



# SAS<sup>®</sup> GLOBAL FORUM 2018

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## USERS PROGRAM

April 8 – 11 | Denver, CO  
Colorado Convention Center

**#SASGF**

# Innovate with Data

## Presenter

### Raj Dalal, Founder & Principal, BigInsights

- Raj is acknowledged as a trusted go-to authority for companies who want to drive data-led business innovation. He helps companies craft and executes digital transformation strategies that increase shareholder value using advanced data & AI technologies and techniques.
- In 2013, Raj set up a boutique Big Data analytics research & advisory firm, BigInsights in Sydney, Australia . He has authored research reports, case studies and is regularly briefed by vendors such as IBM, Cloudera, Google, AWS and others on their strategic direction in Data Analytics, AI and IoT
- Founded BigInsights Data Innovation Awards: Recognise leaders in industry that are driving innovation and business value using Data & AI. (see [www.dataawards.org](http://www.dataawards.org))

Twitter: @BigInsights

# Innovate with Data

Case Studies of SAS® in a Hadoop, AI, Machine Learning, and IoT World

# Your Feedback Counts!

Don't forget to complete the session survey  
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1. Go to the Agenda icon in the conference app.
2. Find this session title and select it.
3. On the Sessions page, scroll down to Surveys and select the name of the survey.
4. Complete the survey and click Finish.

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2018

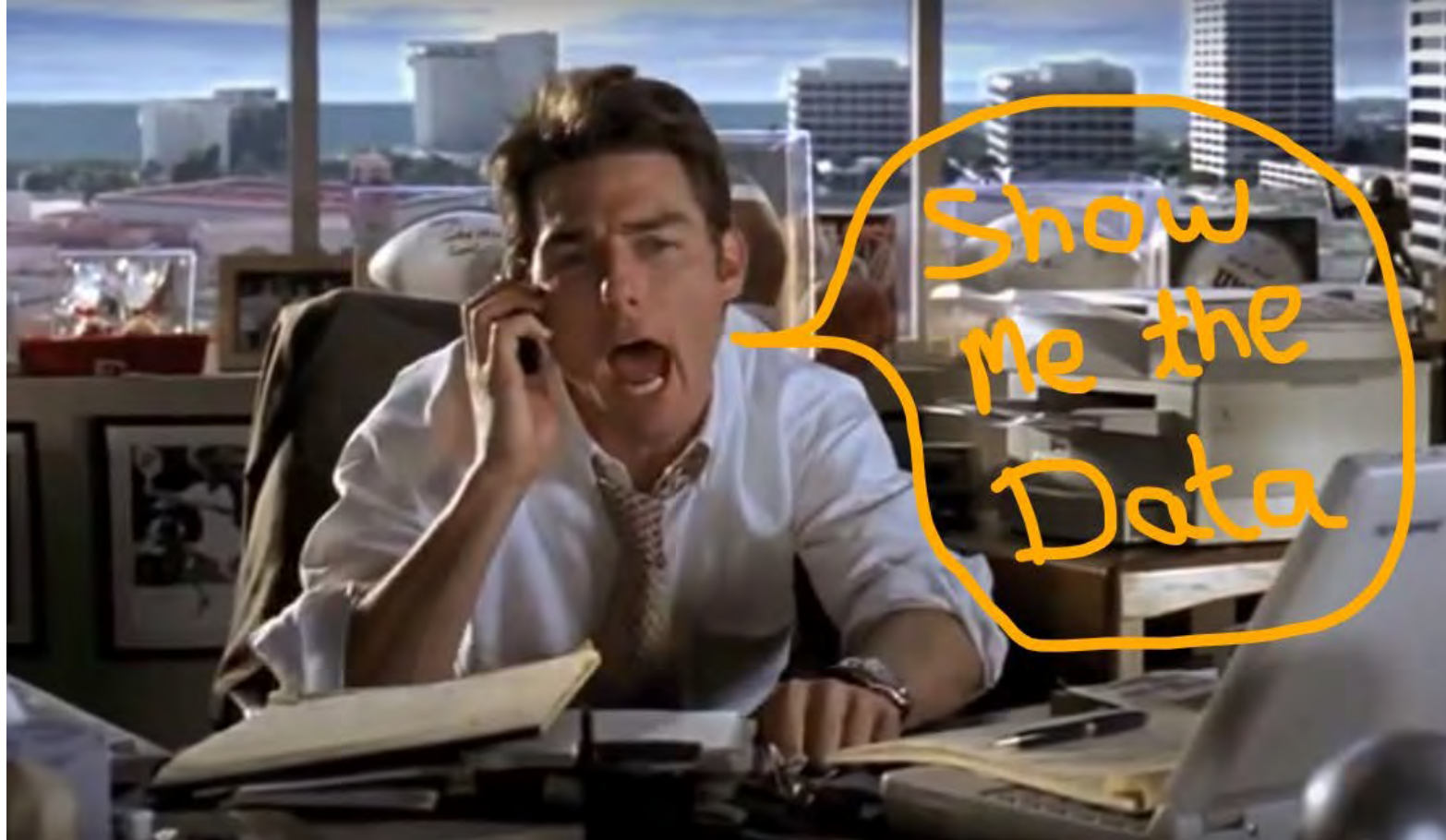
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“In God We Trust – All Others  
Must Bring DATA”

“Without DATA You’re Just  
another person with an  
opinion”

W. Edwards Deming  
Data Scientist



Tom Cruise: Mission Impossible (without Data)



# Why now

- Everything is being instrumented and collecting data
- Cost of storing and computation costs have reduced
- Democratisation of AI & Data Science tools & techniques
- Customer Experience & Expectations
- Digital transformation for business, a survival necessity



# Innovate with Data & AI

## Industry Applications

FSI \* Manufacturing \* Retail, \* Government \* Healthcare \* Telecoms/Media \* Utilities

