The IoT Inc Business Meetup Silicon Valley

Opening remarks and guest presentation

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:

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Two-Day IoT Workshop

I am delivering my 2-day intensive workshop:

“Planning Your IoT Business and Product Line”

Mountain View Computer History Museum on Dec. 14-15

Details at: http://www.iot-inc.com/training

Register at: http://iotworldevent.com/academy/2015/ Use discount code: **IoTInc25**

Will be also delivering my 1-day workshop on January 13, 2016, the day of our next meetup

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Coming Up

Next Meeting, Wednesday, January 14, 2016

IoT Business Meetup, Silicon Valley Meetup, Internet of Thursdays Meetup and the Industrial Internet Meetup

IoT Mega Meetup: Four IoT Meetups Unite

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

My email: bruce@iot-inc.com

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Join us on December 3 at 6PM PST
The Business of IoT The Internet of Things
Hey IT,
Meet OT
Hima Mukkamala
Predix, GE Digital
IoT-Inc. Meetup
© IoT-Inc. 2015

Digital Industrial – OT+IT

Himagiri Mukkamala, Head of Engineering, Predix

Build your digital industry

SOFTWARE IS IMPACTING EVERY INDUSTRY

airbnb

20BN
Hotel Service

The world's largest accommodation provider that owns no real-estate

18BN
Consumer App Economy

The world's largest consumer hardware company only creates a few apps

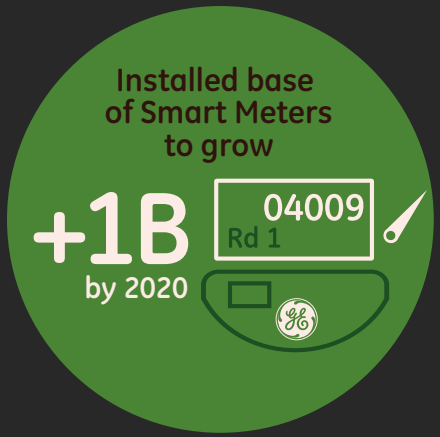
50BN
Taxi Service

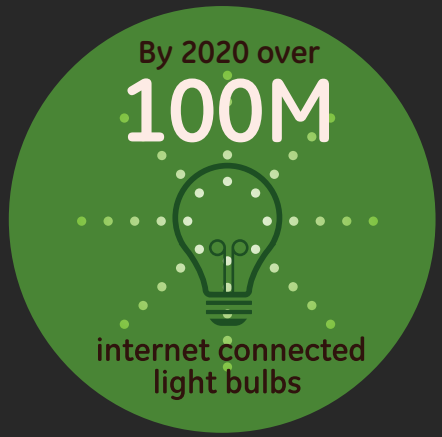
The world's largest taxi company that owns no vehicles

