

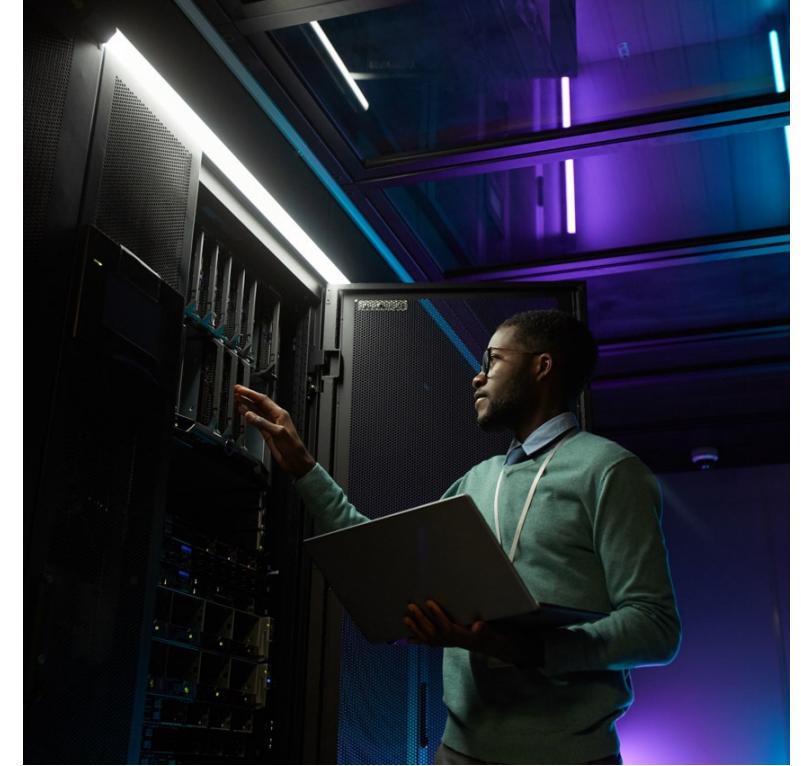
# Maintain Your Intelligent Assets or Pay the Price

Kristian Steenstrup

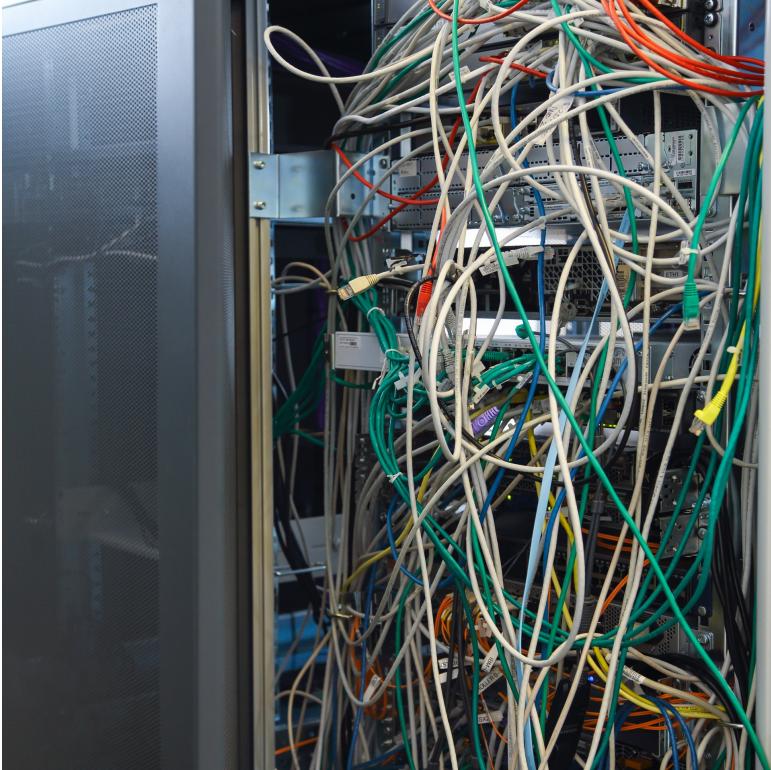
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# What You Think Intelligent Assets Look Like