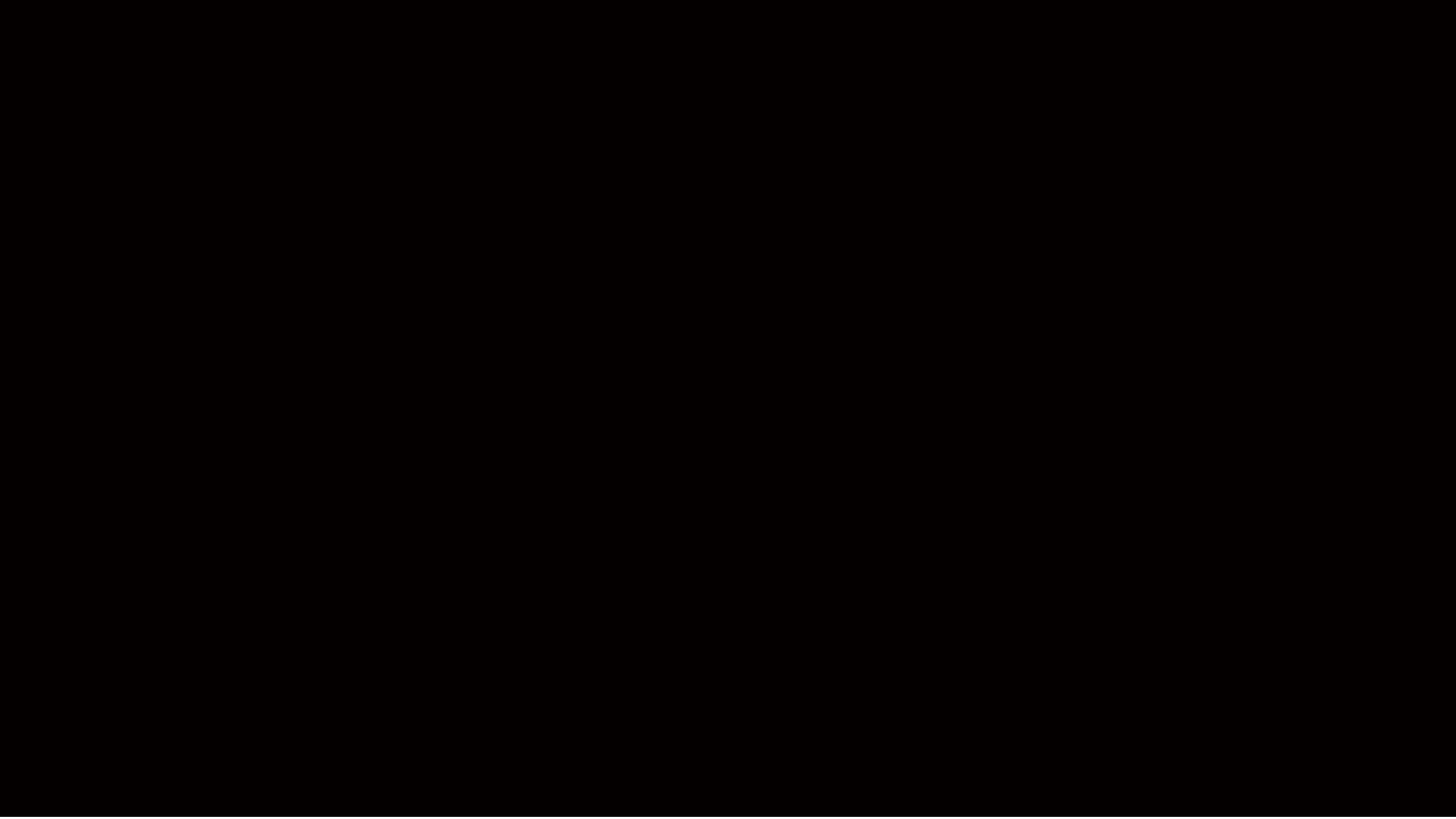
## Acquire, Grow & Retain Customers

Personalization \* Profitability \* Acquisition \* Retention \* 720 degree view of customer

Optimize Supply Chain \* Reduce Fraud \* Predictive Maintenance

Security / IT Infrastructure Ops

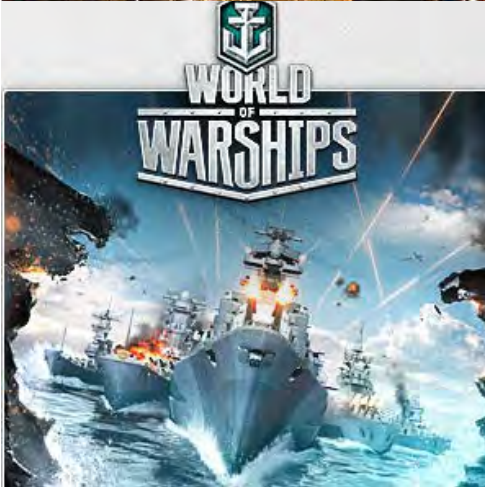
## Data Innovation Platform



# WarGaming

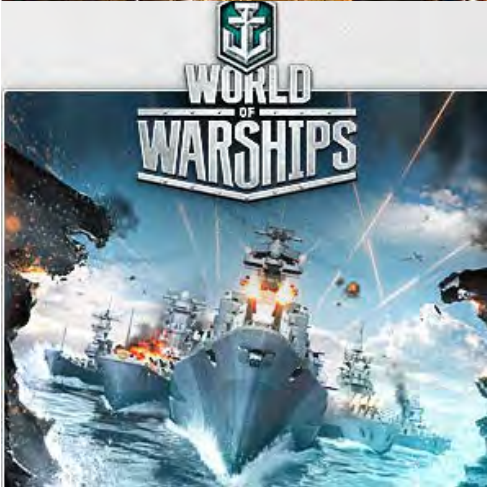
*We deliver legendary online games. Globally. With passion*

- Leaders in the free-to-play Massively Multiplayer Online game (MMO) market across all gaming platforms with over 150 million registered users. Their first blockbuster was **World of Tanks**, launched in 2010. now has a suite of games involving aircraft and warships.
- Pioneer in the ‘free-to-play’ concept of games.
- Make money from up-selling items to make the game more enjoyable and provide a personalized experience..
- Phenomenal growth – Has over 4000 employees working across 15 offices worldwide



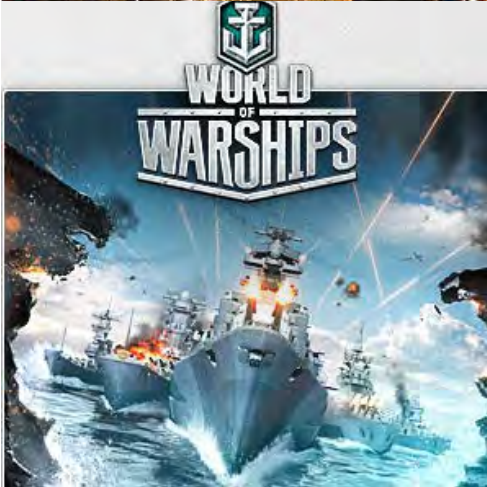
# “The Big Data”

- Three of its mainline games - together generate 550 million ‘events’ a day
- Every game consists of over 15 different main data sources (battle, session, account, logs)
- Players are located in different time zones across Europe, North America, CIS and Asia
- Its team has to process over 3TB of raw data daily

