

Setting the Standard for Automation™



ISA108 Intelligent Device Management

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Standards

Certification

Education & Training

Publishing

Conferences & Exhibits

ISA

- Nonprofit professional association
- Founded in 1945
- 40,000 members and 400,000 customers
- Delivers standards-based technical resources to the industrial automation community
- Standards
 - Accredited by American National Standards Institute (ANSI)
 - Produced 150 American National Standards
 - Many standards are submitted to International Electrotechnical commission (IEC)
- Certification programs – CAP and CCST
- Educations and Training – instructor-led, online, recorded, etc.
- Publishing – books and periodicals

Why is Intelligent Device Management Necessary?



- Traditional work processes
 - Waste Effort on Poorly Defined Problems (“Broke”)
 - Maintenance is Often Deferred for Non-Critical Devices
 - Scheduled Inspection and Testing is Wasteful But Necessary
- Intelligent Device Management
 - Allows Maintenance on Devices that Actually Need Work, Only When They Need Work
 - Can Give Detailed Information on Problems Before a Field Visit
 - Can Significantly Reduce (or eliminate) the Need for Periodic Testing
 - Can Reduce Impact on Operations by Advance Warning of Failure
 - Incentives for majority of devices, especially control valves
 - Provide indication of operating outside optimal operating windows
 - Provide indication of deviation from normal



Why are Intelligent Device Management Standards Necessary?



Standards for Traditional Asset Management

- ISO 55000
 - Part 1 Overview (Principles and Terminology)
 - Part 2 Requirements
 - Includes Mandatory Compliance Metrics
 - Part 3 Guidelines for Application
 - ASTM is US TAG, No Involvement of Automation Professionals
- NAMUR
 - NE129 Plant Asset Management
- These Standards Cover Manual Inspect and Test Methods

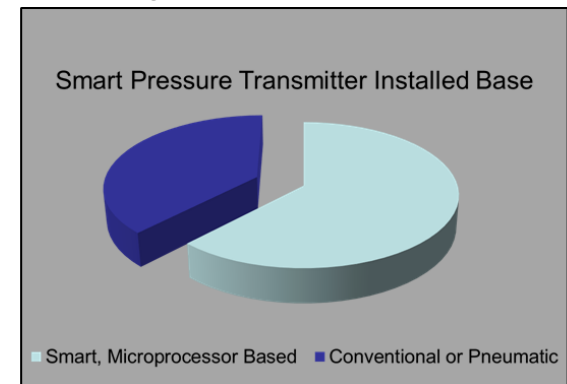


None cover use of Automated Diagnostics for Intelligent Device Management

Why are Intelligent Device Management Standards Necessary?



- Intelligent Device Use Pervasive; most diagnostics not used or not used properly
- Intelligent Devices (IDs) can bring significant benefits by reducing downtime, spares and predicting failures, however very little of this potential has been realized.
 - Lack of appropriate work process
 - The auxiliary functions or diagnostics of ID is not familiar to O/Os because of the complexity.
 - Added complexity has meant that IDs are often never fully implemented or adequately maintained
 - Project doesn't care about utilizing supplementary functions during operation and maintenance (O&M) phase.
 - There is no standard for the work process.
- Approach
 - To provide an environment to use IDs effectively based on risk management and optimization of other KPIs such as cost and production performance through common concepts and terminology and by specifying management activities.



