Connecting to the Internet of Things (IoT)

Chris Borneman
Vice President & CTO
Software AG Government Solutions

GLOBAL PRODUCT DATA
INTEROPERABILITY
SUMMIT
2016

ELYSIUM   Parker Aerospace   NORTHROP GRUMMAN   BOEING

- **Impact to business models**
  - **Shift from physical to digital differentiation.**
  - **Outcome based economy.**
  - **New Revenue Models**
- **IoT and Mobility impact to business processes.**

ELYSIUM   Parker   NORTHROP GRUMMAN   BOEING   GLOBAL PRODUCT DATA INTEROPERABILITY SUMMIT 2016

IoT Transforming Manufacturing

OPPORTUNITY:

- **400 production lines producing 140,000 kilometers of wire per day, 24/7 operation**
- **Growing concern about product liability**
- **Increasing costs of wasted copper, labor, and energy due to late detection**
- **Detection limited to only a few factors and 100 meter segments of wire**

SOLUTION:

- **Monitors dozens of quality factors in real-time against relevant order data**
- **Real-time intervention**
- **25 millimeter segment quality detection**
- **Factory-floor interfaces to monitor quality and augment data manually**
- **Faster product introduction at lower risk**
- **Flawless, uninterrupted copper production**

RESULT:

ACHIEVED FASTER RESPONSE

TO PRODUCTION ISSUES

QUALITY CONTROL

IMPROVED DETECTION

25 MILLIMETERS

GROWTH IN MARGINS

IoT Transforming Field Service

OPPORTUNITY:

- **Engines provide onsite generation for power, heating, and cooling**

- **Support additional revenue stream through contracted engine maintenance**

- **Requirement to meet SLAs for uptime across multiple customers and locations**

- **Preventative maintenance avoids unplanned downtime and reduces costs**

SOLUTION:

- **Advance maintenance deployment before outage saves ~1K/engine/year**

- **3,400+ engines are monitored using machine-to-machine feeds**

- **250 data points every 30 seconds**

- **With 10 second latency, combines engine service diagnostics and engine application performance statistics into consolidated dashboard**

RESULT:

PROACTIVE MAINTENANCE
Deployment and Performance Diagnostics
SAVES $3.4+M PER YEAR

3,400+ engines monitored using machine-to-machine feeds

IoT Transforming Supply Chain

OPPORTUNITY:

- Outcome based contracts requiring shift from shipping on time, to ensuring stock on hand

- Reduce shipping costs for normal deliveries

- Leverage increased delivery traceability through IoT within logistics

SOLUTION:

- Monitor on hand and consumption rates

- Plan shipments via best cost routing for normal restock

- Track deliveries and predict delays based upon known route patterns

- Expedite new shipment when needed to ensure successful outcome
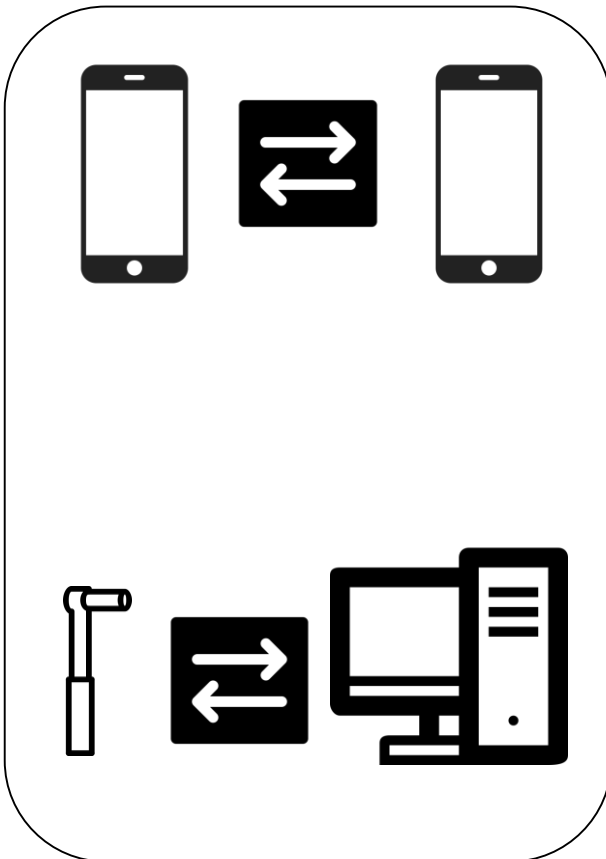
RESULT:

