Session 25: Data: Governance and Efficient Management

Moderator:
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Presenters:
Greg Boyd

Jonathan Bruce Glowacki FSA,MAAA,CERA

Don Loden

Data Considerations to Effectively Support Advanced Analytics

Jonathan Glowacki, FSA, CSPA, MAAA, CERA

Principal and Consulting Actuary

There is a crystal ball. It is called math.

Examples within Milliman

(Why should you listen to me?)

Examples within Milliman

Milliman

1. Pixel **Find Pixel analyzes portfolios from various sources: your recent quotes, current policies, or Milliman's market basket datasets, which are populated with hundreds of thousands of risk profiles calibrated to represent various markets.**

2. Datalytics **Milliman Datalytics-Defense ® employs powerful data mining algorithms to help companies detect patterns in attorney billing practices, allowing them to better understand their costs and develop more effective claims defense strategies.**

3. M'PIRE **Mortgage platform to monitor mortgage market trends, analyze CRT deals, and perform return on capital projections for reinsurance deals**

4. PRM Analytics **Milliman PRM Analytics provides insight into actuarial risk and clinical opportunity. PRM connects the clinical characteristics of the patient with the estimated actuarial value that may be derived from the management of that patient.**

5. Milliman Advanced Risk Adjusters **A suite of risk adjustment tools for population analysis that is perfectly suited for budgeting, pricing and underwriting, payment, stratifying risks, and many other predictive modeling applications for the health insurance industry.**

6. Milliman Intelliscript Projects **GRx, Milliman IntelliScript has combined the value of prescription histories with the power of predictive modeling to bring medical data to new group underwriting.**

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Data Architecture Case Study

Federal Housing Administration

Project Overview

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- Client had a central data repository for various points of information

- Data warehouse contains over 24 databases with information on borrowers, performance, accounting data, claim data, and other information dating back to 1975

- On top of this, a contractor was used to perform forecasts, using data extracts, with limited means of client to access results and perform internal sensitivity testing

- Client was looking for a centralized platform to access data for reporting, independently run the financial models, save model results, and merge historical data to forecasts

Project Overview

- Architecture Requirements
  - Provide access to various members of staff, with different levels of permission, access to data and forecast models
  - Provide a robust change management process to monitor and track changes to the models over time
  - Provide access to the forecast models, at the loan-level (over 1 billion loan quarters), for client to run independent of contractor
  - Ensure consistent access to data and definitions across various functional
  - To be able to access the data remotely via web-browser

