do NoSQL



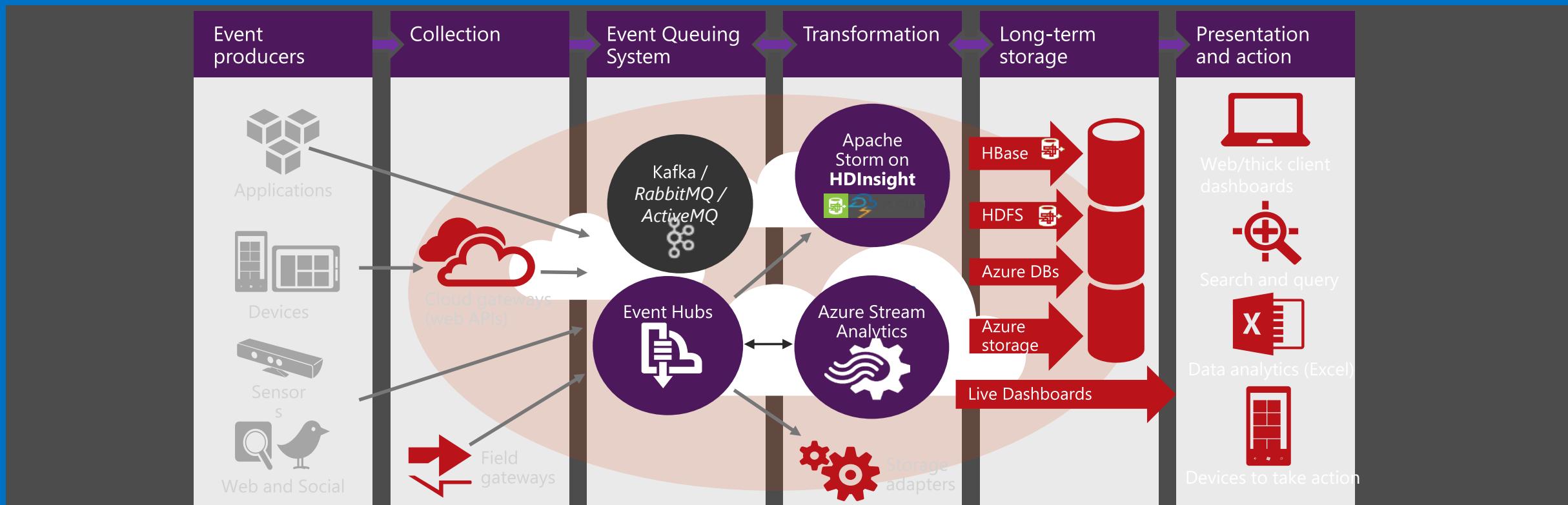
- Random, fast (realtime) read/write access to your Big Data.
- Host very large tables (billions of rows X millions of columns) on clusters of commodity hardware.
- Runs on top of the Hadoop Distributed File System (HDFS)
- Provides flexibility in that new columns can be added to column families at any time



# Storm for Real-Time Streaming



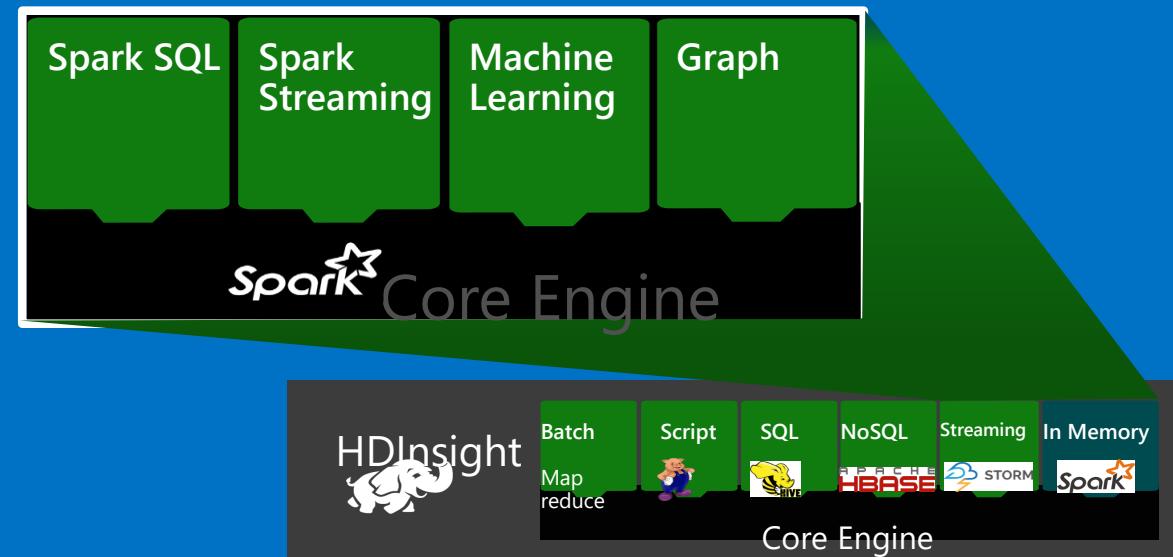
- Distributed real-time computation system
- Reliably consumes millions of real-time events from a scalable event broker (ie. Kafka, Event Hub)
- Performs time-sensitive computation
- Output to persistent stores, dashboards or devices
- Completely customizable with Java + .NET
- Deeply integrated to Visual Studio



# Spark for In-Memory Computation



- Single execution model for multiple tasks (SQL queries, Streaming, Machine Learning, and Graph)
- Processing up to 100x faster performance
- Developer friendly (Java, Python, Scala)
- BI tool of choice (Power BI, Tableau, Qlik, SAP)
- Notebook experience (Jupyter/iPython, Zeppelin)



# Spark for Azure HDInsight

In-memory computation engine – Fully managed



The image shows a desktop interface with three main windows:

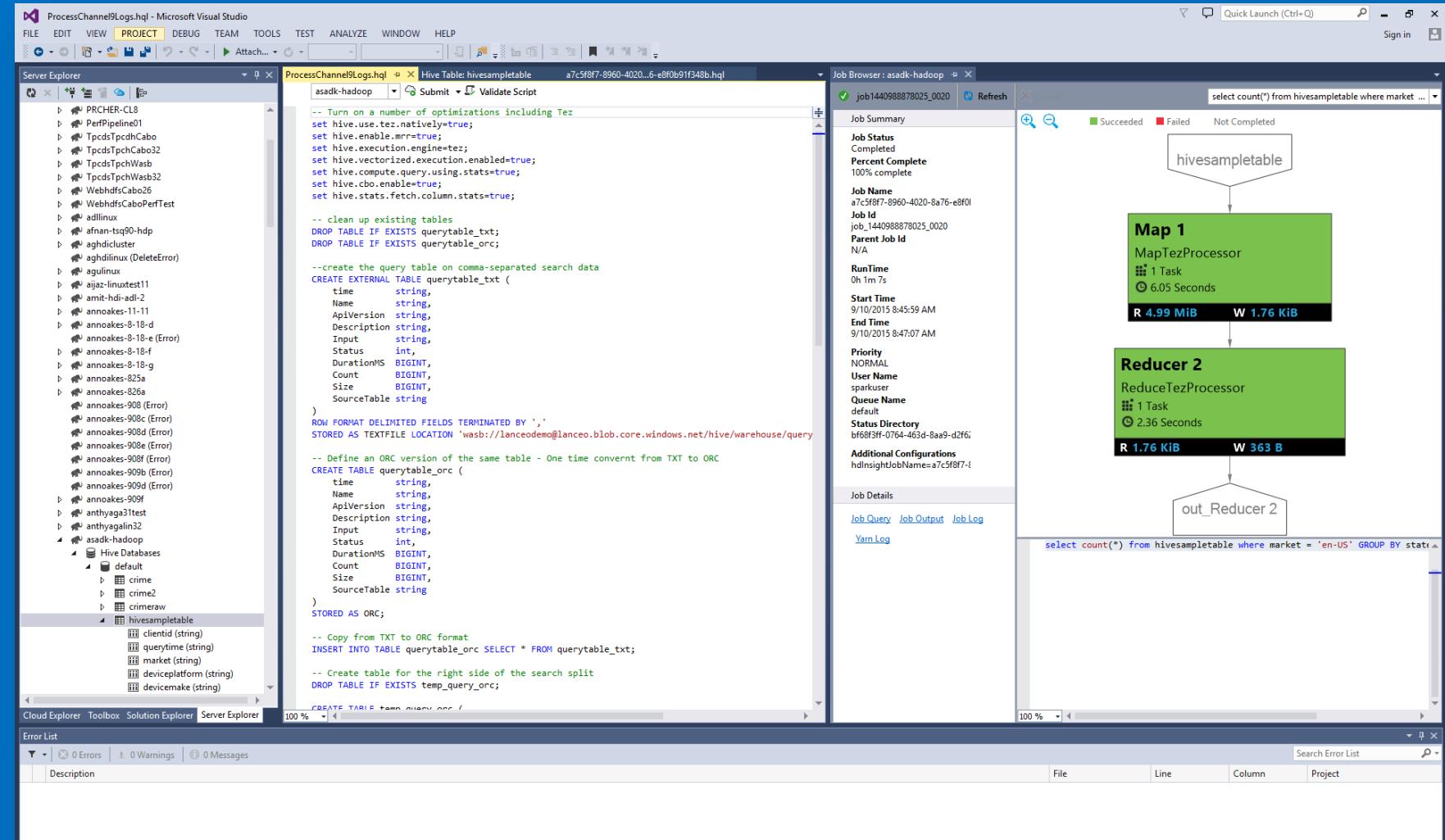
- Jupyter Notebook:** An Untitled 2 notebook is open, displaying Python code for outlier detection using One-Class SVM and robust covariance estimators. The code includes imports from numpy, matplotlib, and scikit-learn, and generates four scatter plots showing data points, decision functions, and outliers.
- Microsoft Power BI Preview:** A preview dashboard titled "Spark" is displayed. It features a large numerical value "1.48M" and a horizontal bar chart titled "BY CRIMETYPE" showing the count of arrests for various crime types. The data for the bar chart is as follows:

Crime Type	Count
THEFT	~1.3M
BATTERY	~1.1M
CRIMINAL DAMAGE	~0.7M
NARCOTICS	~0.7M
OTHER OFFENSE	~0.4M
ASSAULT	~0.4M
BURGLARY	~0.4M
MOTOR VEHICLE THEFT	~0.3M
ROBBERY	~0.2M
DECEPTIVE PRACTICE	~0.2M
CRIMINAL TRESPASS	~0.15M

- Browser Tab:** A Power BI dashboard is shown in a browser window, with the URL <https://pbipmdevcst2.analysis.windows-int.net/dashboards/b0e1aabb-cbd4-42bb-8f8a-0e1aabbcbd4-42bb-8f8a>. The dashboard has a "Spark" title and a "Share Dashboard" button.

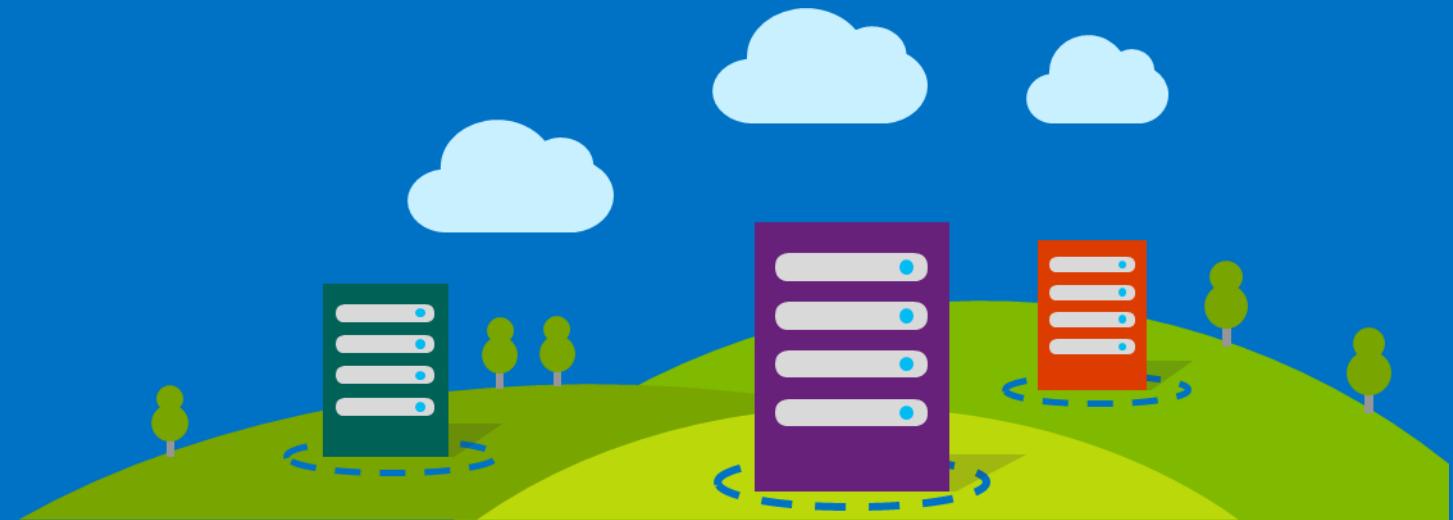
# Integration to Visual Studio

- Debug Hive jobs through Yarn logs or troubleshoot Storm topologies
- Visualize jobs, clusters, tables, and storage
- Submit Hive queries, Storm topologies (C# or Java spouts/bolts)
- IntelliSense