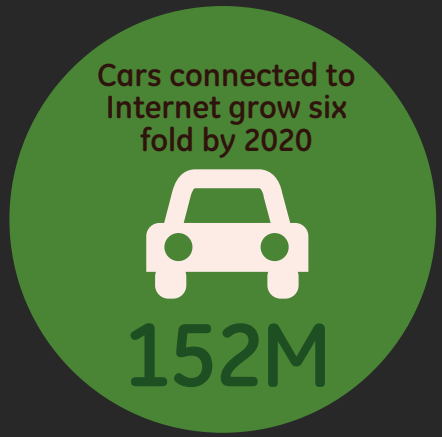
#IndustrialInternet

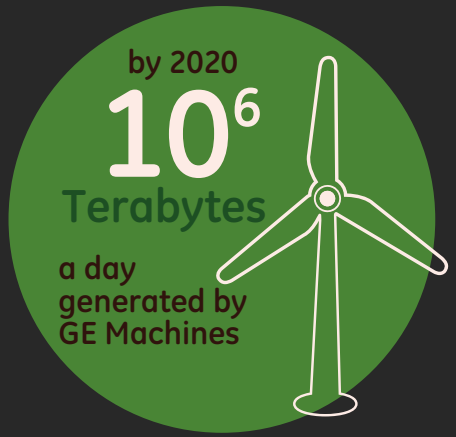
powered by GE

DIGITAL INDUSTRIAL IN FULL FORCE









Industrial Internet no longer is a probability, but an inevitability…

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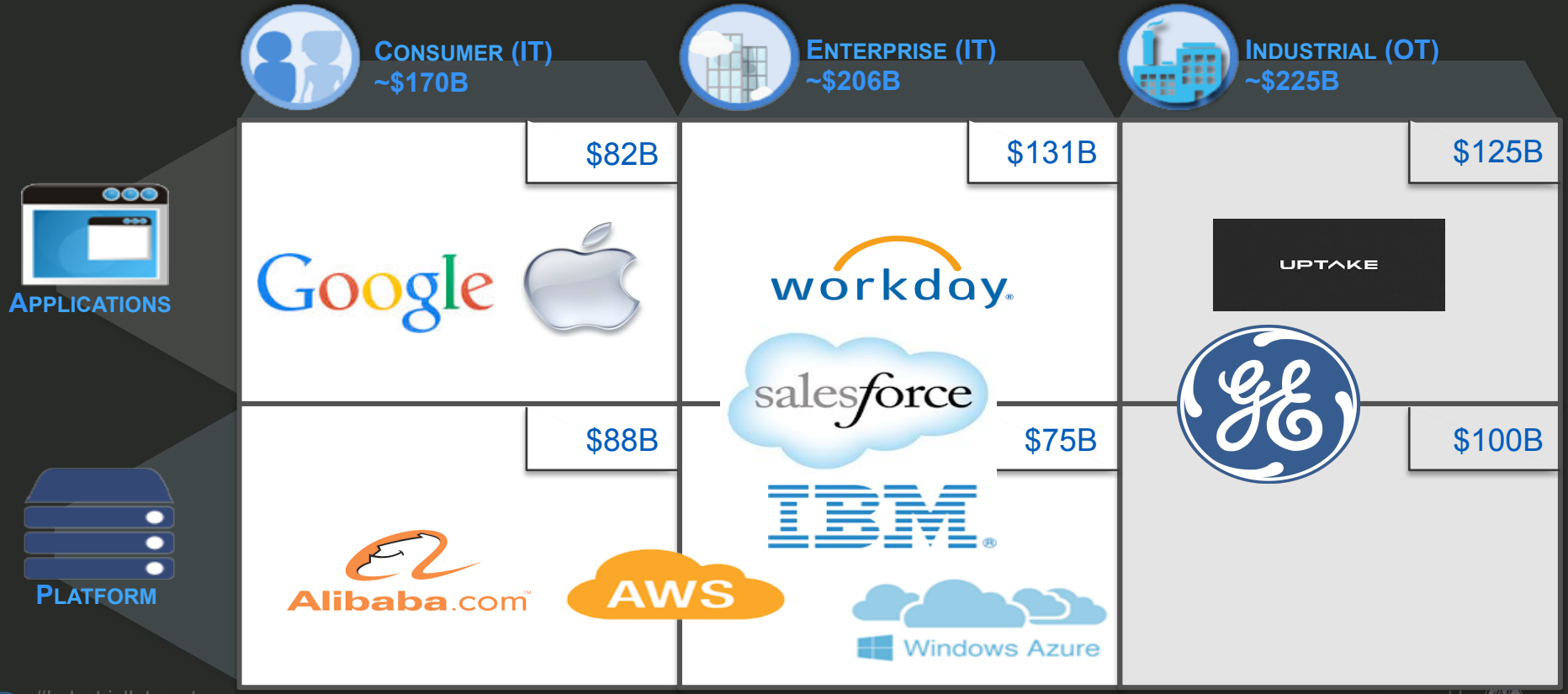
II MARKET BY 2020: $225BN



#IndustrialInternet

Source: Harbor Research, IDC, TCG Analysis

powered by

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Something's wrong here…

#IndustrialInternet

75-80% of intelligent industry solutions will be data intensive.

