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Industrial Internet of Things (IIoT) Ecosystems

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Agenda

- What we do
- IoT and IIOT – What is it and what's the difference
- Roadmap for success
- How to create successful IIoT Ecosystems
- Animated IIoT Use Case Examples
- Summary
- Questions

The background of the slide features a dark, moody photograph of a rocky coastline with waves crashing against the shore. Overlaid on this image is a faint, repeating pattern of light blue circuitry or a grid, giving it a technological or digital feel.

What we do

Boeing Global Services

Information Management Software & Services

About Global Services

- Customers in 400+ locations
70+ Countries, 40+ US States
 - Military, Gov't and Commercial

Tailored Solutions

- **Digital Solutions & Analytics**
- Parts & Supply Chain
- Engineering & MRO
- Training Solutions

Our Information Management solutions increase efficiency, safety and readiness while reducing operations costs



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The background of the slide is a dark blue-grey color. It features a faint, repeating pattern of circuit board traces (PCB layout) across the entire surface. Overlaid on this pattern is a darker, semi-transparent image of a cave interior, showing rocky walls and stalactites hanging from the ceiling.

IoT and IIoT: What is it and what's the difference

What is the internet of things (IoT)?

The Internet of things (IoT) describes the network of physical objects, so known as, "things" — that are embedded with sensors, software, and other technologies that is used for the purpose of connecting and exchanging data with other devices and systems over the [Internet](#).^{[1][2][3][4]}



What is the Industrial Internet of Things (IIoT)

- The **industrial internet of things** (IIoT) refers to interconnected sensors, instruments, and other devices networked together with computers' industrial applications, including manufacturing and energy management.
- This connectivity allows for data collection, exchange and analysis, potentially facilitating improvements in productivity and efficiency as well as other economic benefits.^[1]



- The IIoT is an evolution of a distributed control system (DCS) that allows for a higher degree of automation by using cloud computing to refine and optimize the process controls.



Roadmap for Success

A Roadmap for Success

➤ THINK BIG

Take a global enterprise approach

➤ start small

Pick a use case or two

➤ *Go Really Fast*

Experiment and evaluate benefits
and apply across the enterprise

➤ Repeat

Repeat

Repeat

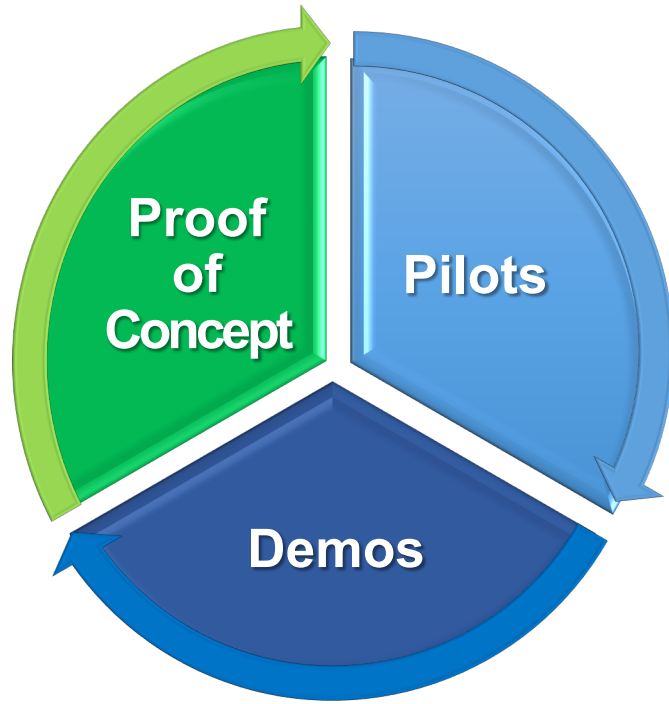


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IIoT Ecosystem for Success: Key Enablers