Source: ARC Advisory Group

Intelligent Devices Are Pervasive, but Are Not Being Used Properly

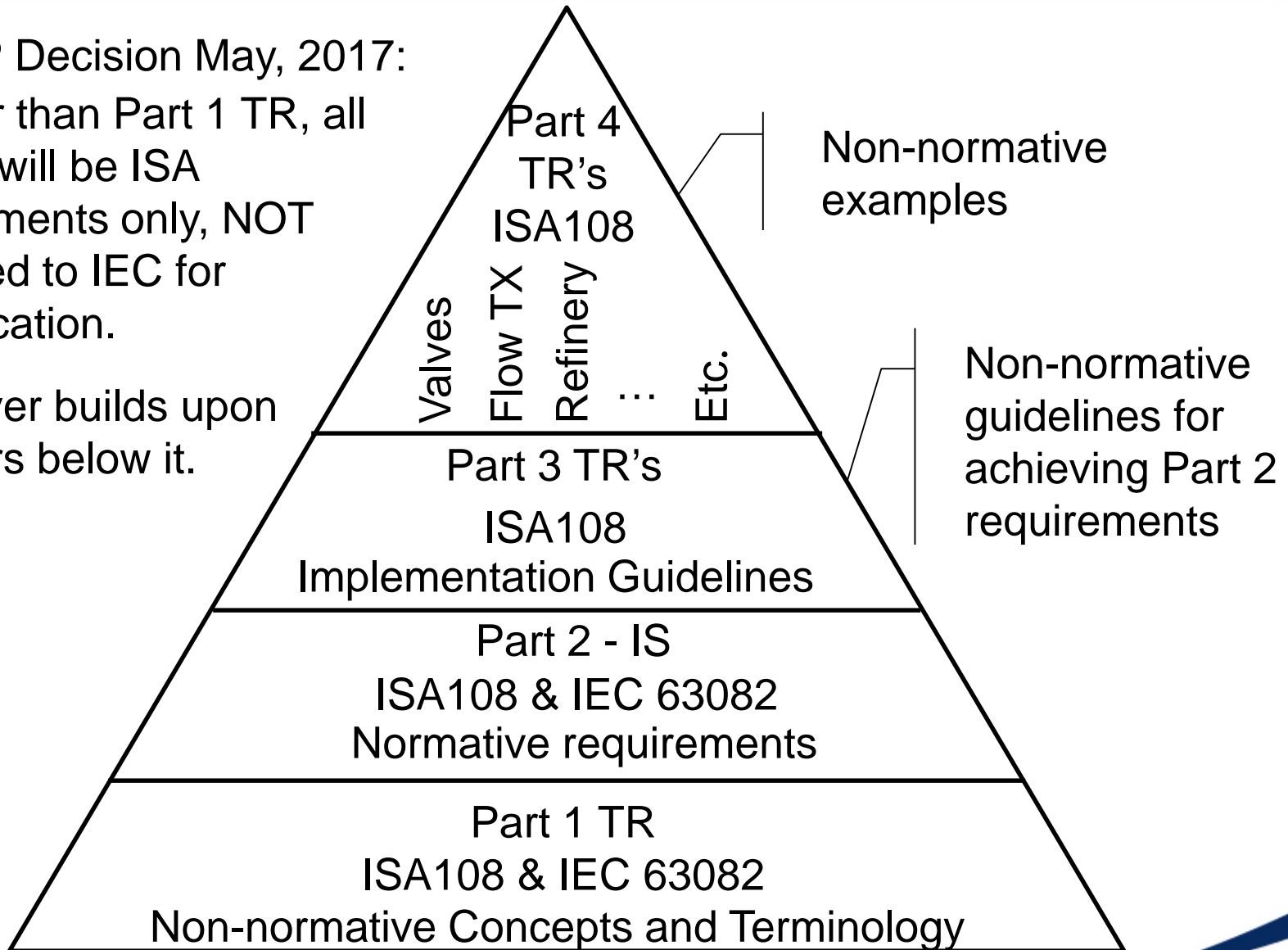
ISA 108 Document Organization



ISA S&P Decision May, 2017:

Other than Part 1 TR, all TR's will be ISA documents only, NOT offered to IEC for publication.

Each layer builds upon the layers below it.



Standards Development Status



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- ISA108 Part 1 has been published by ISA
 - Submitted to IEC as NP
 - IEC formed SC65E WG10 for this work
 - Document circulated in IEC and comments resolved
 - ISA108 Named D Liaison for WG10
 - **IEC 63082-1** has been re-circulated in IEC
 - Should be issued 2018 & will replace ISA108 Part 1
- ISA108 Part 2 & 3 development is in progress