This goes **beyond what traditional systems can deliver** such as back-office, ERP-related billing, procurement, and enterprise asset management systems — leveraging **massive amounts of sensor data** via advanced **predictive analytics.**

Source: IDC

Accesscontrol
PMML
Embedded
Connectivity
Data
IaaS
CERT
Asset Data mgmt.
Storm
Statistics
NoSQL
Spark
Graph
MapReduce
Cassandra
Firewall
Wi-Fi
Big-Data
Cloud
SQL
SaaS
6LoWPAN
Videoanalytics
SQ
Data-Science
Cyber-Security
datamining
PaaS
Mobile
encryption
Predictive
master
Dashboards
DeepLearning
DisasterRecovery
ZigBee
machinelearning
CEAP
4.9Bluetooth
datavisualization
management
CEP

Connect
Analyze
Optimize
API
API
API
Predix
your cloud platform for the Industrial Internet

Big Data

Physics

\+ Analytics

Virtual Models

Digital Twin

Can the Digital Twin Time Travel?

Go backwards to understand what happened
Go forward to understand what to do

Digital Consumer Leadership – Digital Transformation

39 yrs.
$183B rev ('14)

21 yrs.
$89B rev ('14)

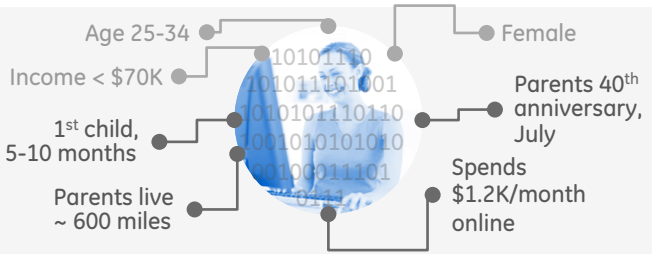
17 yrs.
$66B rev ('14)

net

digital models

insights

Demographic



Psychographic [Model of ONE]

business outcome

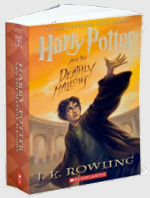
applications

Segmentation

Profiling, Prediction [P&L of ONE]

transformation & expansion

platform



Books

PHYSICAL

DIGITAL

New Industries and Services [New Revenue]

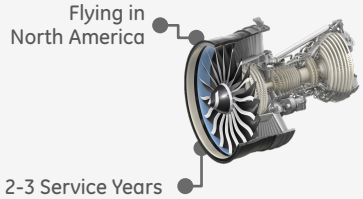
Digital Industrial Leadership – Digital Twin

Engineering models that continuously **increase insights** in each asset to deliver specific **business outcomes**.