# What Intelligent Assets Actually Look Like



# **Underlying Causes of the Problem**

# Intelligent Assets Live in 2 Different Worlds

	Information Technology	Intelligent Assets (IoT and OT)
Purpose	Managing information, automate business processes	Managing assets, controlling plant processes
Organization	<b>Centralized</b> in one department	Sometimes <b>dispersed and fragmented</b> across operational lines of business
Governance	<b>Clear IT governance</b> with the CIO in charge of the planning, acquisition, deployment and support of IT	<b>No single authority</b> ensuring use of standards, architecture plan or authorization of new developments, resulting in many stand-alone OT systems
Tools and Methods	<b>Transactional</b> data-recording, information-processing, publishing and collaboration platforms	<b>Event-driven</b> , real-time observation and control of physical events, embedded software and rule engines
Talent	CIO, infrastructure, operations and applications professionals	Engineers, technicians, and line of business managers
Vendors	IBM, Amazon Web Services, Oracle, Microsoft, SAP, Salesforce, Google, etc.	Siemens, Schneider Electric, Caterpillar, General Electric, ABB, KUKA, Schindler

# Cultural Differences Undermine Efforts



## Culture of IT:

- Manage frequent change
- Shorter lifetimes for products & systems
- User/customer convenience
- “The user experience”

## Solution Approach:

- Develop/use standards
- Assess requirements
- Build/buy best fit at lowest cost
- Plan for upgrades and support

Legacy ... Is the Opposite of ... Good



## Culture of Engineers:

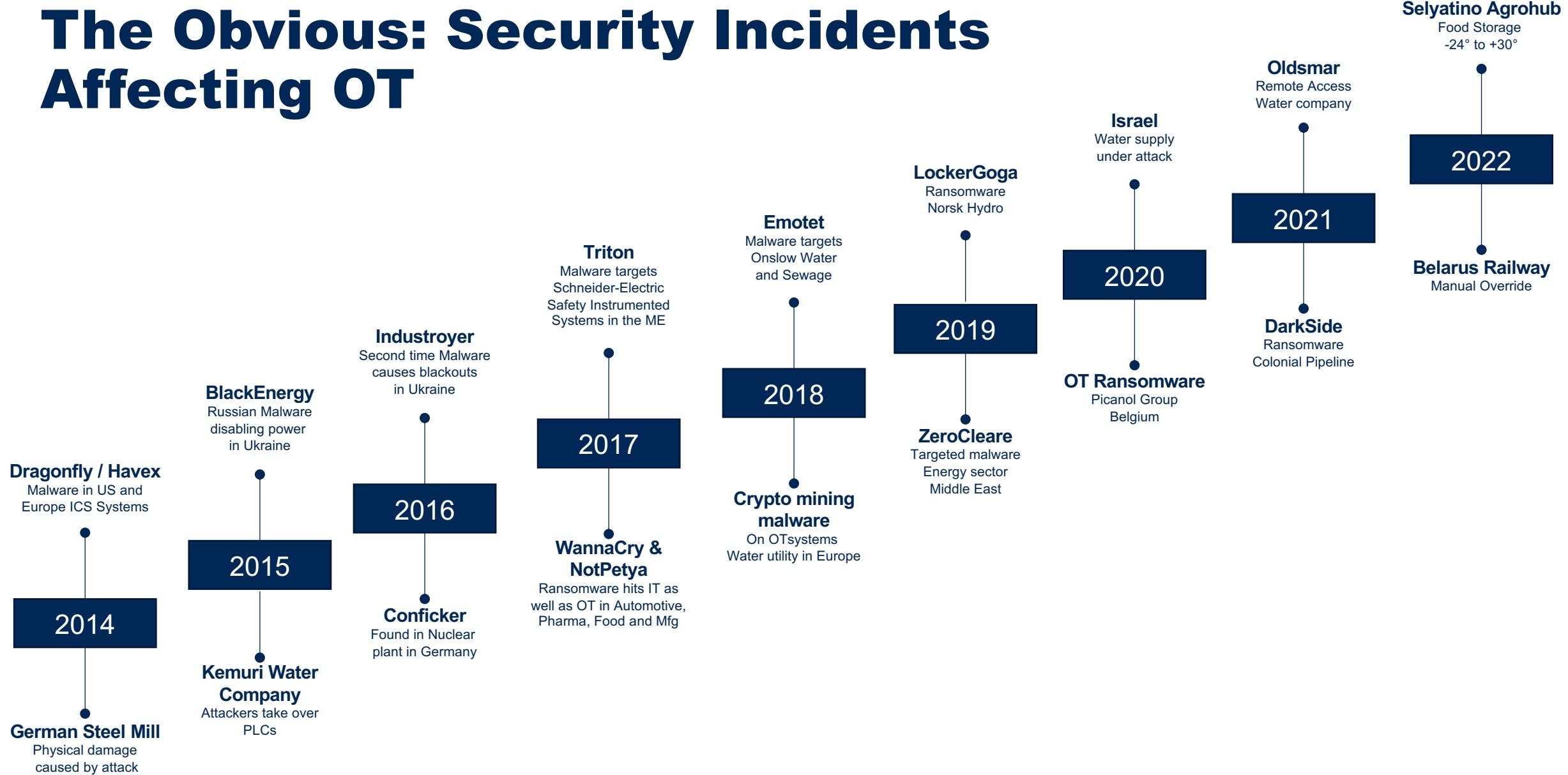
- Reliability and safety
- Fault tolerance
- Determinism
- Consistency
- Longevity