Technical Solution
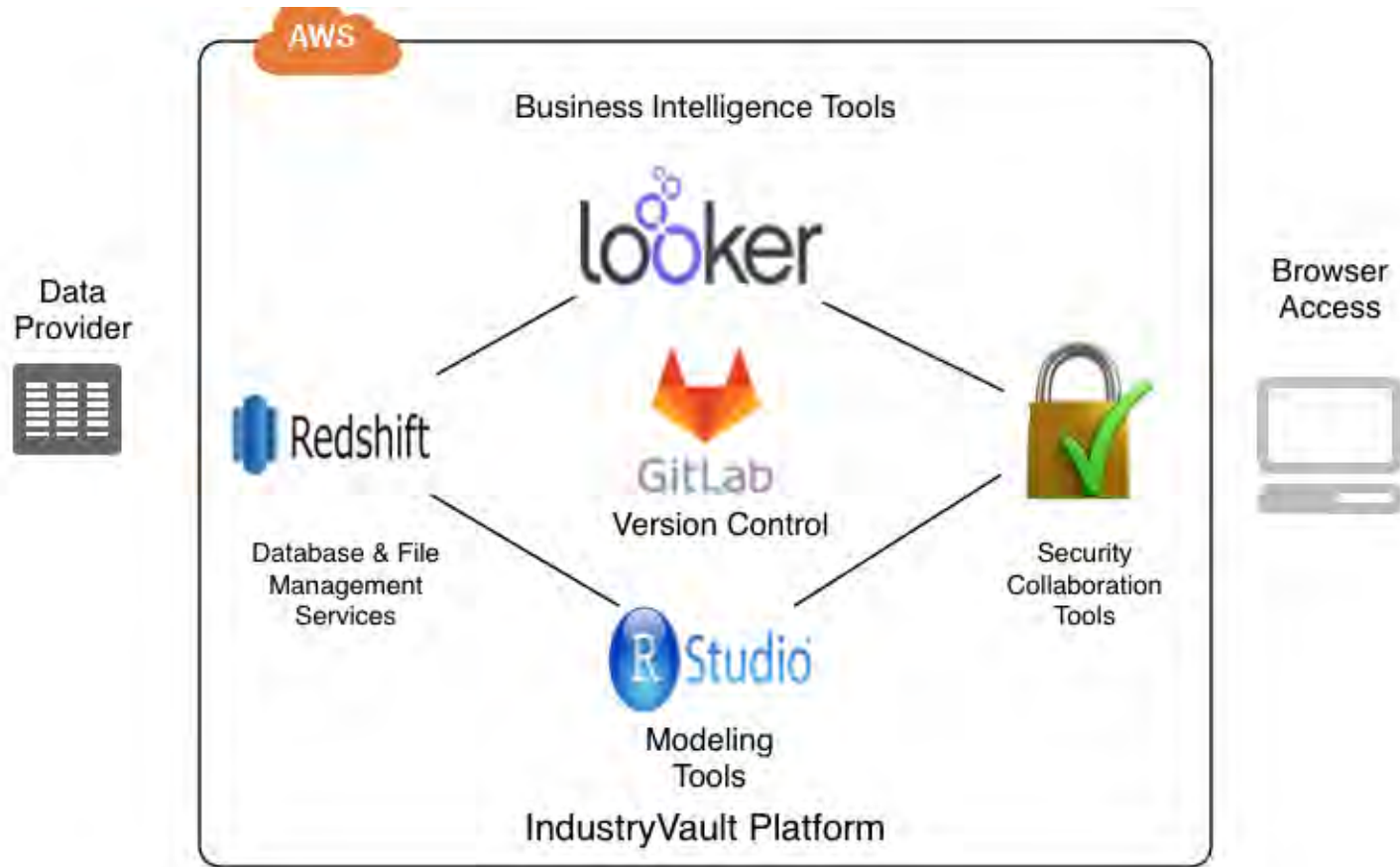
Amazon Web Services
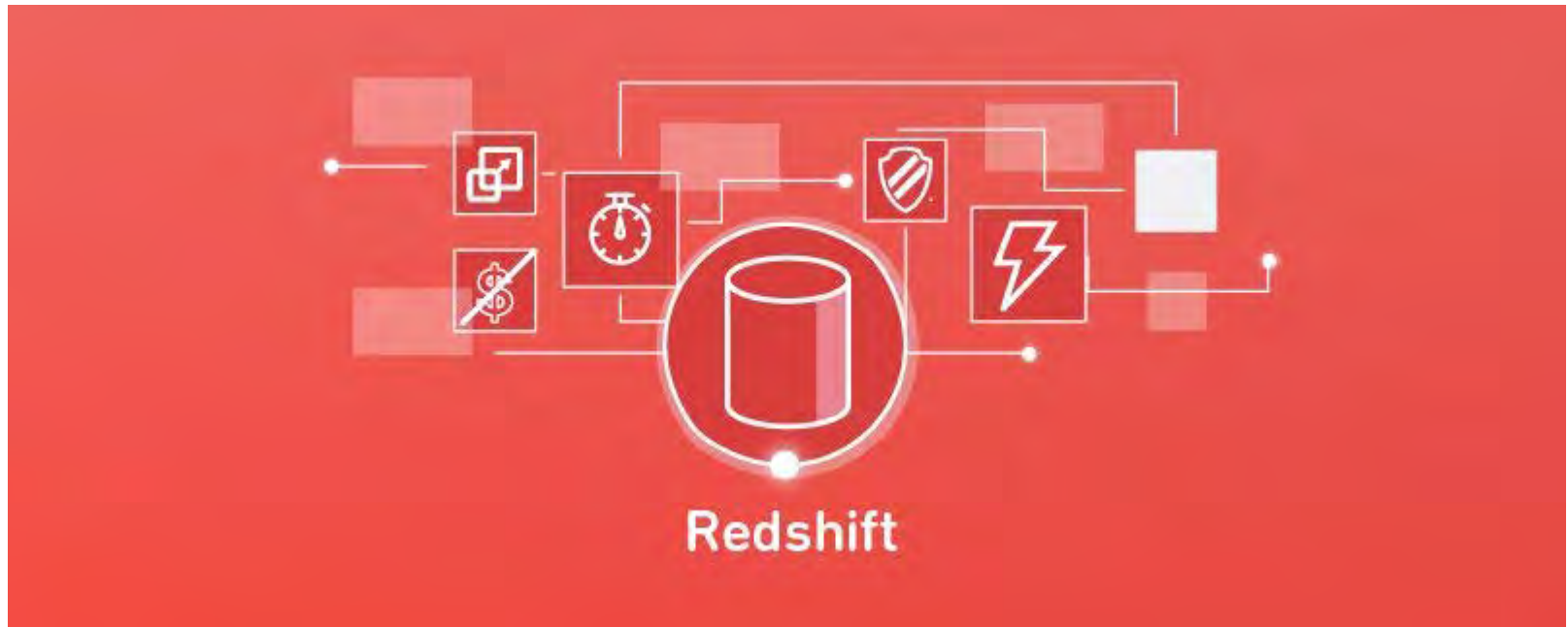
Scalable, fast, "single source of truth"

Version Controlled Collaborative Workspace

Version Controlled Collaborative Workspace

Advanced Analytics

Business Intelligence

Project Results

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- Single source of truth for data that is governed by a robust ETL and data manipulation process

- Data updates are scheduled to automatically once a month with little human interaction (with the exception of final review and approval)

- Access to data has expanded from pre-approved SAS programmers (limited number) to executive management; reports are generated within minutes compared to weeks

- Personalized reports are automatically generated and e-mailed to management as soon as the data in updated

- Access to models is fully transparent to management and files are shared through a Git environment as opposed to shared networks / e-mailing code with multiple versions

- Model validation and review is streamlined by simply providing access to the platform to third parties on a "read only" basis

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Jonathan Glowacki

Principal and Consulting Actuary, Milliman

Jonathan holds a Bachelor of Science degree in Mathematics and is a Fellow of the Society of Actuaries, a Chartered Enterprise Risk Analyst through the Society of Actuaries, and a Member of the American Academy of Actuaries. He has provided consulting services, including predictive analysis and econometric modeling, for mortgage servicers and investors, financial guaranty insurers, mortgage insurers, and government agencies. He has extensive experience in analyzing mortgage risk and mortgage-backed securities including evaluating loan repurchase risk, designing quality control processes, and estimating loan loss reserves.