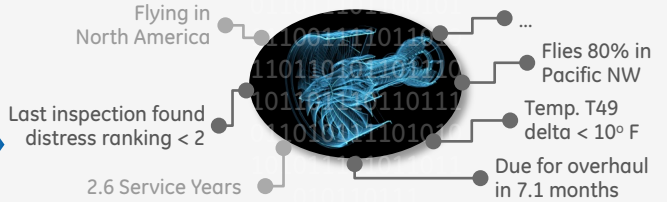
net

digital models

insights



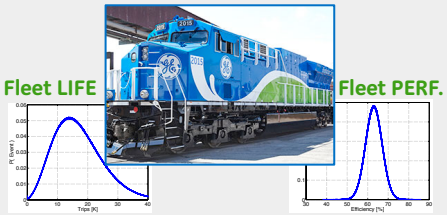
Fleet



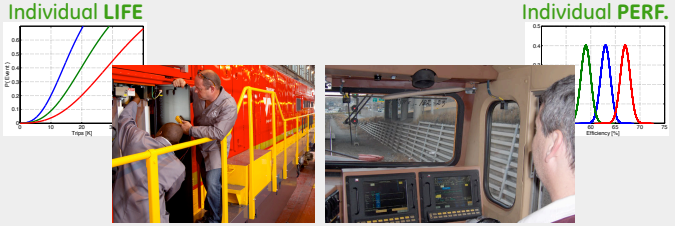
Per Asset ... PER FLIGHT [Model of ONE]

business outcome

applications



Fleet Analytics



Per Asset Analytics [P&L of ONE]

transformation & expansion

platform

Services & Products

Customized Optimizers
- Dynamic controls + Digital Twin + PREDIX

New Services & Products [New Revenue]

Digital Twin – Creating the Cloud-Based Data Economy

- Dynamic teams of cooperative machines with similar operational and/or financial objectives.
- Generate content on their current & optimal states for specific operational and financial objectives.

Optimal settings for new operational modes:

I'm a new addition to this ridge. What is the prevailing wind direction?

Generally 183° ± 5°. We're also sending our optimal vortex wake configuration.

Failure mode inquiries:

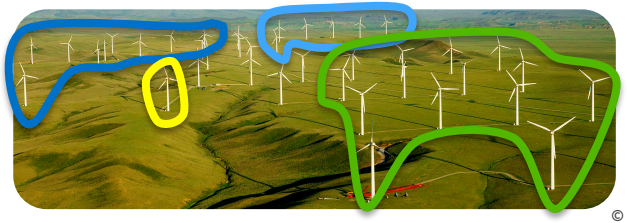
I'm seeing an anomaly – is it a precursor to a failure?

We saw it and then experienced a blade rupture two days later... Coincidence?

Possible Security Anomalies:

We detected a suboptimal unit rotation outside control tolerances. Should we raise an alert?

We observed the same anomaly last week during scheduled tower maintenance. Check the service schedule.

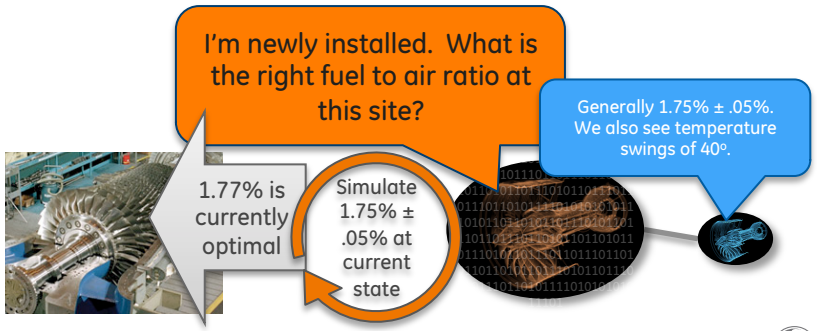


New Services

1. Publish and Search across domains, objectives, scenarios, and modes
2. Translate and Understand for Specific Assets & Conditions

Swarms can generate valuable content to broker to other swarms or individuals:

- Optimal configurations
- Failure mode identification
- Optimal controls
- New algorithms
- New security and fraud mitigation techniques



powered by GE

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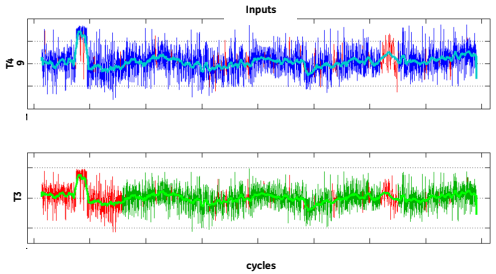
Key Enabling Technologies for Digital Twin