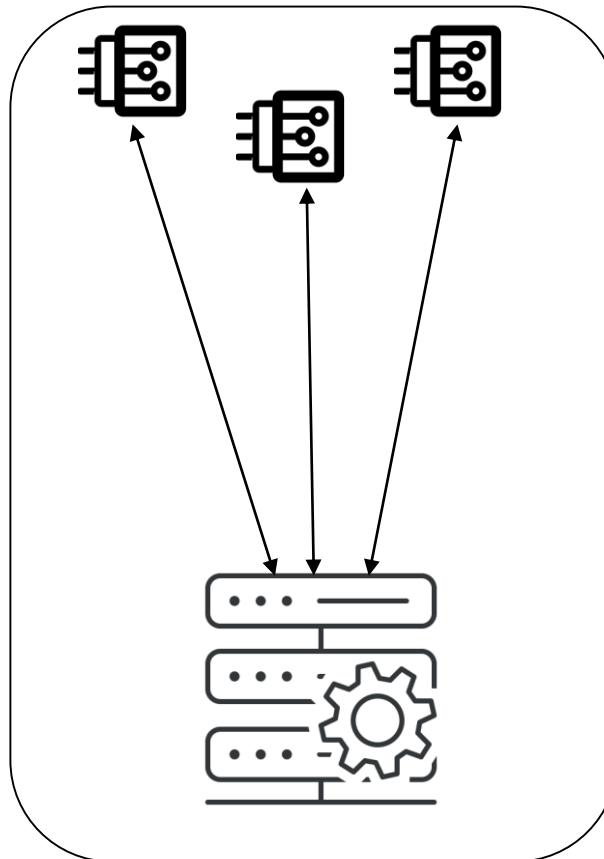LOWER COSTS

IMPROVED SATISFACTION

ENABLED NEW BUSINESS MODEL

ELYSIUM

Parker

NORTHROP GRUMMAN

BOEING

Connecting to IoT

Peer to Peer

Things to Server

Things to Hub to Server
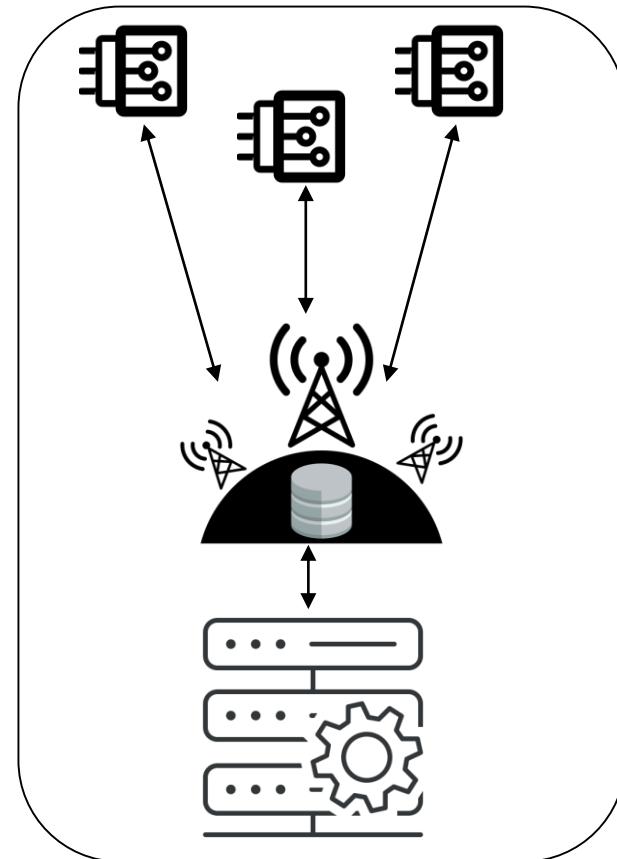
Multiple Variations Combine Models

- Peer to Peer
  - RFID Cartridges so dispenser knows inventory
- Local Hub to things
  - Dispenser monitors flow rates, temperatures, etc.
- Thing to Server (Dispenser)
  - Nightly updates of inventory and usage to hub
  - Receives campaigns and other content updates
  - Servers sweeps, aggregates, analyzes
- Thing to Server (Phone)
  - Setup account on Phone
  - Create Fusion Mixes up to 3 flavors
- Peer to Peer then Thing to Server to Thing
  - Phone reads 2D barcode on machine
  - Phone talks to Server letting it know where it is
  - Server tells the dispenser who with recipes
  - User picks recipe and mix flows

Volume of Data

Pratt & Whitney's Geared Turbo Fan (GTF) engine – an engine that comes with 5000 sensors that generate up to 10 GB of data per second.

A single twin engine aircraft with an average of 12 hours flight-time can produce 844 TB of data.

