IOT15657 - What Connected Products are Doing For Us

Bryan Kester, Head of IoT | Autodesk

Class Summary & Goals

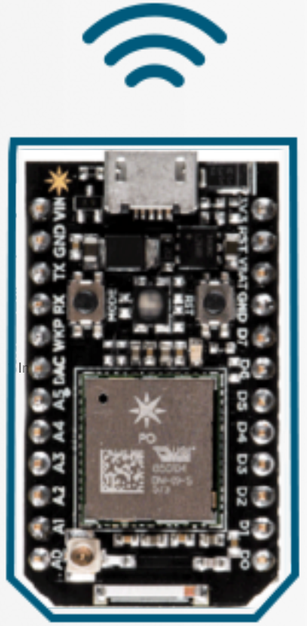
- Understand more about which businesses are embracing connected products
- Hear about the benefits real customers see from this technology
- Learn more about the process involved in setting up an IoT platform
- Get some tips on how to overcome your own connected-device challenges

Why are you **Here?**

IoT is being catalyzed by the rapidly declining cost of four key technologies:

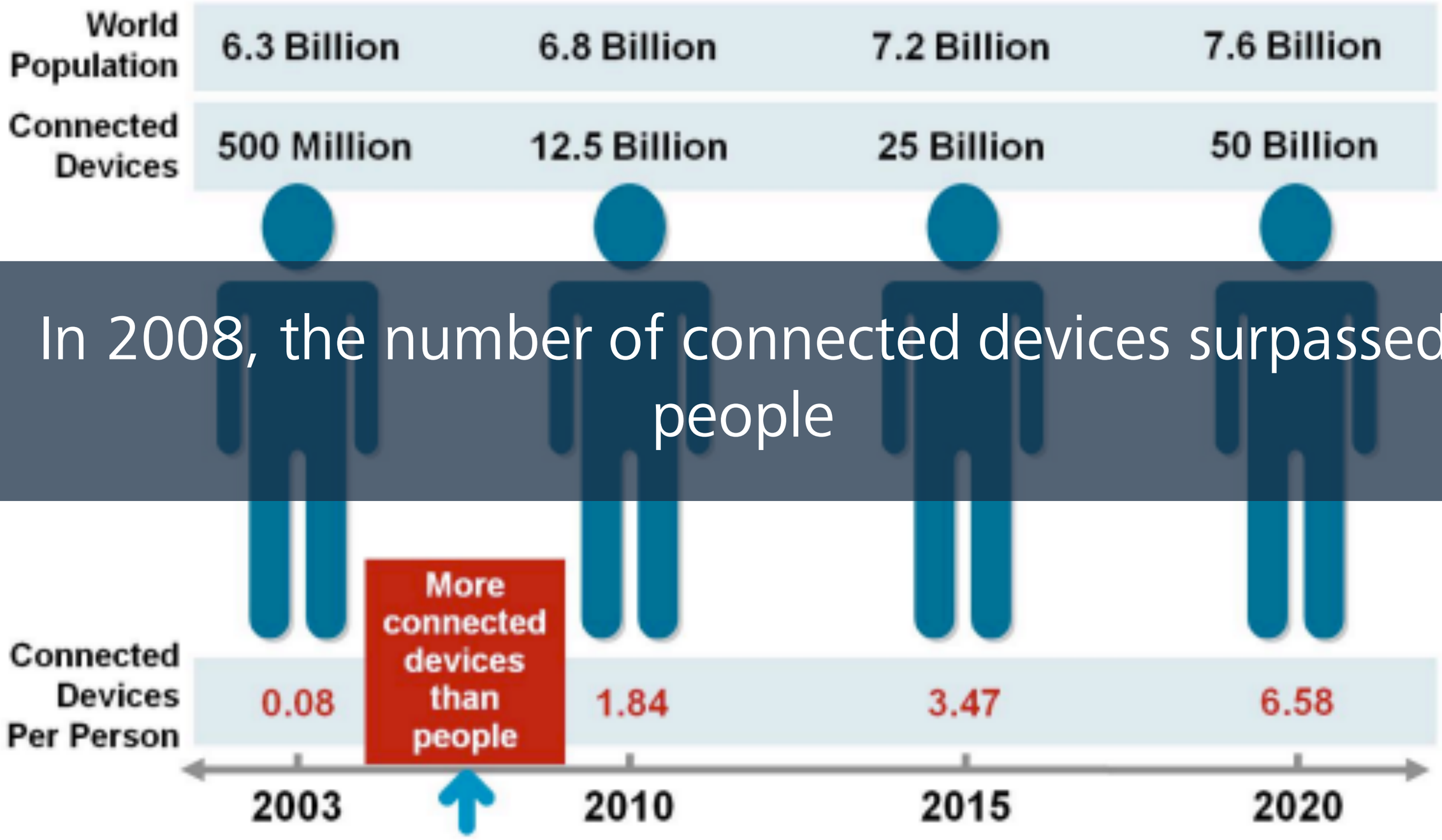
- Sensors - $22 in 1997, Today $0.40*
- Small, embeddable computers
- Wireless networks
- Cloud server farms

$5 WiFi Chip



$19 WiFi + Computer

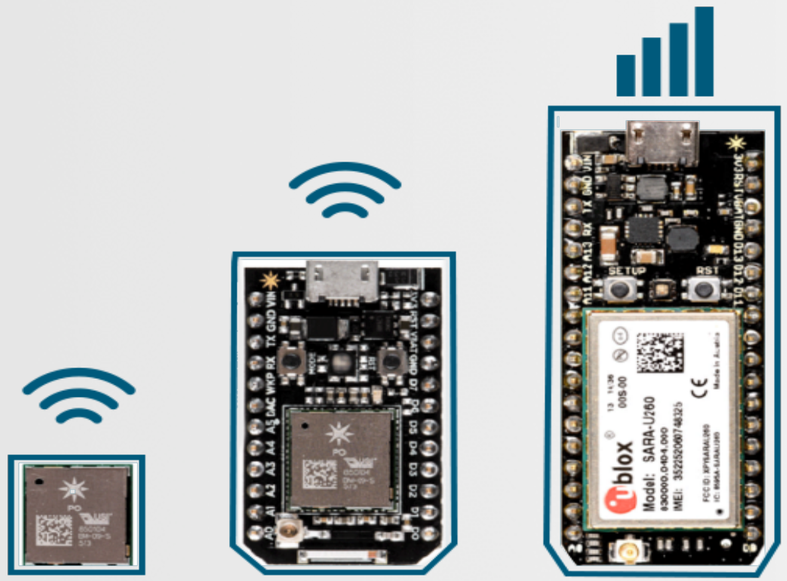
$39 Cellular + Computer



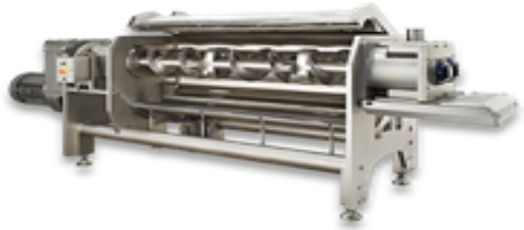
In 2008, the number of connected devices surpassed people

2016: Critical Inflection **Point**

In Q1 of this year, more machines were connected to the mobile network than phones*



*Chertan Consulting







The High ROI Applications Have Been in (Remote) Machines








Yearly Savings With Predictive Maintenance*

MINING SITE

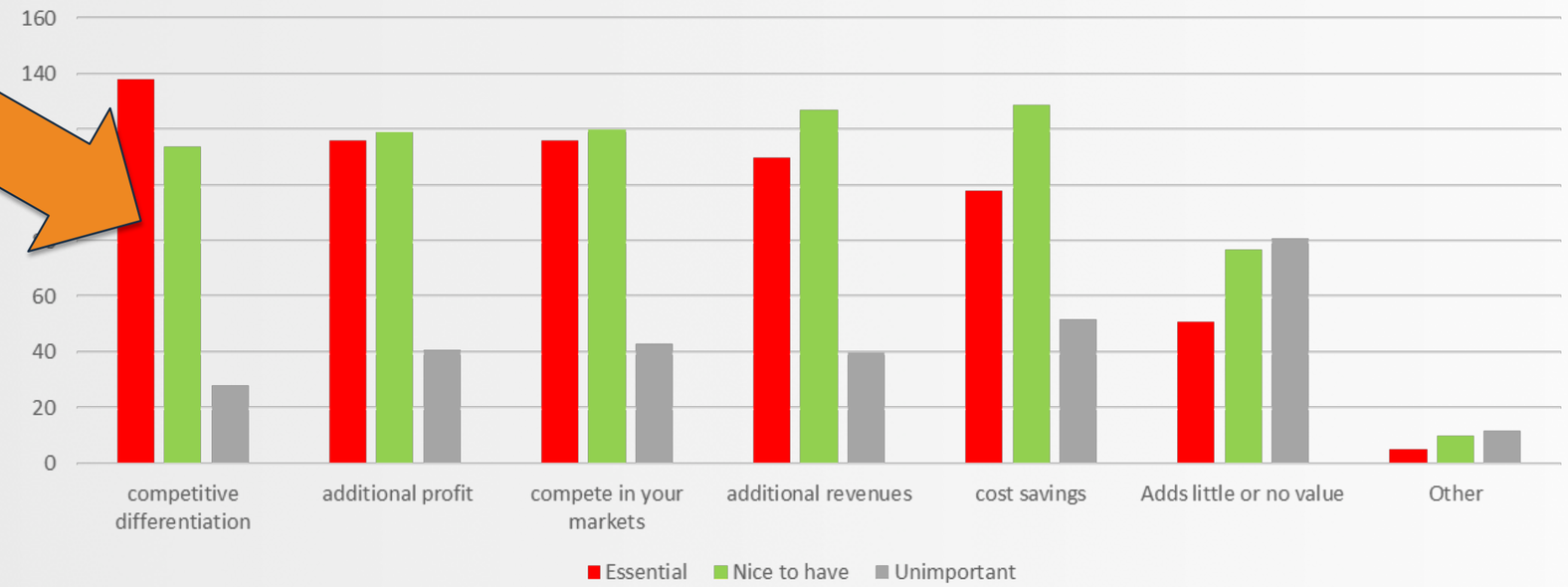
Crusher:	$119,000
Pump:	$62,000
Haul truck:	$60,000

*General Electric

Survey of Mid-Market OEMs

BEAT COMPETITORS & ADD REVENUE

- What opportunity does IoT/connected allow you address(n=281, multiple selections allowed)



IoT **Opportunity & Journey**

REACTIVE

- Limited design feedback
- Break-fix service

CONNECTED

- Usage data enables closed-loop design
- Push features out via internet
- Diagnose before service

ANALYZED

- Timing for new product sale
- Predictive maintenance
- Shift to proactive service

TOTALLY ENGAGED

- Sell subscriptions, leases, managed services
- Tailor to customer need
- Integrated, customer-driven business

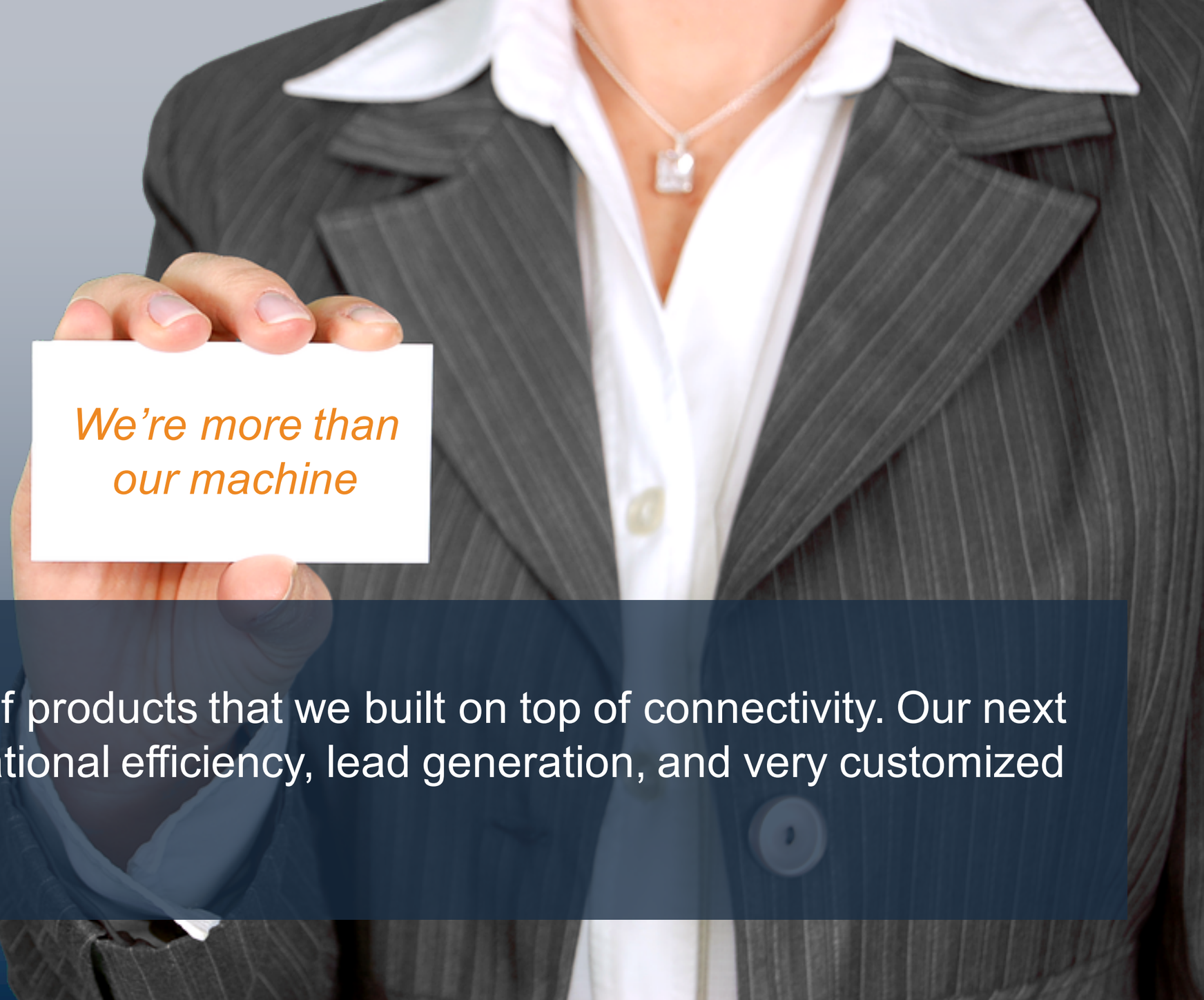
AUTODESK® **FUSION CONNECT**

Reactive Product Feedback and Service Model

REACTIVE

- Expensive Truck Rolls
- Spare Parts Stockpiles
- High Call Center Costs
- Downtime Losses
- Brand Risk & Damage
- High Warranty & Exchange Costs
- Poor Root Cause / Engineering Analysis