Jonathan has published articles and presented for organizations such as the MBA, PRMIA, and the Society of Actuaries. Jonathan has been involved in mortgage reform discussions with the Department of Treasury, FHA, FHFA, USMI, and others.

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DATA CONSIDERATIONS TO EFFECTIVELY SUPPORT ADVANCED ANALYTICS

Don Loden

Greg Boyd

April 2018

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Face the Future with Confidence

WHO WE ARE

Protiviti is a global consulting firm that delivers deep expertise, objective insights, a tailored approach and unparalleled collaboration to help leaders face the future with confidence. Protiviti and our independently owned Member Firms provide consulting solutions in finance, technology, operations, data, analytics, governance, risk and internal audit to our clients through our network of more than 70 offices in over 20 countries.

We have served more than 60 percent of Fortune 1000® and 35 percent of Fortune Global 500® companies. We also work with smaller, growing companies, including those looking to go public, as well as with government agencies. Protiviti is a wholly owned subsidiary of Robert Half (NYSE: RHI). Founded in 1948, Robert Half is a member of the S&P 500 index

Our revenue*:
$817 million
in 2017

Over **20 countries**
in the Americas, Europe, the Middle East and Asia-Pacific

More than
3600
professionals**

70+
offices

*Inclusive of Protiviti's Member Firm network, revenue for the year ending 2017 was $888M
**Inclusive of Protiviti's Member Firm network, the number of professionals is approx. 5000

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WHAT WE WILL COVER

Do you have enough data for your identified needs?

What strategy is most effective to meet the data needs of today and tomorrow?

How do you organize your data efficiently and securely?

Questions

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EXPLOSION OF INFORMATION

An explosion is a rapid increase in volume and release of energy in an extreme manner.

Consider what is happening in our industry…….

Massive volumes of data available…
Companies are generating and sending out in many directions…

What do we need?

How do we store it, manage it, secure it?

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THE INSURANCE LIFECYCLE - DATA EXPLOSION

There is a Data Explosion occurring across all functions within the Insurance lifecycle.

| Product Development | Marketing | Acquisition | Underwriting | Service | Claims |

Facebook

D&B

State and Local

Claim Data

Twitter

Verisk

Strata

Field Operations

Claim Notes

LinkedIn

Lexus Nexus

Expense

Legal

IBM

CMS

Provider Rating

Demographics

Photo/Video

CCC

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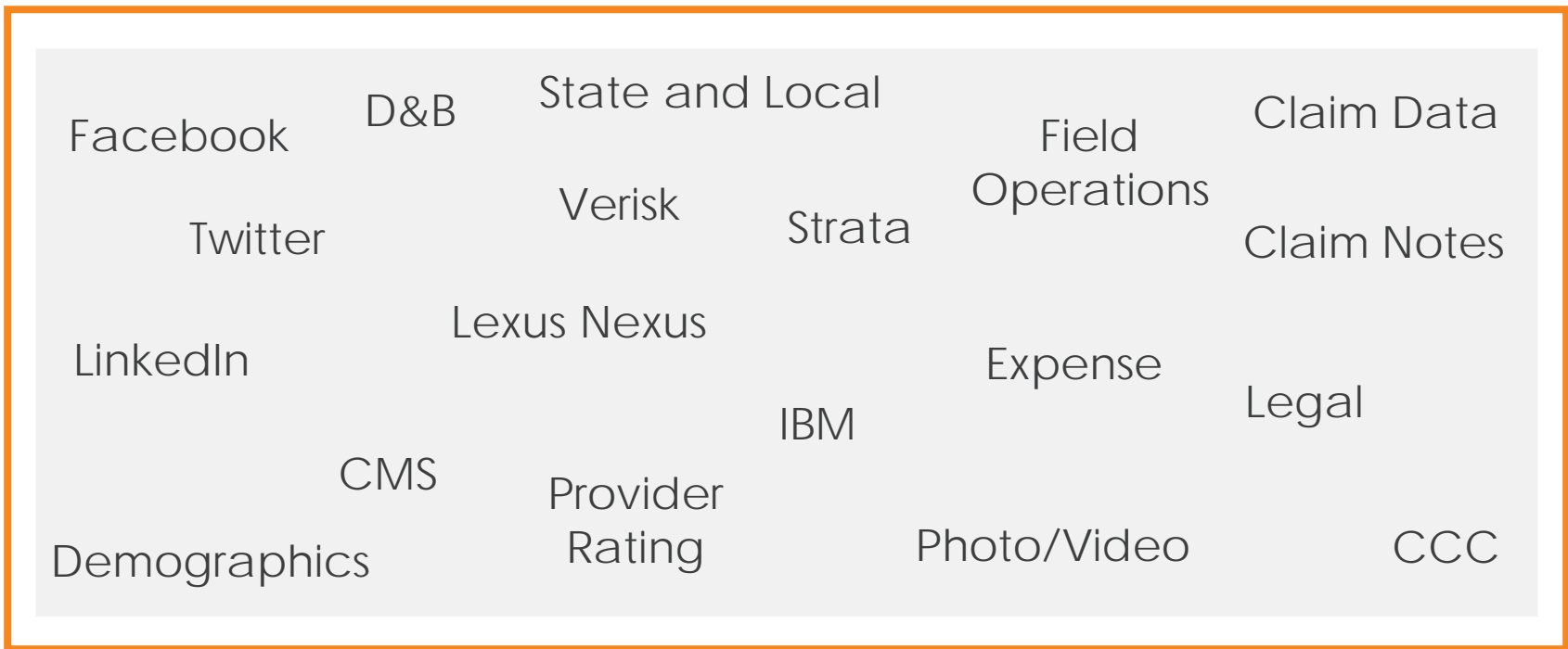
ANALYTICS IS AN IMPERATIVE