Enterprise Vision + Funding + Intention = TRANSFORMATION



- **Corporate Sponsorship**

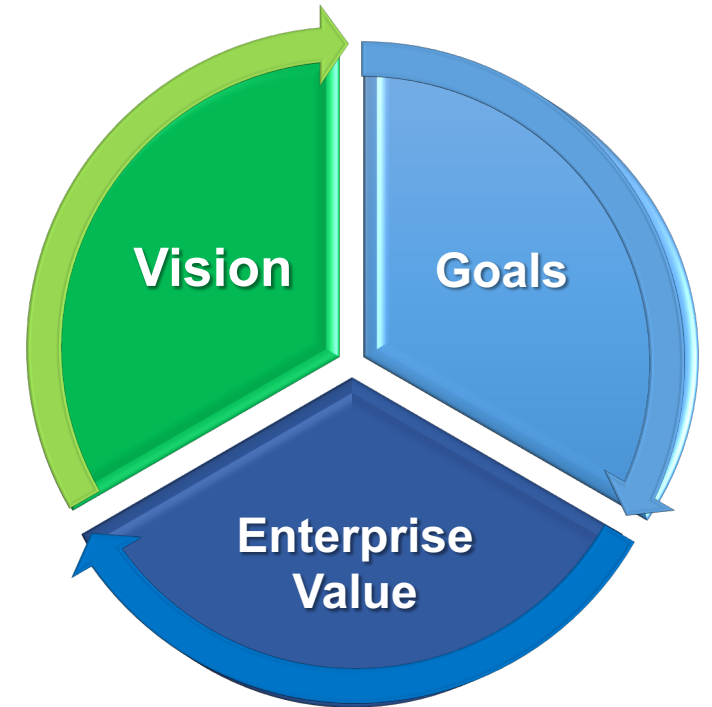
(BoD, CEO, CFO, CTO, etc.)

- **Where do we want to be?**

- Vision
- Goals
- Objectives

- **Where are we now?**

- Assessment
- Gap analysis



Develop a transformation roadmap to close the gaps

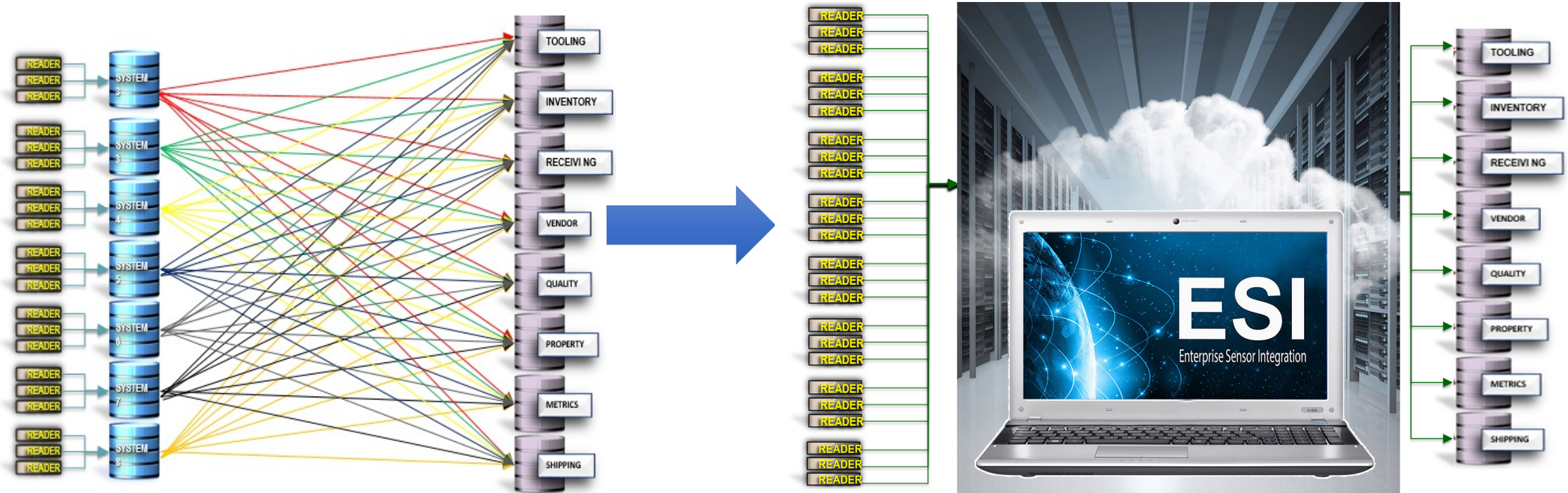
IIoT Implementation Smart Factory Transformation

- ✓ Corporate Vision
- ✓ Value Proposition
- ✓ Major Features



Enterprise Sensor Integration (ESI)