## Solution Approach:

- Find example
- Iteratively optimize for performance and use
- Lockdown design
- Stability

Change ... Is the Opposite of ... Good

# The Obvious: Security Incidents Affecting OT



# 9%

**Of Respondents Have Experienced  
a Security Incident That Crippled  
Operational Systems But Not IT Systems**

n = 398; All Respondents, Excluding Don't Know

Q: What OT security failure experiences have you had in the last year?

Source: 2021 Gartner IT/OT Alignment and Integration Survey

# Security Is Just One Avenue to Failure

- No Disaster Recovery
- Incorrect Software Release
- Software Incompatibility
- Technology Update Faults



# The Price of Failed Intelligent Assets

- Operator Safety
- Direct Revenue \$\$\$ Loss
- Product Quality
- Consumer and Partner Trust
- Competitive Position
- Brand Reputation
- Technical Debt
- Environmental Damage



# Why Is IoT / OT Fragile?

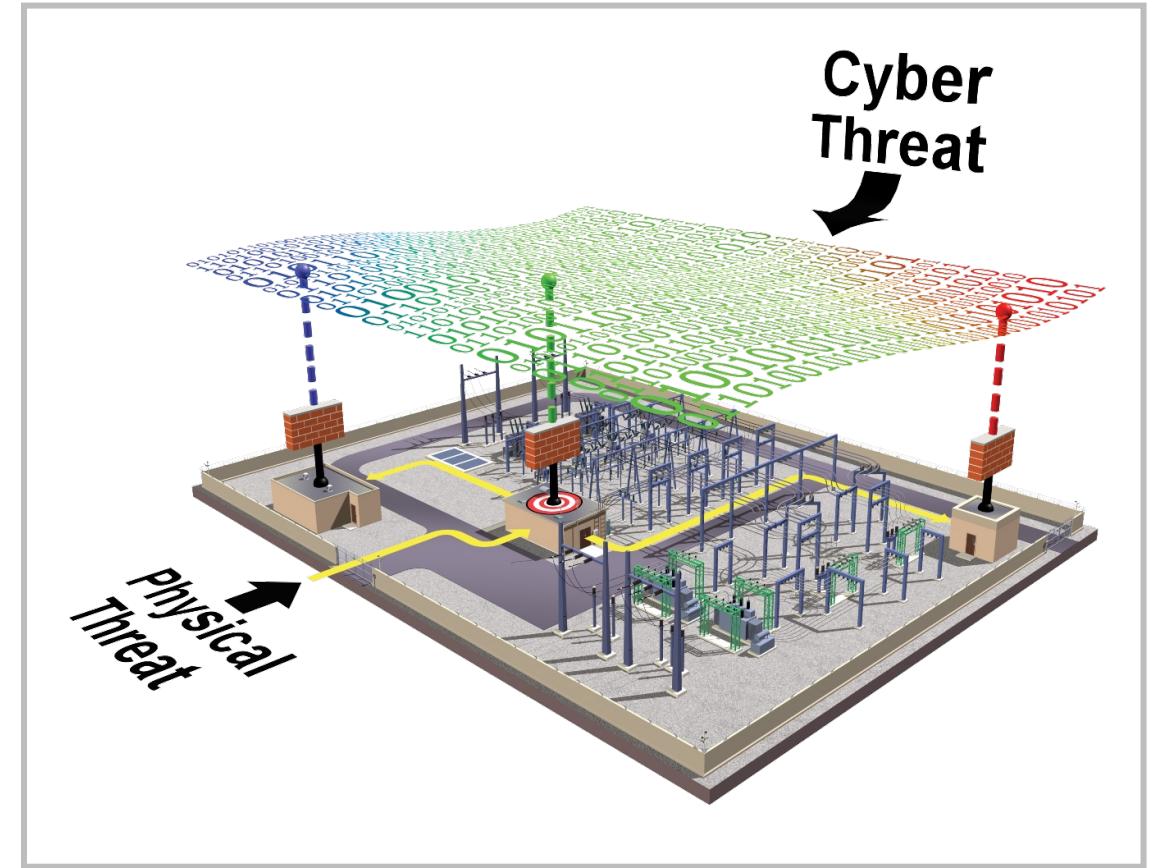
# Intelligent Assets Have Unique Security Needs

## Typical Asset Characteristics:

- Physically Accessible
