



The IoT Inc Business Meetup Silicon Valley

Opening remarks and guest presentation

Join us onsite or online on Sept. 1 at 6PM PST

Value Creation

with Streaming Analytics

Eric Tran-le & Mark Hughes
Logtrust & MediumOne



IoT Inc. Meetup Meet at www.iot-inc.com/meetups

Bruce Sinclair (Organizer): bruce@iot-inc.com

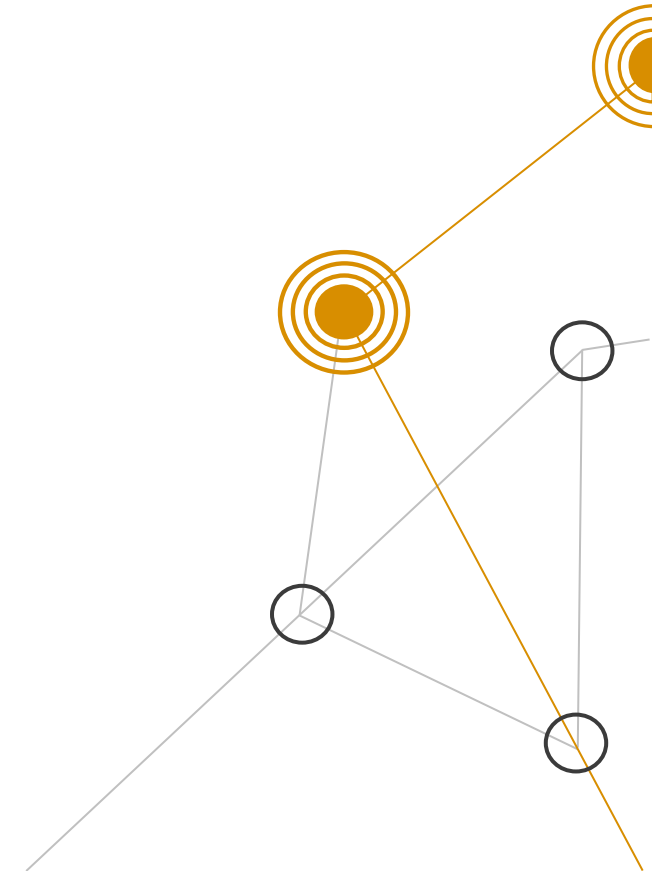


Target of Meetup

For business people selling products and services into IoT
but of course everyone else is welcome: techies, end-users, ...

Focus of presentations and discussions:

Business Models
Support
Marketing
Sales
Distribution
Finance
Post Sales
Pre Sales





Coming Up

Next Meeting, Thursday, October 20th at IoT Tech Expo in Santa Clara convention center

Other notes

- Presentation, recording of Meetup and announcements for today's meeting will be sent in one week to everyone who provided their email upon signup for this meeting or any other past Meetup
- Send announcements to me: My email: bruce@iot-inc.com
- We need sponsors!
- Reviews would be great!

Our Sponsors!



Gold



Bronze



Shelter



Sponsor spots still available!

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Value Creation with Real-time Big Data and Streaming

IoT Meetup 9/1/2016 – Bruce Sinclair

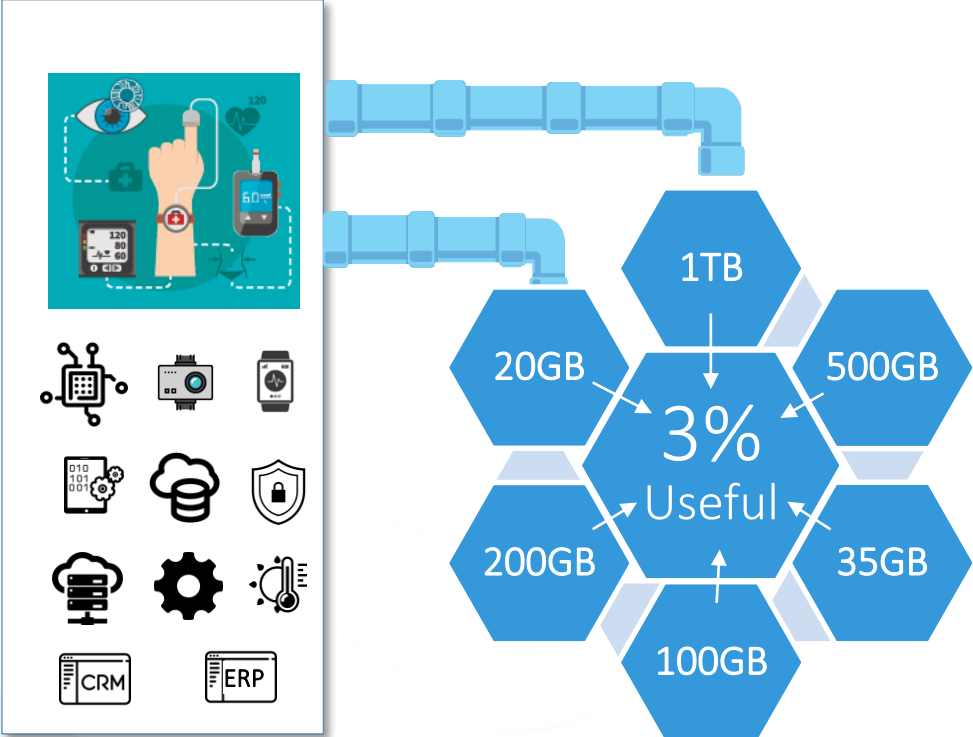
Eric Tran-Le - Global CMO Logtrust

About Me, About Us and IoT

- My name is Eric Tran-Le, I am the Global Chief Marketing Officer of Logtrust
- Logtrust is a Global Start-Up headquartered here in the Silicon Valley with offices in Boston, New York, Philadelphia and Madrid