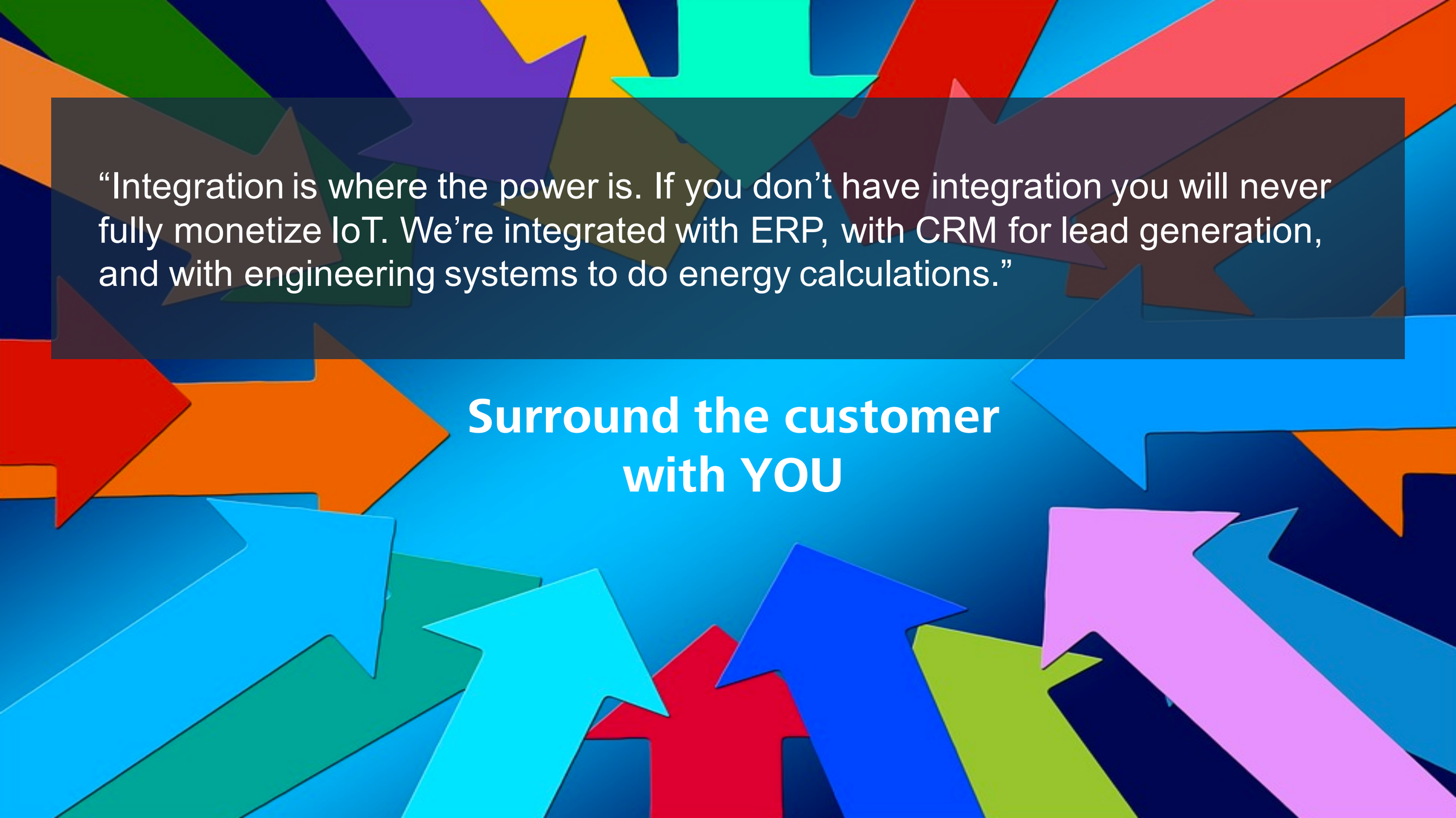
Increase your selling ability

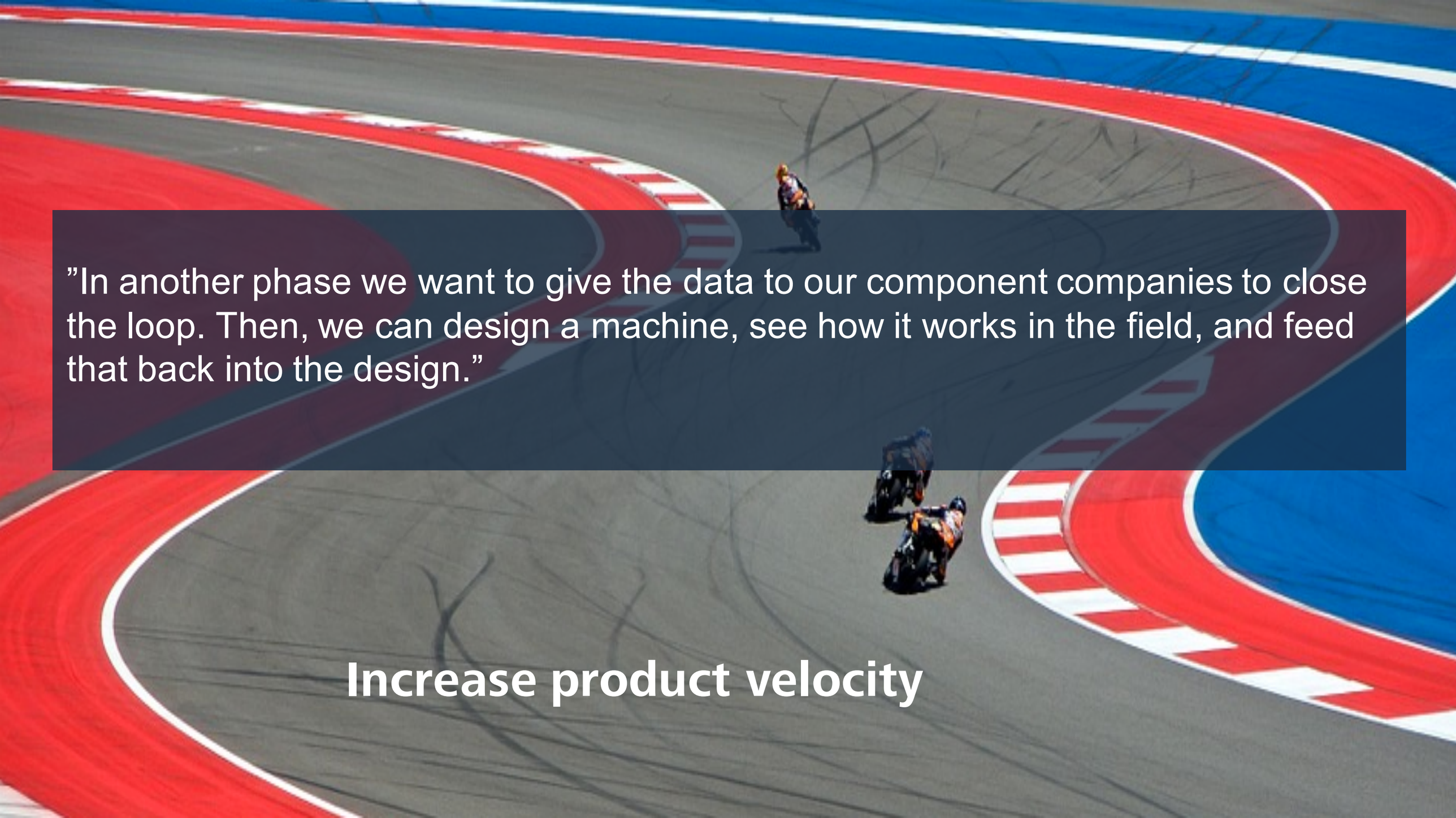


“We have a whole chain of products that we built on top of connectivity. Our next steps are looking at operational efficiency, lead generation, and very customized products.”

Stand out from the pack

“The IoT platform adds sex appeal to the product. Sales puts the units on a map of the world and shows that to their end customers using out of the box functionality in the platform. It’s much better than showing the product at a tradeshow!”

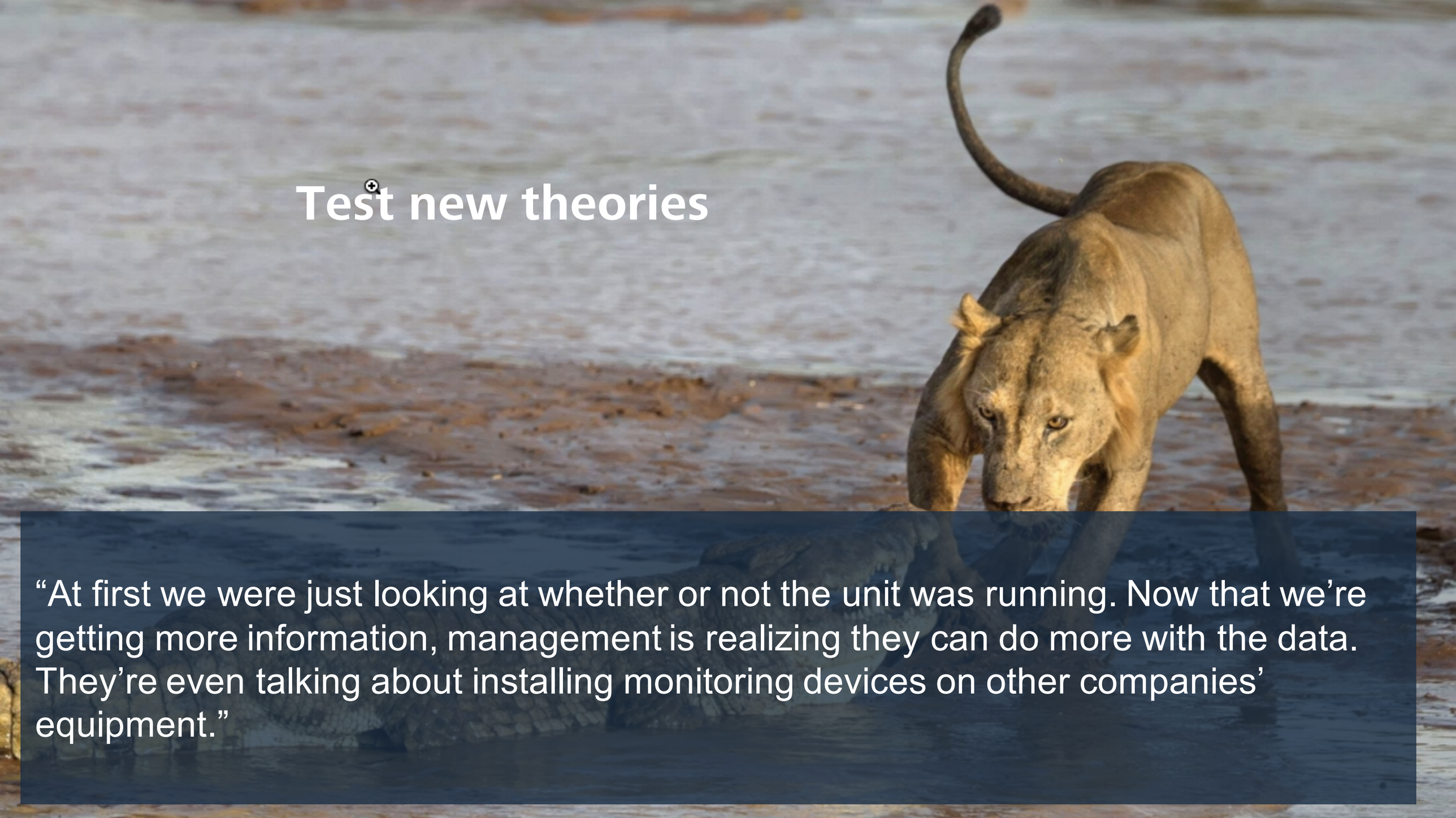

“Integration is where the power is. If you don’t have integration you will never fully monetize IoT. We’re integrated with ERP, with CRM for lead generation, and with engineering systems to do energy calculations.”
Surround the customer with YOU



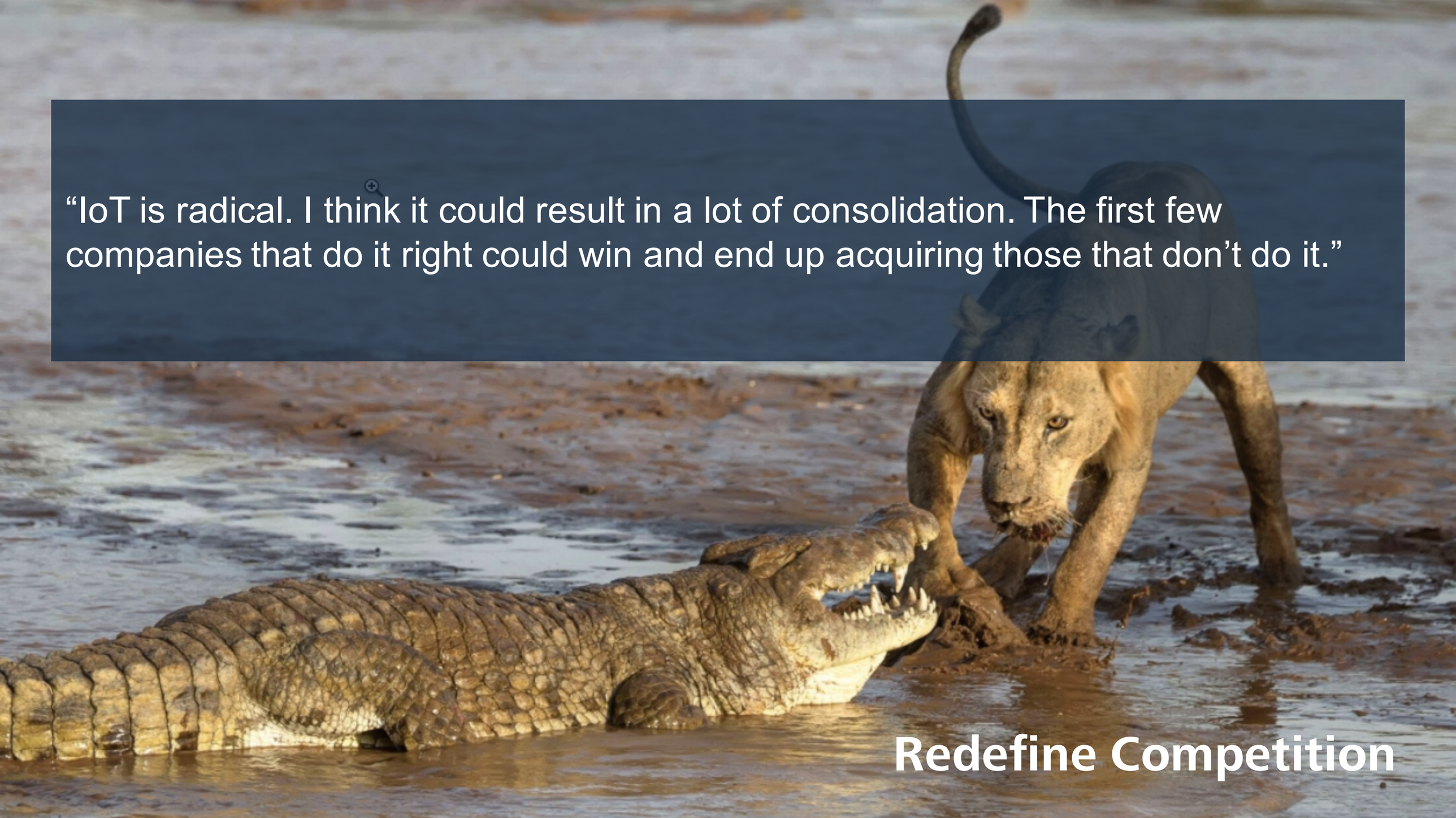
”In another phase we want to give the data to our component companies to close the loop. Then, we can design a machine, see how it works in the field, and feed that back into the design.”