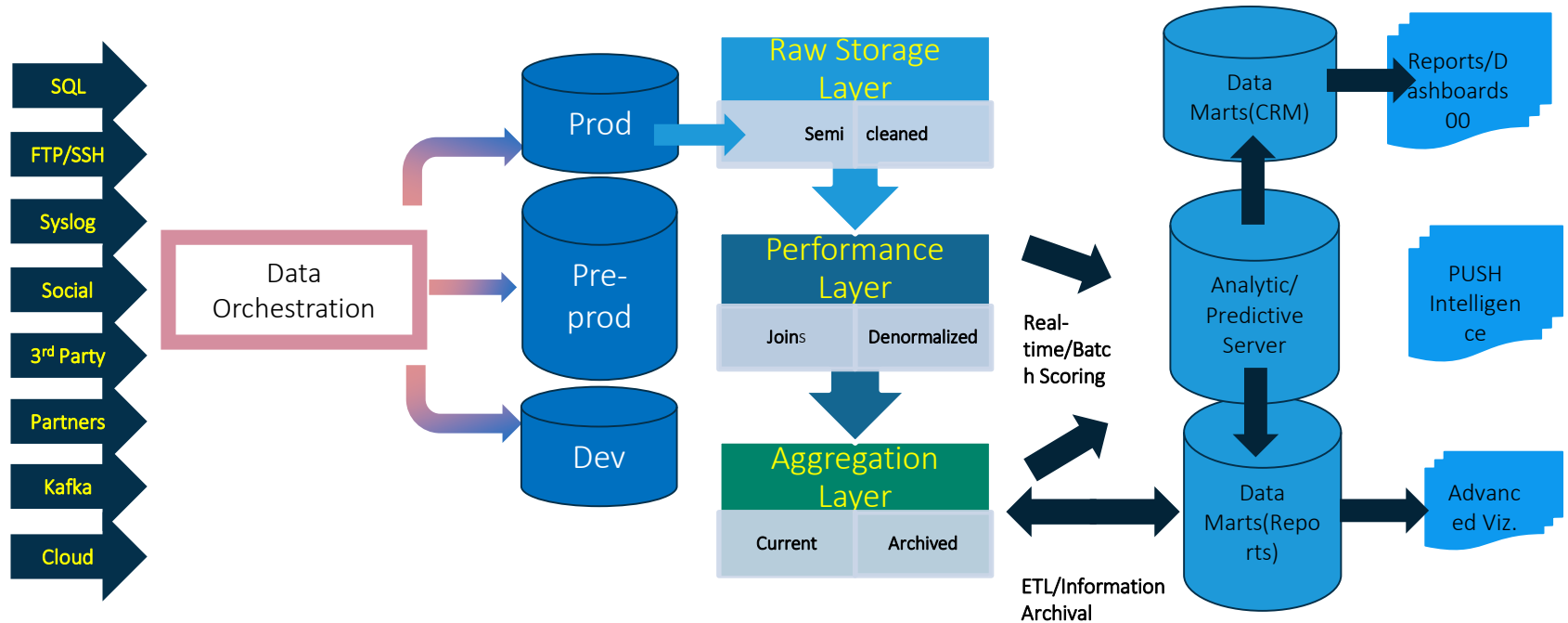


# Analytics Objectives

- Improve the gaming experience
- Customer segmentation and KPI dashboards
- In-game player targeting with offers in real time
- Personalised marketing campaigns
- User research using predictive analytics
- Understanding players and their needs
- Game tracking and game design



# Enterprise Data Warehouse Infrastructure Telemetry and real-time monitoring



Channels    Injection/Integration    Long Term Storage (Data Reservoir)    Optimized Storage    Presentation

# Real Time Recommendation - Results

About 80% of the over 100 million users play the games for free. An important focus for the Wargaming is to increase the percentage of users that “pay-to-play”, and then increasing their LTV.

The Data-driven Real-time Rules Engine (DDRRE) analyzes large amounts of data in real time and allows personalization of game interaction with players through recommendations.

Using complex machine learning algorithms, they identify and predict potential paying customer and then run recommender algorithms to up sell players on items from the premium store. (E.g. The latest tank or aircraft for battle)

Wargaming was able use personalized communication and recommendation made in real time with players to increase LTV compared to those players who weren't contacted at all. This campaign effectiveness was measured at 5-10% across their business when compared to non-personalized interactions.

Using machine learning approach enabled them increased the number of campaigns **being run simultaneously by 10 time** as it minimized the need for a marketing expert to manually design targeted campaigns.