- Heterogeneous
- Continuous
- Disconnected

## Basic Principles May Not Apply:

- Firewalls?
- Patch and Upgrade?
- Virus Scan?



# Insecure, Obscure, or just Complicated Supply Chain

Your Project



# Mounting Technical Debt

## Definition:

Lingering software, code, hardware or other outdated infrastructure but still part of the operations stream.



*Southwest's Meltdown Could Cost It Up to \$825 Million*

**Flights Canceled: 16,700**

**Cost to Carrier: \$725 Million — \$825 Million**

## PROs

- Low Maintenance Cost
- Established Integration
- Familiarity

## CONS

- Strategic Incompatibility
- Outdated Support Skills
- Restricted Functionality
- Scalability
- Security

# **6 Steps to Better Manage Intelligent Assets**

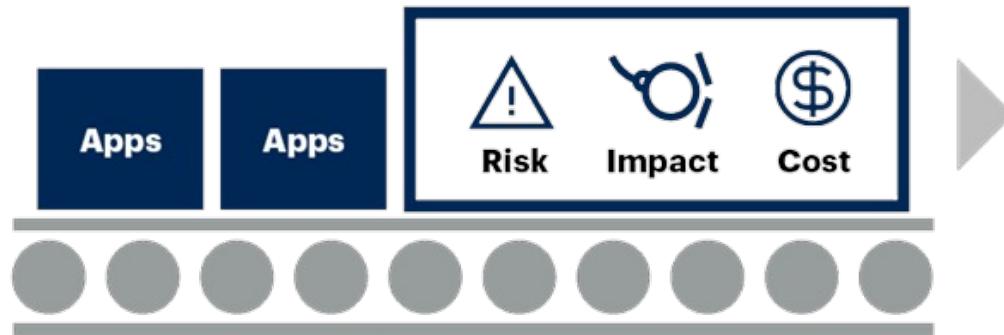
# Step 1. Manage Technical Debt

1



2

Use the Plan Address Ignore Delay (PAID) Model to Prioritize Technical Debt



Source: [Address Technical Debt With Gartner's PAID Model and Avoid Bankrupting Your Application's Future \(G00719923\)](#)