Onslaught of Fast and Big Data

But Data Value Density is Low

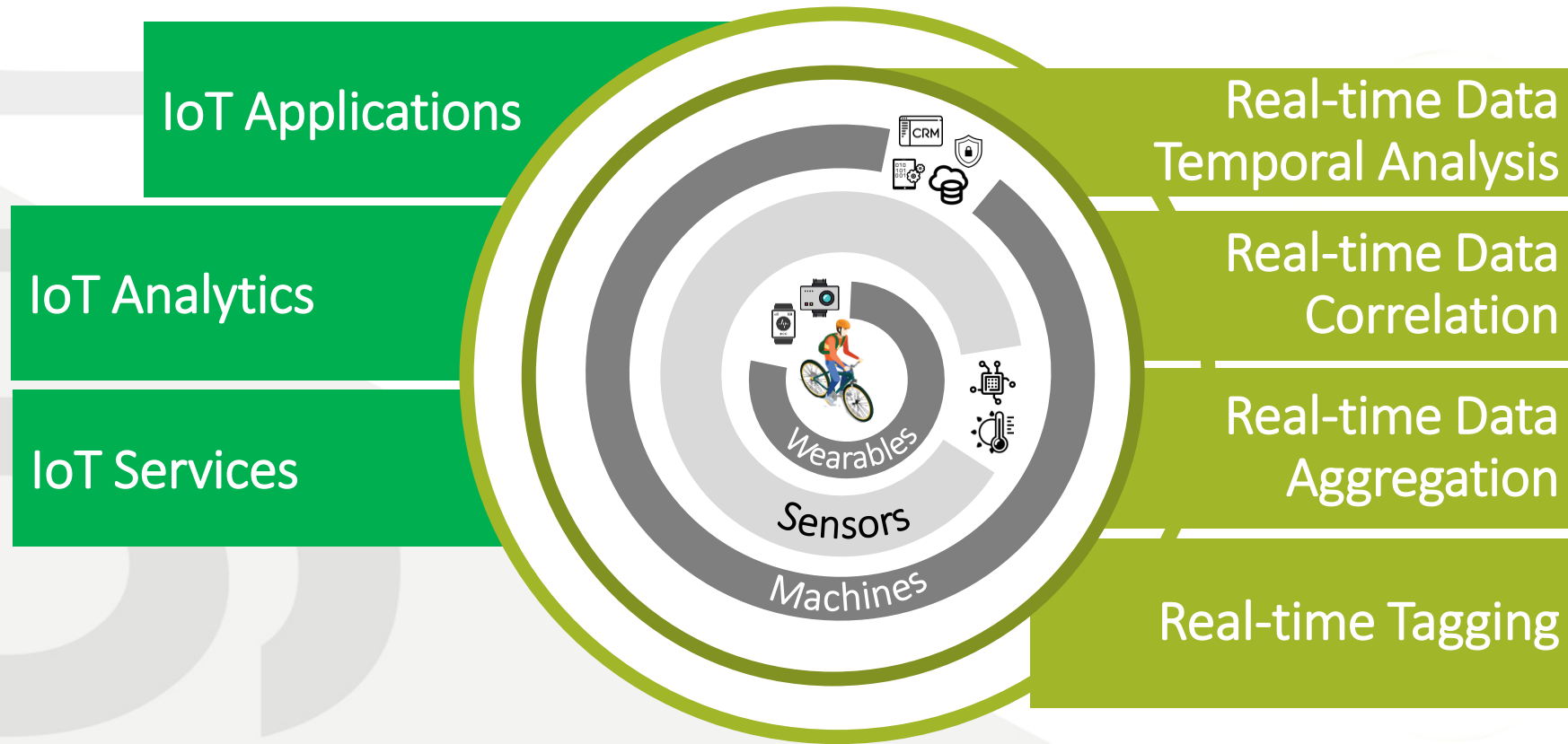


Because Only 3% can be “tagged” and make sense as a whole

(1)Gartner predicts that IoT to include nearly 26 billion devices, with a global economic value-add of \$1.9 trillion by 2020

Making Sense Out of Fast and Big Data

Streaming and Real-time Big Data-in-Motion Analytics

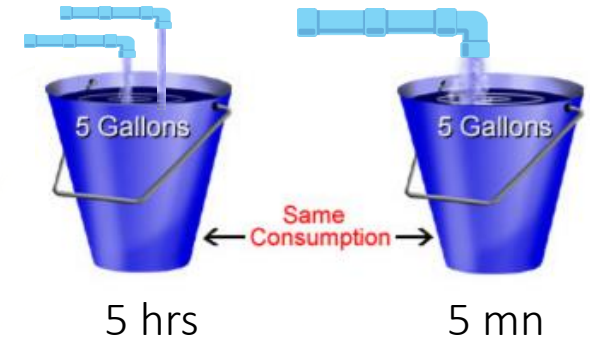


Fflatcon by EpicCoders in weather

Getting Value Out of Data Flows

■ Data Pipeline → “Liquid Data Flows”

- You can think about of streams of water that you are trying to catch to fill let’s say 5 gallons of water bucket
- Well you can have small pipes and fill you 5 gallons bucket in 5 hours or have a big pipe that will fill your bucket in 5 mn
- Liquid data flows arrive continuously, could have sudden change rate...



■ Data Insights → “Perishable Goods”

- Think about data insights as “perishable goods”.
- Their value last only a short period of time
- Catching the “Value per GB of Data As-they-Come” is the end game
- But similar to liquid data flows, you need to catch many sources to increase the value density of data



■ Data Analytics → “Time Machine”

- You Need a Time Machine Like the DeLorean Time Machine in Back-to-the-Future
- Well Marty McFly wanted to change the past for the better present, you will be trying to analyze past data to understand the present and predict the future in real-time
- Ultimately you want to make decision in-the-moment and gain extreme agility



IoT – Connecting Things in a Disconnected World

Ex: Smart Cities

Connected Smart Street Lights

- Street lighting can consume 40% of a city's energy
- Replacing with LED-based lamps can cut energy and operations costs by 50% or more
- Networking them, connected them to metering infrastructure and demand response/distribution automation can save even more

Solar Energy & Wind Farm

- Wind Farm health monitoring
- Wind turbines are located in remote places, subject to harsh conditions
- Early warning of structural problems in towers or blades