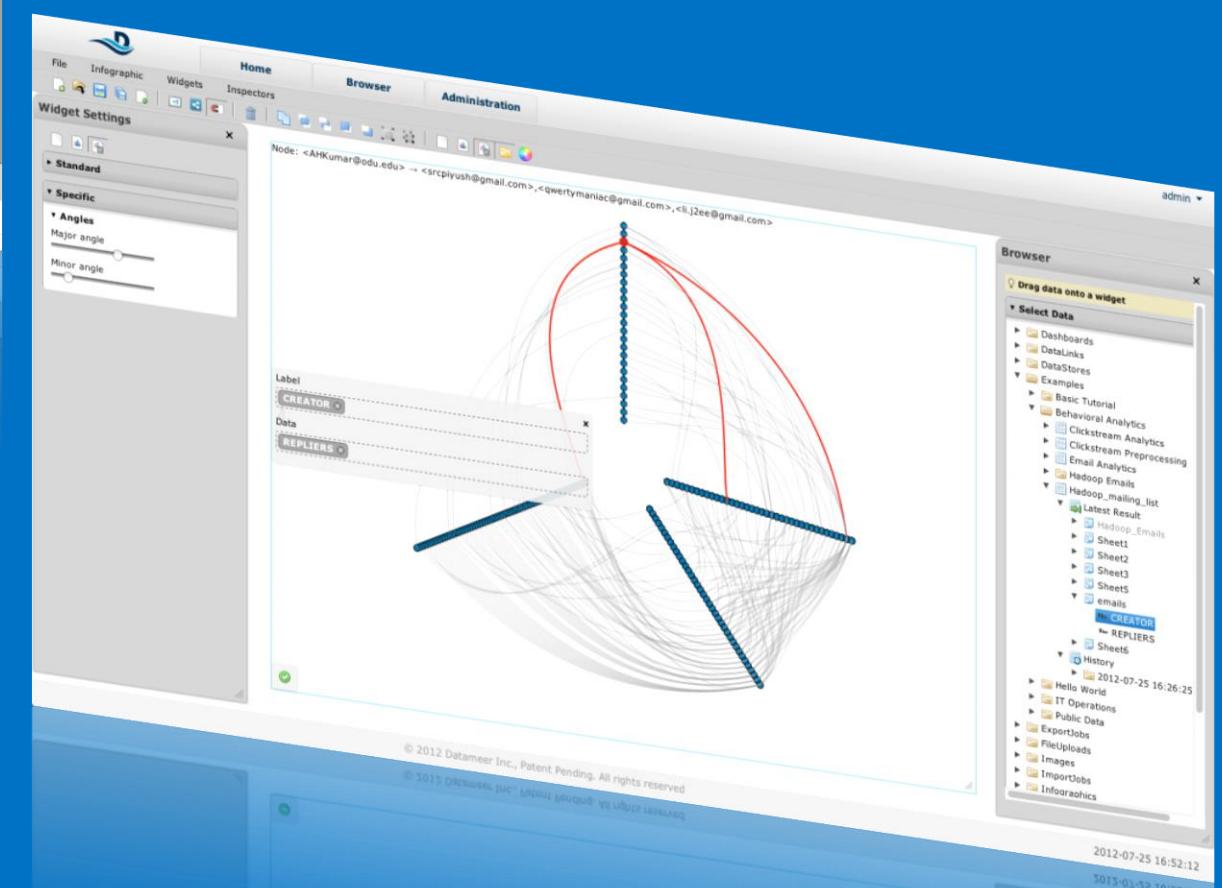
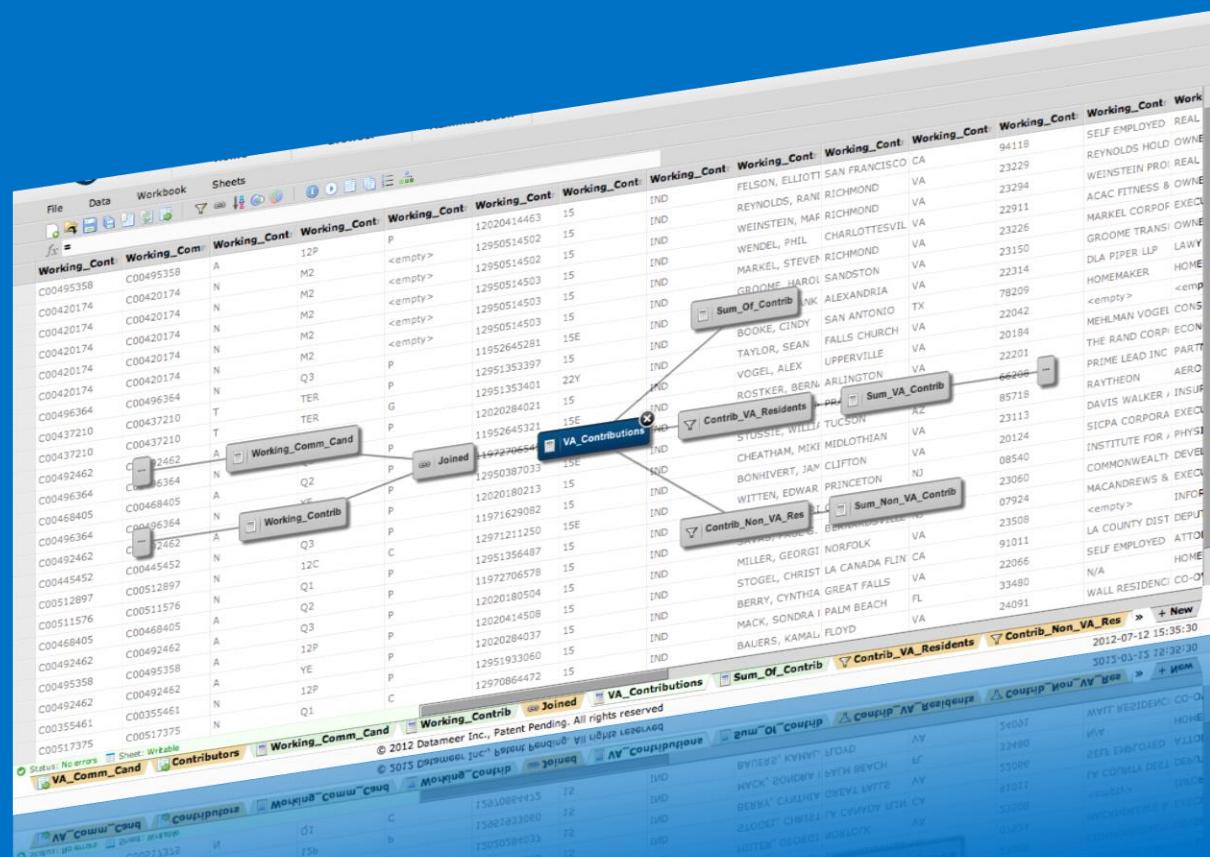
# HDInsight Built for Linux or Windows