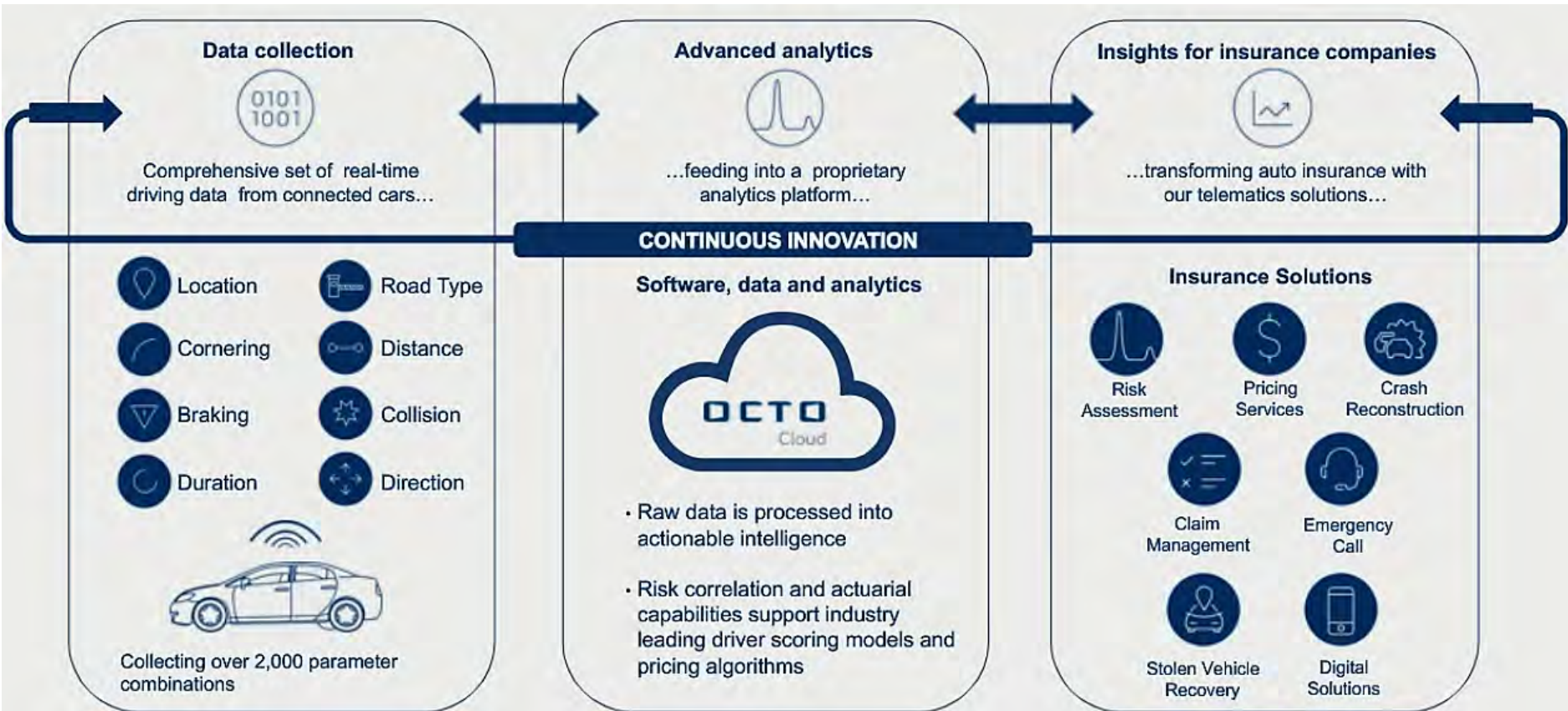




# Octo Next Generation Platform

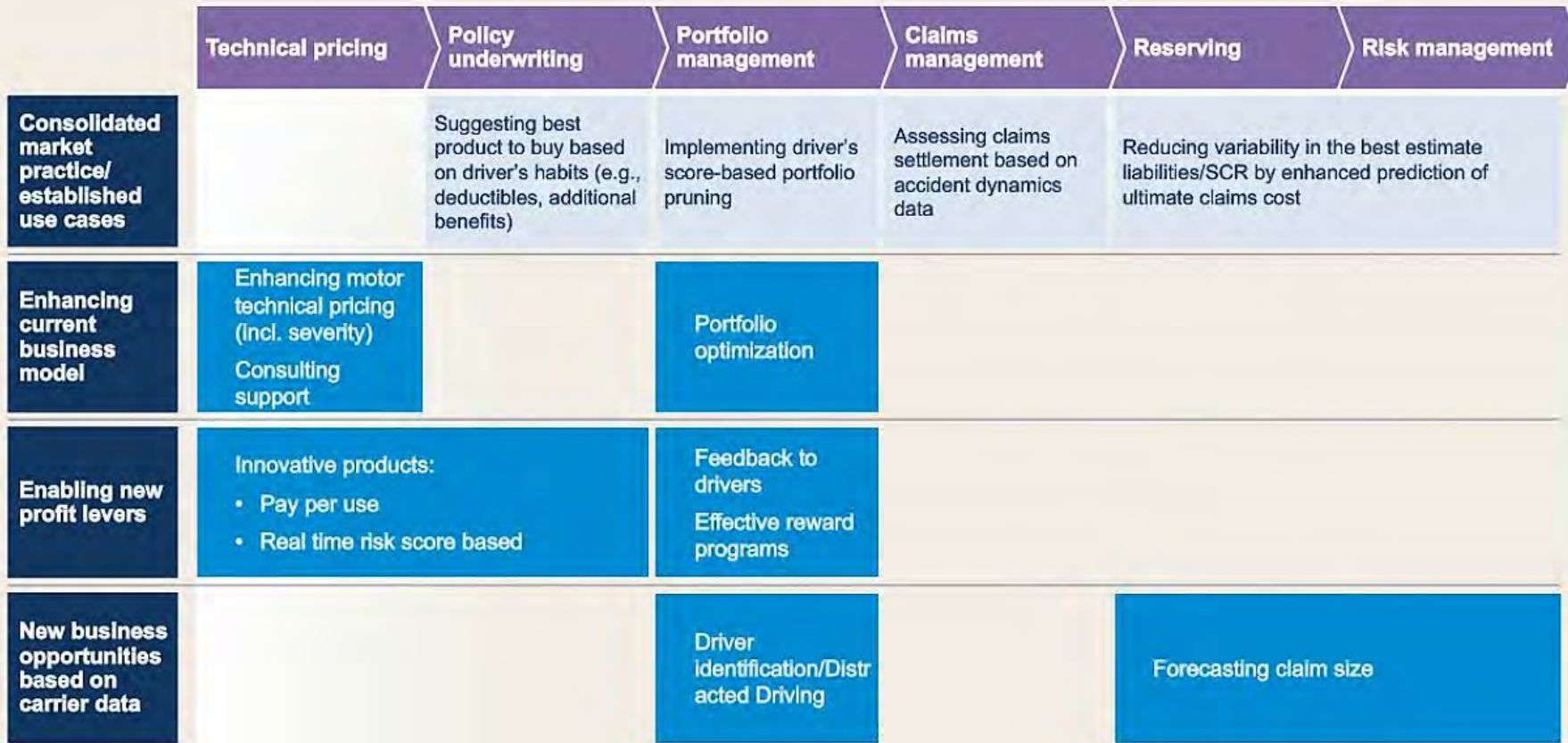


# Data to Insights

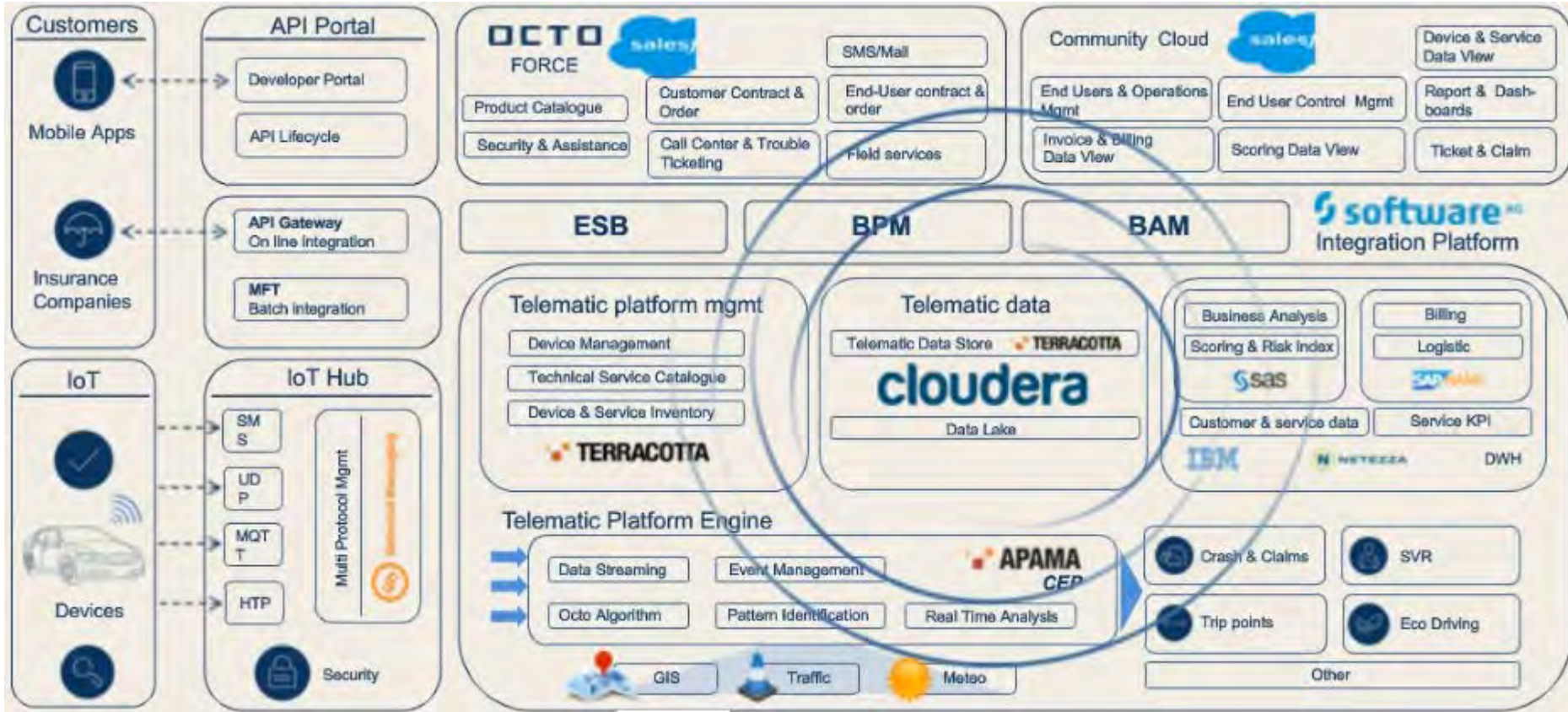


# Insurance Value Chain

Disruptive innovation degree

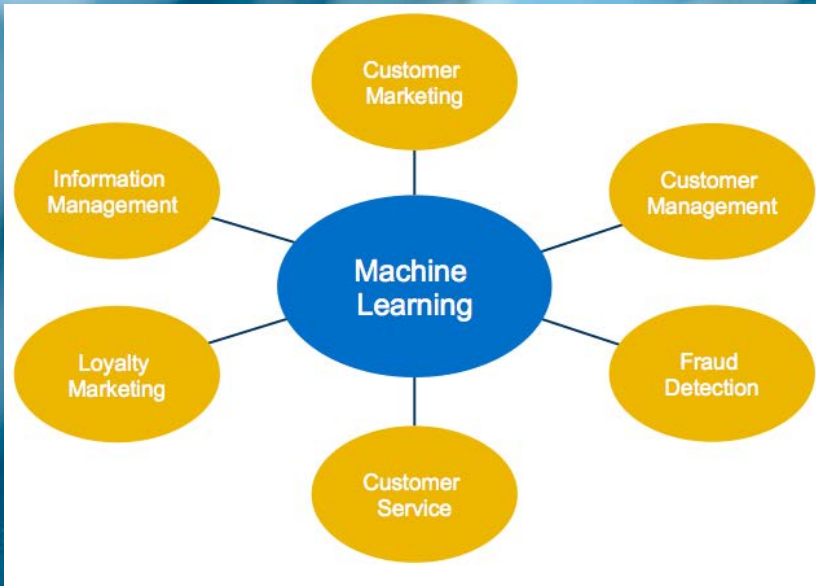


# Octo Platform Architecture





# Data led Innovation at AMEX



104 Million Card Members  
\$1 Trillion in spending per annum  
25% of Credit card spend  
Multi-PB scale of data  
100s of PhDs and data scientists

## Myoffers:

Mobile coupons based on location data  
Personalized Restaurant recommendations

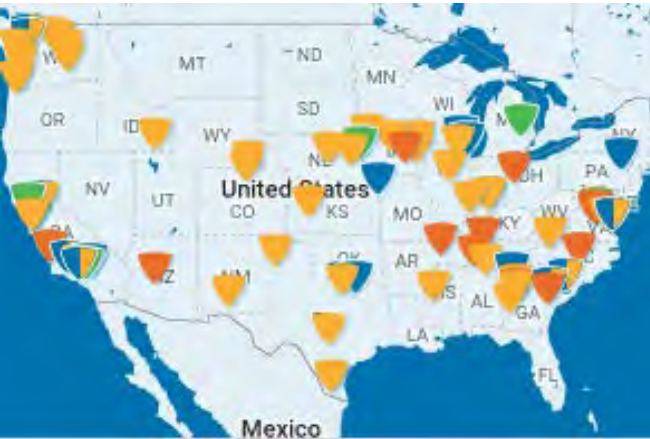
## Fraud Minimization

Make decision in 2-3 milliseconds to approve, reject or automatically trigger alerts to phone, email, text for the cardholder

## New Customer Acquisition

Direct mail campaigns (90%) to online (40%)

# Logistics & Warehousing



- Second largest cold storage warehousing company in North America with over 100 warehouses