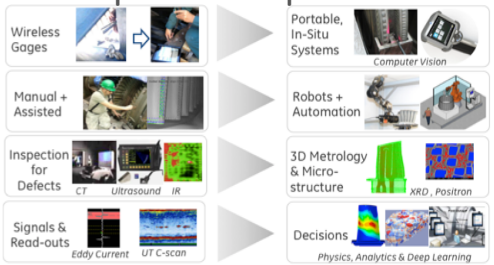
Innovation, Speed, and Scale

1 Domain Data

Automated Data Pre-processing

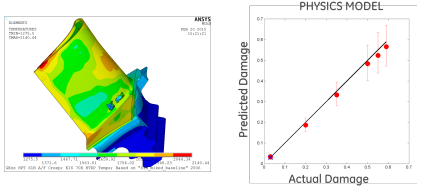


Inspection Capabilities

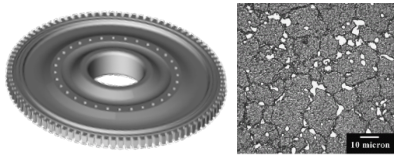


2 Physical+Digital Engineering Models

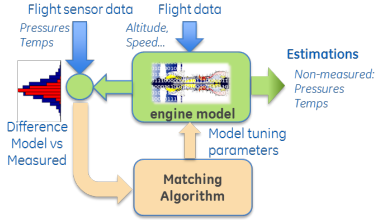
Cumulative Damage



Microstructure-Based Lifing