- Managed & supported by Microsoft
- Familiarity of Windows
- Re-use common tools, documentation, samples from Hadoop/Linux ecosystem
- Add Hadoop projects that were authored on Linux to HDInsight
- Easier transition from on-premise to cloud



# Partner Spotlight: Datameer

## Hadoop Data Preparation and Analytics for the Analyst



# Partner Spotlight: Trifacta

## Hadoop Data Preparation for the Data Developer – Discovery, Assessment, Shaping, Enrichment

**Mobile Logs** MobileTracking.csv Sample 1 - First 488.28KB ▾ New Sample Ready

TRANSFORM EDITOR

SUGGESTED TRANSFORMS

```
keep row: empty([Screen_Detail])
keep row: empty([Screen])
delete row: empty([Screen])
```

13 Columns 2,699 Rows

Preview String

Access\_Time abc

1 1/88-6:35 Dec 20 6 Cat

2 8/88-14:17

3 5/88-10:19

4 6/88-13:32

5 7/88-2:10 adta

6 8/88-1:38 adta

7 7/88-11:03 adta\_name=holidaypromo1&adta\_source=dynamic&adta\_size=300x250

8 2/88-4:41

9 9/88-11:30

10 10/88-15:32 adta\_name=holidaypromo1&adta\_source=dynamic&adta\_size=300x250

11 11/88-11:57 adta\_name=holidaypromo2&adta\_source=dynamic&adta\_size=240x400

12 4/88-23:03 adta\_name=holidaypromo1&adta\_source=mobile&adta\_size=300x250

13 13/88-7:04 adta\_name=holidaypromo1&adta\_source=dynamic&adta\_size=300x250

14 14/88-13:19

15 15/88-11:28

16 2/88-15:06 adta\_name=holidaypromo1&adta\_source=dynamic&adta\_size=300x250

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18 15/88-22:00

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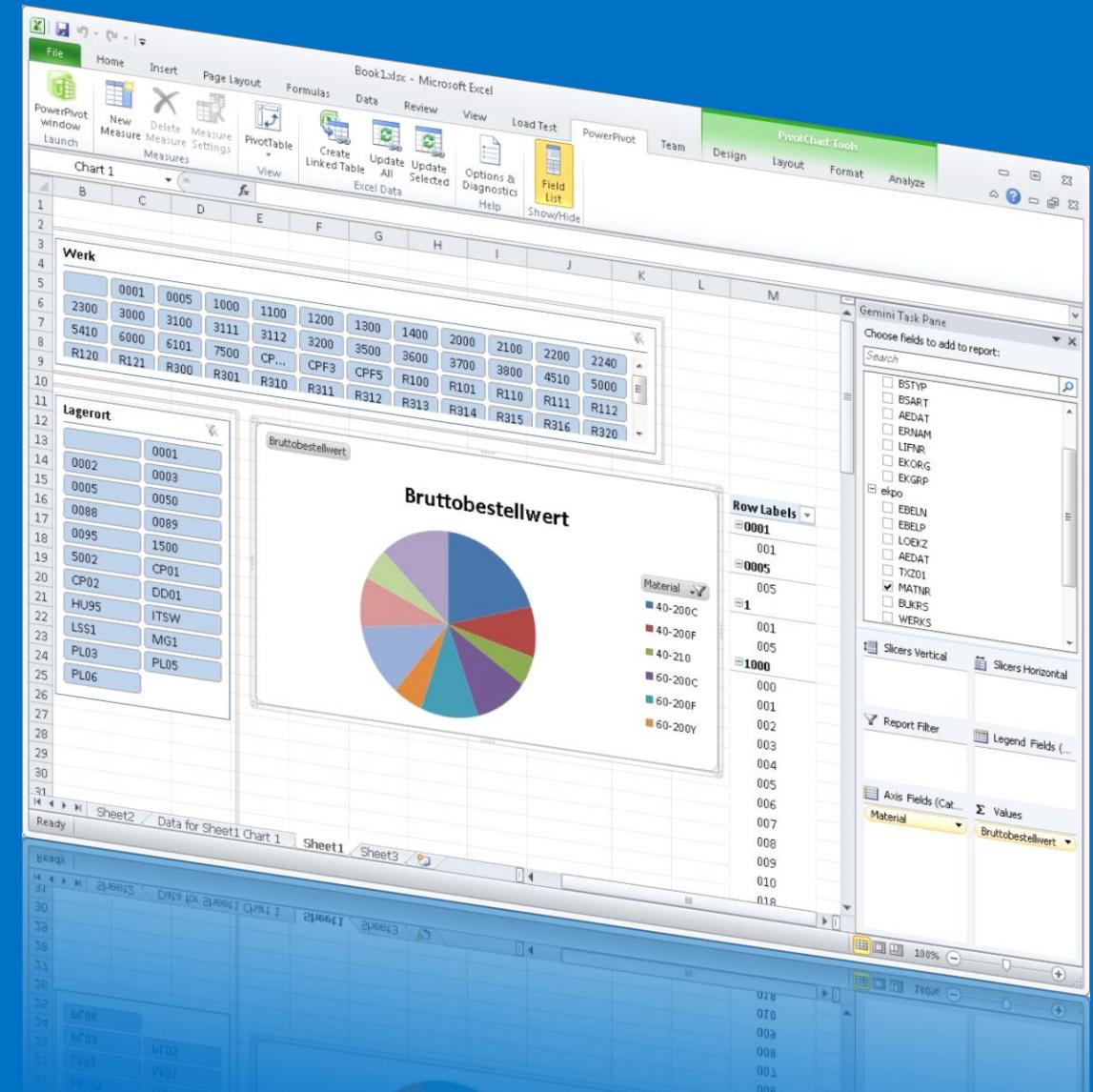
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# Partner Spotlight: AtScale