Connected Vehicles Hub

- The USDOT has selected three connected vehicle deployment sites:
- Use connected vehicle technologies to improve safe and efficient truck movement along I-80 in Wyoming
- Improve vehicle flow and pedestrian safety in New York
- Mobility apps and reversible lanes in Tampa Florida

Connected Commercial Buildings

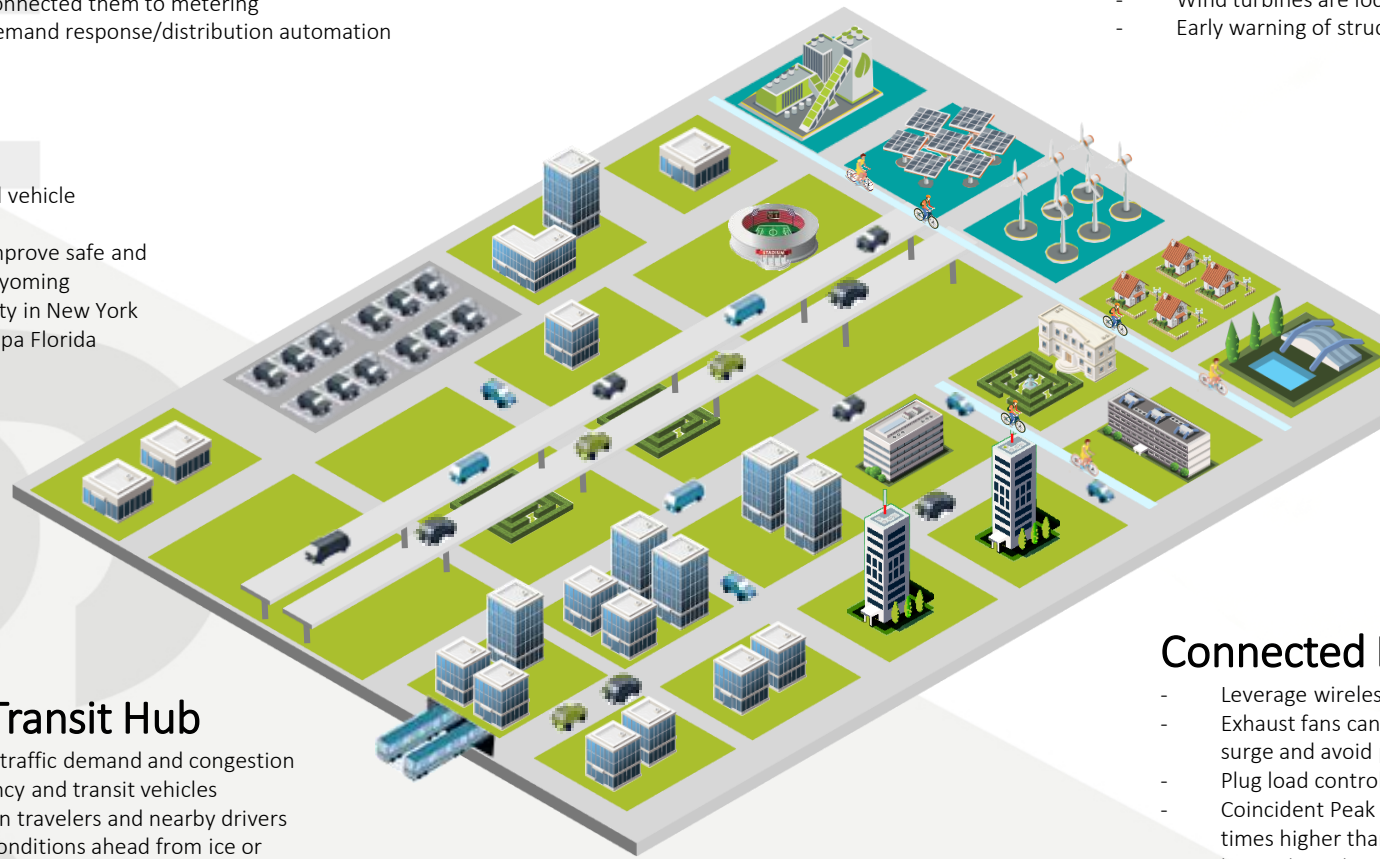
- Connected lighting: wireless networked control systems to deliver demand response based lighting
- HVAC and Fan Control – All areas of warehouse with optimized control and cooling load base on dynamic pricing
- Energy Aware Data Center with automated workload migrations depending on Hotspots areas.

Connected Public Transit Hub

- Adjust traffic signals based on traffic demand and congestion
- Give signal priority to emergency and transit vehicles
- Coordinate rideshares between travelers and nearby drivers
- Alert drivers to deteriorated conditions ahead from ice or heavy rain

Connected Energy Demand Response

- Leverage wireless control system to automate demand response
- Exhaust fans can be programmed to operate in sequence to reduce surge and avoid peak load penalties
- Plug load control: powered down receptacles when not in use
- Coincident Peak Pricing (CPP) for data centers: works by charging 200 times higher than base rate where the coincident peak hour is the hour when electricity is the most requested



Note: These are examples of Smart Cities Not Done with Logtrust

What You Should Look For

Business Models are Still Pretty Much Work in Progress

“We need to create space, test beds, where a variety of players from the IoT provider ecosystem can safely experiment, fail fast, and figure out what is going to work or not” – Dr Richard Soley - IIC

Safely Experiment

- Data needs to be protected in-fly and at-rest
- Data country residency matters and needs to be controlled
- Any Data, any Volume, Any Where at Any Time

Should Be Disruptive By Design

- Moore’s Law applied to sensors means that cost is no more a barrier for consumer acceptance
- Innovative industrial design is moving out of incremental growth to step function growth

Figure Out What Works or Not

- Need to understand the business value of data quickly
- Need to understand the right data models that will aggregate the right data value density

Fail Fast

- Need to deploy to be able at scale fast so that experiment can run in production fast
 - Meter everything continuously
- Understand if the Insights into Data are “Monetizable” at the right price
- Shut down and restart something entirely different if it does not work