Increase product velocity

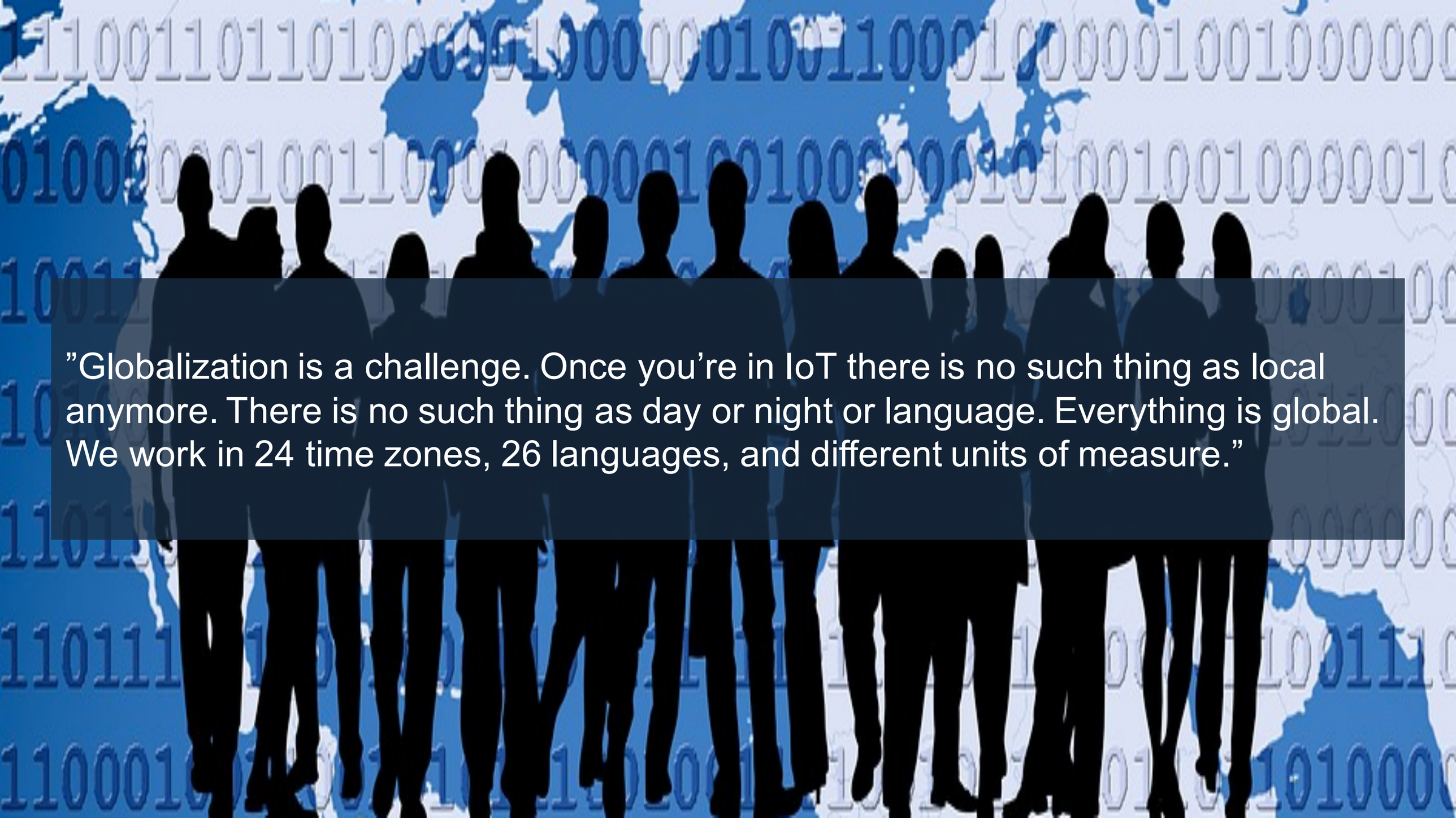
Test new theories



“At first we were just looking at whether or not the unit was running. Now that we’re getting more information, management is realizing they can do more with the data. They’re even talking about installing monitoring devices on other companies’ equipment.”


“IoT is radical. I think it could result in a lot of consolidation. The first few companies that do it right could win and end up acquiring those that don’t do it.”
Redefine Competition

”Honestly, this has been a hard project and I took it on in addition to my normal job. However, I feel like if I don’t do IoT, I either won’t have a job or a company in a few years. You don’t want to be second when the market shifts”


”Globalization is a challenge. Once you’re in IoT there is no such thing as local anymore. There is no such thing as day or night or language. Everything is global. We work in 24 time zones, 26 languages, and different units of measure.”

”I would never advise anyone to build an IoT platform themselves. We spent a fortune on building it, literally millions of euros. To rebuild everything again would we spend the same amount again, or perhaps double that.”

IoT **Opportunity & Journey**

CONNECTED

Usage patterns inform closed loop design

Push features out via internet

Diagnose before service

Create Superior Products

Offer Higher Price Points with Software Based Features

Increase First Time Fix Rate with right data “know before you go”

IoT **Opportunity & Journey**

ANALYZED

Timing for new product sale

Predictive Maintenance

Shift to proactive service

Increase topline growth

Offer alerts and diagnostic data as revenue service

Reduce support calls, engineering escalations and warranty claims

IoT **Opportunity & Journey**

TOTALLY ENGAGED

Sell subscriptions, leases & managed services

Higher, more stable revenue streams with customer lock-in

Tailor to customer need

Win more bids and create new market segments

Integrated, customer-driven business

Optimized sales, marketing, product development, logistics and service flows

ROI Levers

REVENUE DRIVERS

- On-site spares and consu
- Install base tracking
- Energy / fuel consu
- Failure alerts
- Sales lead gene
  operation)
- Remote opera
- Remote upgra
- Subscription
- Leasing
- Pay-for-performa
- SLAs – contracted
- Tailored products
- Tailored product data (re

Autodesk partners can help you navigate business ideas

COST REDUCTION

- Spares inventory made, held (30% carrying cost) and shipped (often overnight expedite)
- Downtime avoidance / revenue leakage
- gineering escalations, missed product verables
- ort calls per day
- ved first-time fix rate, reduced 2nd/3rd/etc.
- ced truck rolls and fuel/labor costs
- ranty claims; ensure customers use and intain product correctly
- Reverse shipping costs (RMA processing)
- Product recall reduction
- Field upgrades/patches

Visit Softweb in Booth #1912

AUTODESK® FUSION CONNECT

Premier Deicers

Sluggish winter de-icing operations impacted departure times and profitability

- De-ice cycle accelerated **40%**
- More on-time departures
- Less fuel consumption
- New revenue streams/services
- Created competitive advantage

SOLUTION TIME
30 Days

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TSM Control Systems

Highly reliable, long-last products limited sales growth and market opportunities

- Enhanced remote diagnostic service
- Power and speed of IoT solution caused strategy rethink
- Transitioning to Product-as-a-Service

SOLUTION TIME
30 Days

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Top 5 Industrial OEM

Remote water treatment facilities are expensive to staff and service

- Cellular remote pump control product
- Shift from field service to unmanned facilities
- Proactive, diagnostic-led service
- Revitalized sluggish product line sales

SOLUTION TIME

30 Days

vs. 2 years and 10X the cost with in house team

AUTODESK® **FUSION CONNECT**

Air Compressor OEM

Pioneer: Started Service in early 2000s

- All new units built with IoT hardware and data plans; initial trial service is free
- 3 Revenue Offerings
  - Good: Alerts and Notifications
  - Better: Remote Managed Diagnostic & Fix/Update
  - Best: Energy and other Data Services

Building an IoT Capability

Technology Implementer **View**

7 **Optimize Performance**
(Purpose, People and Process)

6 **Business Applications**
(Analytics, Reporting, Control)

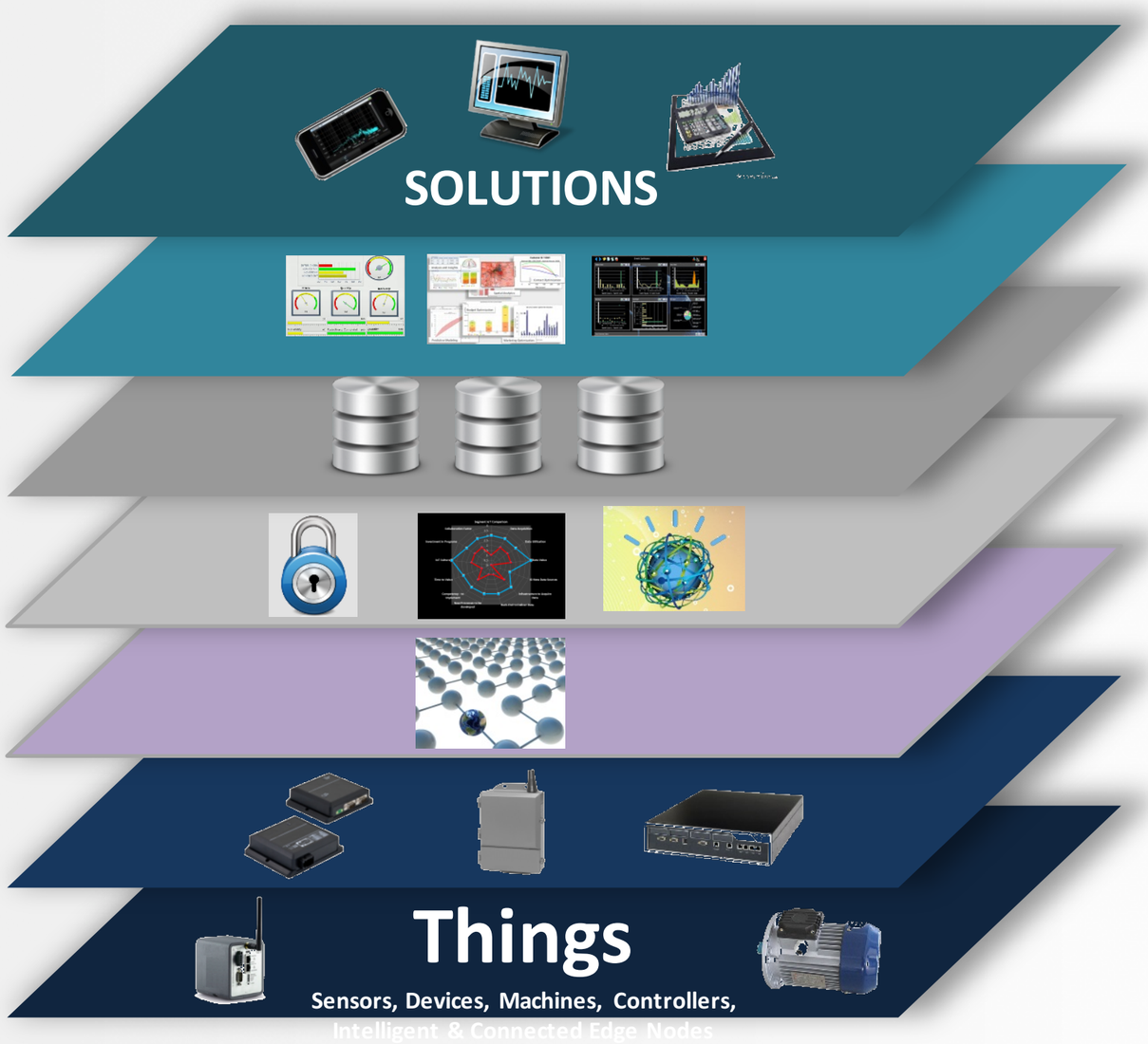
5 **Cloud Servers**
(Storage, Software, Redundancy)

4 **Software Platform Services**
(Security, Aggregation & Logic)

3 **Network Connectivity**
(Internet Access, M2M Wireless)

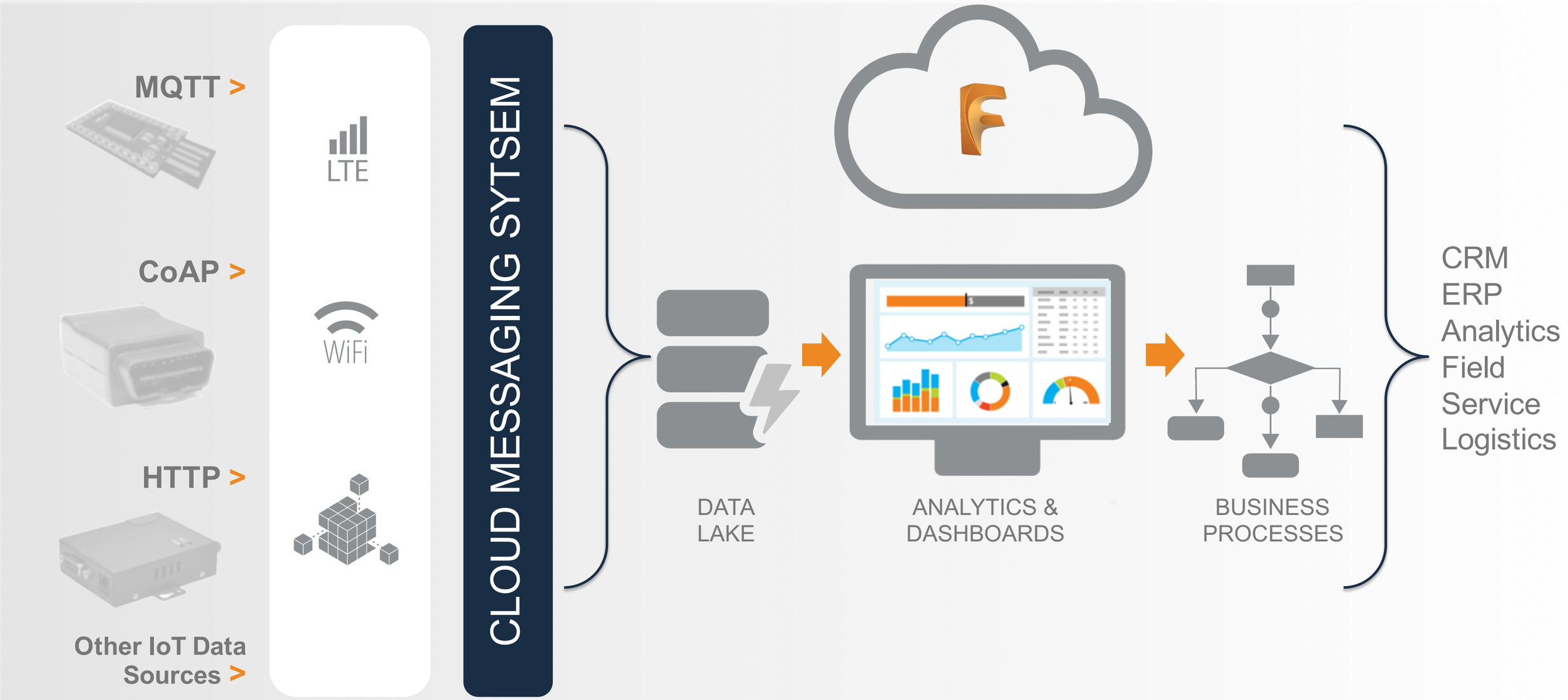
2 **Gateways & Edge Computing**
(Data Filtering/Analysis, Demarcation, Interface Protocols and Security)

1 **Physical Sensors & Controllers**
(The "Things" in IoT)