The Gateway to the IIoT



ESI integrates disparate sensors and hardware to connect your enterprise

- Total Asset Visibility
- Automated workflow
- Material replenishment

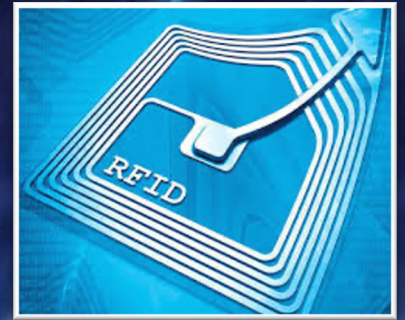
Value Proposition

- Award-Winning Solution
- Total Asset Visibility
- High Availability
- Scalability – Stream Processing
- High Performance
- Enterprise-Class
- Cloud-Enabled
- IoT Ecosystems
- Improved Cost Performance
- Edge Computing
- Improved Velocity
- Process Automation
- Centralized Infrastructure Management
- ERP, MRP & MES Integration



Major Features

- Asset Management
- Parts Management
- Inventory
- Reports
- Events
- Disruption Alerts & Notification
- Global Track & Trace
- ERP Integration
- MES Integration
- Chemical Management
- Workflow Automation
- WIP tracking
- Auto Replenishment
- Parts Attrition
- Auto Receiving
- FOD Control (“Foreign Object Debris”)
- Environmental Monitoring
- Group management
- User Controls
- Tool Management



Differentiators

■ Proven Enterprise-Level Deployments

- Boeing & BAE Systems' rollouts

■ Agnostic Integration

- Hardware agnostic; middleware solution

■ Modular Applications

- Asset tracking & reporting, Tool mgmt., automated workflow, safety, material replenishment

■ System Performance

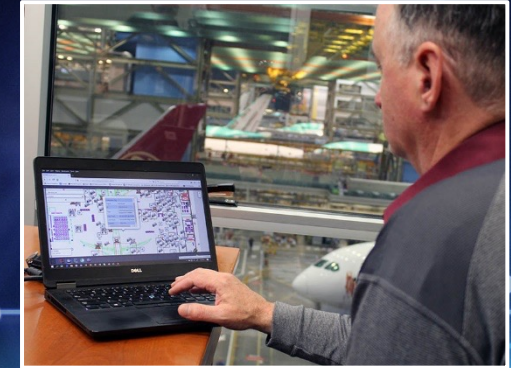
- High bandwidth enables 6 - 10 billion RFID transactions weekly, and scaling upward