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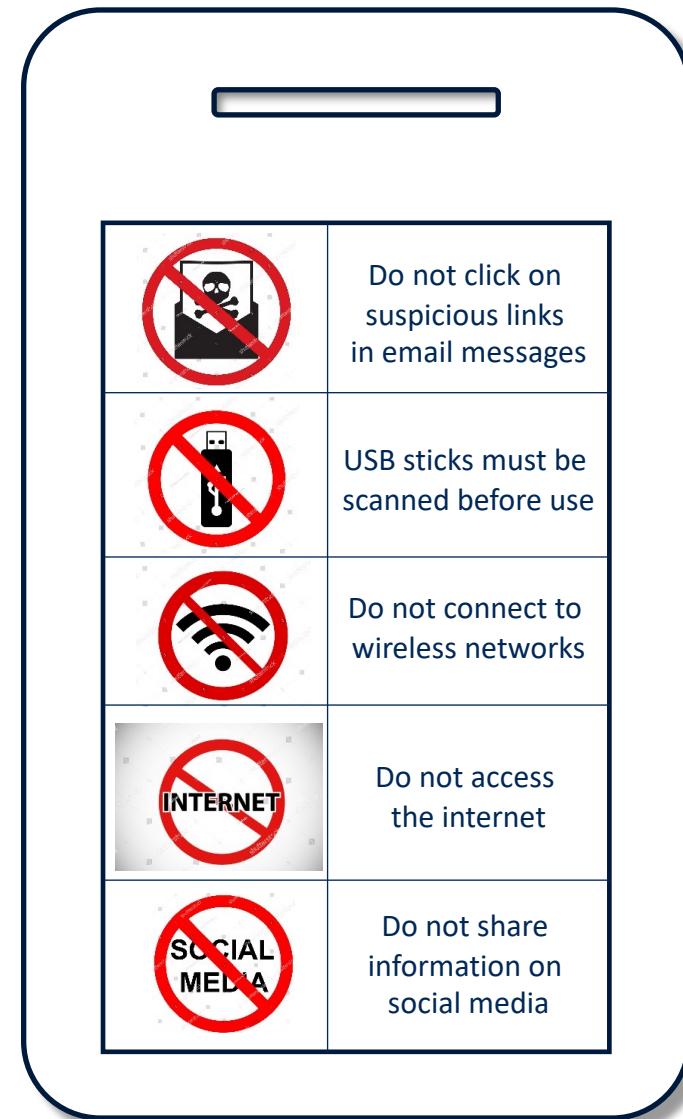
## Step 2. Have IT Learn From Their Engineer Friends

- Physics matter
- Real time, means real time
- Learn to live with the old
- Every problem is a value/risk/cost problem
- Cybersecurity is physical security
- Things wear out



## Step 3. Have Engineers Learn From Their IT Friends

- Governance and policy can be your friend
- Software impacts stability, putting safety and reliability at risk
- Use tools and processes to manage constant software change



# Step 4. Use Expanded Asset Management Tools

Equipment Is Hard

Intelligent Assets Are Much Harder

Physical Asset

EAM/CMMS

Primary Asset

Constraints

Function

Specification

Measurements

Location

Warranty

Service History

Primary Tool(s)

Physical

Software

Data

Operational Device (Sensors, Actuators)