"With the proliferation of data and escalating risks in the global economy, insurers must place a priority on the enablement of advanced analytic capabilities to remain competitive, reduce risk and provide compelling services to their customers."

Greg Boyd, Protiviti

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ANALYTIC HOT TOPICS IN INSURANCE

Customer Engagement — Seamless interaction

Underwriting Effectiveness — Accurately pricing risk

Claim Handling — Paying the right amount with the lowest LAE

Fraud Detection & Mitigation — Mitigate risk and manage fraud

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ANALYTIC HOT TOPICS IN INSURANCE

Customer Engagement

Underwriting Effectiveness

Claim Handling

Fraud Detection & Mitigation

- Consistent and personalized view of the customer across all lines of business "360 degree view"

- Predictive insights on customer buying patterns and behavior to support personalization

- AI and Chatbots, voice recognition and unstructured text mining for optimal omni-channel customer interactions

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ANALYTIC HOT TOPICS IN INSURANCE

Customer Engagement

Underwriting Effectiveness

Claim Handling

Fraud Detection & Mitigation

- Deeper granularity and insight to increase confidence scores and accurately price risk

- AI to support real time decisioning and accelerate quote delivery to increase customer satisfaction

- Analytics to reduce uncertainly and unnecessary labor to analyze historical anomalies

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ANALYTIC HOT TOPICS IN INSURANCE

Customer Engagement

Underwriting Effectiveness

Claim Handling

Fraud Detection & Mitigation

- Automated settlement of low severity claims quickly with little or no human interaction

- Accurate loss reserving leveraging machine learning to quickly compare losses against similar claims

- Loss Cost Drivers analysis to manage Loss Adjustment Expense

- Analytics to understand all participants and linkages to support claim professionals decisions

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ANALYTIC HOT TOPICS IN INSURANCE

Customer Engagement

Underwriting Effectiveness

Claim Handling

Fraud Detection & Mitigation

- Predict potential fraudulent activity through the use of modeling, rules, internal and external data mining, exception reporting and machine learning

- Location analytics to understand patterns of travel, purchases and relationships

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ACHIEVING SUCCESS WITH THE ANALYTIC PRIORITIES WILL REQUIRE......

- **A renewed focus on rapidly changing technology enablers and processes to support all activities**

- **Sourcing of internal and 3rd party data,**

- **Discovery capabilities to assess data assets and demonstrate value,**

- **Robust delivery capabilities to provide consistent delivery of analytic insights to the business.**

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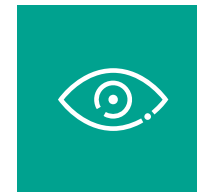
KEY SUCCESS FACTORS
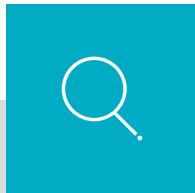
Core focus on the line of business priorities and analytic needs

Clarity of where Business Intelligence, Predictive modeling and Cognitive/Artificial Intelligence and Machine learning fit within the business use cases and the optimal consumption method based on LOB needs and user groups.

Data - A focus on ensuring that internal data sources are governed, secure and of the highest quality, and 3rd party sources are properly evaluated and are maintained in an accessible environment. All location specific data should be geocoded to support geospatial analytics.
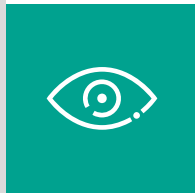
Discovery - Flexible and simple data analysis and tools suitable for both data engineering to evaluate data sources and business users to manipulate visualizations to prove out innovative ways to analyze the business discover new use cases for more predictive and prescriptive analytics and consistent information delivery.

Delivery – Industry proven and robust information delivery tools and methods to deliver near real time predictive and prescriptive capabilities to Agents, Brokers, Sales teams Underwriters and Claim Professionals.

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HOW DO YOU DESIGN FOR YOUR FUTURE DATA

Current State Assessment	Future State Planning	Gap Analysis	Recommendations
Current State evaluation involves the interviewing of key Business and IT stakeholders to define and understand the current data needs and challenges. Discussion of key themes, pain points, high-level functional requirements and technical requirements during the interview sessions and technology overviews with IT.	Validation sessions are held to confirm the understanding of both the Current State functionality and desired Future State capabilities. Using the information gathered from the Current State discussions and review of the existing data strategy, this phase will finalize the Future State design required to accommodate the client's needs.	Conduct a gap analysis to determine a list of initiatives that will minimize (and eventually eliminate) functional and technical gaps between the Current State and the desired Future State data strategy program. Work with key stakeholders to prioritize initiatives, refine key gap themes and plot gap closing initiatives by impact and priority.	Deliver detailed functional and technical recommendations (both tactical and strategic) to the project sponsors and key stakeholders with a strategic plan for execution.