## Analysts Use Traditional BI Tools Against HDInsight

The screenshot shows the AtScale interface for managing a cube named "Internet Sales Cube". On the left, there's a sidebar with "Organization default" and a "Project Internet Sales Insights". The main area displays the cube structure with various dimensions and measures. Orange arrows highlight specific relationships between dimensions like Customer, Product, Date, and Color, and their respective hierarchies (Customer Hierarchy, Product Hierarchy, Date Dimension, Color Dimension). A preview pane on the right shows a detailed hierarchy for the Date Dimension, including Year, Quarter, Month, Day, and Work Week.

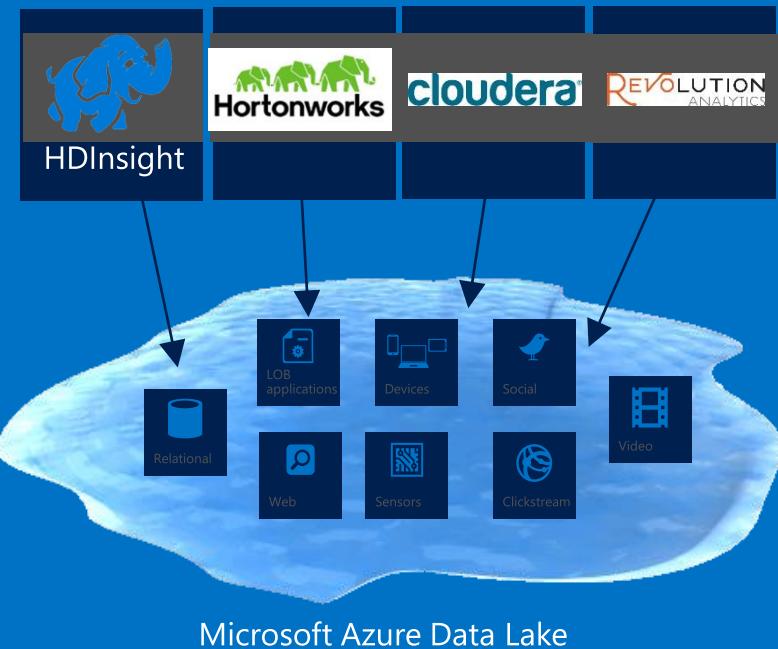


# Azure Data Lake Introduction – Make Big Data Easier



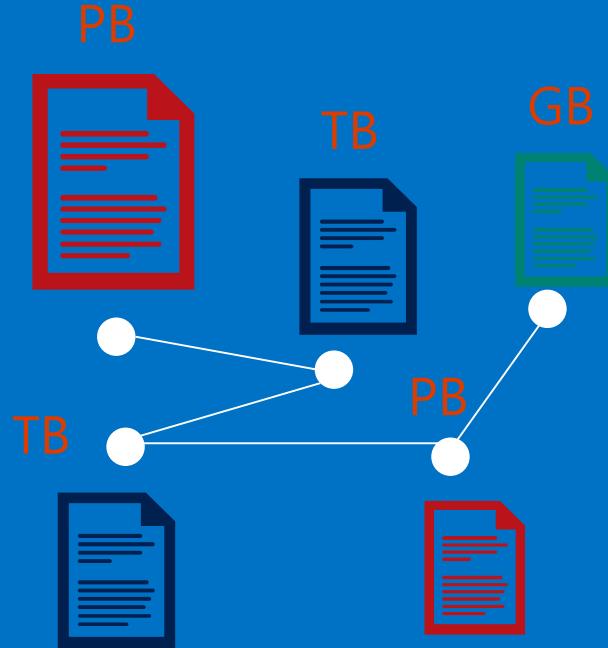
- HDFS For the Cloud
- Unlimited Storage, Petabyte Files
- Optimized for Massive Throughput
- High frequency, low latency, read immediately
- Managed and secured

# Hadoop Distributed File System (HDFS) For The Cloud



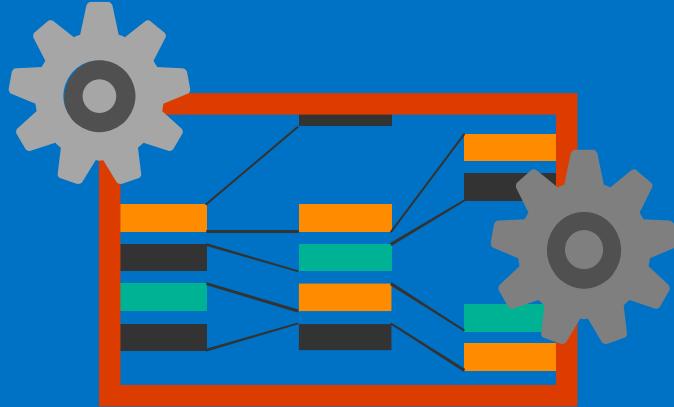
- Built from the ground-up as native HDFS
- Integrated w/ HDInsight, Hortonworks, Cloudera
- Accessible to all HDFS compliant projects (Spark, Storm, Flume, Sqoop, Kafka, R, etc.)

# Unlimited Storage, Petabyte Files



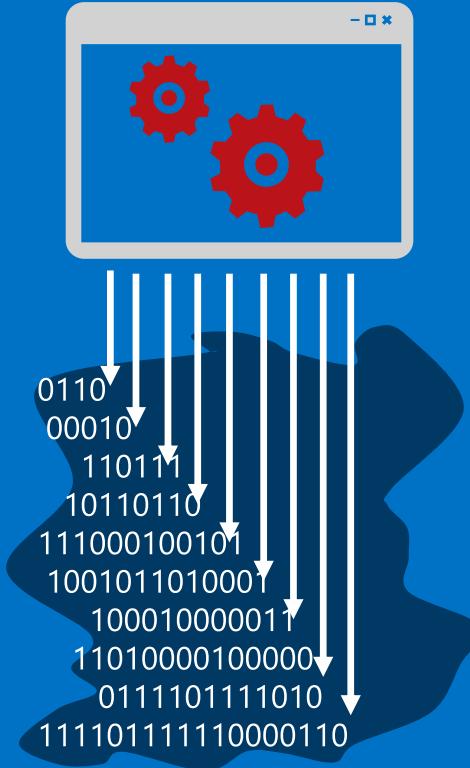
- Unlimited account sizes
- Individual file sizes from GBs to PBs
- Immediate read/write access

# Optimized for Massive Throughput



- Built for running large analytic systems that require massive throughput
- Automatically optimize for any throughput
- Optimized for parallel computation over PBs of data

# High frequency, low latency, read immediately



- High volumes of small writes at low latency
- Optimized for near real-time scenarios like IoT, real-time fraud detection, clickstream analysis, etc.