■ Enterprise Visualization

- Offers global visibility of any asset in real-time

■ Scalable

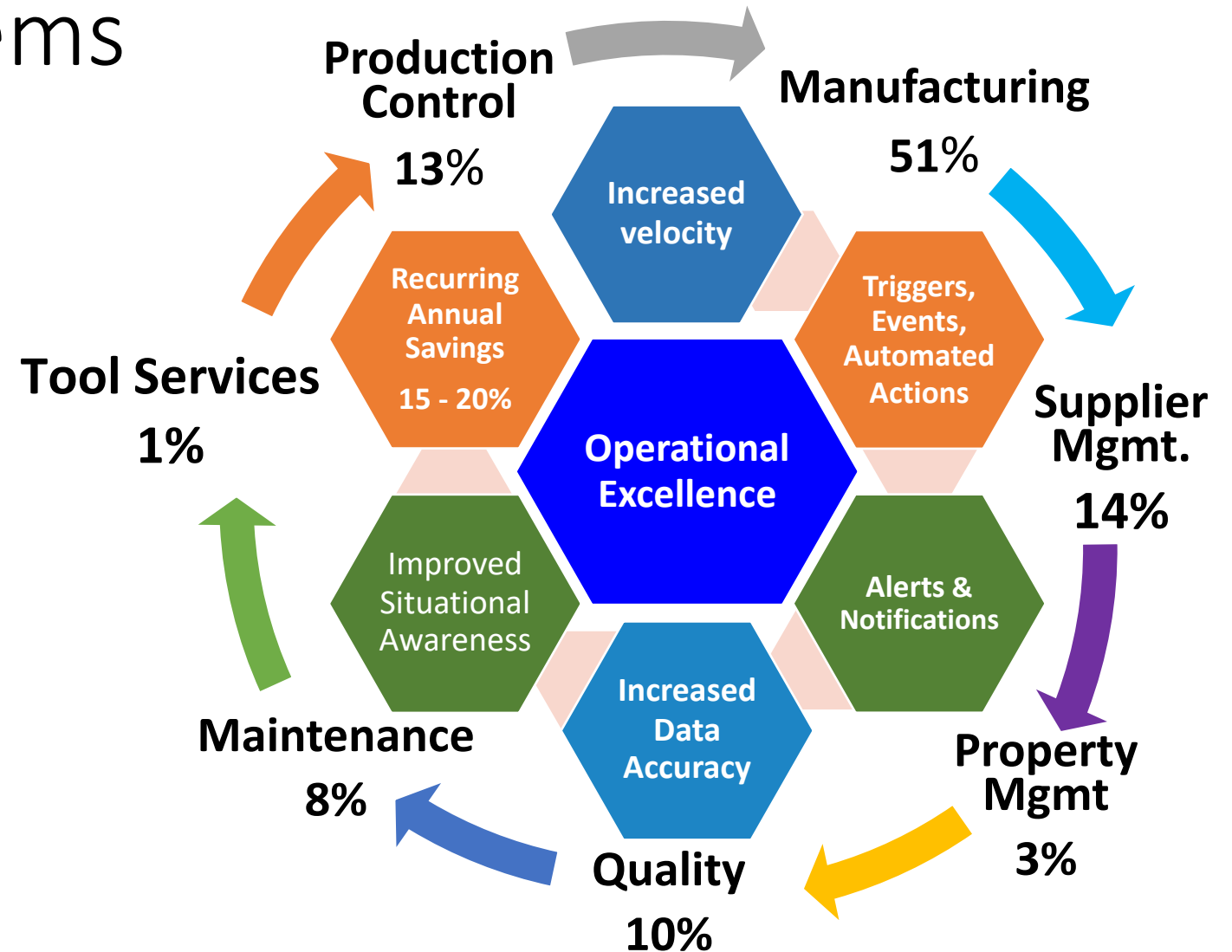
- From single-factory to global enterprise



Value of IIoT Ecosystems

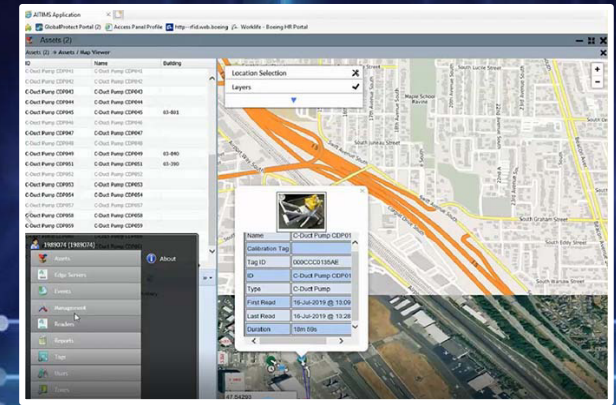


The Boeing Company saved over \$100 million in first year



Automated Transaction/ Improved Information


- Inbound Shipments
- Receiving
- Inventory Mgmt.
- WIP Tracking
- Auto Replenishment
- Parts & Kits Ordering
- Asset Track & Trace
- Factory Status (MES)
- Material Validation
- Data Capture / Metrics
- Serialization and Lot Control
- Tool Control and Tracking
- Sealants & Composite Mgmt.
- Equipment Tracking
- Conveyance Tracking
- Intra /Inter-Plant Tracking
- Equipment Monitoring



Eliminated or Reduced Physical Effort

- Inbound Shipments
- Receiving
- Inventory Mgmt.
- WIP Tracking
- Auto Replenishment
- Parts & Kits Ordering
- Tool Ordering
- Tool Control and Tracking
- Sealants and Composite Mgmt. (Freezer Management)
- Equipment Tracking
- Conveyance tracking
- Intra /Inter-Plant Tracking
- Equipment Monitoring