Should Be Self-Funded

- OPEX driven vs CAPEX driven for Data Processing Platform
- Self-funded at the devices level



What Type of Operations

Ex: Fleet Management

Real-Time Tagging

As unstructured data flows from various sources, the only way to extract signal from noise is to classify the data as-they-come

- Any time you have to parse data and apply a “schema-on-the-fly
- Ex: *tagging source field, timestamp field, part number field, component state,....*



Real-Time Aggregation

Real-time Aggregation and Compute on Events-of-Interest along a Sliding Time Window

- Any time you aggregate and compute data along a sliding time window you are doing real-time aggregation
- Ex: *Real-time fleet geolocation and dispatching*
- Ex: *Real-time optimization of “Half Truck Load”*

Real-time Temporal Correlation

Connected and Disconnected Sources Real-Time Correlation

- If you are connecting multiple streams of data-in-motion, over a period of time that could be seconds or days, identify that condition A was followed by B, then C, you are doing real-time correlation
- If the time interval between changes and the rate at which these changes occur are key indicators for your scenario you need temporal analysis
- Ex: *if you connect to your fleet fuel consumption and identify if one vehicle consumption is 150% higher than the rest of the fleet in real-time*

What Type of Operations

Ex: Real-time Threat Analytics, Tweets Real-time Analysis,...

Real-Time Tagging

As unstructured data flows from various sources, the only way to extract signal from noise is to classify the data as-they-come

- Any time you have to parse data and apply a “schema-on-the-fly
- Ex: *Tweets Sentiment Analysis, Emails Scam,....*

Real-Time Aggregation

Real-time Aggregation and Compute on Events-of-Interest along a Sliding Time Window

- Any time you aggregate and compute data along a sliding time window you are doing real-time aggregation
- Ex: *Find a user behavior logging pattern in the last 5 seconds and compare it to the last 5 years to detect deviations*



Real-time Temporal Correlation

Connected and Disconnected Sources Real-Time Correlation

- If you are connecting multiple streams of data-in-motion, over a period of time that could be seconds or days, identify that condition A was followed by B, then C, you are doing real-time correlation
- If the time interval between changes and the rate at which these changes occur are key indicators for your scenario you need temporal analysis
- Ex: *Identifying emerging events based on location and time, real-time event association from large-scale streaming social media data*

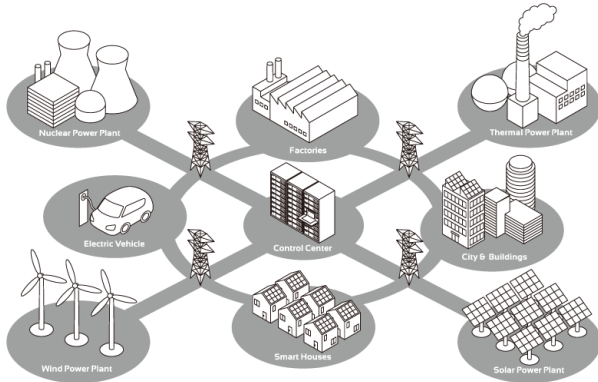
What Type of Operations

Ex: Real-time Smart Grid Monitoring

Real-Time Tagging

As unstructured data flows from various sources, the only way to extract signal from noise is to classify the data as-they-come

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Real-Time Aggregation

Real-time Aggregation and Compute on Events-of-Interest along a Sliding Time Window

- Any time you aggregate and compute data along a sliding time window you are doing real-time aggregation
- Ex: *Identify is a voltage sag or swell is specific to a transformer or it is part of a group of transformers. Need to calculate voltage variations at short-interval*

Real-time Temporal Correlation

Connected and Disconnected Sources Real-Time Correlation

- If you are connecting multiple streams of data-in-motion, over a period of time that could be seconds or days, identify that condition A was followed by B, then C, you are doing real-time correlation
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Use Case: Real-time Wind Farm Monitoring

More than just Streaming Analytics



Avoid This!

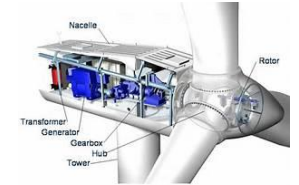
A 200 Turbine Wind Farm contains 50 sensors with data saved in an onboard data historian¹

- Level 1 Analysis: Within the Turbine
 - Every 40 milliseconds the pitch of the turbine's blades is being optimized with real-time analytics on the conversion of rotational energy into electricity and determine whether should be stored in / discharged from batteries or sent to the transmission grid
 - 200 tags² analyzes the turbine health at a one-second interval
- Level 2 Analysis: Across the Farm
 - The farm controller receives 30 signals from each turbine at 160-millisecond intervals
 - Real-time analytics ensure the right combination of turbines deliver predictable power to the utility



Turbine
(50 sensors)

+200 tags
Every 40ms



~ 588 GB/day



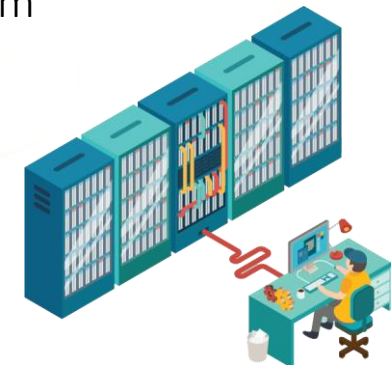
Wind Farm

+ 6000 tags
Every 1 sec

> 1,000,000 tags
Every 1-10min

(1)**Data Historian**: a database optimized for time-series or streaming process and asset data

(2)**Tag**: raw sensor data with name, value, time stamp, data types, data,...)