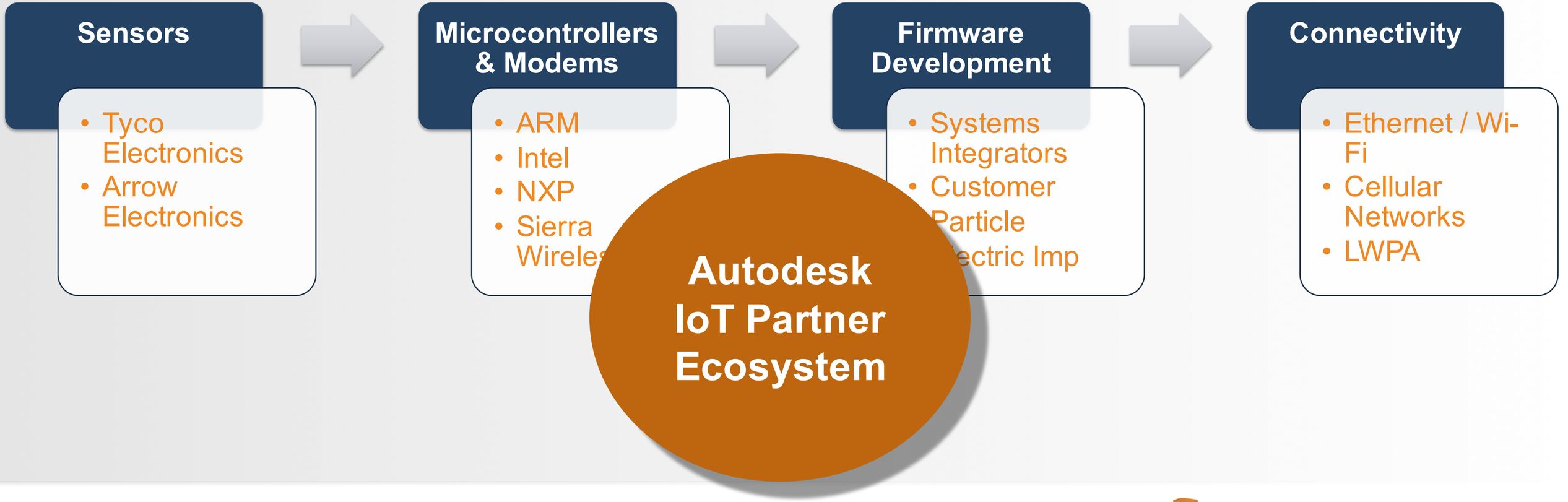


Source: Iot Transform Book, Steve Grady of Enviro Controls

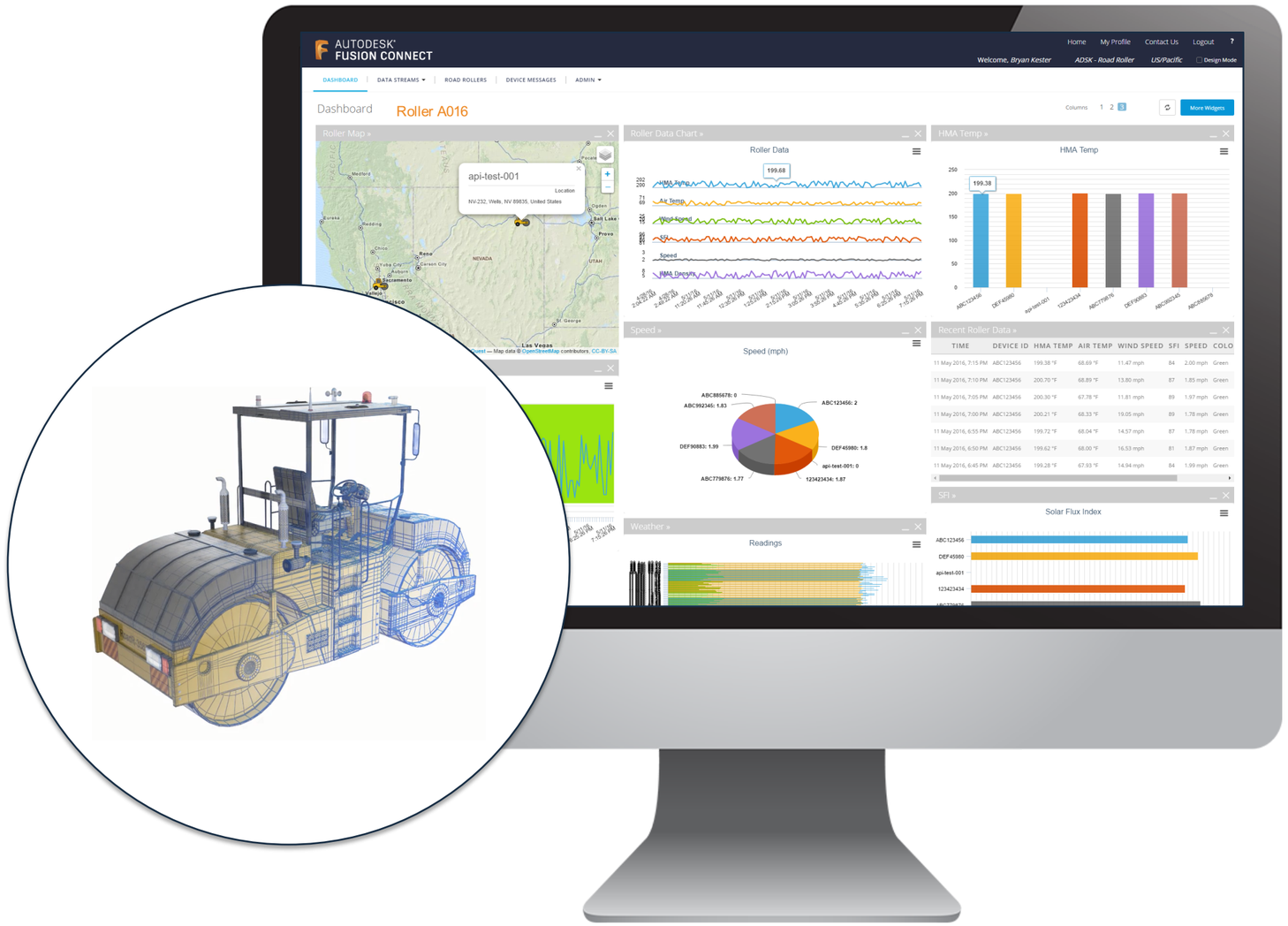
DNA – End to End **View**



DNA – **D**evices and **N**etworks



DNA – **A**pplication – Product/Thing Model



Data
Serial Number
Make
Model
Weight
RPMs
Engine Temp.
Fuel Level
Diagnostic Code

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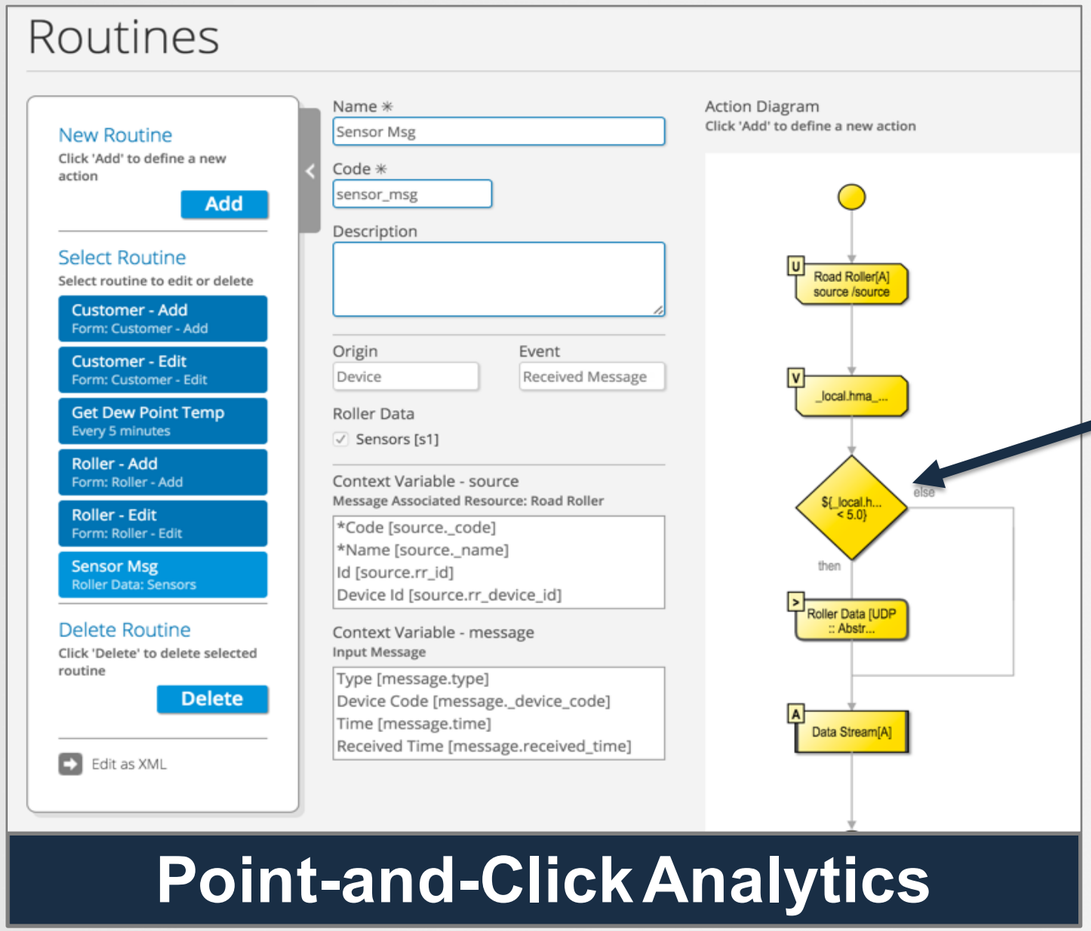
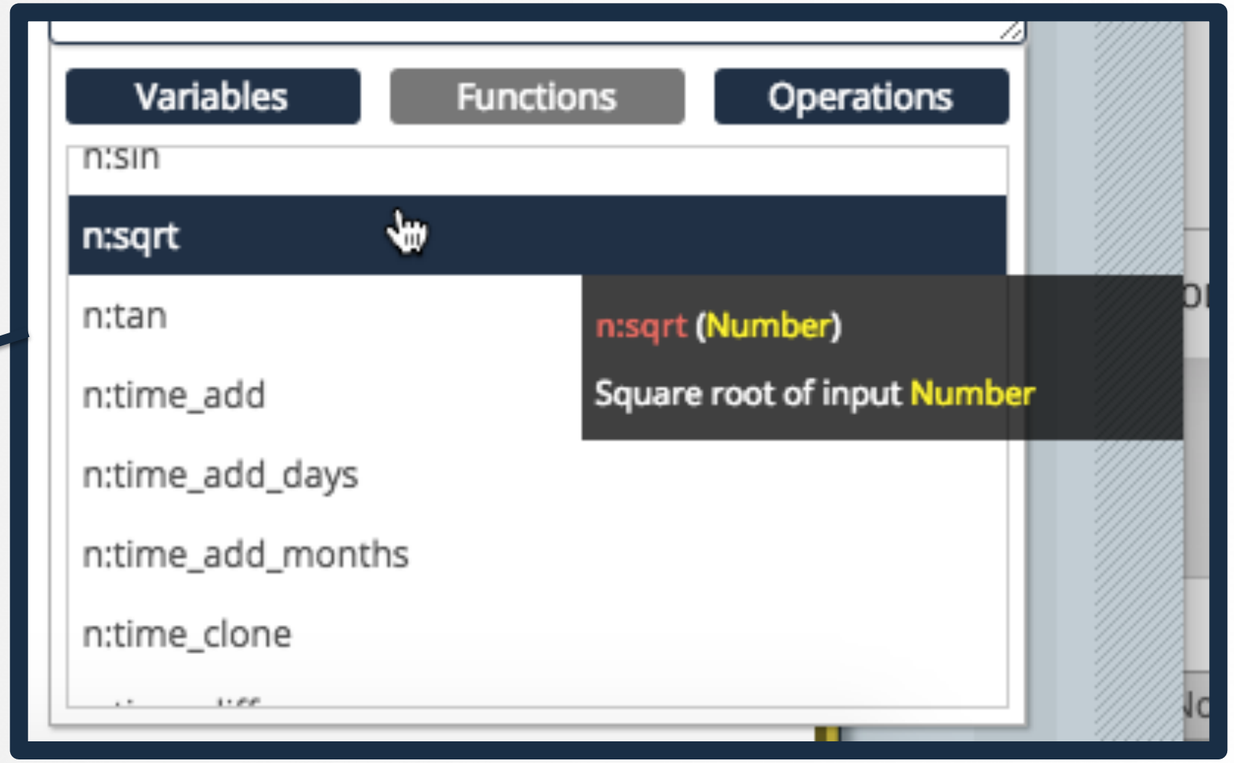
DNA – **A**pplication – Event Processor & Analyzer



Point-and-Click Analytics



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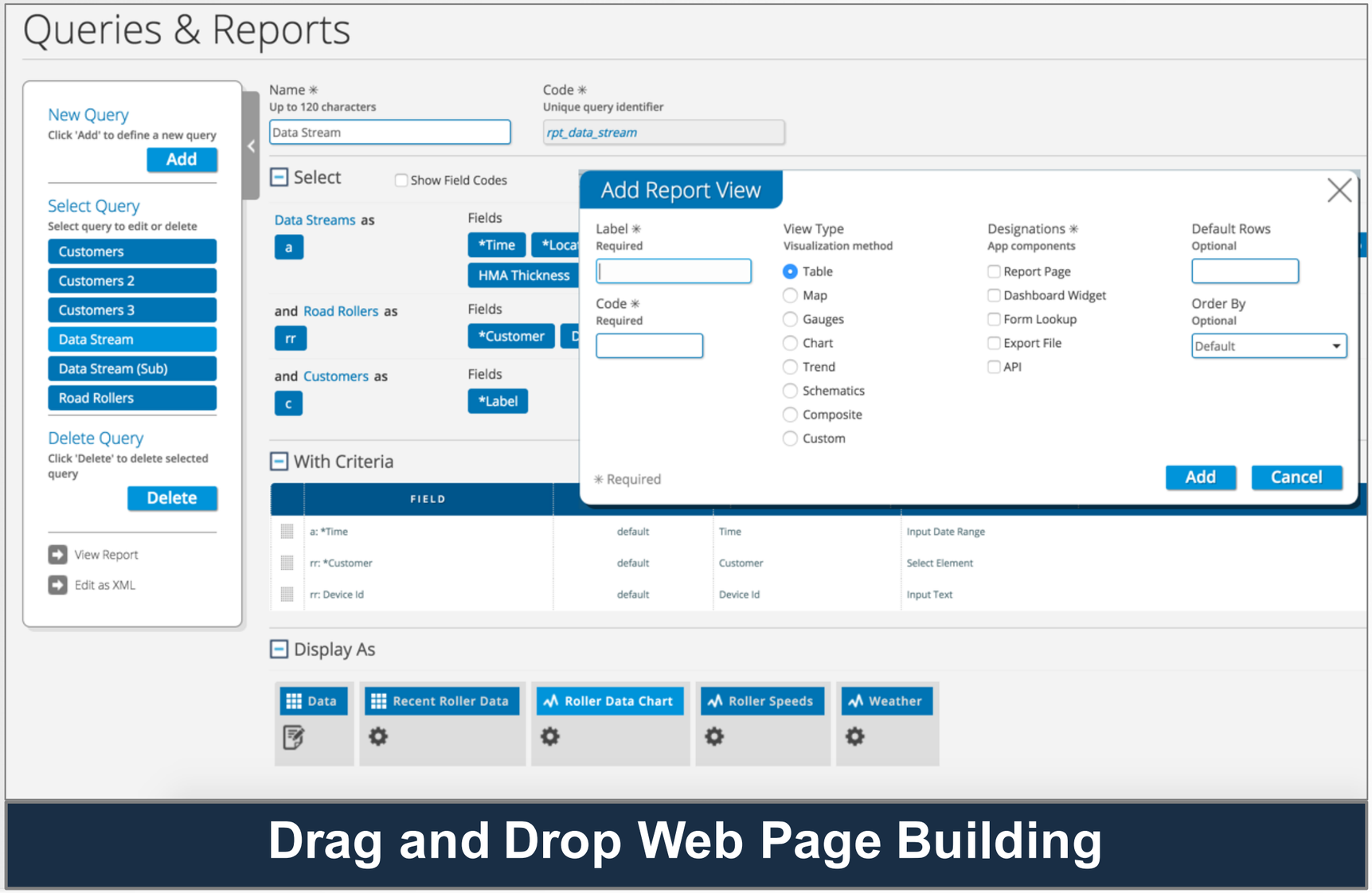
IoT **Simplified**