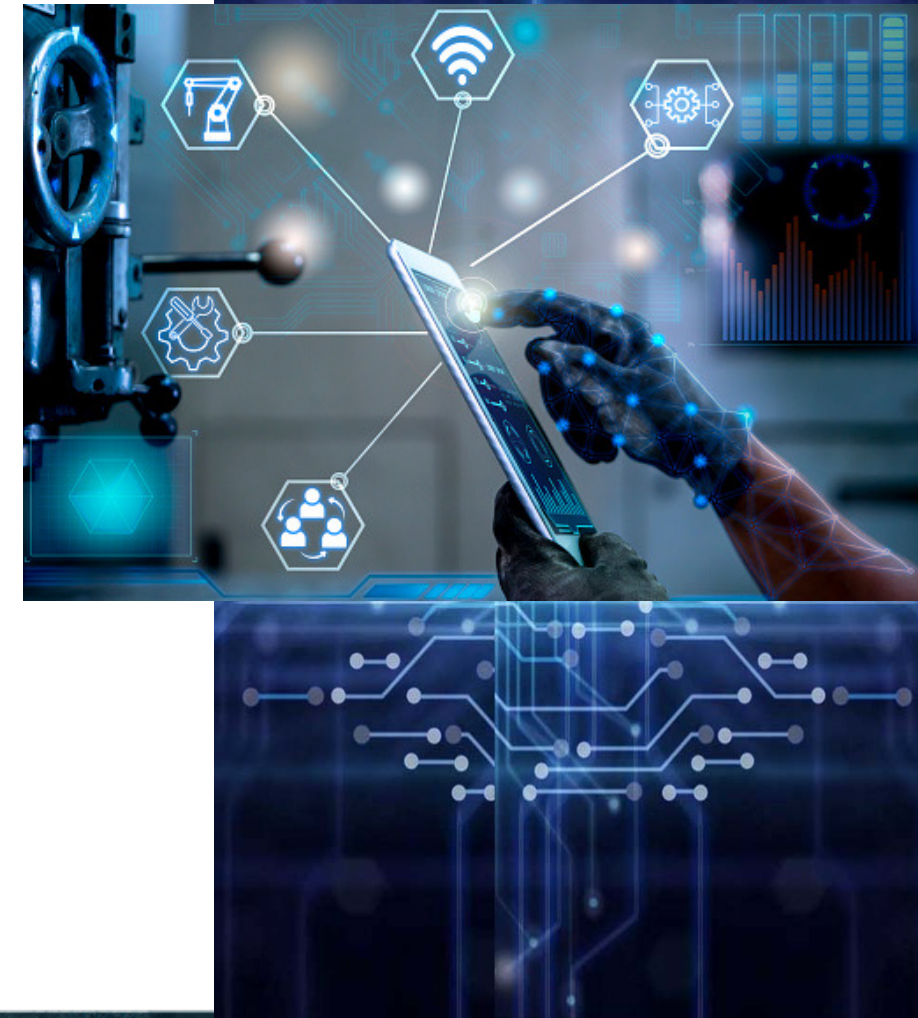


The background of the slide is a dark blue-grey color. It features a subtle, repeating pattern of circuit board traces or a topographical map. Overlaid on this pattern is a faint, high-contrast image of a rocky, mountainous landscape, possibly a desert or a high-altitude region, with some peaks and valleys visible.

How to create successful IIoT Ecosystems

Creating IIoT Ecosystems

- Identify process steps
- Identify the supporting components for each process step
- Identify the component capabilities and limitations
 - Can it be automated?
 - Will it create efficiency, production velocity, reduce cost or quality?
 - How will automation/integration impact cost, performance or schedule?
 - Does it add to the decentralized control of the eco-system?



The background of the slide features a dark blue, textured surface. Overlaid on this is a faint, repeating pattern of light blue circuit traces or a maze. In the upper right quadrant, there is a subtle, darker image of a cave entrance with stalactites hanging from the ceiling.