# Manage and secure your data assets



- Monitor performance, receive alerts, and audit usage
- Azure Active Directory integration for identity and access management over all of your data

# Agenda

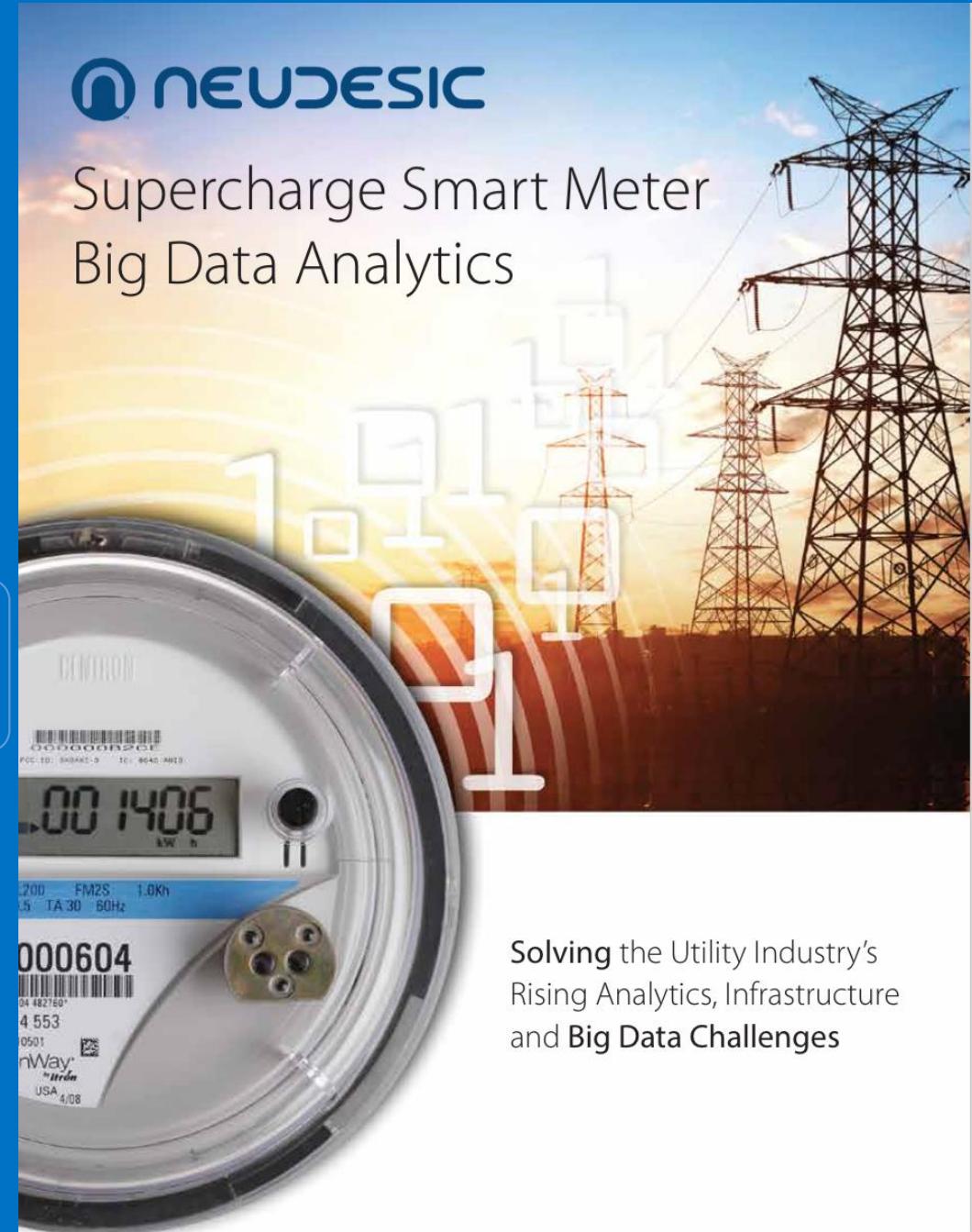
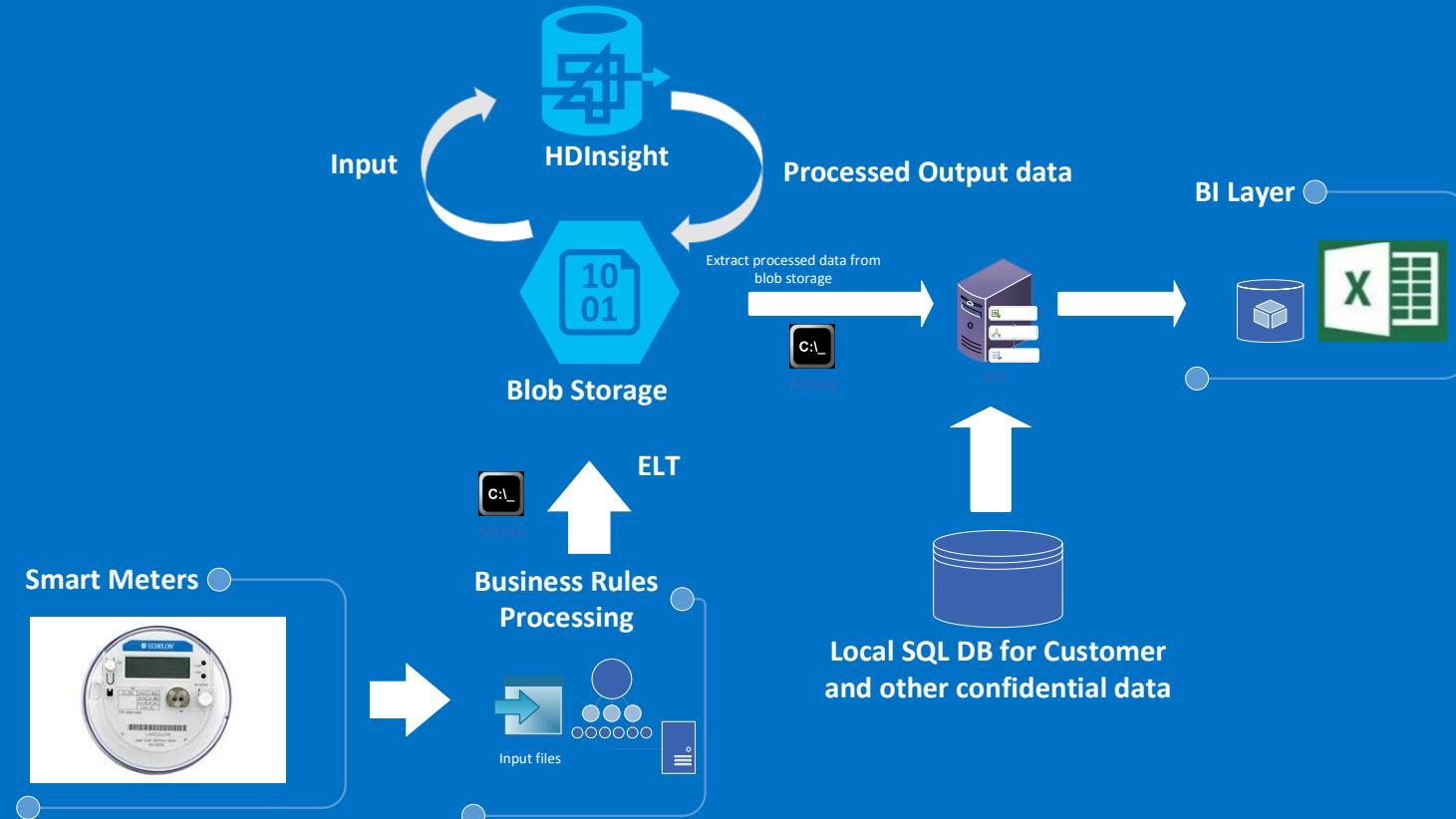
Big Data As Part of Cortana Analytics