Drag and Drop Web Page Building

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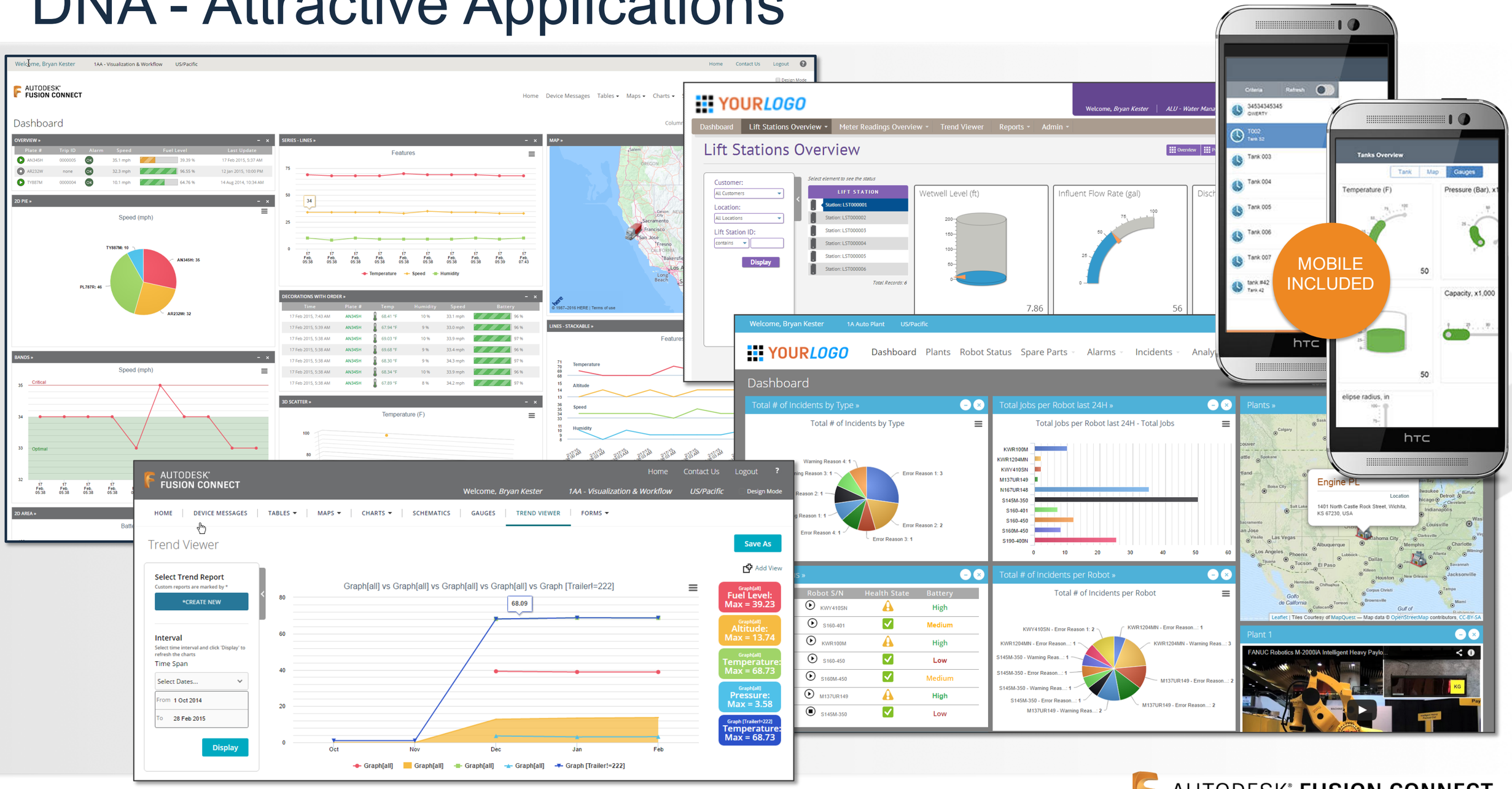
DNA - Attractive Applications



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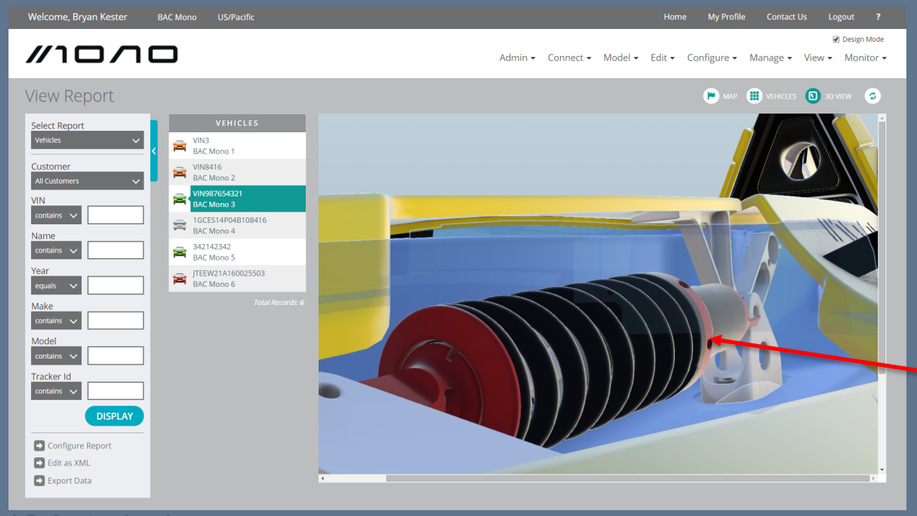
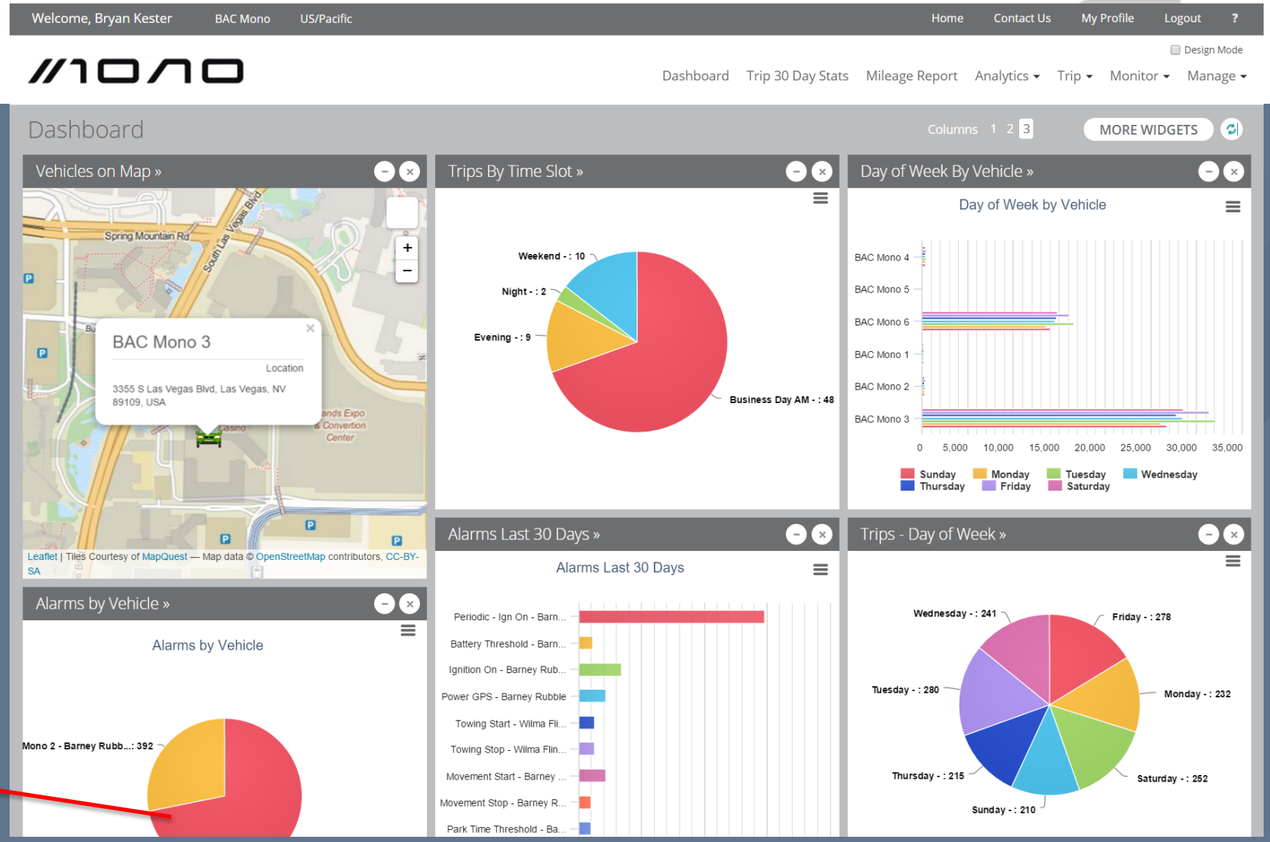
XIRGO

KORE telematics

Integrated 3D + IoT





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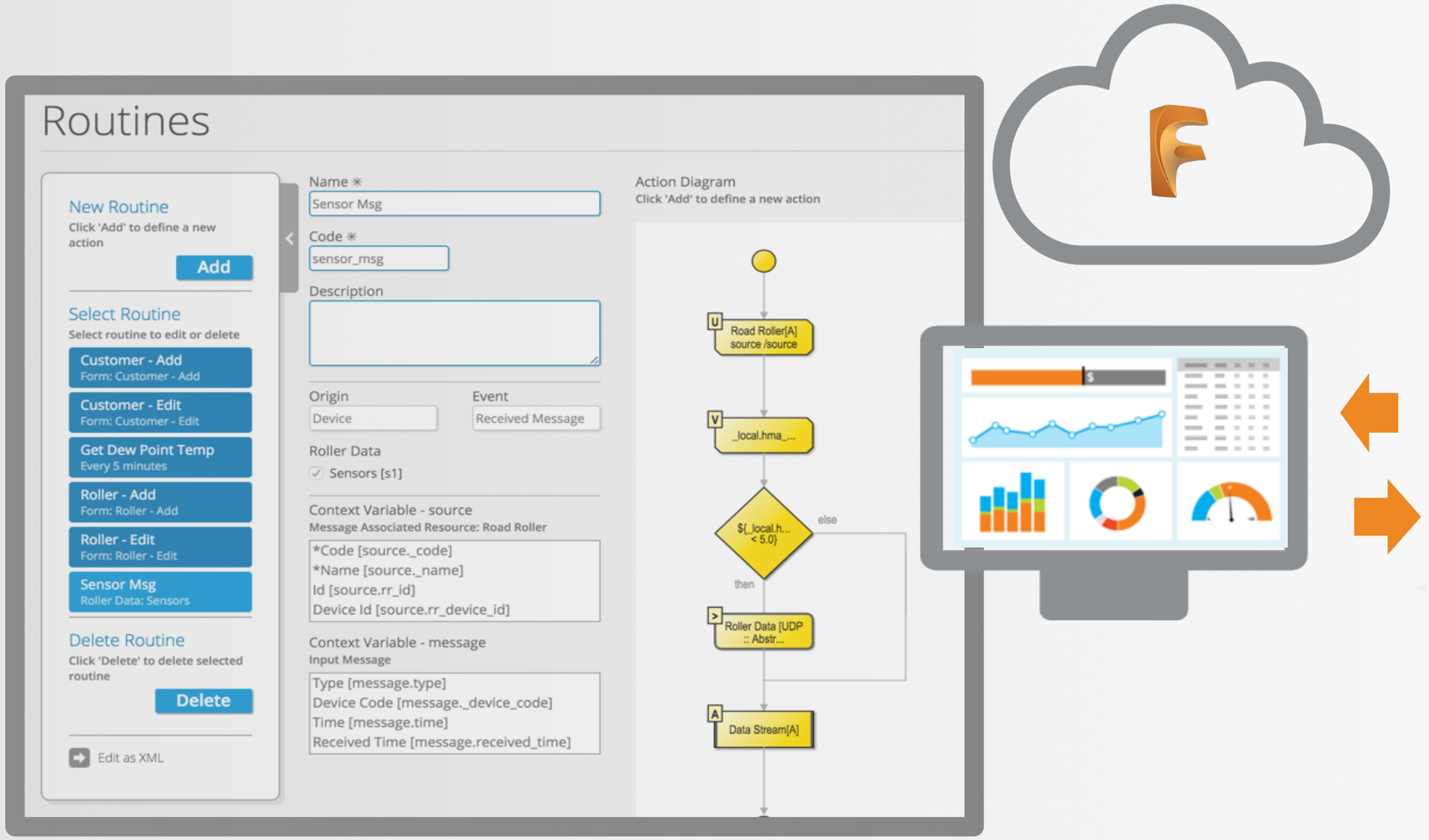
Dynamic Analytics



Pre-Built Functions + Partner Functions

Nutonian

Analysis + Math Model

AUTODESK® **FUSION CONNECT**

Making Data Science & IoT Affordable & Accessible

$113,000*

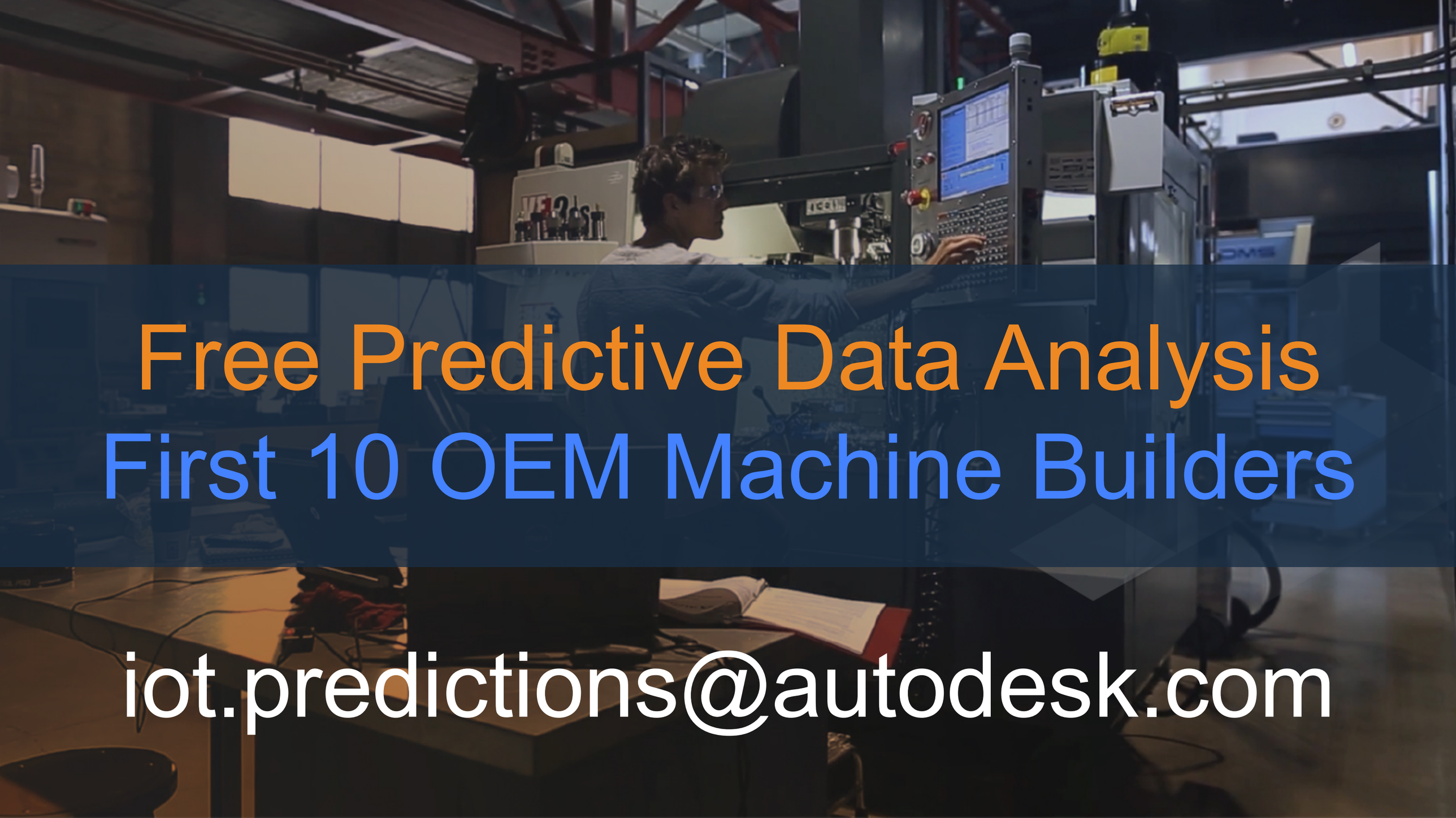
Data Scientist Salary

*Source: National average for
Data Scientist salary; Glassdoor 08/24/16

vs.