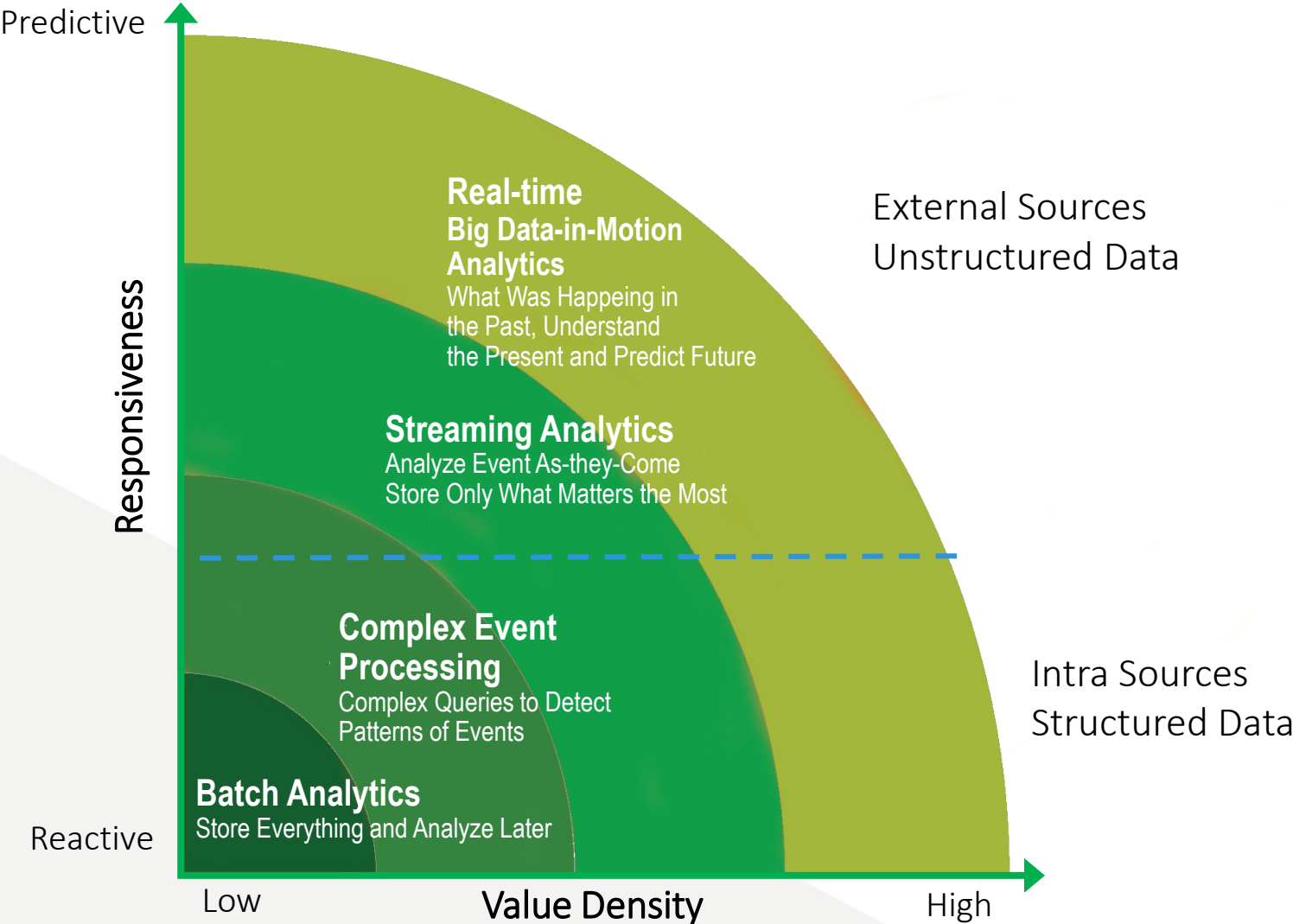


Power Producer

Note: This a use case to explain IoT – It has not been implement with Logtrust

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Where Does it Fit in the Analytics Mix?



What You Should Look For

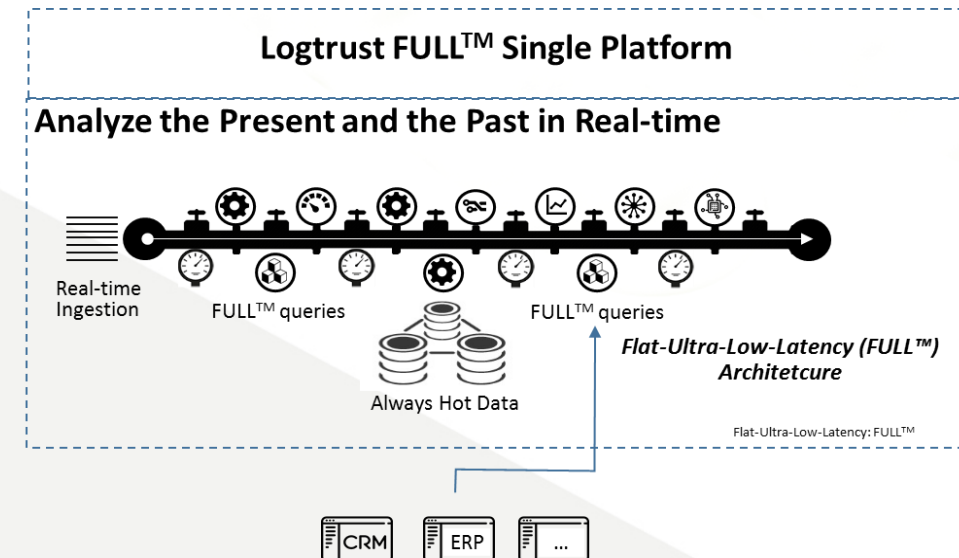
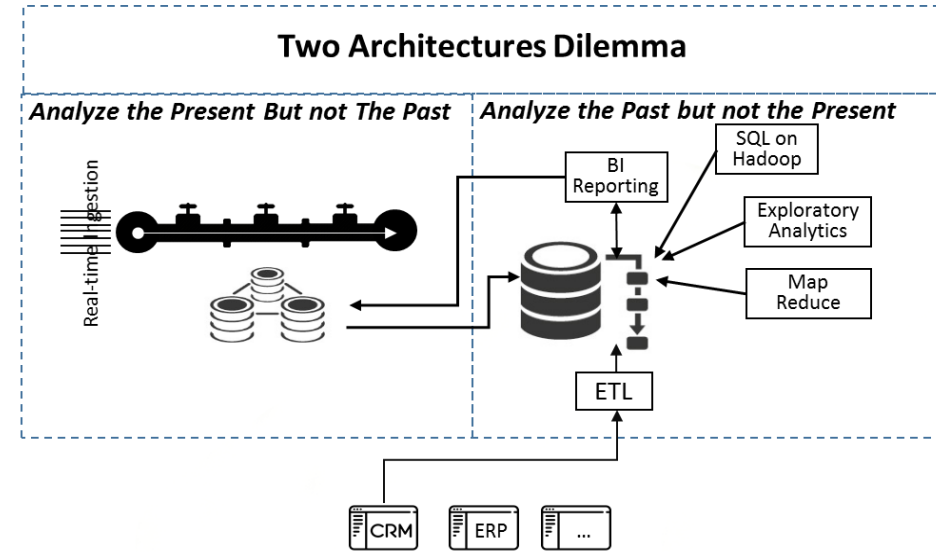
Architecture Matters