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GAP ANALYSIS FOR FUTURE STATE (2019 AND BEYOND)

Functional & Architectural Gaps

Integration

	Gap Analysis		
	People	Process	Tech
Data ETL	🟢	🟡	🟢
Data Streaming	🔴	🔴	🔴
Big Data Analysis	🔴	🔴	🔴

Alternate Data Layer

	Gap Analysis		
	People	Process	Tech
Data Lake (Hadoop)	🔴	🔴	🔴
Data Archiving	🔴	🔴	🔴

Enhanced Data Warehouse

	Gap Analysis		
	People	Process	Tech
Data Quality	🟡	🟡	🔴
Master Data Management	🟡	🟡	🔴
Insights Factory	🟡	🟡	🟡

Consumption

	Gap Analysis		
	People	Process	Tech
Operational Reporting & Governed Reporting	🟡	🟡	🟡
Self-Service & Discovery Analysis	🟡	🟡	🟡
Advanced Analytics	🔴	🔴	🔴

🟢 No Gaps	🟡 Partial Gaps	🔴 Gaps

*For details regarding Gap Analysis, see Gap Analysis Details in the Current State Appendix section.

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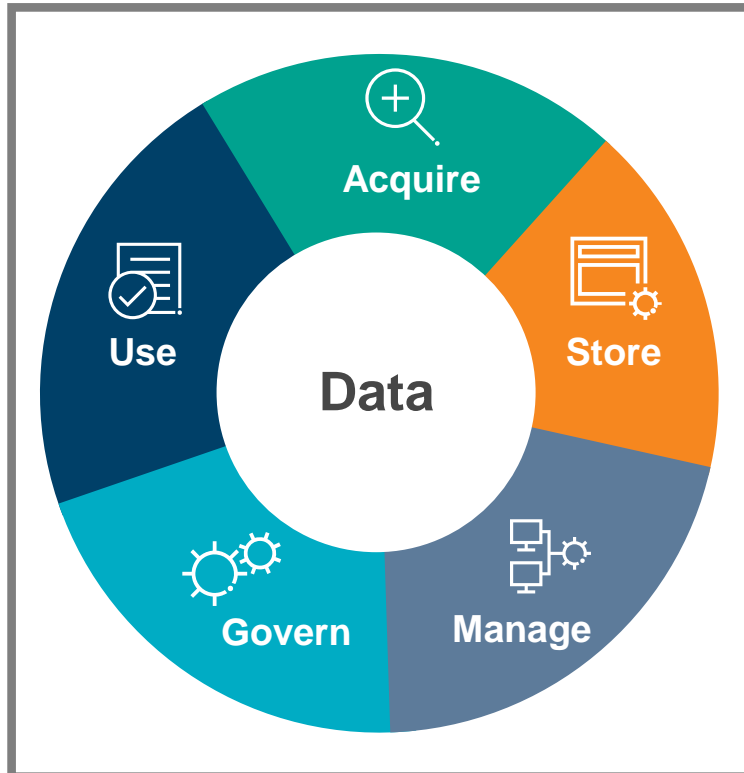
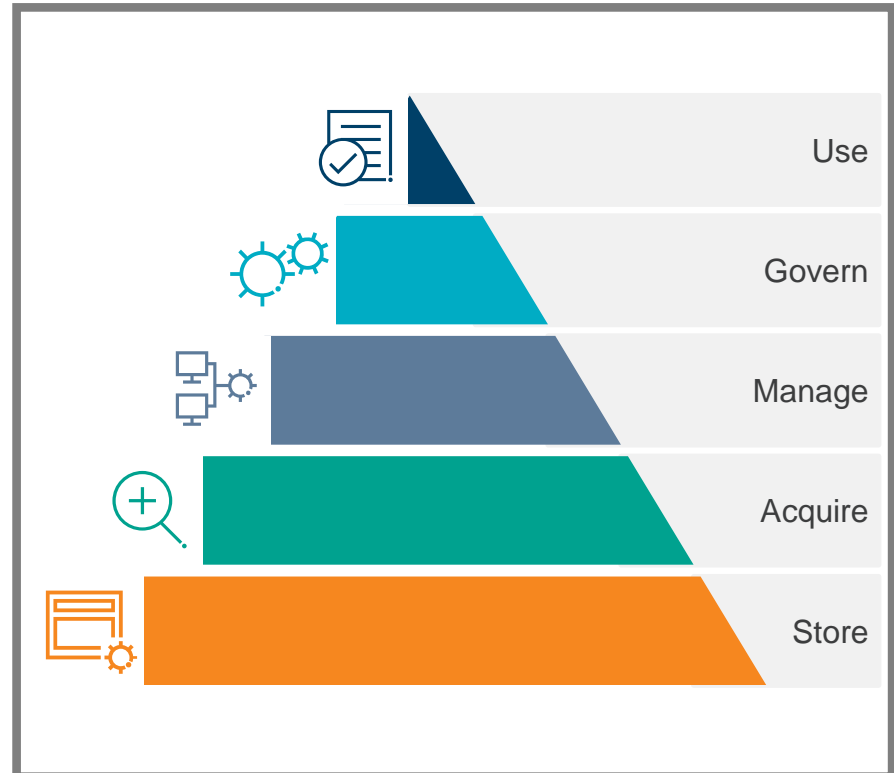**How do you organize your data efficiently and securely?**