- Storage of all major food commodities in their gigantic refrigerators.
- Act as “buffer” for seasonal produce and major spikes in demand (ie Thanks giving and Christmas for Turkey and Ham)
- Cost of cold storage is 3-4X at room temperature so all inefficiencies are magnified

# Warehouse optimisation - Before



# Warehouse Optimisation: After





# Business Outcome

- 25% increase in warehouse density
- Re-configure warehouse at 10% cost of building new warehouse
- Reduce number of aisles traversed from 5 to 2

## Data Science Team

The analytics team is led by visionary data scientist. (Mathematics and statistics background). The team now consists of several PhDs in physics, computer science and master level engineers from different disciplines. It maintains close relations with research departments at universities to bring in specialist skills when required.

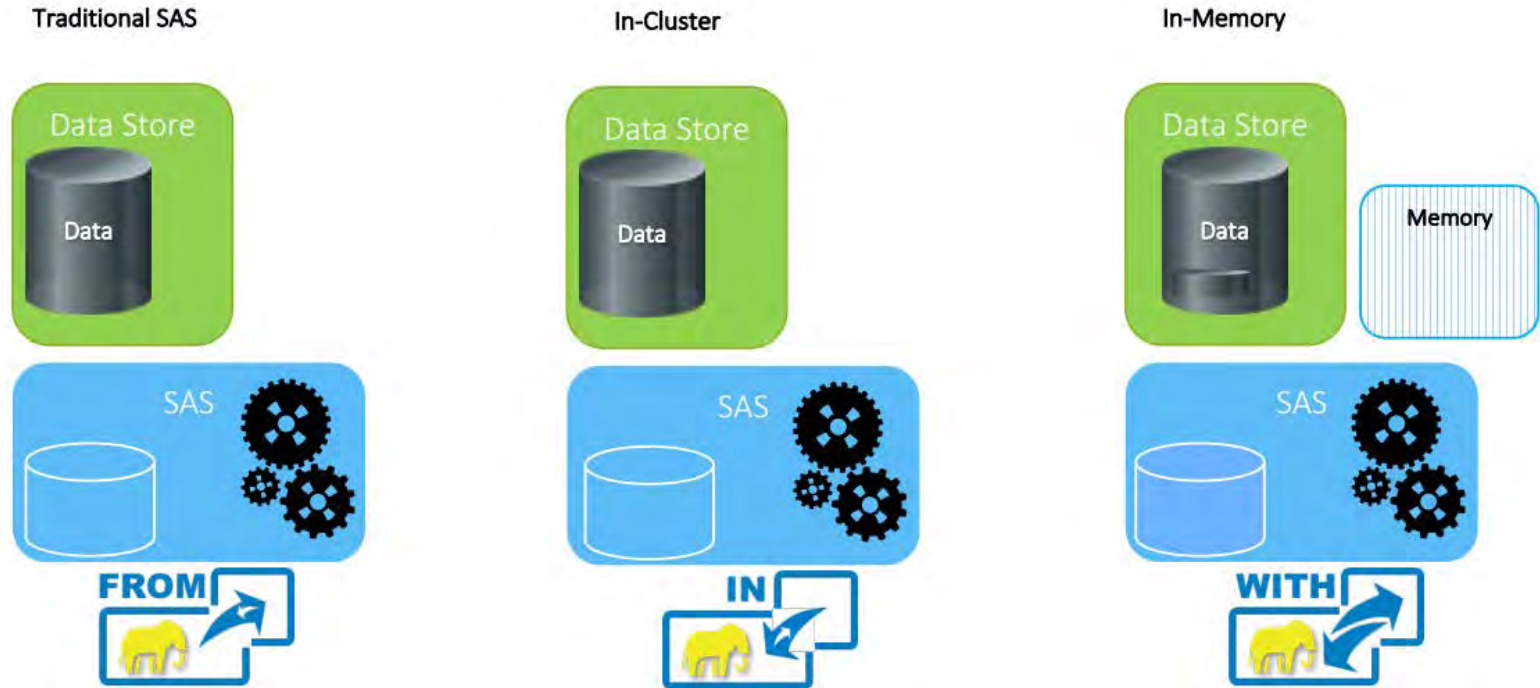
# SAS & Hadoop - Architectural patterns

SAS & Hadoop intersect in many ways:

- SAS pulling data **FROM** Hadoop, when it is more convenient
- SAS can work **WITH** Hadoop, lifting data into a purpose-built advanced Analytics in-memory environment
- SAS can work directly **IN** Hadoop, leveraging the distributed processing capabilities of Hadoop



# Data Processing Options



These approaches are complementary & can be combined for maximum effect

# HOW SAS INTERACTS WITH HADOOP

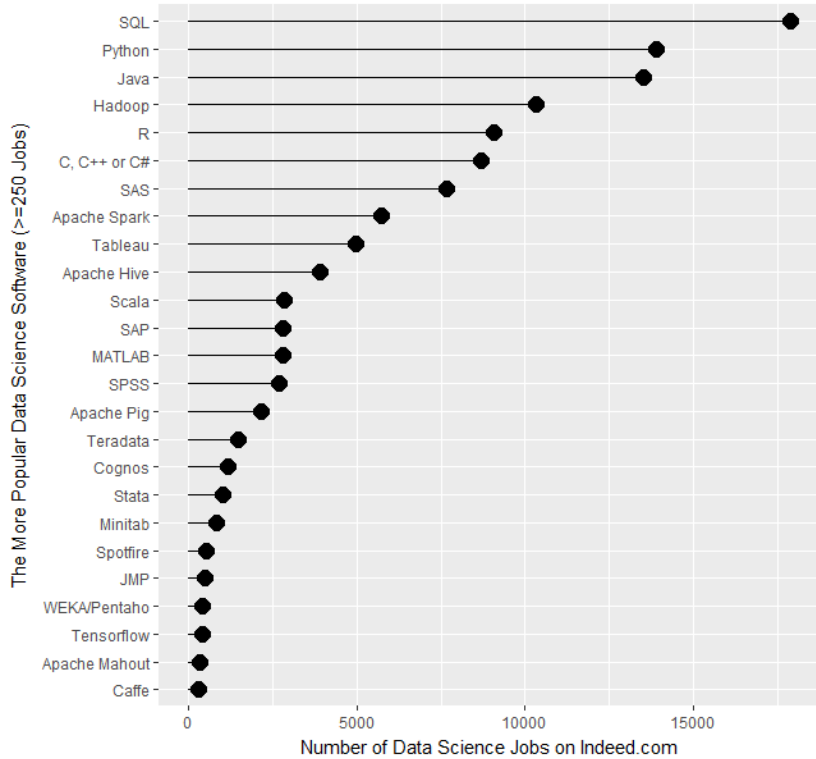
Some

More

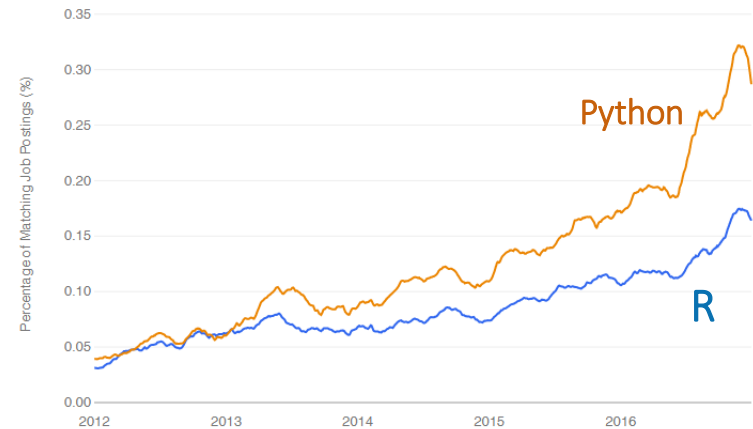
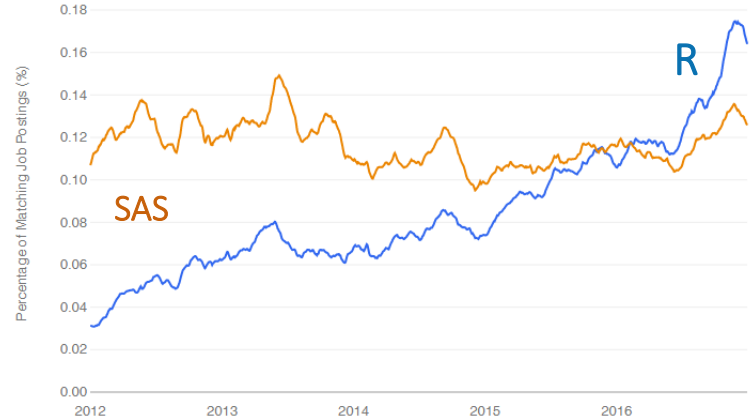
	HiveQL & Other operations	Data Storage	Analytics & other activities
Description	SAS operations performed as SQL which run <i>inside</i> the data store	SAS Solutions <i>maintaining</i> data in Hadoop	SAS products using Hadoop platform to perform analytics & other processing.
Examples	<ul style="list-style-type: none"> <li>• Pushdown processing of some SAS Procedures by SAS/Access into HiveQL</li> <li>• SAS Data Integration (DI) generates HiveQL for ELT transformations</li> <li>• Explicit use of MR, Pig Latin, HiveQL</li> </ul>	<ul style="list-style-type: none"> <li>• SAS Asset Performance Analytics</li> <li>• SAS Financial Crimes</li> <li>• SAS Anti-Money Laundering</li> </ul>	<ul style="list-style-type: none"> <li>• SAS Scoring Accelerator</li> <li>• SAS Code Accelerator</li> <li>• SAS Data Quality Accelerator</li> <li>• SAS Data Loader for Hadoop</li> <li>• SAS Visual Analytics &amp; Visual Statistics</li> <li>• SAS High-Performance Analytics</li> <li>• SAS Visual Investigator</li> <li>• SAS VDMML</li> </ul>

Refer to <http://support.sas.com/documentation/cdl/en/indebug/67366/PDF/default/indebug.pdf> for latest list of In-Database supported Data Stores and capabilities and <http://support.sas.com/documentation/cdl/en/hadoopov/68100/PDF/default/hadoopov.pdf> for an overview of how SAS works with Hadoop