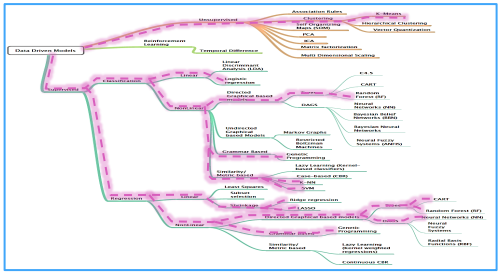


Dynamic Performance Estimation

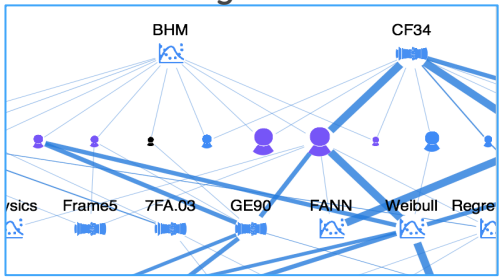


3 Industrial Analytics

Model Generation & Automation



Knowledge Extraction



4 PREDIX PLATFORM

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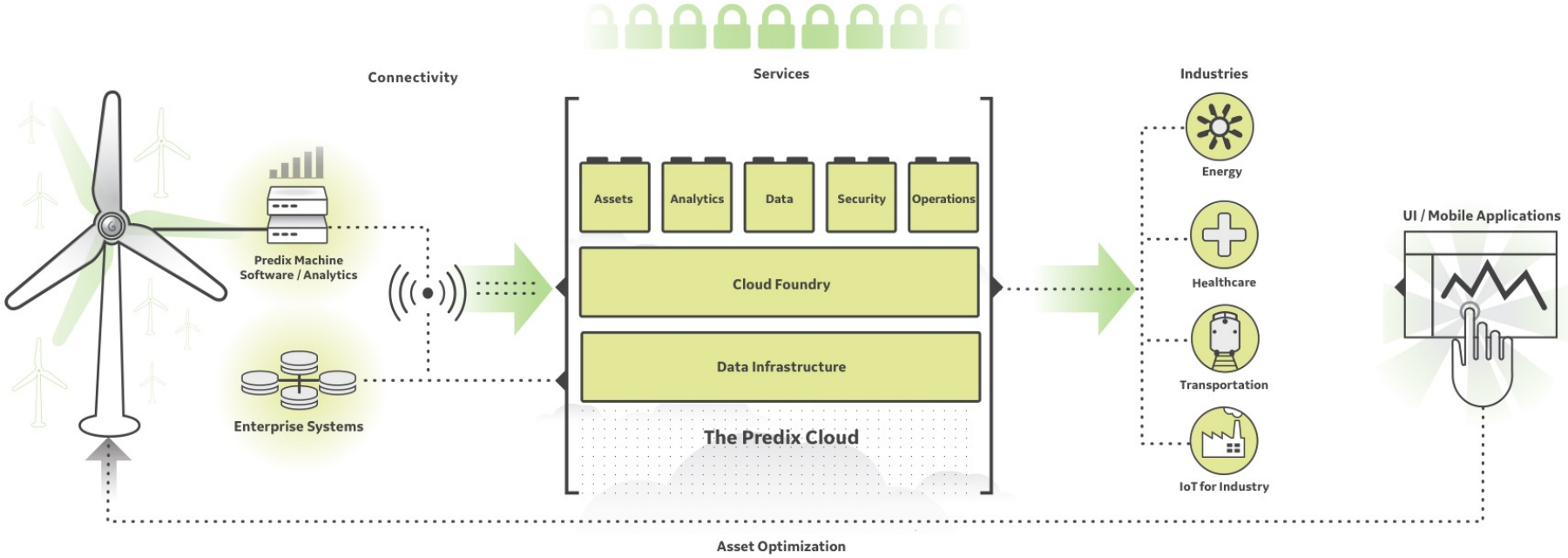
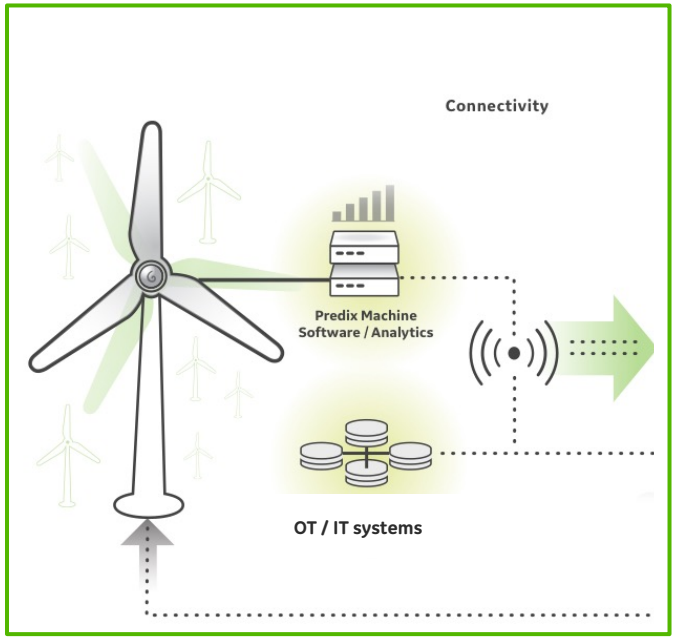
Predix Platform Architecture