Questions

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MOST DATA STRATEGIES FOCUS ON STORAGE AT THE EXPENSE OF USE

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DATA AND ANALYTICS NEEDS CHANGE DUE TO CONSTANT INTERNAL AND EXTERNAL FACTORS. RESPONSIVENESS IS KEY

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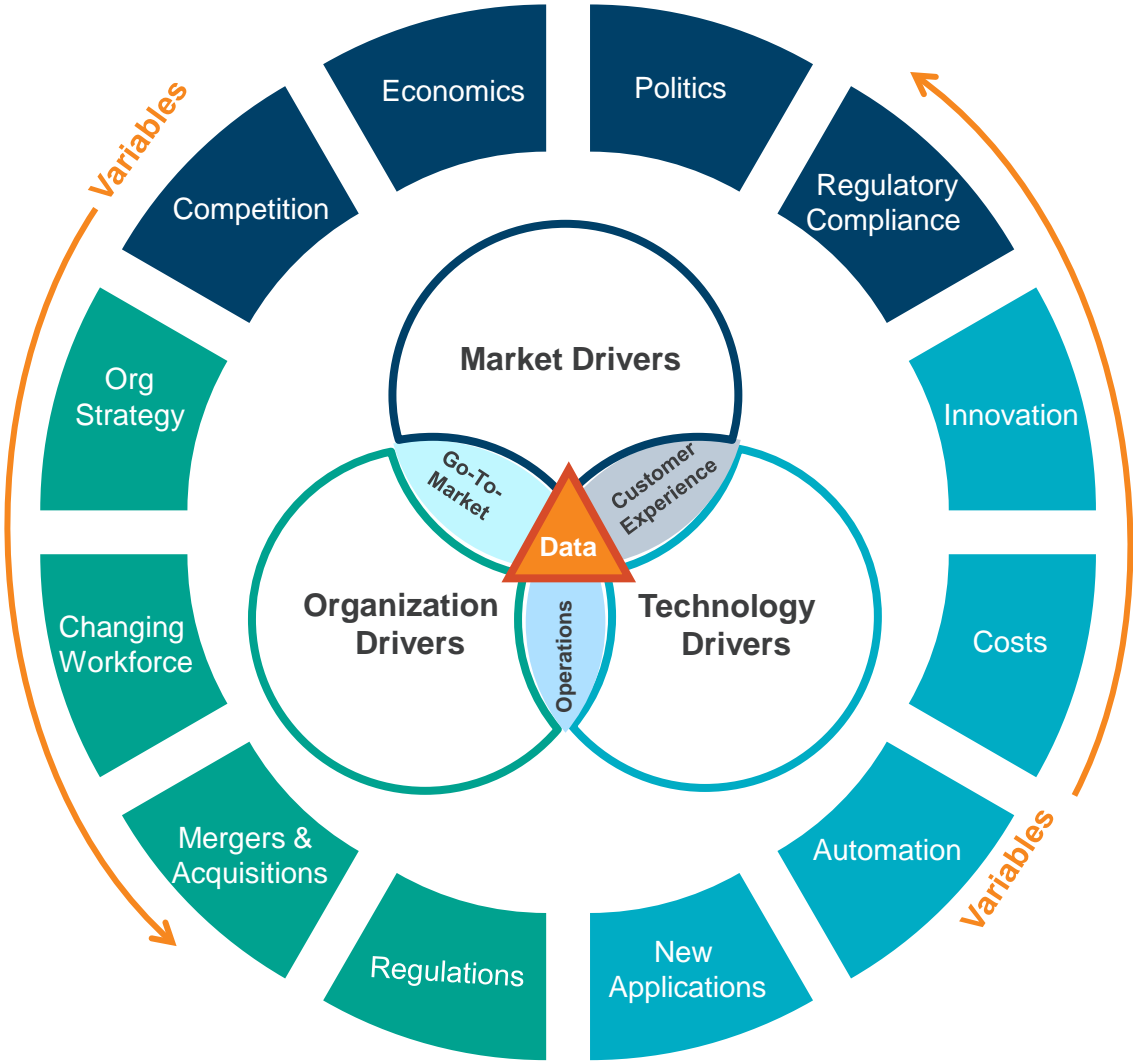
COMPLETE 360O DEGREES VIEW OF THE CUSTOMER

Corporate internal data

Transactions data

Government agencies data

Business Processes

App usage, mobile log

Mobile Usage

Items owned
Wish list

Products

E-commerce, web searches

3D-360º View

Sensors & IoTs
Weather, Pollution

Twitter, Facebook, LinkedIn

Social Media

3rd Party

Satellite Imagery
Geolocation,

Customer

Google Search trends

Geographic, Demographic,
Customized

Member registration, customer service
data, clicks, chat, text. emails

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HOW TO ENSURE PEOPLE KNOW WHAT THE DATA REPRESENTS AND WHAT IT DOES NOT?

- Pay attention to data quality! Without quality data your algorithms are just math!
- Without quality data your business intelligence or advanced analytics will fail…

Recent (2014 – 2016) survey results say:

33%

59%

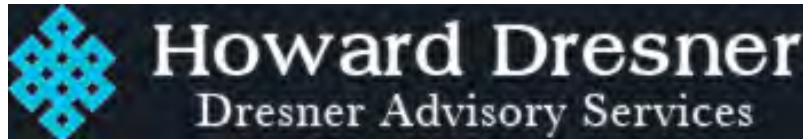**ComputerWeekly.com**

50%

Gartner

70%!!!