■ Two Architectures Dilemma

- Huge Hidden Costs
- Long Time-to-Value

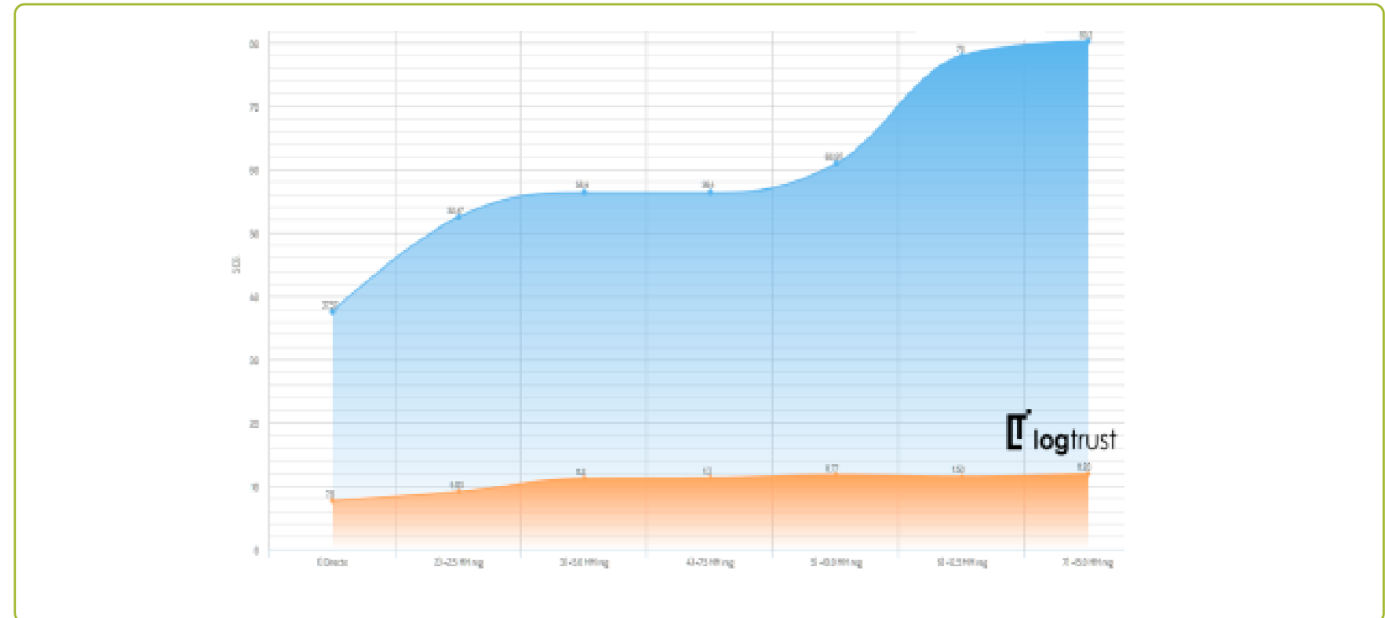
■ Single Architecture

- Cost Efficient
- Predictable Response Time, All-the-Time
- Faster-time-to-Value



What You Should Look For

Linear Performance Matters



More Information About Logtrust

- www.logtrust.com
- Strata New York September 26th-29th 2016
- IoT TechExpo North America – October 20th-21st Santa Clara
- AWS Re-Invent 2016 – November 28th to December 2nd



IoT-Inc.com

Meet Up

**Value Creation with
Streaming Analytics**

September 1, 2016

Abstract

A Real Time Data Intelligence platform

uses data to learn about an environment or process.

Workflows bring together Real Time Stream Processing, Big Data Analytics, and Machine Learning.

Data from many devices are **collected in the cloud**.

Actionable intelligence results from combining device data with other data sources.

Applications that range from process monitoring, lighting control, and demand response create continuously adaptable systems.



Value Creation with Streaming Analytics

Introduction:

Michael Porter (Academic): Smart, Connected Devices *Defined*

New Functions and Capabilities Enabled:

Monitoring

Control

Optimization

Autonomy

Elon Musk (Industrialist): Smart, Connected Devices *Deployed*

Value Creation with Data Intelligence

Real Time Streaming Analytics enable – Optimization and Autonomy

The IoT Platform : Fastest Path to Value Creation

Medium One Highlight



Michael Porter - Smart, Connected Products Defined

Smart Connected Products Defined:

“... have **three core elements: physical components, “smart” components, and connectivity components**. Smart components amplify the capabilities and value of the physical components, while connectivity amplifies the capabilities and value of the smart components and enables some of them to exist outside the physical product itself. The result is a virtuous cycle of value improvement.”

“... offer exponentially expanding opportunities for **new functionality, far greater reliability, much higher product utilization, and capabilities that cut across and transcend traditional product boundaries**. The changing nature of products is also disrupting value chains, forcing companies to rethink and retool nearly everything they do internally.”