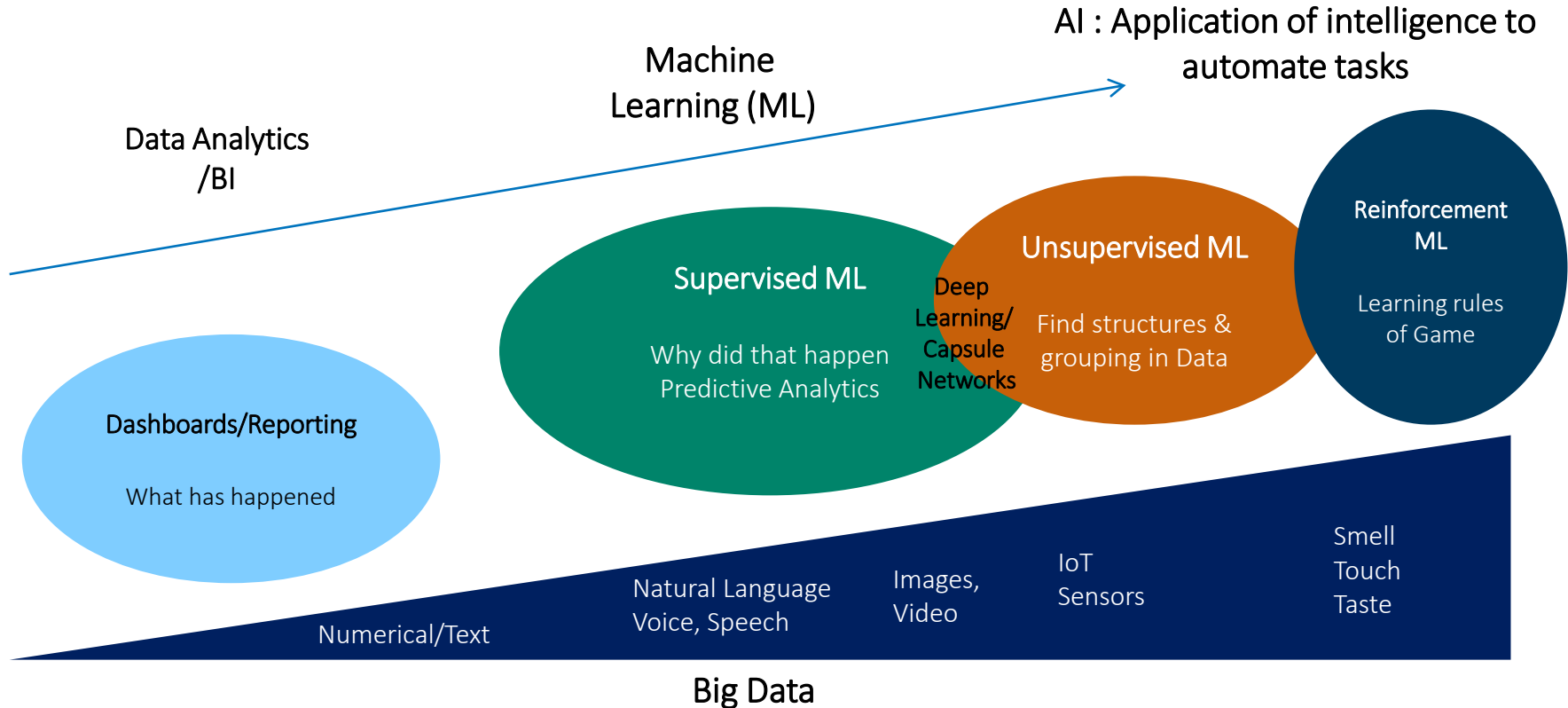
# Data Science Tools



Source: [r4stats.com/articles/popularity/](http://r4stats.com/articles/popularity/)



# AI/ML Cheat sheet



# Cloud Wars: Data & AI Innovation Platforms

AI Assistants ( SW or HW devices)

AI API's (Vision, Language, Speech)

AI Platform Services (Machine Learning studios and tool kits)

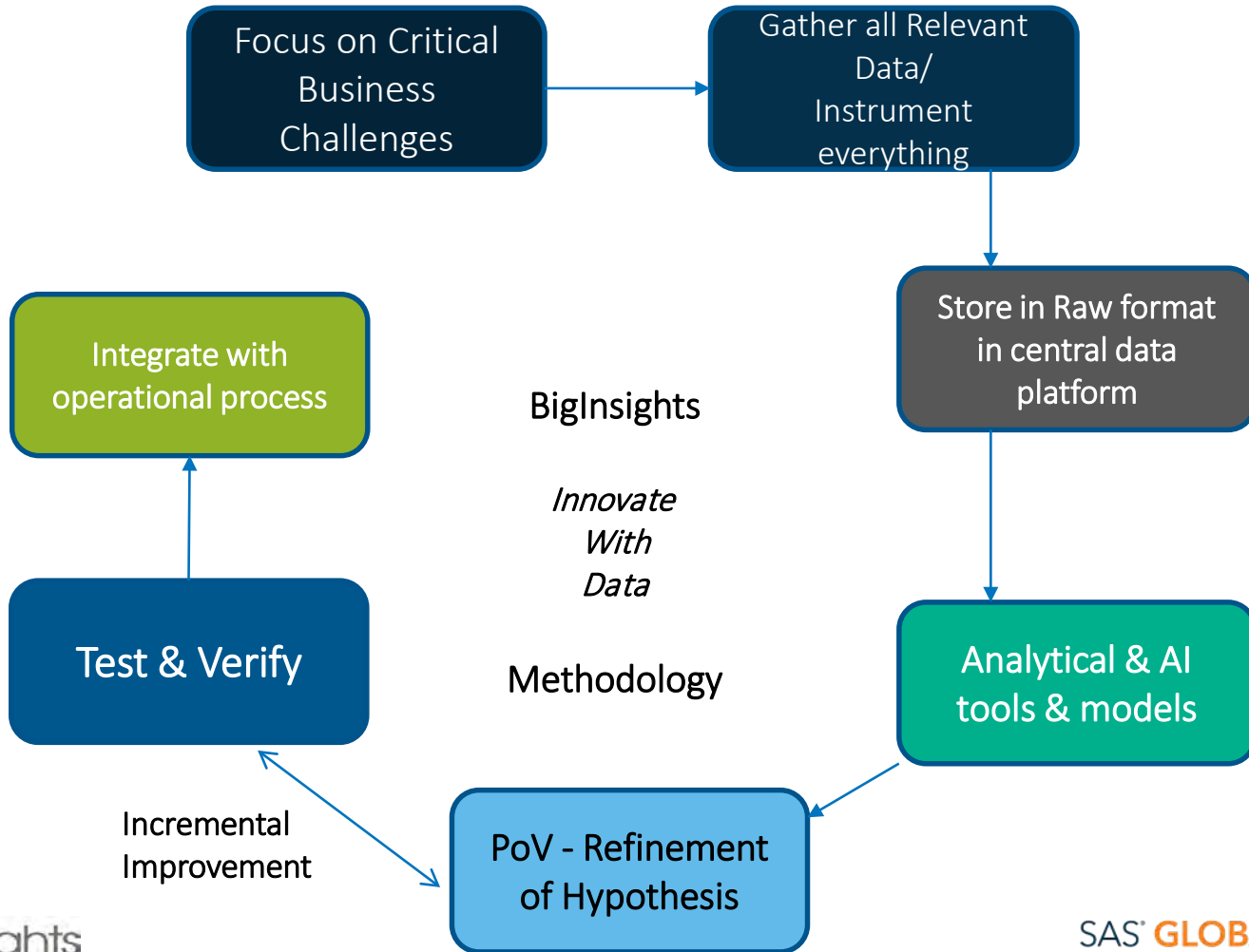
AI Frameworks (MxNet, TensorFlow, Theano, Caffe2, MSFT CNTK)