$6-$12K /year

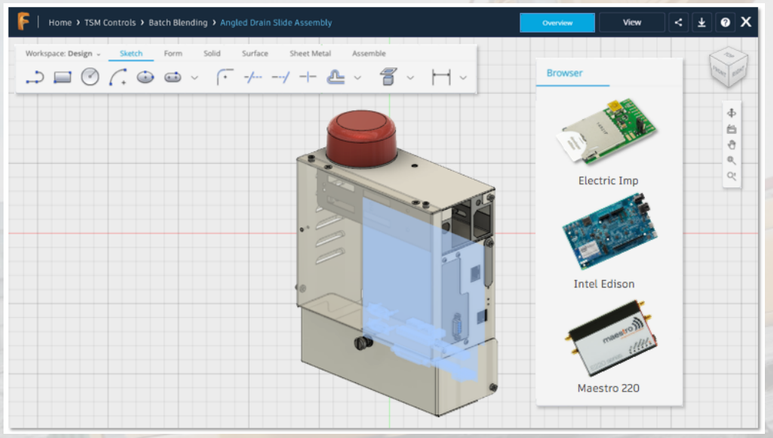
Dynamic Predictive Analytics
powered by Nutonian's
Eureqa, A.I. modeling engine

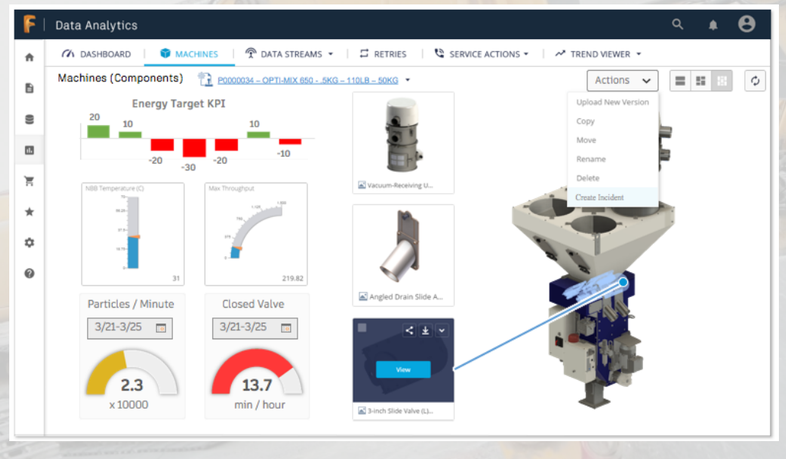


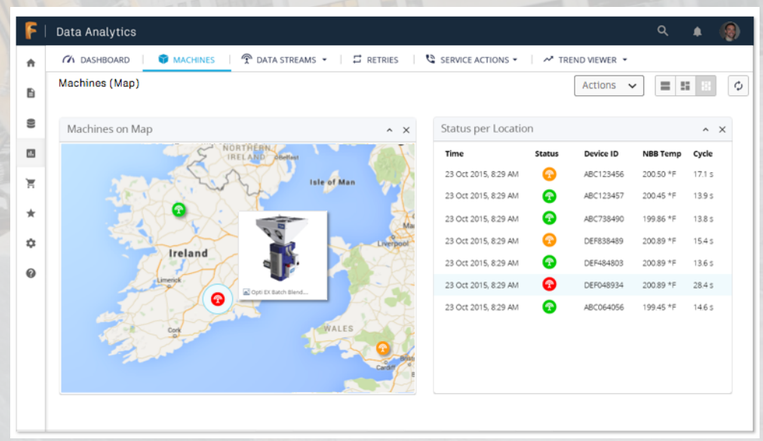
Free Predictive Data Analysis
First 10 OEM Machine Builders

iot.predictions@autodesk.com

What if you radically altered product development?







CAD/CAM → **CPQ & PLM** → **IoT**

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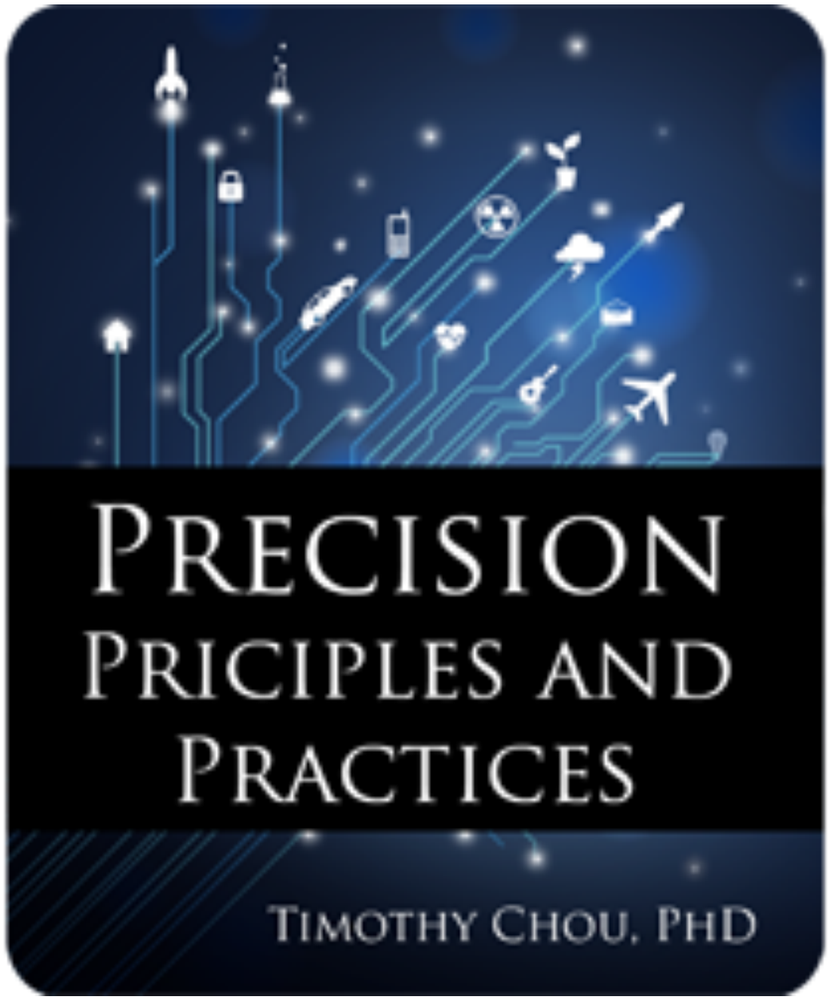
Recommend Reading and Remaining Classes

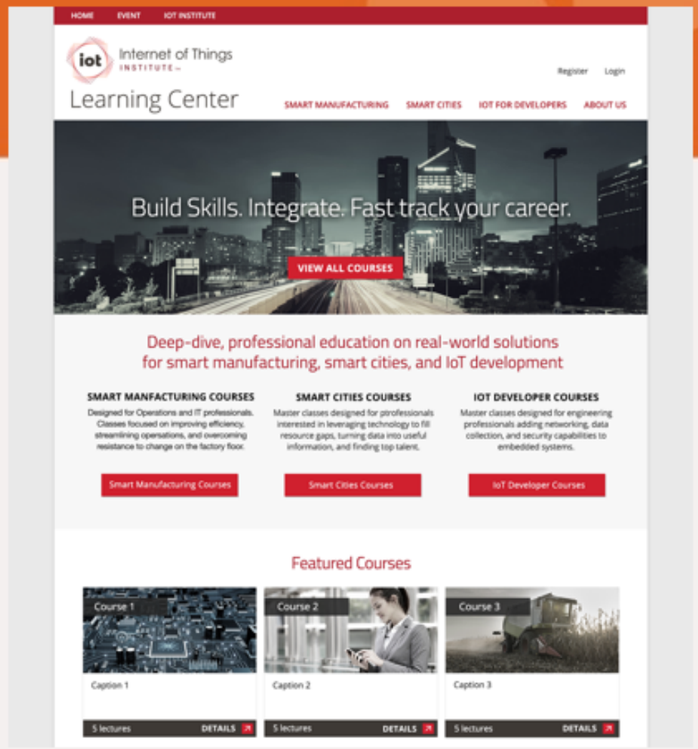


Thursday

- 8:30 am – 9:30 am - IOT15637 - **Getting on the Fast Track to IoT - Panel**
- 1:00 pm – 2:30 pm - IOT15559 - **An Introduction to Fusion Connect - demo**

Learning Center

Education.IoTi.com is an e-learning platform with free courses focused on Smart Manufacturing, Smart Cities and IoT Engineering



FEATURED COURSE:

IoT Fundamentals & Examples of Business Transformation

Instructor: Dr. Timothy Chou

-Stanford Lecturer & Author of *Precision: Principles, Practices and Solutions for the Internet of Things*

Sponsored by:

Autodesk Fusion Connect

Internet of Things INSTITUTE ™

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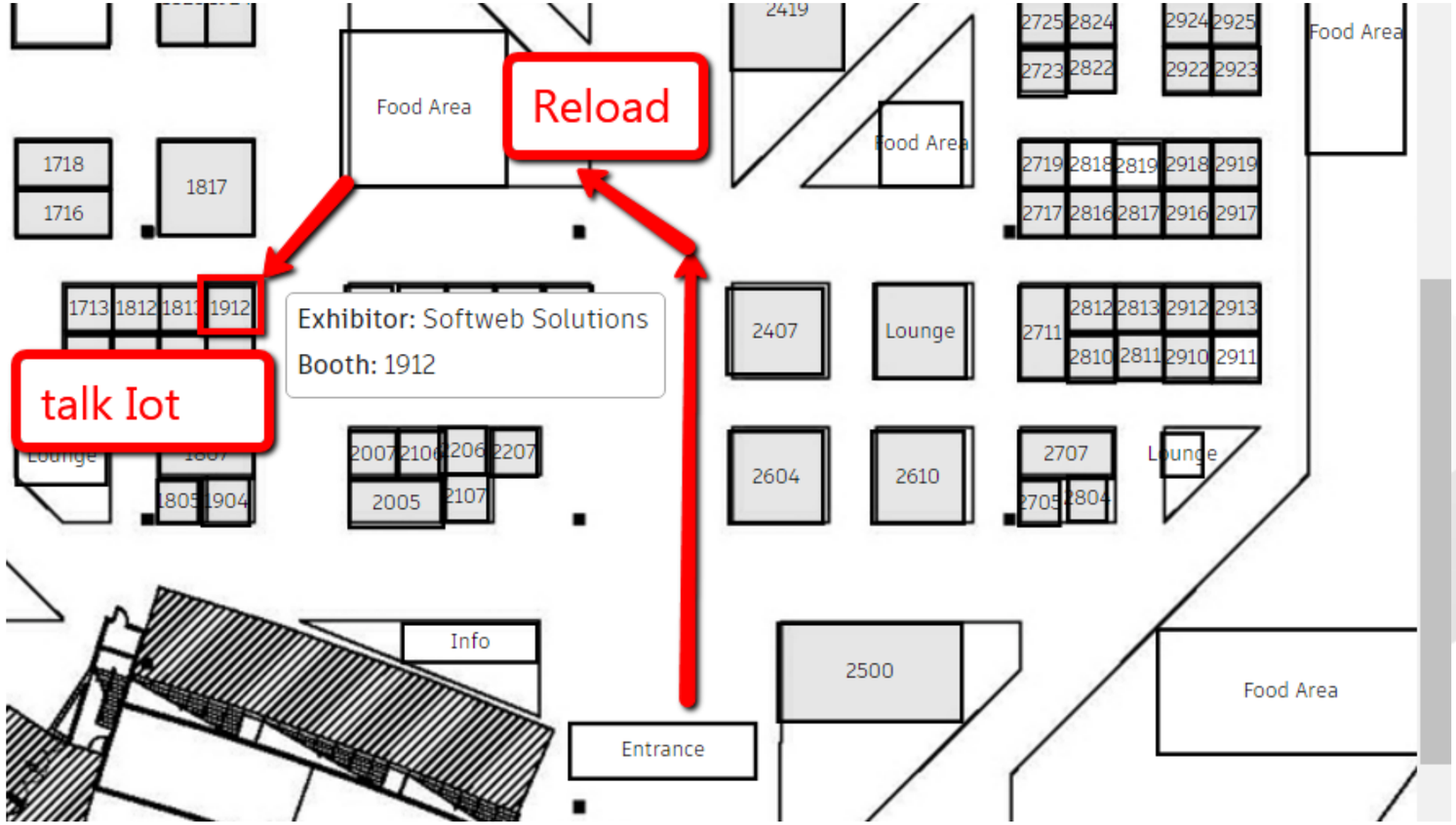
Softweb Solutions

Stop by Softweb booth to talk about “Proof of Value Workshop”

Booth Number # 1912



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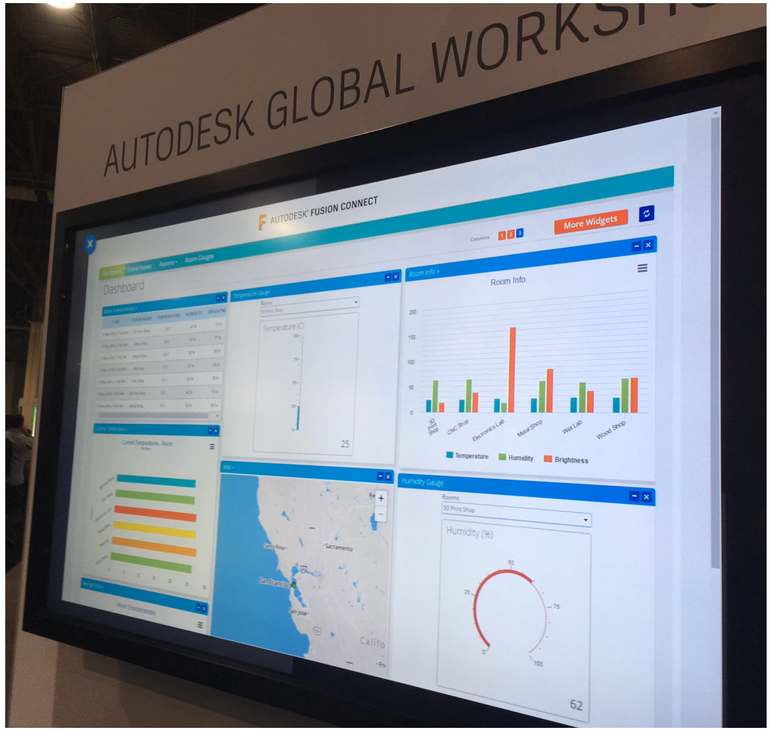
Check out the Global Workshop Dashboard



Autodesk Product
Design & Mfg Zone
Booth Number # 1031

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How did I do?