Additional Considerations

- **Data at Rest**
- **Data in Motion**
- **Classes of Information**
- **Registration**
- **Authentication**
- **Scale**
- **Throttling**
- **Software Updates**

Point to Point Approach

- **Still working on visual**

Point to Point Challenges

- **Direct Coupling and Dependencies**
- **Lifecycle Timing**
- **Security**
- **Scale**
- **Limited Intelligence**
- **Complexity**

IoT via Gateway and ESB

- **Still working on visual**

Benefits of Gateway and ESB for IoT Connectivity

- **Provides Abstraction**
- **Consistent Security**
- **Registered Consumers with Onboarding**
- **SLA Differentiation**

IoT Combined with Gateway & ESB Creates Value
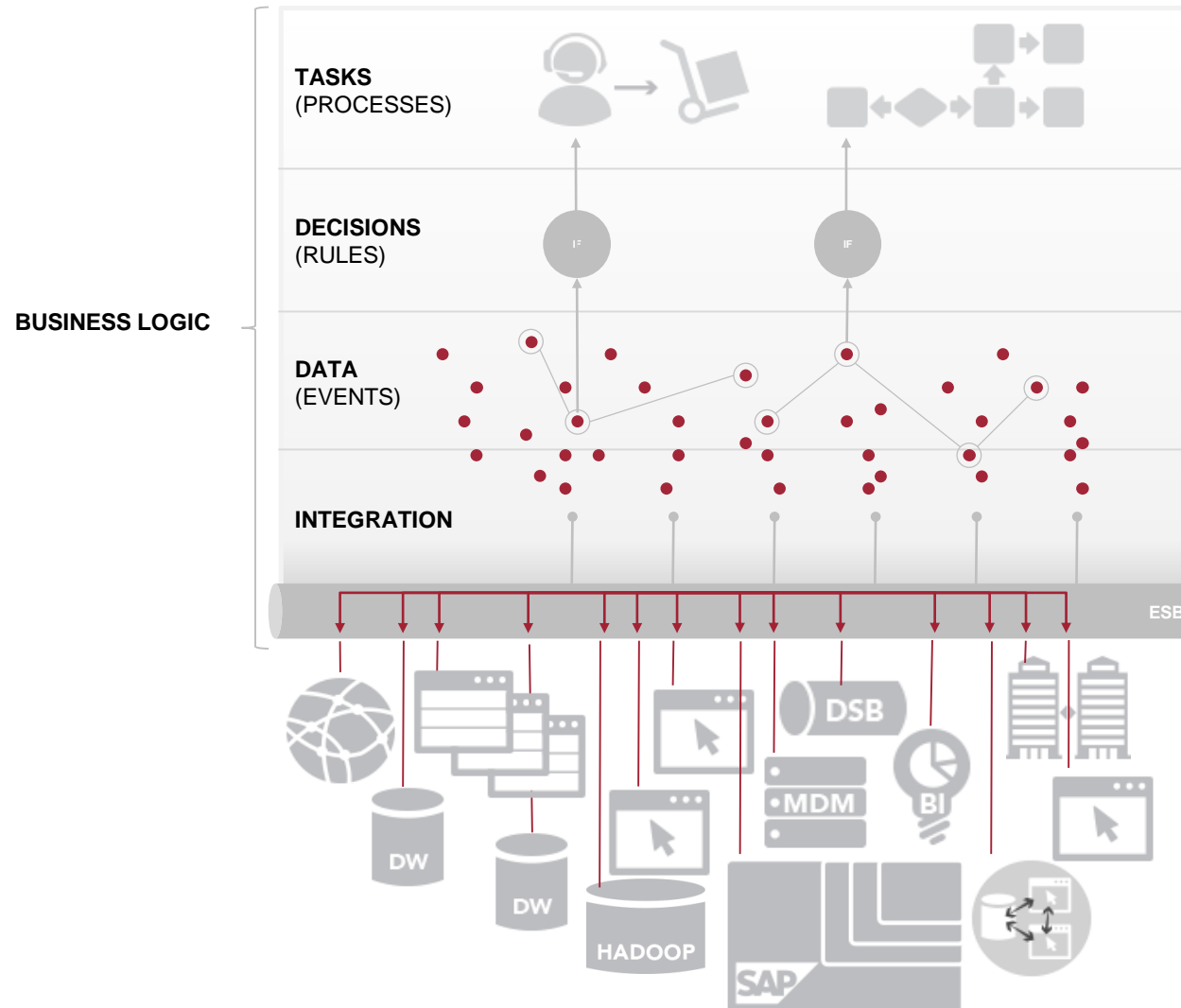
Connecting to the
Internet of Things (IoT)

Chris Borneman
Vice President & CTO
Software AG Government Solutions
chris.borneman@softwareaggov.com
www.linkedin.com/in/chrisborneman