End-to-end platform, machine to cloud

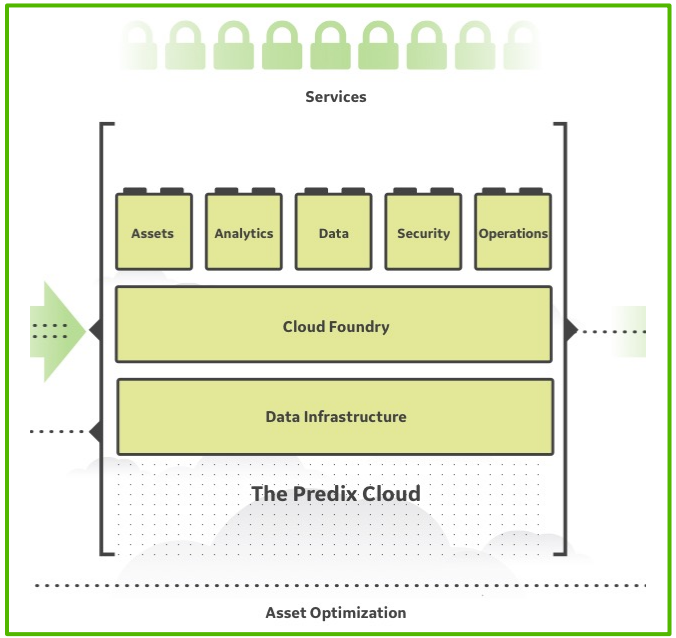


Connect ALL your OT / IT Systems

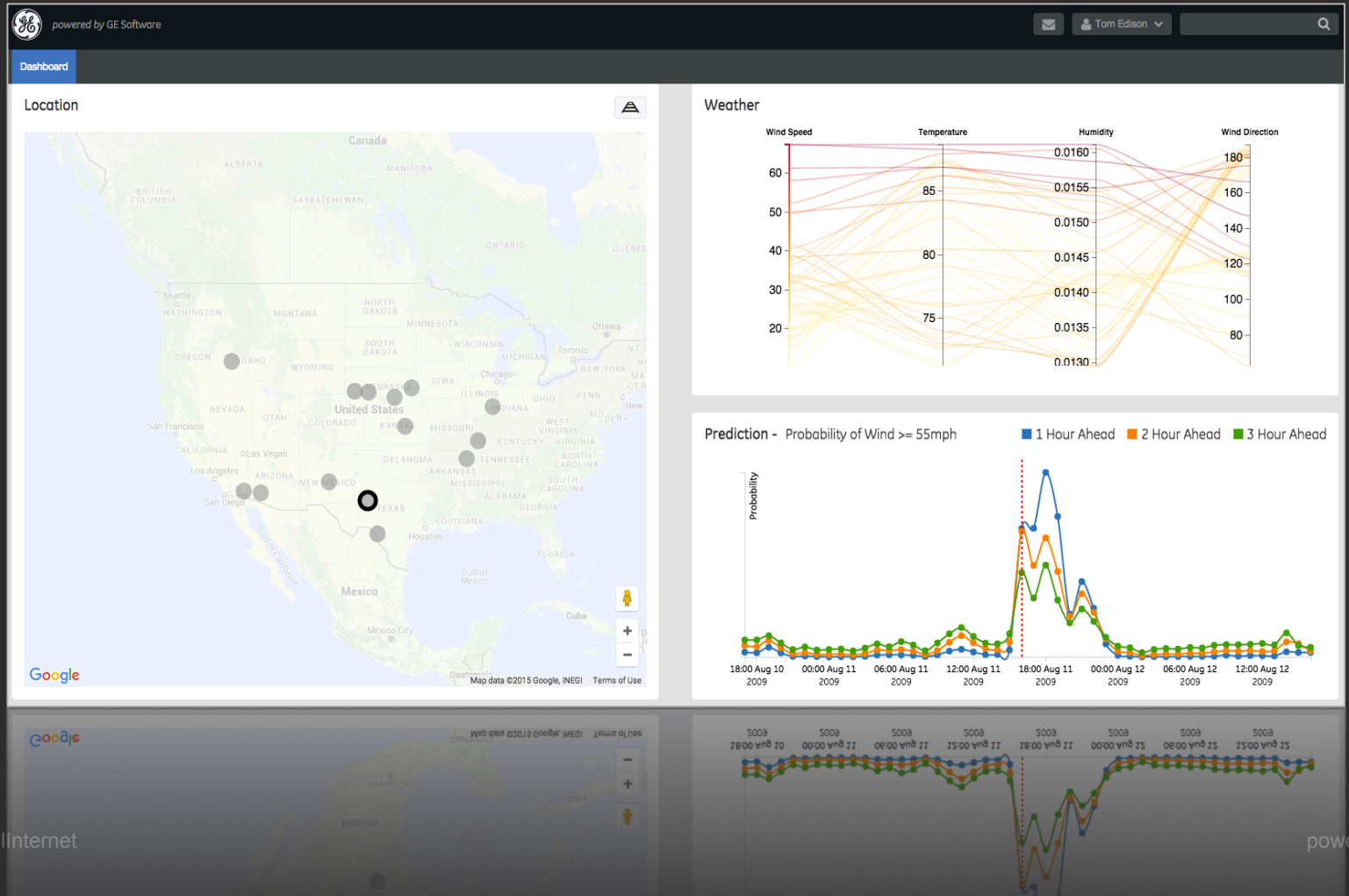


- **ANY** asset (GE, non-GE; new, old)
- **ANY TIME, ANY PLACE** connectivity
- **EDGE** analytics
- **PUSH** software updates
- **SECURED** device management

Digitize, Analyze, Monetize in the Cloud



- **ASSET DATA** models, from pipe to plant
- **ANALYTIC** modeling (R, Matlab, …)
- Packaged **DATA SCIENCES** (GE, partners)
- Data at **SCALE** (fast, vast)
- **METERING** and **COSTING** (BizOps)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Tom Edison
Dashboard
Location
Canada
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Seattle
WASHINGTON
MONTANA
NORTH DAKOTA
MINNESOTA
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WISCONSIN
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WYOMING
NEW YORK
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TEXAS