Business Scenarios For Big Data

What To Do Next

**Neudesic** partnered with one of the nation's largest utility companies that recently deployed Smart Utility Meters for power customers, nearly a million meters sending usage data every 15 minutes.

**The result:** an Azure hybrid big data processing solution that enabled the customer to perform gap analytics: a process for identifying gaps that exist in the power usage readings, over 7x faster than their previous solution! Billions of Smart Meter reads get processed to identify the nature and duration of the gaps to mitigate revenue losses.



Solving the Utility Industry's  
Rising Analytics, Infrastructure  
and Big Data Challenges

# Cortana Analytics Key Verticals

## Retail



## Healthcare



## Financial Services



### Industry Overview

- \$22 trillion global revenue (\$4.7 trillion U.S.)
- 4% annual growth rate
- 3.7 million businesses
- 42 million employees

### Industry Trends

- Commerce anywhere, anytime
- Personal and in context

### Scenarios

- Sales & Marketing: Demand Forecasting
- Customer & Channel: Personalized Offers

### Industry Overview

- \$2 trillion spent in U.S./year on healthcare
- 5,754 hospitals with >36 million patients
- Hospital readmissions cost ~\$41 billion/year
- ACA new regulations for Medicare/Medicaid

### Industry Trends

- Payments based on patient outcome
- Government monitoring hospital readmissions and number of hospital-acquired conditions

### Scenarios

- Customer & Channel: Patient Outcomes
- Operations & Workforce: Operational Efficiency

### Industry Overview

- 7.9% of US Economy
- \$1.2 trillion revenue
- 12% revenue growth rate
- 5.9 million employees

### Industry Trends

- Understanding customer behavior
- Cybersecurity
- Taking banking "mobile"
- Proactive regulatory compliance

### Scenarios

- Finance & Risk: Risk & Compliance
- Sales & Marketing: Personalization

# Big Data in Retail

## Big Data in Retail



- Clickstream analytics
- Online recommendation engine
- 360° view of the customer
- Analyze brand sentiment
- Localized, personalized promotions
- Optimal store layout



Leading computer manufacturer in world



- Use clickstream to deliver custom website ecommerce experience
- Targeted ads for abandoned carts



- Use unstructured data from website and social for data mining
- Combine w/sales data for 360 view

Leading clothing online retailer



- Use clickstream to understand who is viewing their site
- Building recommendation engine based on users' clickpaths



- Gather social media sentiment from customer feedback
- Combined with POS data, can determine right product mix

Leading Multi-national Retailer



- Track weather information (temperature/forecast) to predict shelf space for different seasons
- Sentiment analysis on feedback