“... **raise a new set of strategic choices related to how value is created and captured**, how ... data they generate is utilized and managed ...”

IoT is the 3rd Wave of IT Driven Competition:

- Wave 1 : Enterprise – focused on Process Automation, Control and Efficiency
- Wave 2 : Internet - focused on user connectivity
- Wave 3 : Smart, Connected Devices
 - Device has access to external resources; no longer internally constrained
 - Continuous process improvement
 - Interconnected devices are continuously learning

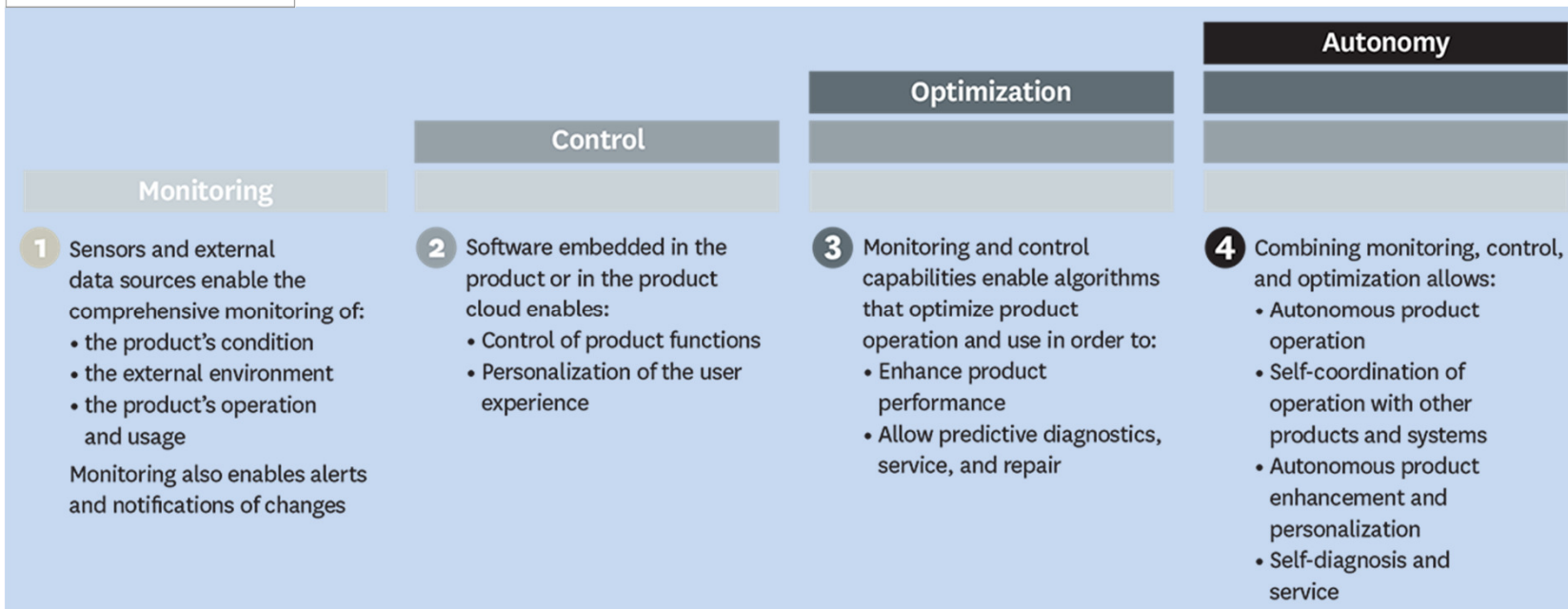


Michael Porter – Smart, Connected Device Model



Real Time Streaming Analytics

Value is created by closing open loops !!



Intelligence and Connectivity of Smart, Connected Devices enable an entirely new set of product functions and capabilities



Elon Musk – Smart, Connected Products Deployed



Real Time Streaming Analytics bridge the gap between Computing Resources and Devices

Master Plan, Part Deux Smart, Connected Devices Deployed

Build a Smart, Connected Product

Computing integrated into Automobile

Build it in a Smart, Connected Factory

Computing integrated into fabric of factory

Deploy it into a Smart, Connected Environment

Computing integrated into Environment

The product then operates Autonomously

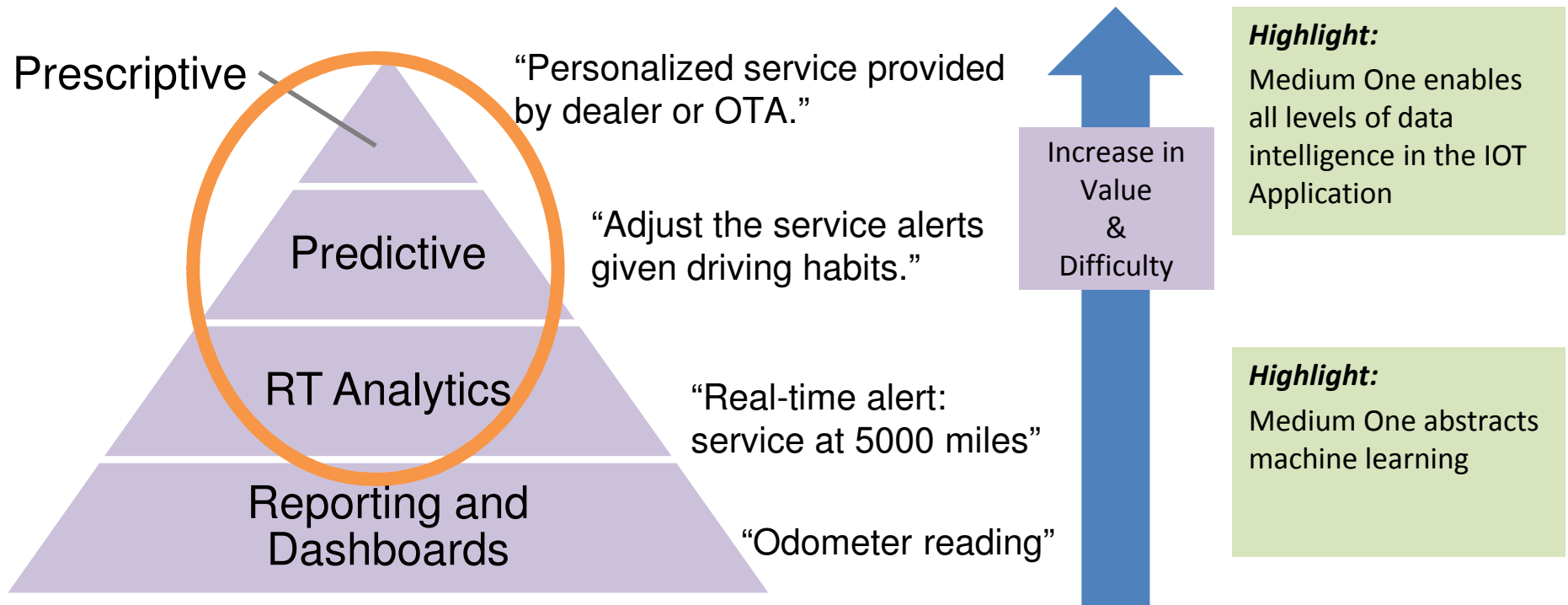
Updates allow service creation and customization autonomously