EAM/CMMS

Secondary Asset

Function

Location

Constraints

Specification

Measurements

Warranty

Service History

Software Management

S-BOM

Firmware Management

Calibration

Inspection

Connection

Configuration

Discovery

Last Test

Authentication

Data Management

Measurement

Actuator

Operations

Control

Latency

Sensor

Time Series Data

Measure

Events

Acquisition

Validation  
Estimation Errors

Integrate

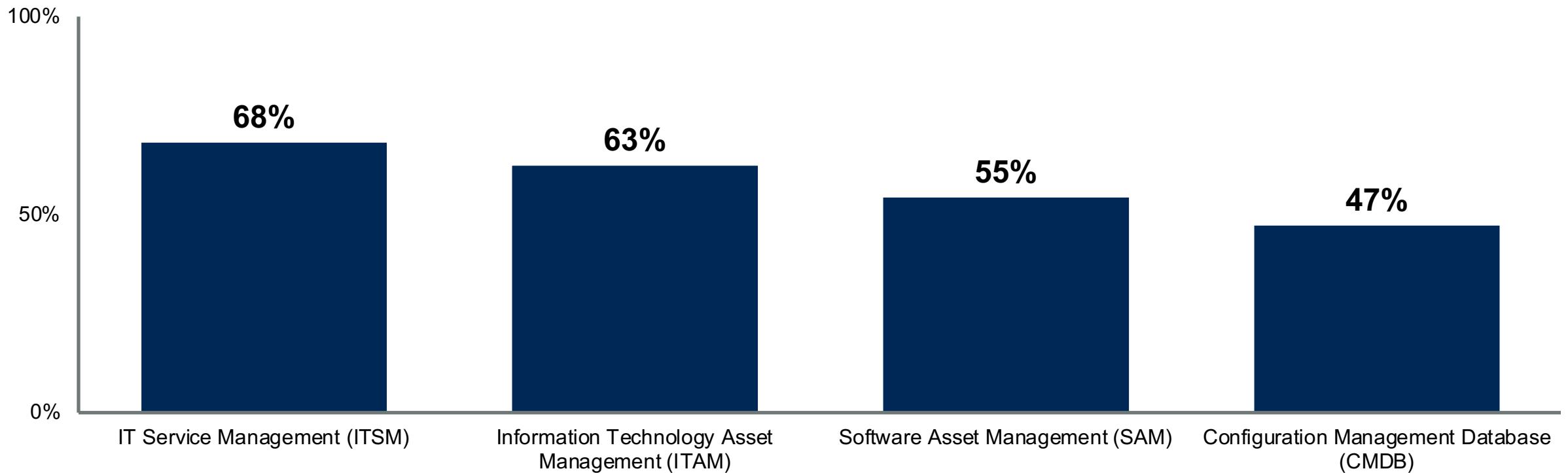
- Software Keys
- Field Tags
- Unified Name Space



# ITSM and ITAM Used to Manage OT Software

Specialized Tools Used to Manage OT Software

Multiple Responses



n = 398; All Respondents, Excluding None

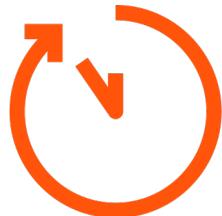
Q: Which of the following specialized tools are used to manage OT software in your organization?