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WHAT IS DATA QUALITY?

"Data is of high quality when it is fit for intended uses in Operations, Decision Making, and Planning"
– J. M. Juran

Can you use the data or is it junk?		
Data Content Errors	**Error in migration (ETL)**	**Data Inconsistency**
• Missing Data • Invalid Data • Out-of-Date Data	• Normalization Inconsistencies • Duplicate or lost data	• Multiple formats for same data • Field overuse • Different meanings for the same codes

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EVOLUTION OF THE DATA WAREHOUSE

- Increase Data Volumes
- New Data Sources and Types
- Big Data + DW Workloads

Cloud

Data Warehouse

Visualize

LOB				
CRM				
Graph				
Image				
Social				
IoT				

Ingest	Store	Prep & train	Model & serve
Data Orchestration and Monitoring	Big Data Store	Hadoop/Spark and Machine Learning	Data Warehouse

Apps & Insights

Courtesy of Microsoft

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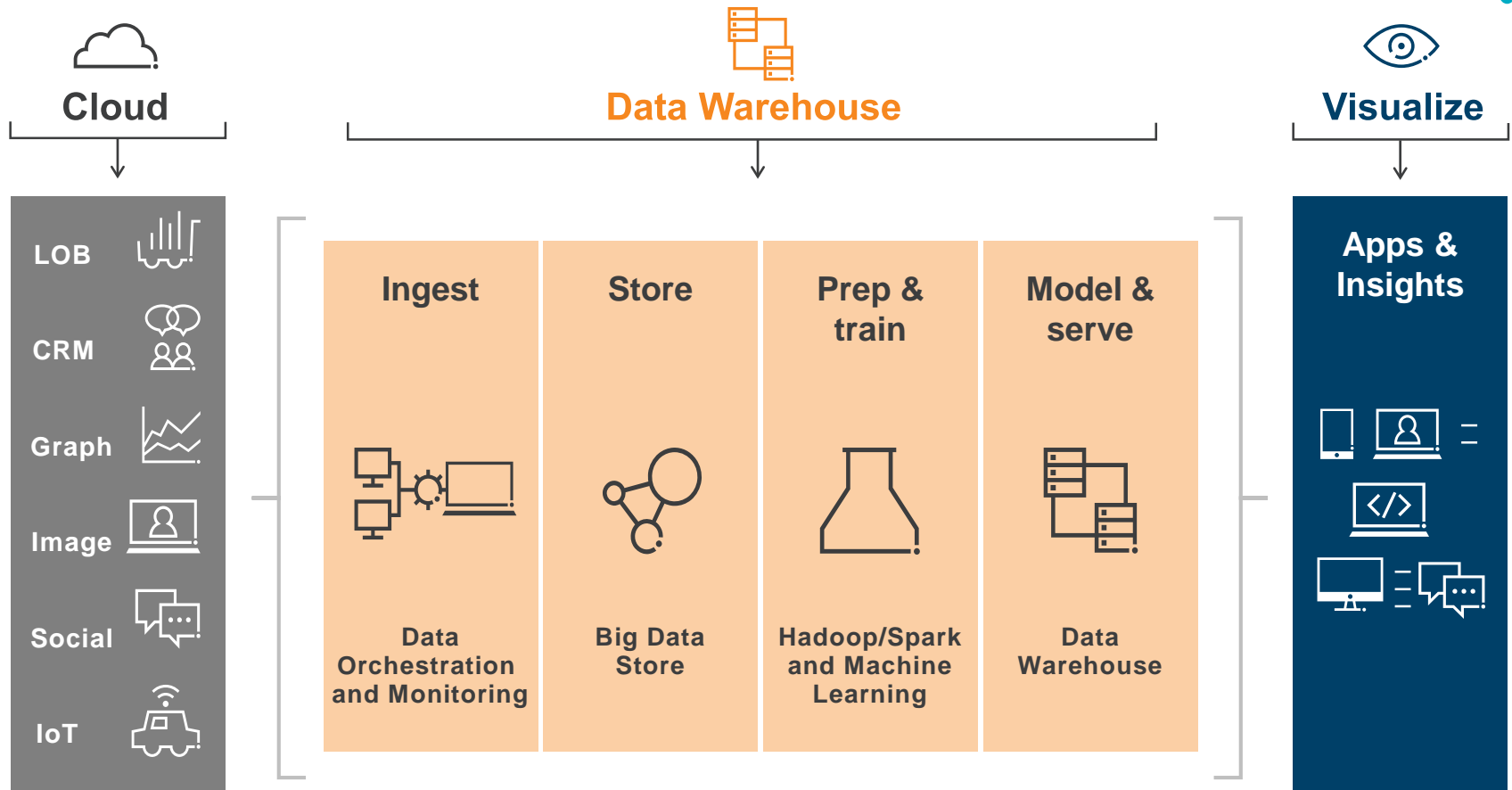
THE CONSOLIDATED VIEW – LAMBDA ARCHITECTURE

Source Data

Azure

Presentation

Sensors and IoT (unstructured)

Logs, Files, & media (unstructured)

Business/Custom Apps (structured)

Azure Event Hubs

Azure Storage

Azure Machine Learning & Machine Learning Server

Azure HDInsight (Hadoop/Spar)

Cosmos DB

Web & Mobile Apps

Analytical Dashboards

Azure ExpressRoute — **Private Connections**

Azure Data Factory — **Orchestration**

Azure Key Vault — **Key Management**

Operations Management Suite — **Monitoring**

Courtesy of Microsoft

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DON'T BE AFRAID OF CLOUD!