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Houston
FLORIDA
Gulf of California
Gulf of Mexico
Mexico
Cuba
Mexico City
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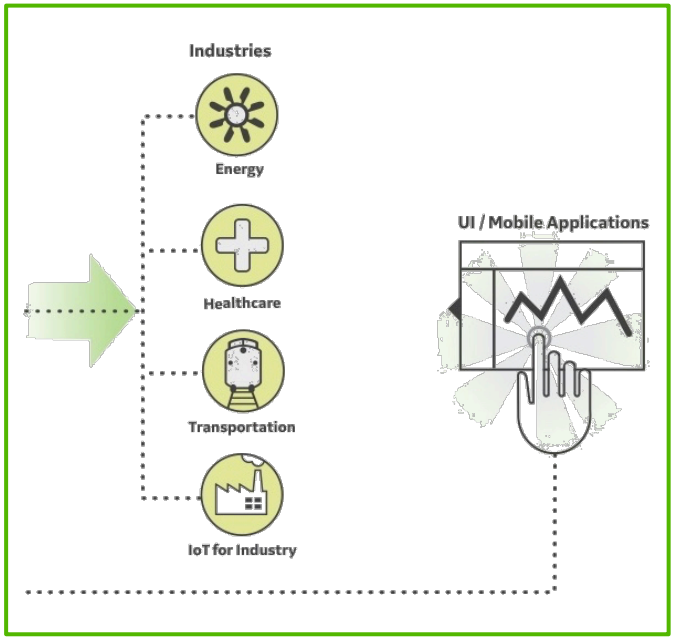
Terms of Use
Weather
Wind Speed
Temperature
Humidity
Wind Direction
60
50
40
30
20
85
80
75
0.0160
0.0155
0.0150
0.0145
0.0140
0.0135
0.0130
180
160
140
120
100
80
Prediction - Probability of Wind >= 55mph
1 Hour Ahead
2 Hour Ahead
3 Hour Ahead
Probability
18:00 Aug 10 2009
00:00 Aug 11 2009
06:00 Aug 11 2009
12:00 Aug 11 2009
18:00 Aug 11 2009
00:00 Aug 12 2009
06:00 Aug 12 2009
12:00 Aug 12 2009

Build & design your apps FASTER

- **DEVOPS** frequent deployments
- **AUTOMATION** with Microservices
- Roles-based **EXPERIENCE** for industries
- **ANY** dev tool, programming language



Ready for the Cloud?

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The Industrial Internet needs coders.

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