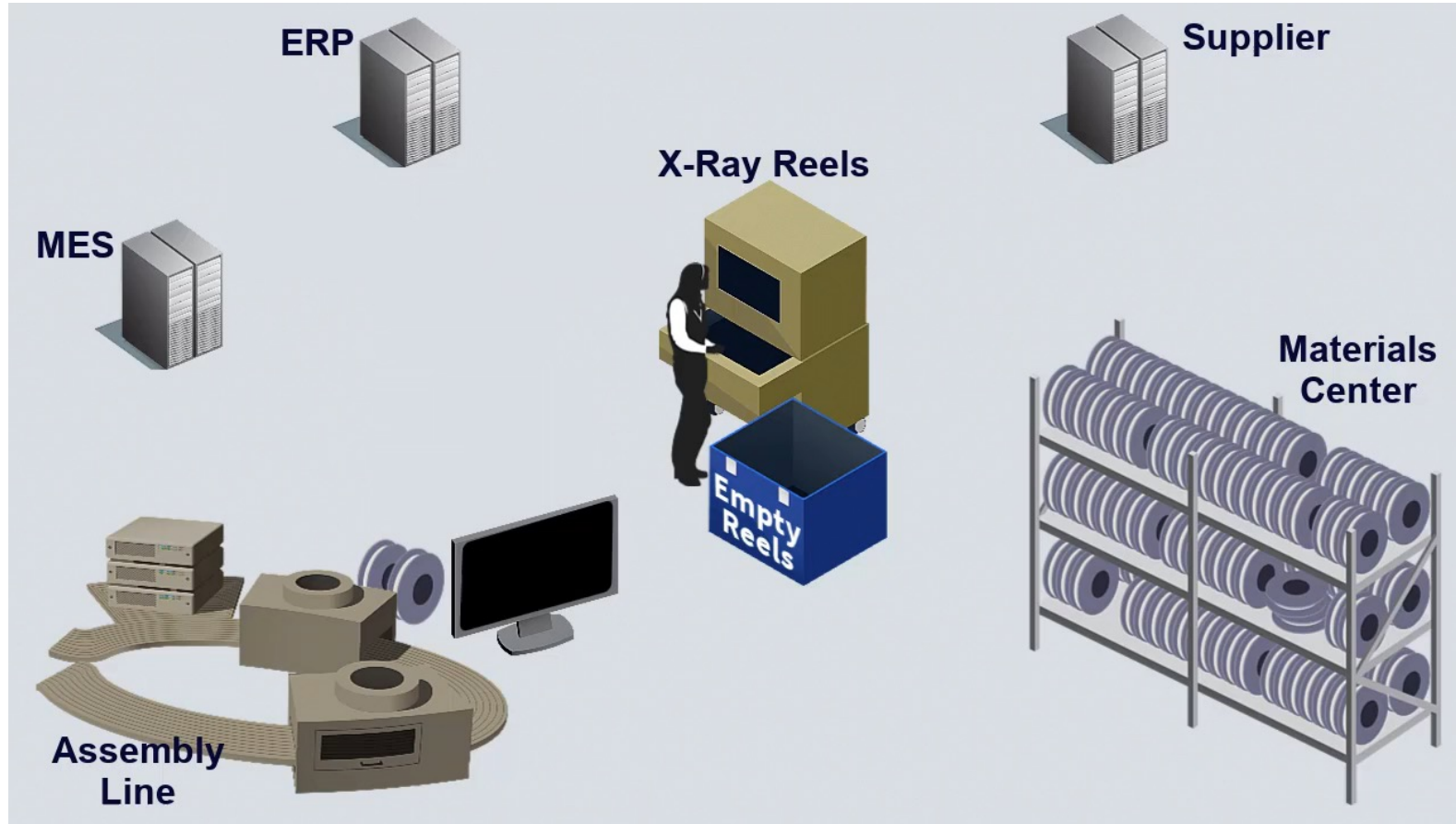
Animated IIoT Use Case Examples

The diagram illustrates a supply chain network with four main components, each represented by an isometric illustration:

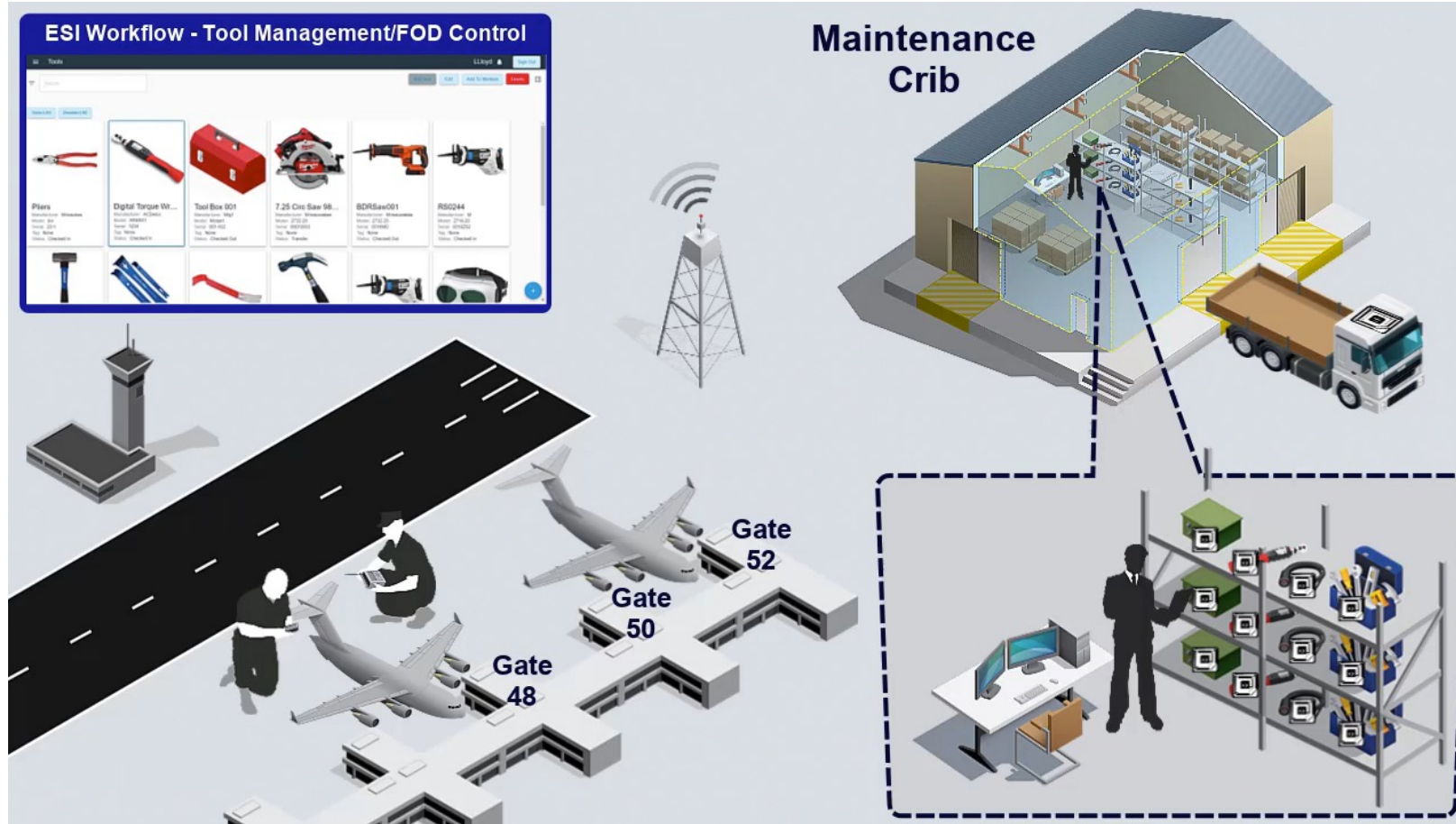
- Oracle ERP:** Represented by a server rack icon, indicating the central information system.
- Supplier Network:** Represented by a building, a shipping container, and a cargo ship, indicating the flow of materials from suppliers.
- Factory:** Represented by a large industrial building with smokestacks and a radio tower, indicating the manufacturing process.
- Parts Bin:** Represented by a bin containing red gears, indicating the final assembly or distribution stage.

Arrows indicate the flow of information and materials between these components, forming a complex network.

IIoT Use Case #2 - Parts Attrition



IIoT Use Case #3 - Tool Management / FOD Control



The background of the slide features a dark, moody photograph of a rocky coastline or cave entrance. The rocks are rugged and layered, with some light reflecting off their surfaces. Overlaid on this image is a faint, repeating pattern of circuit board traces, creating a technical or digital aesthetic.

Summary

Why are IIoT Ecosystems Important?

- Promotes ***momentum*** gains across your operations & manufacturing footprint
- Defines current workflows enabling advance insights across organizational boundaries
- Takes advantage of your ***deep local insights*** to determine automation touchpoints to ***increase velocity, drive down cost, and enable ramp-to-rate efficiencies***
- Identifies ***triggers*** to generate ***events*** that drive ***actions***
- ***Reduces cost, minimizes disruption*** by creating integrations capable of increased efficiency, and optimization that is greater than the sum of its parts

THANK YOU

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