- Your class feedback is critical. Fill out a **class survey** now.
- Use the AU mobile app or fill out a class survey online.
- Give feedback after each session.
- AU speakers will get feedback in real-time.
- **Your feedback results in better classes and a better AU experience.**

Q&A

www.fusionconnect.io

Extra - More IoT Cases

Energy Orchestration

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Welcome, Bryan Kester SolarCity US/Pacific Home Contact Us Logout

Design Mode

SolarCity

Home Trend Viewer Reports Resources Groups

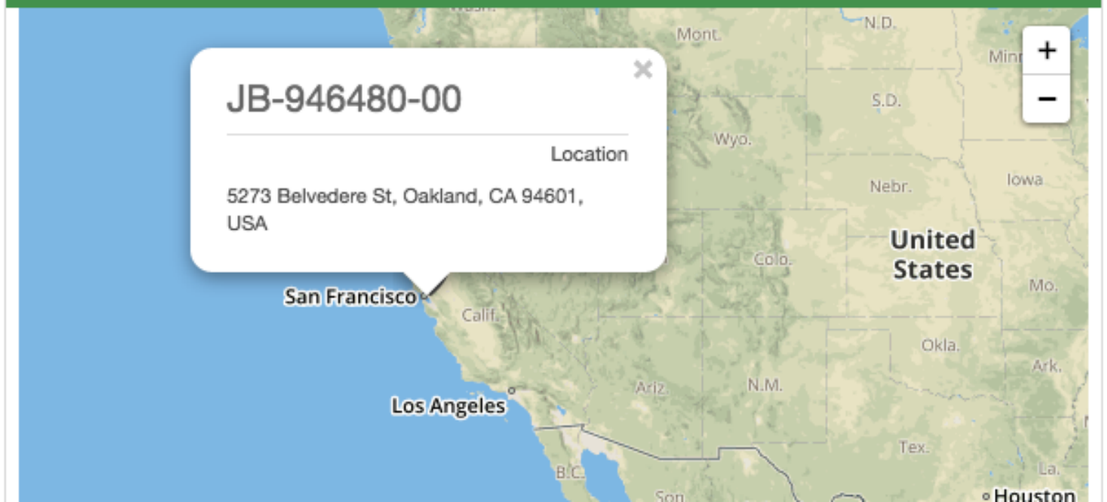
Dashboard

Columns 1 2 3 MORE WIDGETS

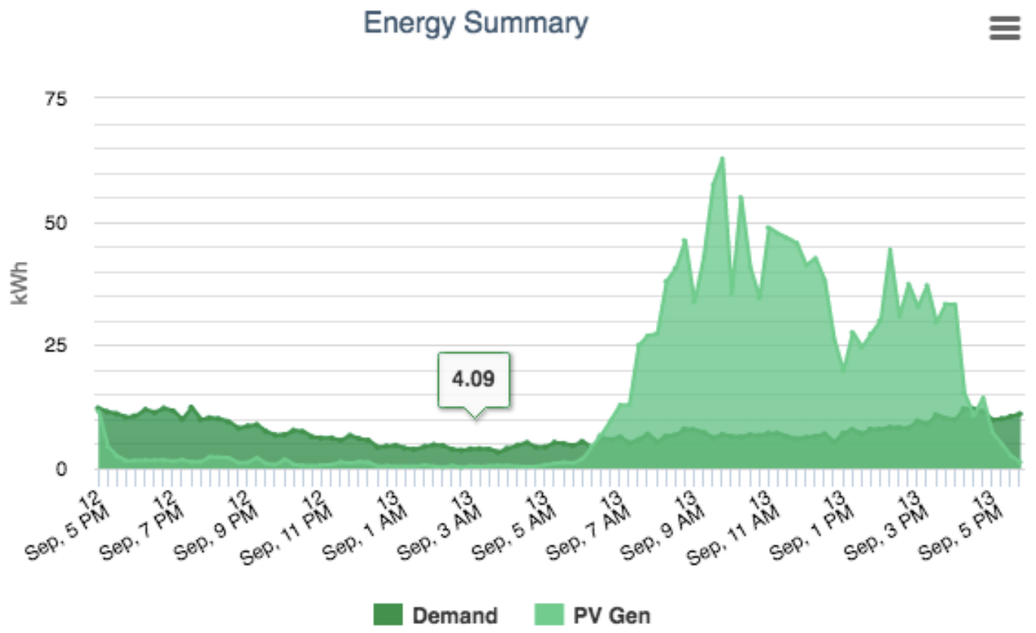
OFFLINE DEVICES »

Project	Device	URL (API Key)	Last Upd
Forest City Water Heater Pilot	eGauge16492	egauge16492.egaug.es	20 Aug 2016, 9
Forest City Water Heater Pilot	eGauge16491	egauge16491.egaug.es	24 Jul 2016, 3:2
Oakland Test Site	eGauge13714	egauge13714.egaug.es	8 Jul 2016, 11:(
Forest City Water Heater Pilot	eGauge16490	egauge16490.egaug.es	7 Apr 2016, 5:2
Forest City Water Heater Pilot	eGauge16494	egauge16494.egaug.es	20 Mar 2016, 3
Forest City Water Heater Pilot	Forest City Steffes	3817D727-70D9-43EA-B558-EC866D8D1C8A	20 Aug 2015, 1
Oakland Test Site	Oakland Steffes	8C7DE156-4A10-4EDD-9E2A-9B752D98C1E1	2 Feb 2015, 11

SITES ON MAP »



ENERGY SUMMARY »



DEVICE MESSAGES »

Time	Project	Device	Register	Value
13 Sep 2016, 6:35:40 PM	Forest City Water Heater Pilot	eGauge16484	PVGen1	-3.3 W
13 Sep 2016, 6:35:40 PM	Forest City Water Heater Pilot	eGauge16484	Grid2	2672.7 W
13 Sep 2016, 6:35:40 PM	Forest City Water Heater Pilot	eGauge16484	Grid	6441.5 W
13 Sep 2016, 6:35:39 PM	Forest City Water Heater Pilot	eGauge16488	PVGen2	-13.4 W

NECT

City of Houston

500K Water Meters

AUTODESK® FUSION CONNECT

Nodes

NODES ZONED MAP

Node ID

contains

IP Address

contains

Status

ALL NONE

- [ ] In Operation
- [ ] Caution
- [x] Error

Type

ALL NONE

- [x] Node
- [x] Gateway

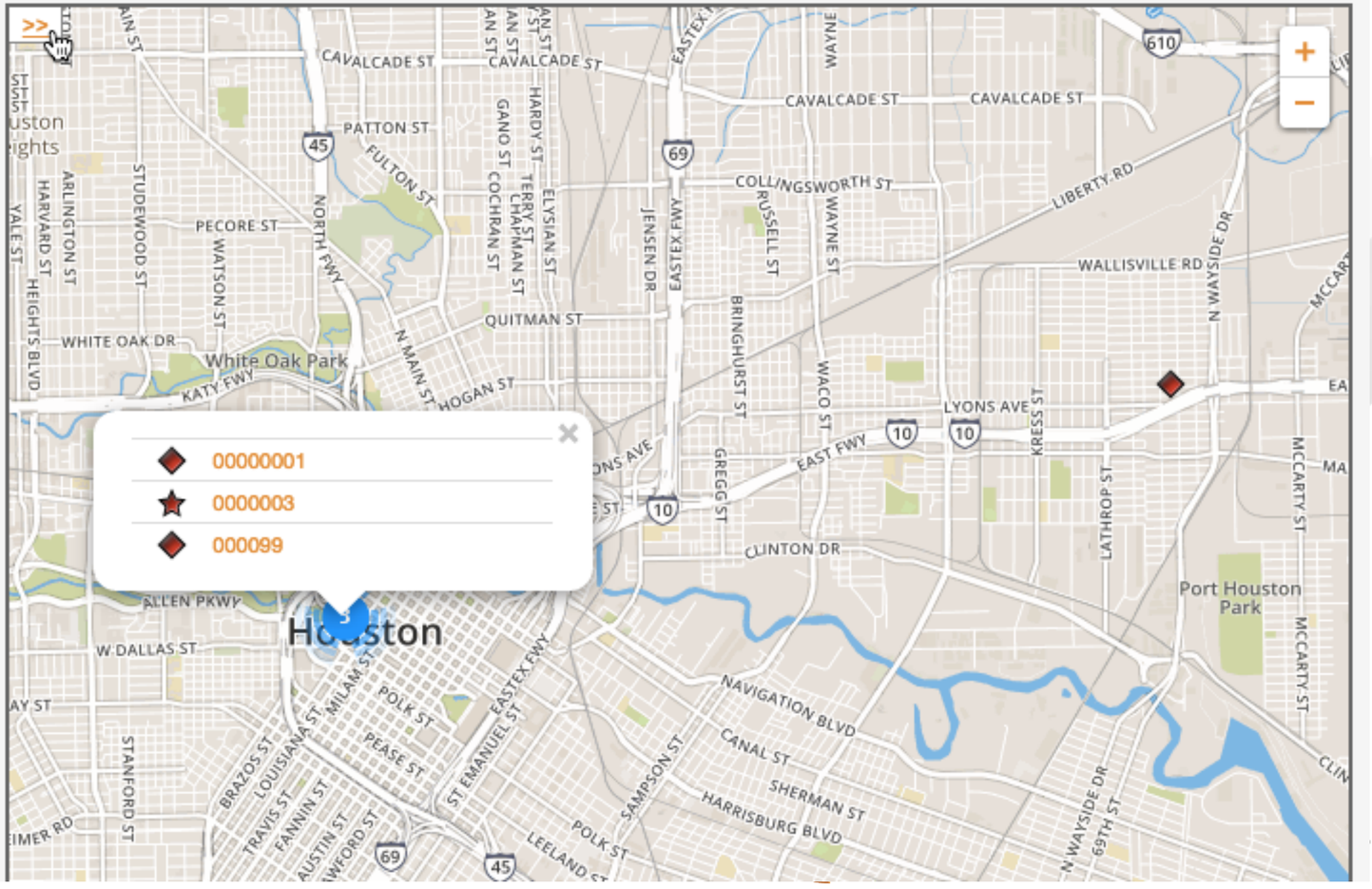
DISPLAY

NODES

- Node: 00000001 Last Update:
- Node: 0000002 Last Update: Fri, 30 May 2014 05:00:00 CDT
- Node: 0000003 Last Update: Wed, 21 May 2014 12:49:00 CDT
- Node: 000099 Last Update:
- Node: 023415 Last Update: Sun, 1 Nov 2015 03:28:00 CST

Total Records: 5

To get more information click on marker



Construction Site Monitoring

AUTODESK® FUSION CONNECT

Home | Contact Us | My Profile | Logout | ?

Design Mode

Welcome, *Bryan Kester* | *Deconstruction* | *US/Pacific*

Dashboard | View Reports | Manage | Data Capture | Trend Viewer

Sensors

Submit Clear

Defines the settings associated with a sensor.
You may add a new sensor or edit an existing sensor using this form

Sensor

Job Site ✳

Id

Name ✳

Alarm Settings ✳

Last Update

Battery
Percentage of charge: 0.0

Humidity
Percentage: 0.0

Noise
Decibels: 0.0

Temperature: 0.0 C

X Axis Movement
Meters/second: 0.0000

Y Axis Movement: 0.0000

Z Axis Movement: 0.0000

Location
Latitude
Longitude

Temperature State ✳: High

Humidity State ✳: Normal

Noise State ✳: Normal

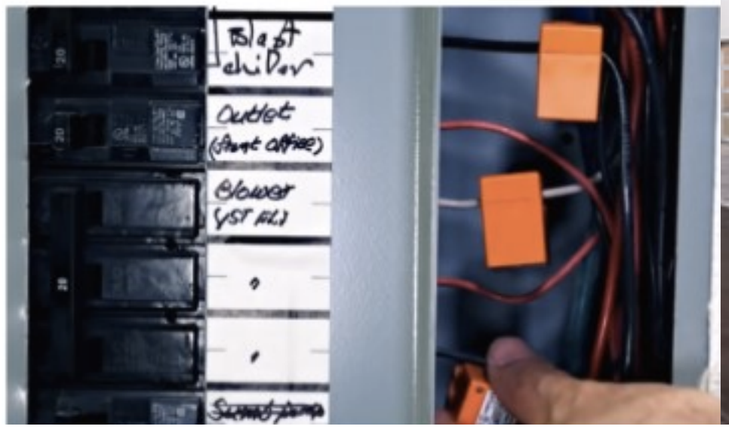
Vibration State ✳: Annoying

Battery State ✳: Normal

Submit Clear

Autodesk

Pier 9



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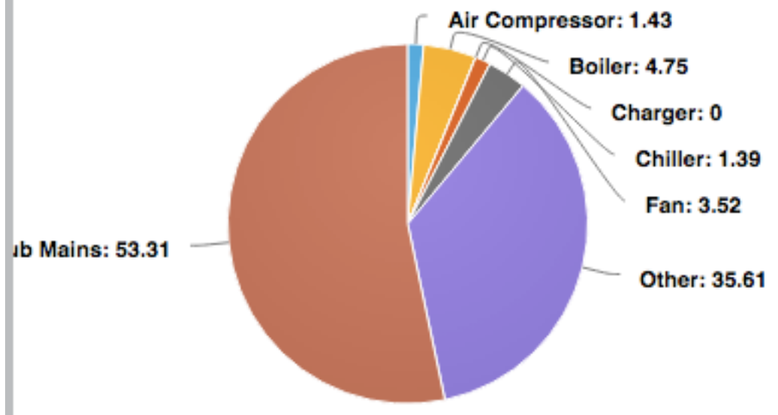
Dashboard

Columns 1 2 3 | MORE WIDGETS

Energy Last 7 Days »

Energy - Summary (Percent)



Load Types per Site »

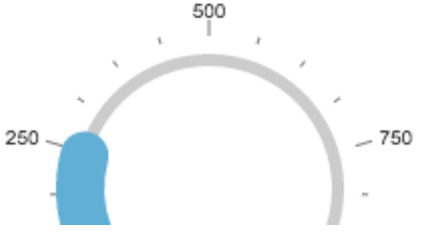
Load Types

Site Total

Energy Yesterday (kW), x1,000

2.040

Cost Yesterday ($)