- Get results quickly and try on solutions!
- Current Microsoft examples:

Courtesy of Microsoft

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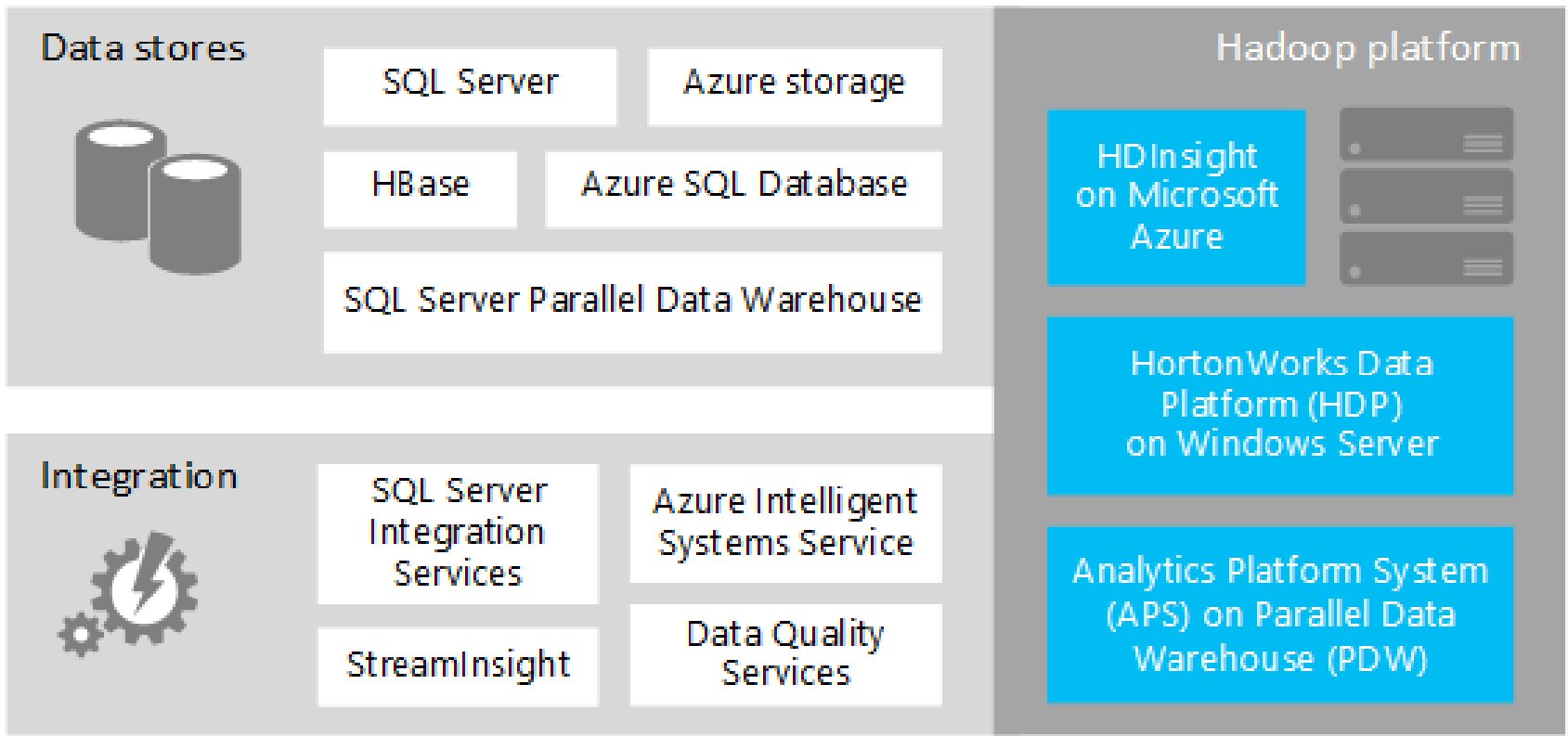
DON'T BE AFRAID OF CLOUD! (CONT.)

Current AWS offerings…

Big Data Analytic Frameworks

Managed, distributed computing for big data

Hadoop & Spark
Amazon EMR

Easily provision a fully managed Hadoop framework in minutes. Scale your Hadoop cluster dynamically and pay only for what you use. Run popular frameworks such as Apache Spark, Apache Tez, and Presto. Learn more »

Elasticsearch
Amazon Elasticsearch Service

Setup and deploy an Elasticsearch cluster in minutes, using a web-based console. Seamlessly run your existing Elasticsearch applications using the Elasticsearch open-source API. Learn more »

Interactive Query Service
Amazon Athena

Easily analyze petabytes of data in Amazon S3 using ANSI SQL. With Amazon Athena, there are no clusters or data warehouses to manage, so you can start analyzing data immediately. You don't even need to load your data into Athena, it works directly with data stored in S3. Learn more »

Courtesy of Amazon

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THANK YOU!

Questions

How to contact us :

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