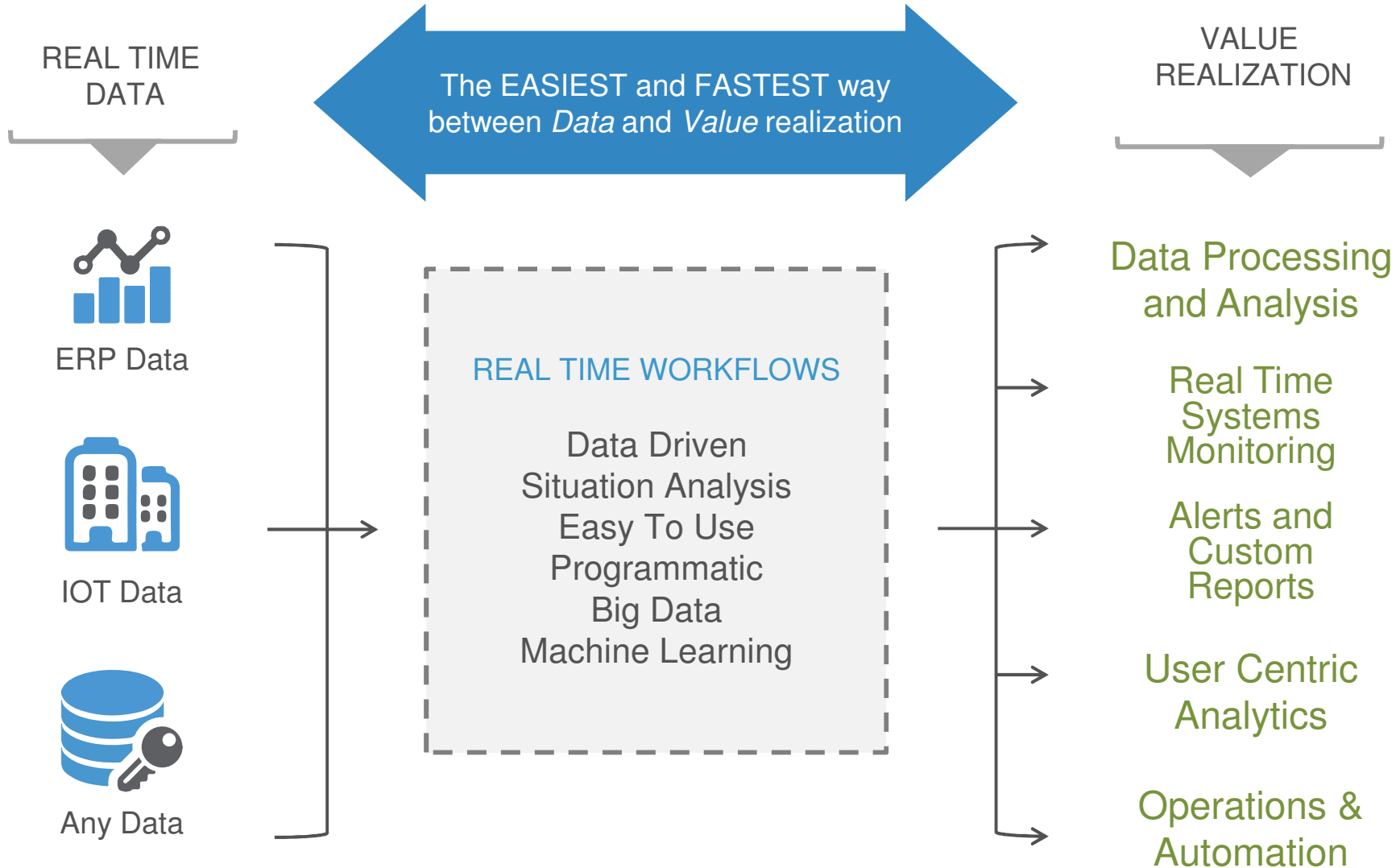
Value Creation with Data Intelligence

The Value Pyramid

Real-time Streaming Analytics **drive decisions and enable automation.**
(Optimization and Autonomy from M Porter's Product Functions)



IoT Platform : Fastest Path to Value Realization



Real Time Streaming Analytics unlock the value of Smart, Connected Products



Medium One Highlight

Medium One offers an IOT Data Intelligence platform enabling customers to build smart applications

Key Medium One BENEFITS

- IoT cloud platform
- Rapid time-to-market
- Machine Learning

COMPANY

- Silicon Valley
- 15 Member team
- Background in Semi & Big Data

Medium One Platform Provides Each Key Piece



Flexible
Real-Time
Workflows



Cloud
Data
Storage



Built-in
Identity
Management



Enterprise
Grade
Cloud



Real-time
Streaming
Analytics



Dashboards
and
Visualization



Machine
Learning



Thank You

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