Analytics & Visualisation tools

IoT & ETL

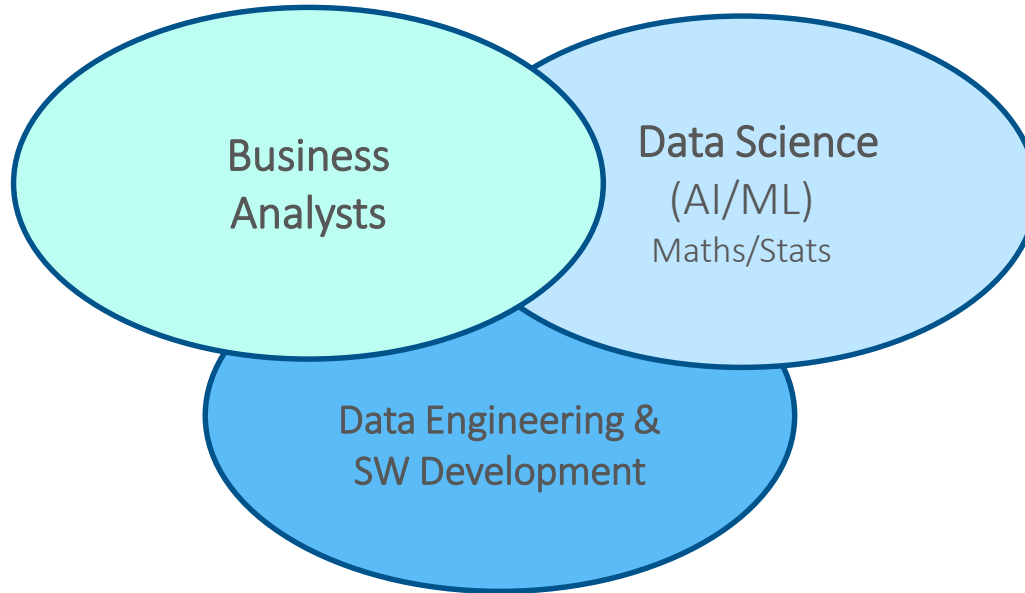
Hadoop, Spark, Relational, Columnar (DW), NoSQL,

Servers & Storage (CPU, GPU, Object)





# Building a Data & AI Innovation Team



# Thank You

Raj Dalal – Founder & Principal

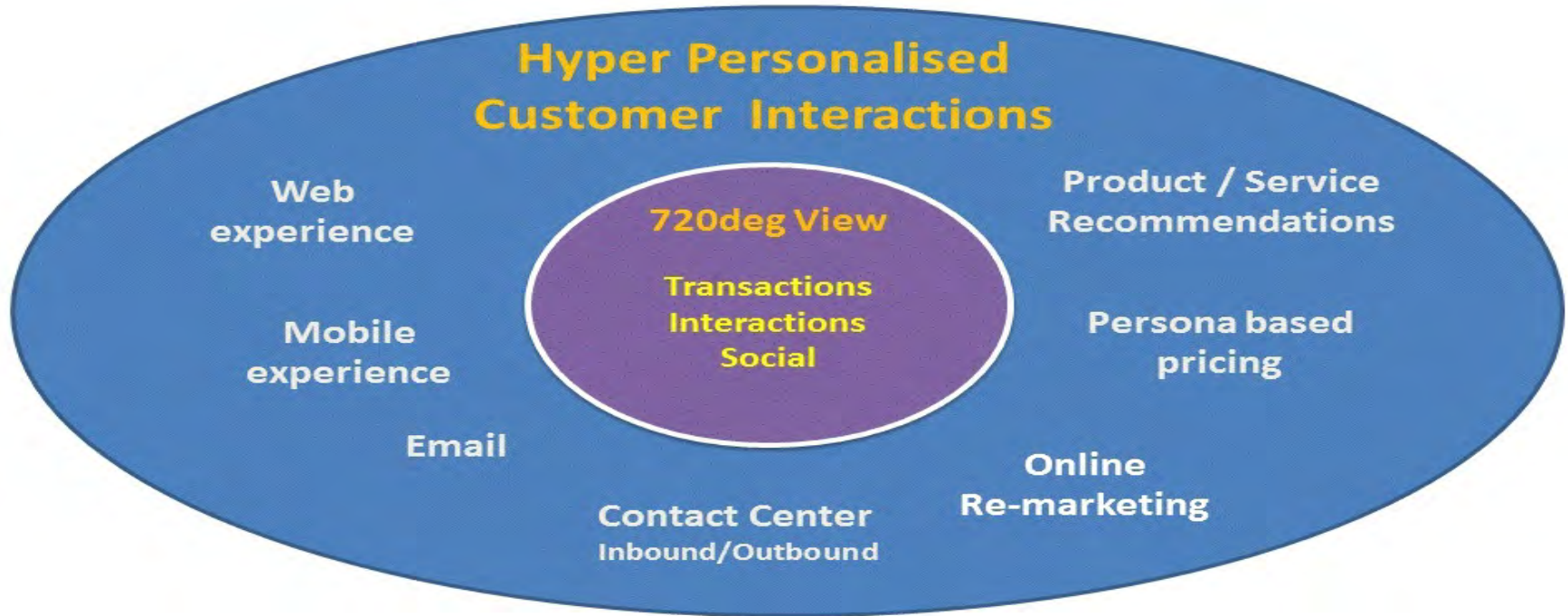
BigInsights

[raj@biginsights.co](mailto:raj@biginsights.co)



@BigInsights

# Hyper personalisation



Source: BigInsights ([www.BigInsights.co](http://www.BigInsights.co))

# Novantas: Persona-Based Deposit Pricing- A Practical, Powerful Application of Big Data Analytics

Traditionally banks have offered unprofitable “honeymoon rates” to attract new deposits

Novantas has recognized that individual customers have a “money persona” which falls within a broad price elastic curve. Among the personas Novantas has characterized are:

- The Promotion Hopper: Constantly looking for best rates and may switch for even 25 basis point difference in rate
- The Occasional Shopper: Shops around occasionally or when there is a trigger like receiving a bonus
- The Convenience Seekers: Values the entire relationship with bank and does not shop for best in class products and/or rates in the market

# Approach

Novantas has developed an analytical model that maps individuals' personas by looking at:

- Shopping behavior (how often they shop)
- Rate sensitivity (how much of a premium needs to be offered to initiate action)
- Retention period (how long they are likely to keep monies with bank)

This model, or more accurately series of models, enables banks to better predict which of their customers are likely to be profitable to attract for the banks deposit products and which groups can be repriced in a manner (and at what rate) where the gains from additional rate overcome any incremental balance losses.

# ANALYTICAL WORKFLOW

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