Source: 2021 Gartner IT/OT Alignment and Integration Survey

# **Step 5. Combine Physical and Software Maintenance**

OT/IoT software maintenance is constrained by the real world

## **Continuous Usage**



## **Safety**



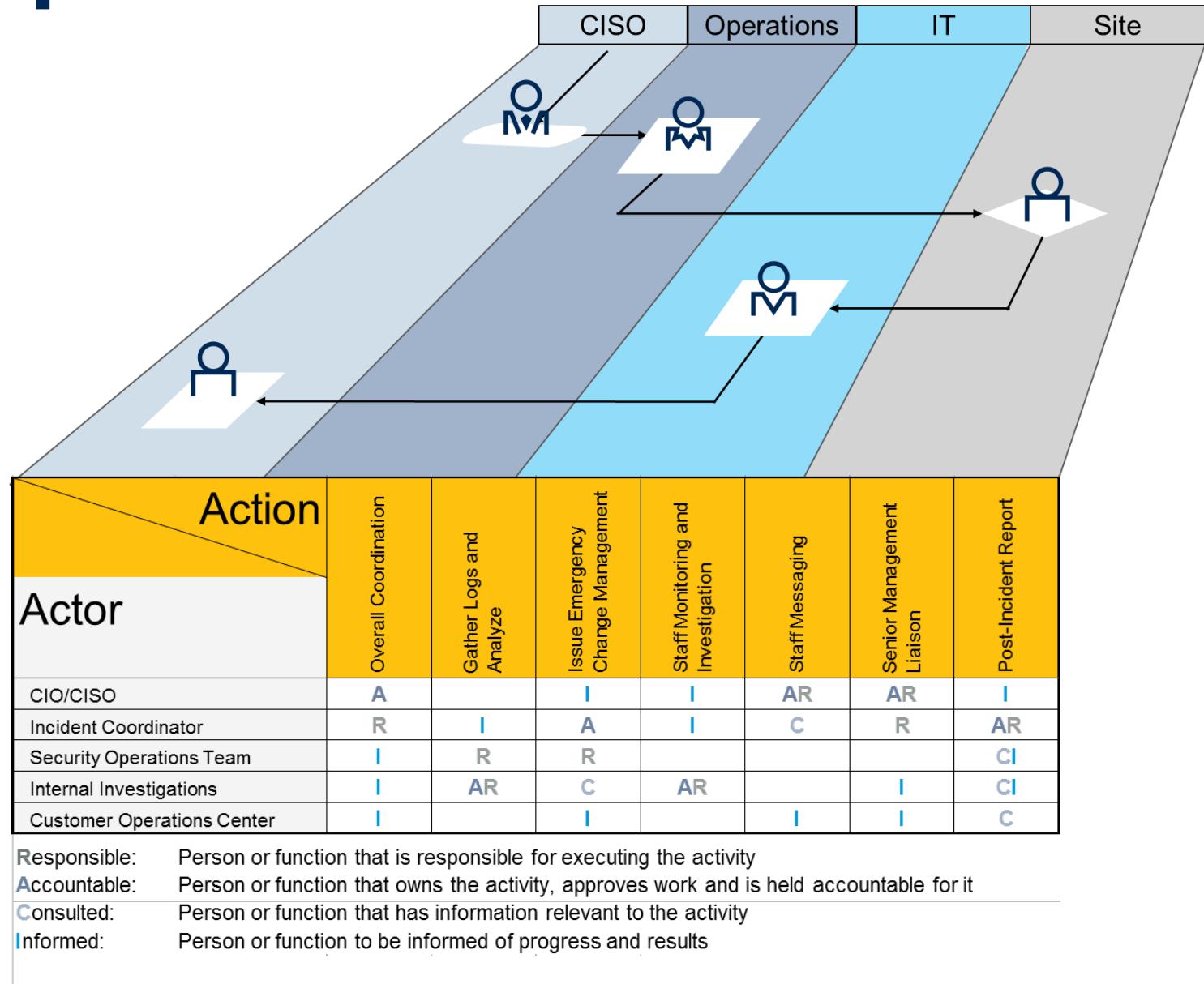
## **Physical Access**



- EAM is used for the physical equipment.
- ITAM/SAM is used for software.
- Scheduling of maintenance needs to combine physical and software maintenance.

# Step 6. Roles & Responsibilities

- All sites must have an accountable person for OT security appointed.
- Roles and responsibilities for all security roles must be clearly described and assigned.



# Recommendations

- Follow the six steps.
- Assess your OT/IoT portfolio with the help of operations.
- Include security aspects but be aware of other contributing factors.
- Cross pollinate cultures between IT and operations/engineering.
- Develop the use of integrated planning for physical and software maintenance.
- Make OT/IoT security and maintainability part of vendors obligations.

# Recommended Gartner Research

- [To Enable Intelligent Industrial Assets, Strengthen These Digital Capabilities](#)  
Rich McAvey and Lloyd Jones
- [Quick Answer: What Are Intelligent Assets and Why Are They Important?](#)  
Rich McAvey, Lloyd Jones and Alfonso Velosa
- [When Does a CIO Need to Be Involved in OT?](#)  
Kristian Steenstrup
- [Quick Answer: What Should Be Included in an OT Standards Framework?](#)  
Kristian Steenstrup
- [As IT and OT Converge, IT and Engineers Should Learn From Each Other](#)  
Kristian Steenstrup and Earl Perkins
- [How to Improve Infrastructure Fitness and Sustainably Reduce Technical Debt](#)  
Roger Williams, Daniel Stang and Mark Margevicius