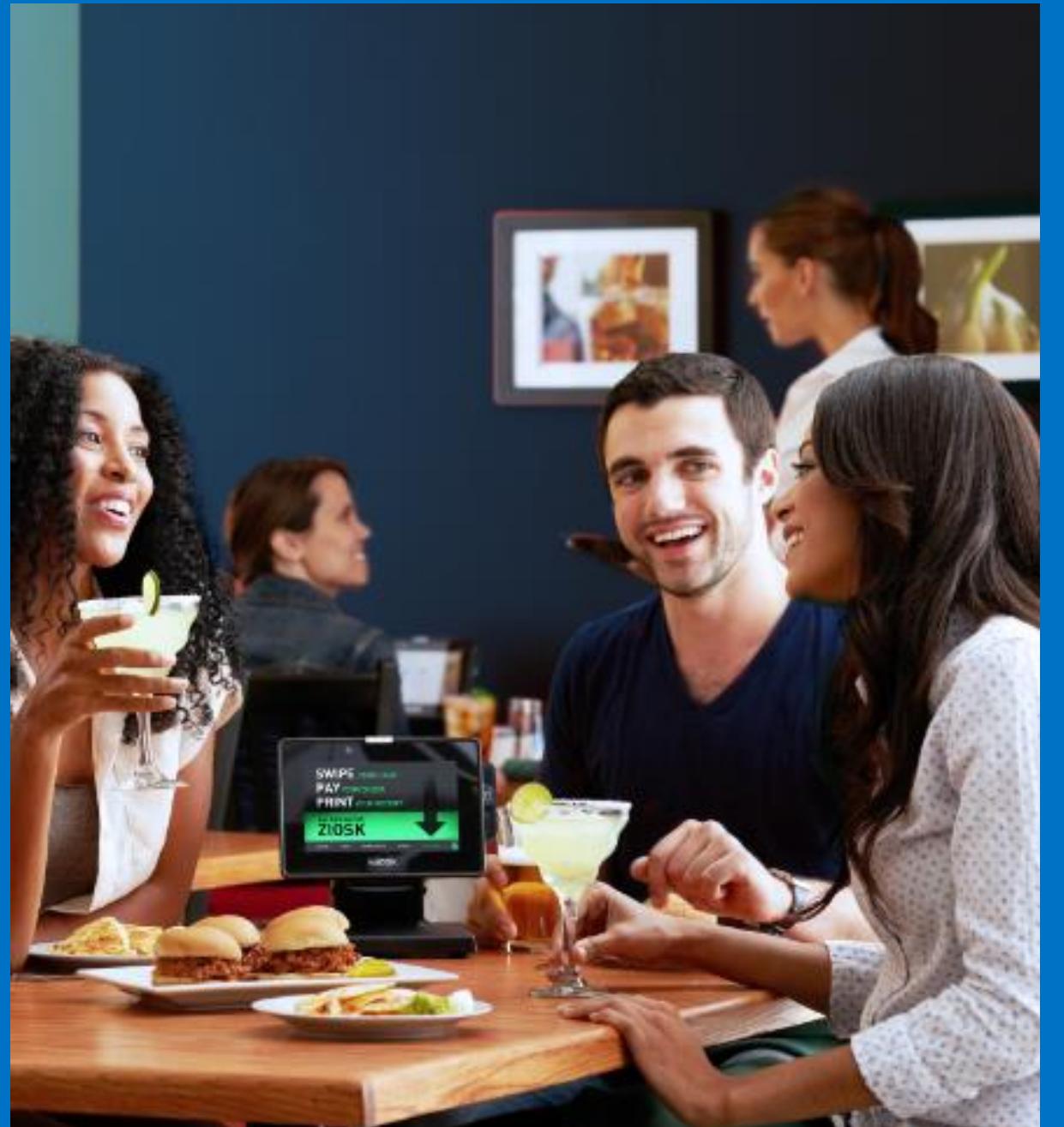
- Gather data from table-side devices at restaurants
- Predict promotions/offers and content to upsell to guests

Ziosk turned to Microsoft gold partner, Artis Consulting to deploy a hybrid deployment consisting of the Analytics Platform System, Azure HDInsight, Power BI, and Azure Machine Learning.

"Until now, we haven't had the ability to optimize the guest experience based on their specific interactions with the devices. With Azure, we can close the loop."



Kevin Mowry  
Ziosk  
Chief Software Architect

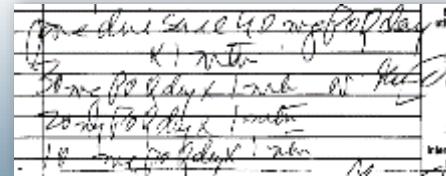
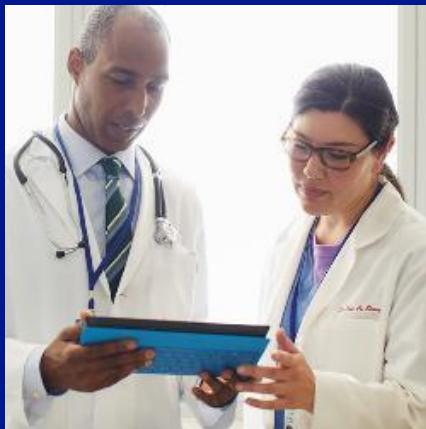


# Big Data in Healthcare

## Big Data in Health



- Predictive Analysis of Patient Health & Clinical Decision Support
- Population, risk, and Care management
- Real-time quality measures to assist providers w/regulatory requirements
- Medical research data (eg. genomics)
- Recruit cohorts for pharmaceutical trials



- Scan handwritten notes and do natural language processing
- Analyze if symptoms might map to bigger outbreak



- Process large volumes of data from any healthcare provider EHR system
- Assist in showing compliance



- Process 6 years worth of data in a few hours without any infrastructure



- Collect clinical trial data (from automated equipment, sensors)
- Find patterns on this data (chemical compositions, enzymes)



Beth Israel Deaconess Medical Center



- Store 7-30 years of data to meet audit requirements

# Big Data in Financial Services

## Big Data Financial Services



- New account risk screens
- Fraud prevention
- Trading risk
- Maximize deposit spread
- Insurance underwriting
- Accelerate loan processing



**RBS**  
The Royal Bank of Scotland



- Actively monitor currencies used by UK manufacturers in supply chain to do risk analysis
- Monitor UK GDP to help customers stay on top of economic trends

**DirectEdge**



- Needed to handle increasing amounts of finance, compliance, and legal data from trading operations
- Trading data drives strategic decisions

**Tangerine**



- Track customer feedback on social media and on their blog posts/website to understand loyalty
- Predict at-risk clients to reach out to

**Milliman**



- Process data for actuaries to analyze results to understand risks for insurance companies
- Milliman's application understands relationships between people, process, and technology to manage risk

Tangerine partners with Microsoft to build a solution with Analytics Platform System for the data warehouse and uses PolyBase to query Azure HDInsight in the cloud.

"With pre-built integration using PolyBase to query both the relational data warehouse and Hadoop in the cloud, the solution will allow us to reap the benefits of both relational and non-relational data regardless of where it lives."

Kevin Mowry  
Ziosk

Chief Software Architect



# Agenda

Big Data As Part of Cortana Analytics

Business Scenarios For Big Data

What To Do Next

# Attend big data sessions

Today – Part 2

Hands-on Getting Started with query, storm, and HBase

1:00

Baker

Tomorrow

New services in the Cortana Analytics Suite

10-12

Hood

Azure Data Lake, Apache Spark, Data Catalog

# Learn More

Read documentation

<http://azure.microsoft.com/en-us/documentation/services/hdinsight/>

Learning Map

<http://azure.microsoft.com/en-us/documentation/articles/hdinsight-learn-map/>

Microsoft Virtual Academy

<http://www.microsoftvirtualacademy.com/training-courses/getting-started-with-microsoft-big-data>

Channel 9 Data Exposed Show

<http://channel9.msdn.com/Shows/Data-Exposed>

Try 30 day trial

<http://azure.microsoft.com/en-us/pricing/free-trial/>