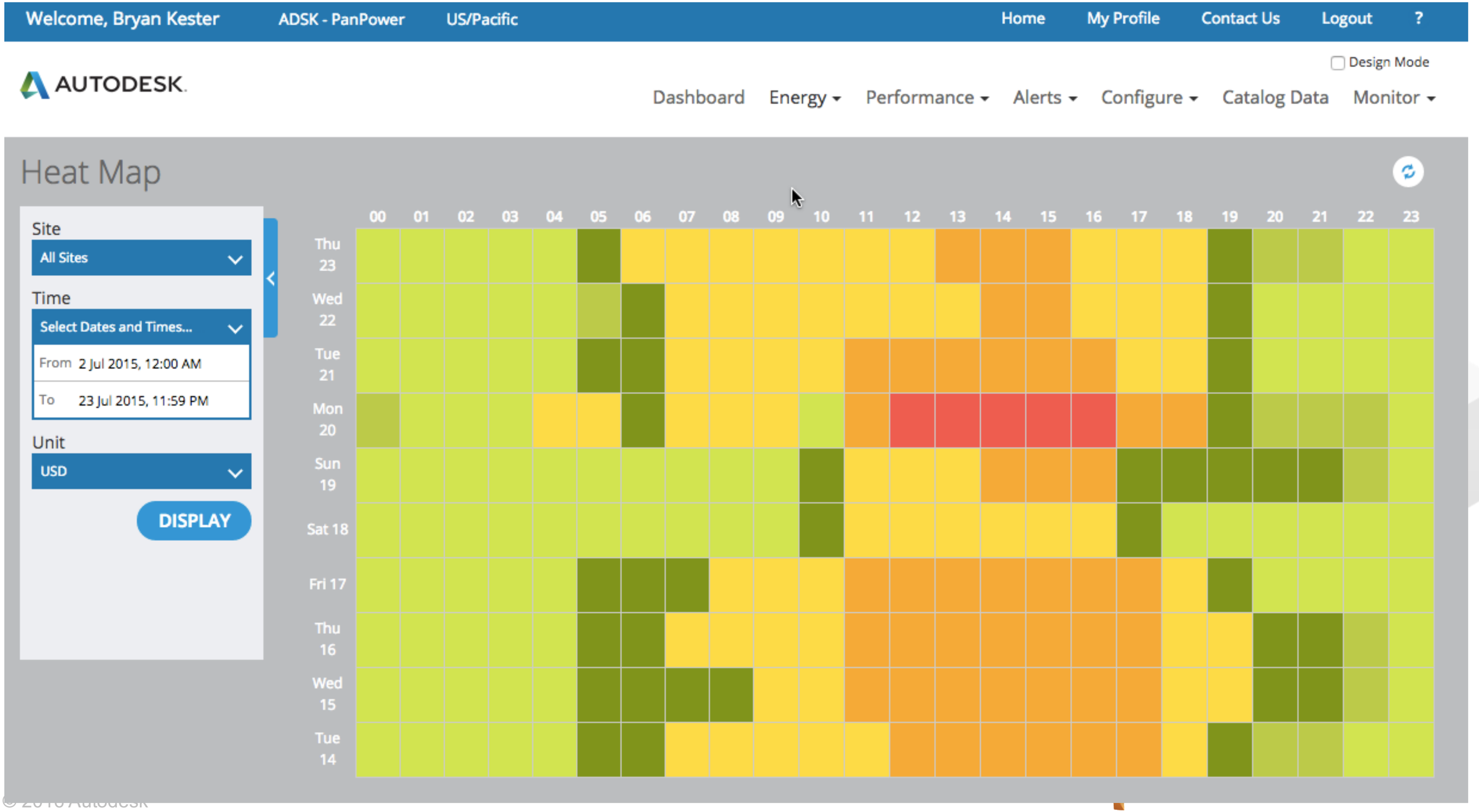


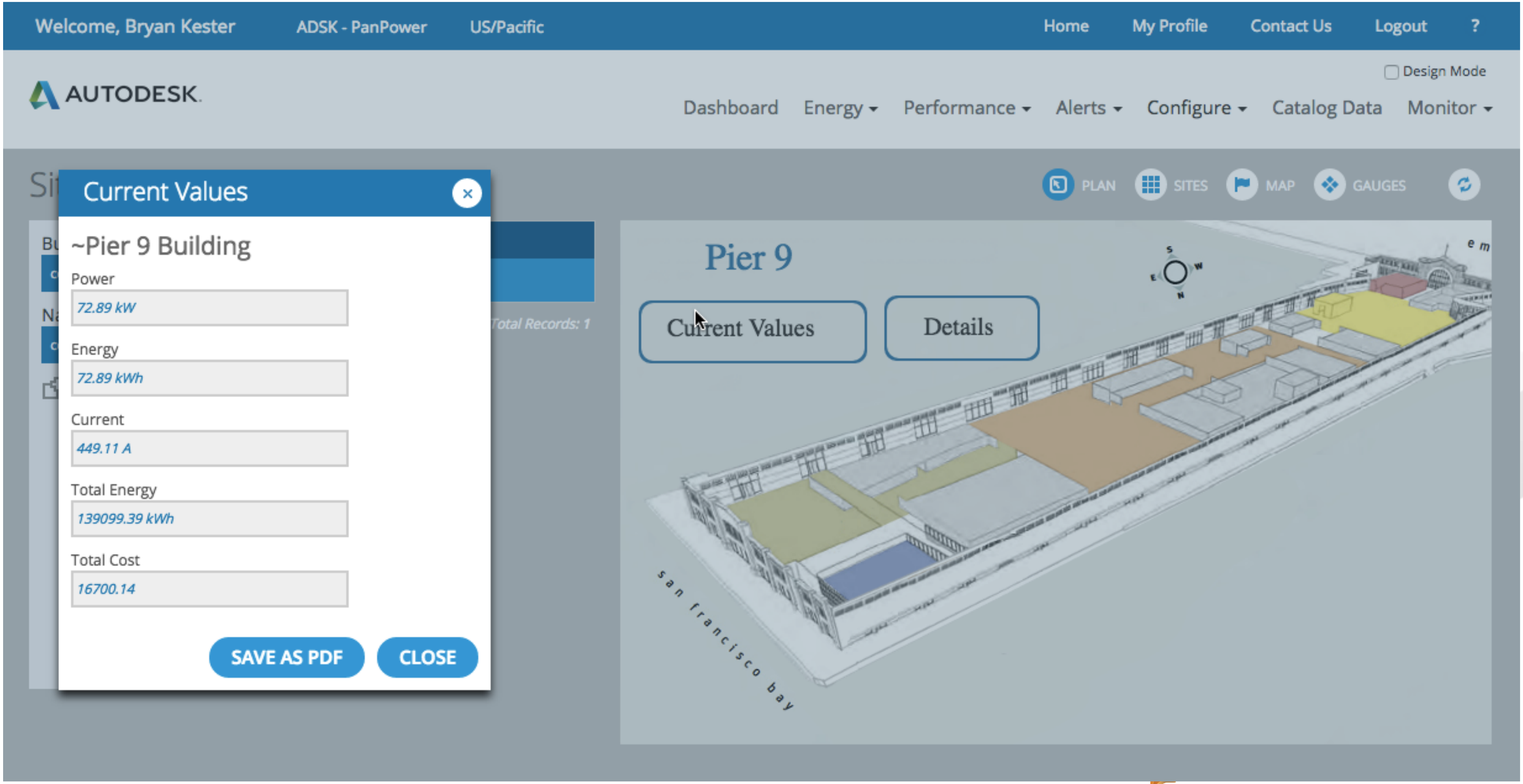
Alerts »

Status	Last Update	Name
Acknowledged	3 Oct 2015, 7:26 AM	Low Powe
Acknowledged	28 Sep 2015, 9:58 AM	Device Missi
Acknowledged	28 Sep 2015, 9:58 AM	Low Powe
Acknowledged	28 Sep 2015, 9:58 AM	Device Missi
Closed	14 May 2015, 9:46 AM	High Powe
Closed	14 May 2015, 9:46 AM	High Powe

Load Types »

Current Values of Load Types





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Design Mode

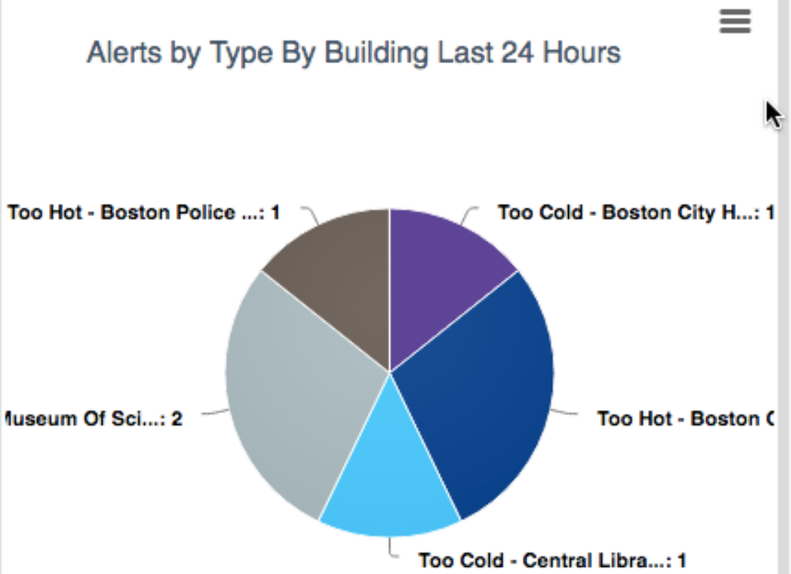
Dashboard | View Trends | Buildings | Rooms | Alerts | Sensor Messages

Dashboard

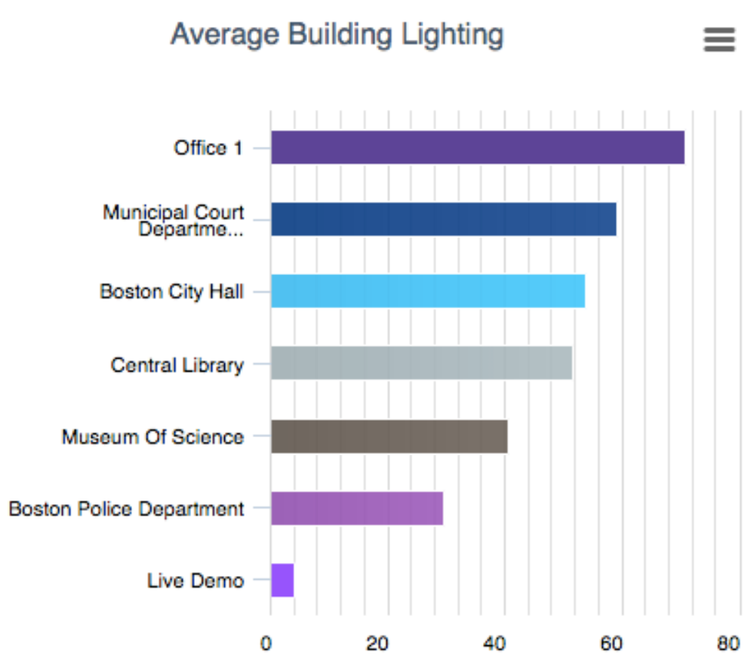
Columns 1 2 3

More Widgets

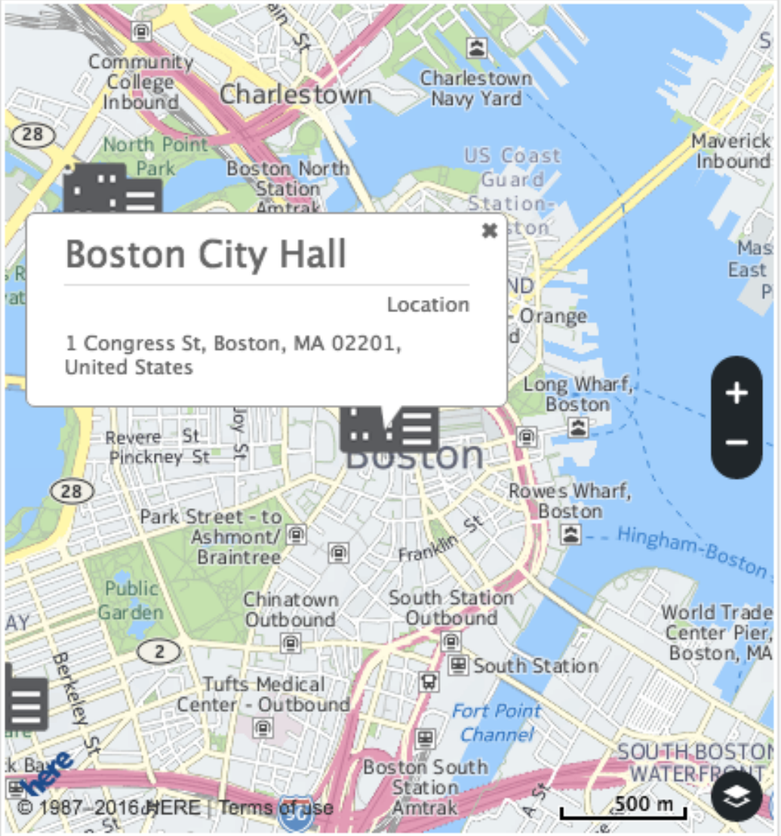
Alerts by Type By Building Last 24 Hours »



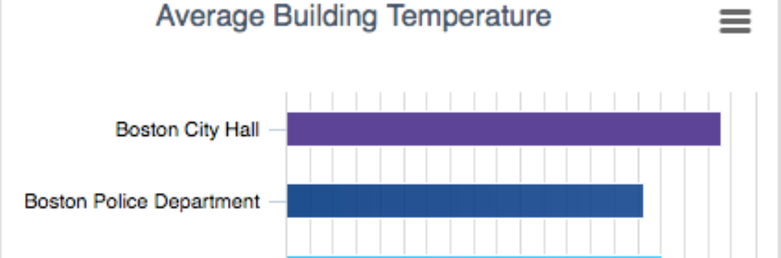
Average Building Lighting Last 24 hours »



Buildings on Map »



Average Building Temperature Last 7 days »



Sensor Historic Data »

TIME	BUILDING	ROOM	TEMP
24 Aug 2016, 6:25 PM	Central Library	Reading Room	48
24 Aug 2016, 6:20 PM	Central Library	Reading Room	60
24 Aug 2016, 6:20 PM	Municipal Court Department	Judge's Office	68

Rooms »

BUILDING	ROOM NUMBER	LAST UPDATE
Live Demo	Demo Room 1	24 Nov 2015, 5:30 PM

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Dashboard | View Trends | Buildings | Rooms | Alerts | Sensor Messages

Buildings

Plan | Buildings | Locations | Average Building Temperature

Building
contains

Average Light
equals

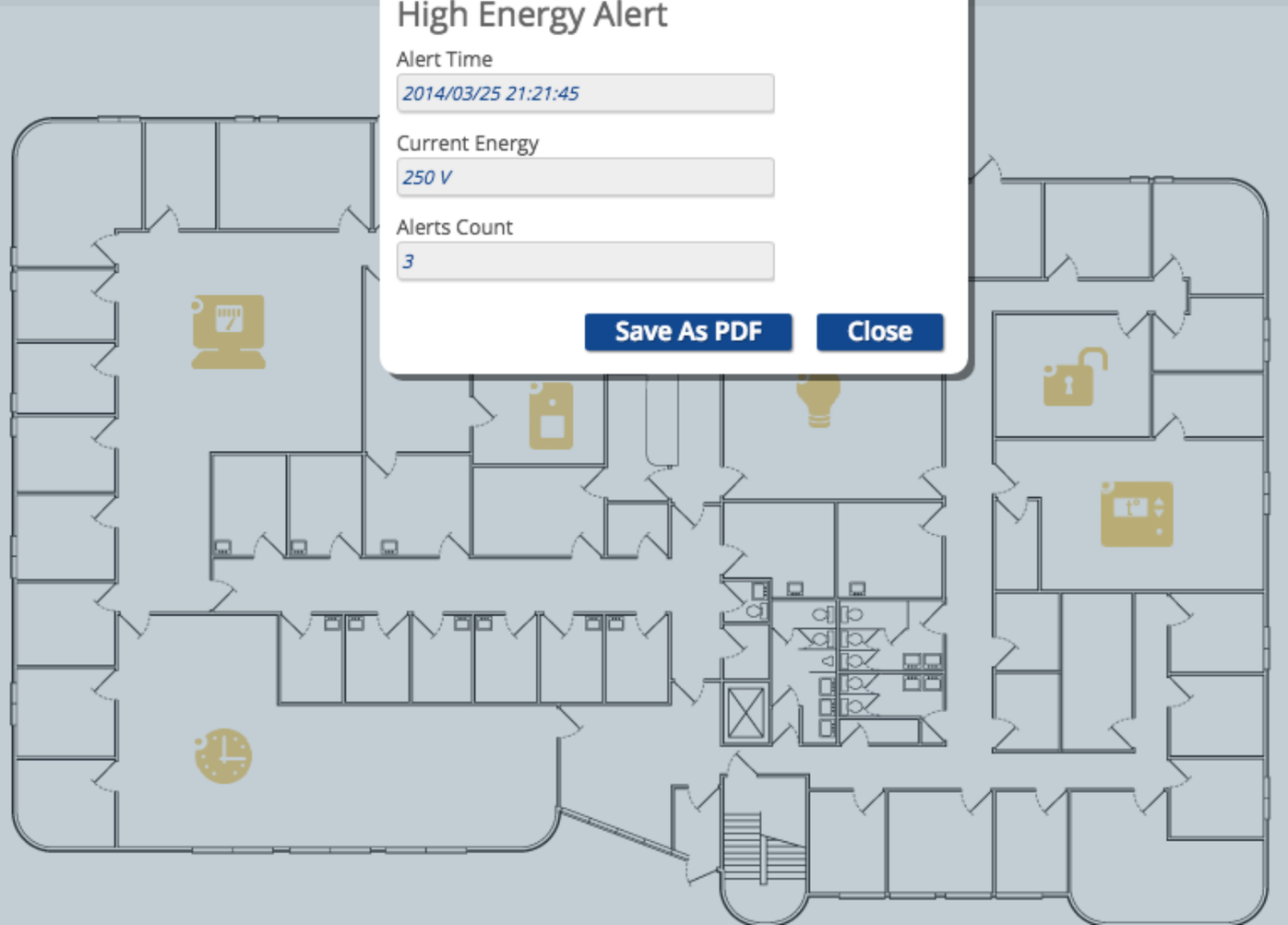
Display

BUILDING

- Boston City Hall
- Boston Police Department
- Central Library
- Live Demo
- Municipal Court Department
- Museum Of Science
- Office 1

Total Records: 7

FloorPlan 1 | FloorPlan 2



2nd hall

High Energy Alert

Alert Time
2014/03/25 21:21:45

Current Energy
250 V

Alerts Count
3

Save As PDF | Close

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Dashboard | View Trends | Buildings | Rooms | Alerts | Sensor Messages

Buildings

Plan | Buildings | Locations | Average Building Temperature

Building
contains

Average Light
equals

Display

Export Data

Data Analytics

Show all columns and restore the order

Add

BUILDING	ROOMS	CONTACT NAME	PHONE	E-MAIL	
Office 1	Rooms	office owner	617-544-8765	oowner@boston.net	
Museum Of Science	Rooms	Ben Stiller, Museum Keeper	617-723-2500	bstiller@boston.net	
Municipal Court Department	Rooms	Judge Smith	617-727-5300	sjudge@boston.net	
Live Demo	Rooms	John Smith	888 345 0987	frank.ploumen@alcatel-lucent.com	
Central Library	Rooms	Jane Doe, Head Librarian	617-536-5400	jdoe@boston.net	
Boston Police Department	Rooms	Sheriff Jack Green	617-343-5500	jgreen@boston.net	
Boston City Hall	Rooms	Veronica Smith, Mayor's Admin	617-555-1212	vsmith@boston.net	

Total Records: 7

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Q&A

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