ISA 108 Working Group Scope



Parts 2 & 3

a) Project Configuration Management

b) Turnover Management

c) Repair and Replacement Management

d) Turnaround Management

e) Upgrades

WG A) Build and Maintain Configuration and Change Management

a) Availability: Diagnostic or Condition Based Maintenance

b) Performance: Inspection & Testing including Calibration

c) Reliability Improvement

WG B) Condition Management

a) Program Establishment & Management

b) Technology and Product Management

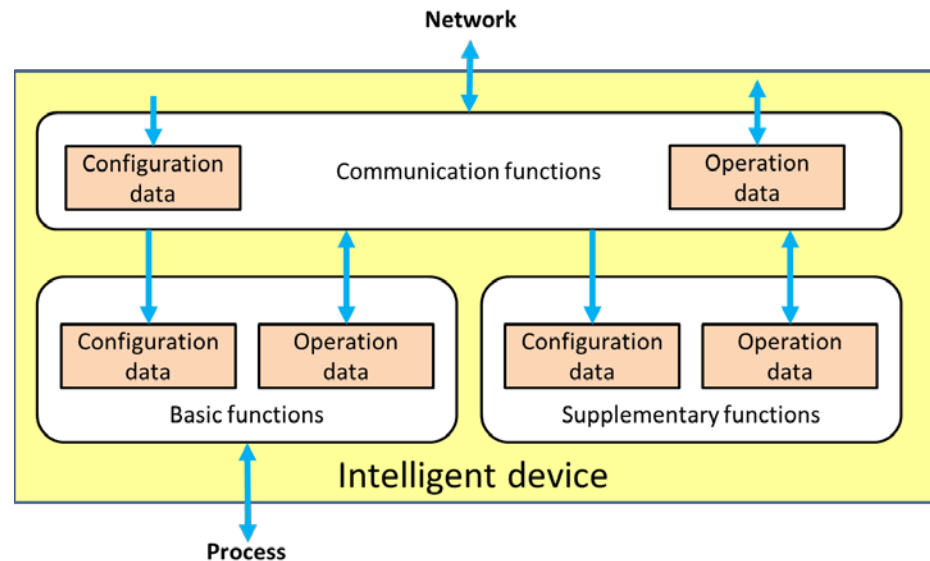
c) Other enterprise work processes

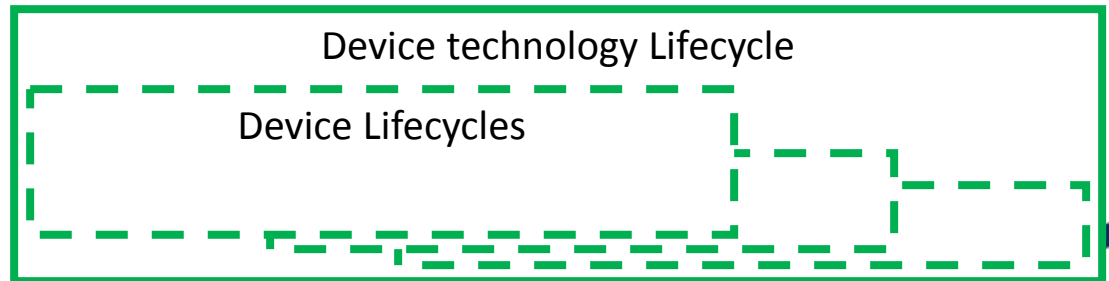
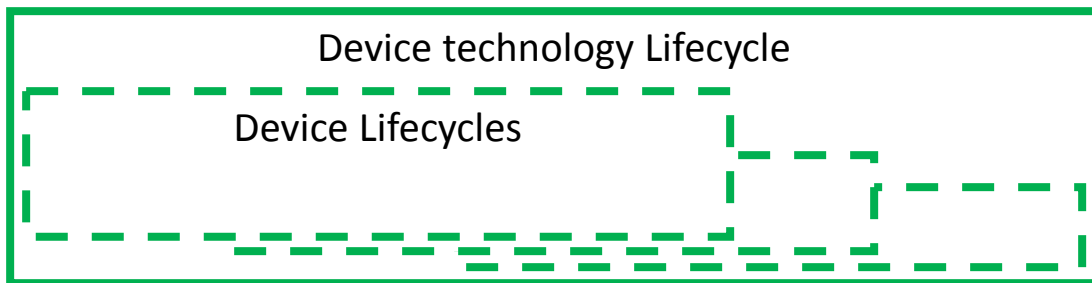
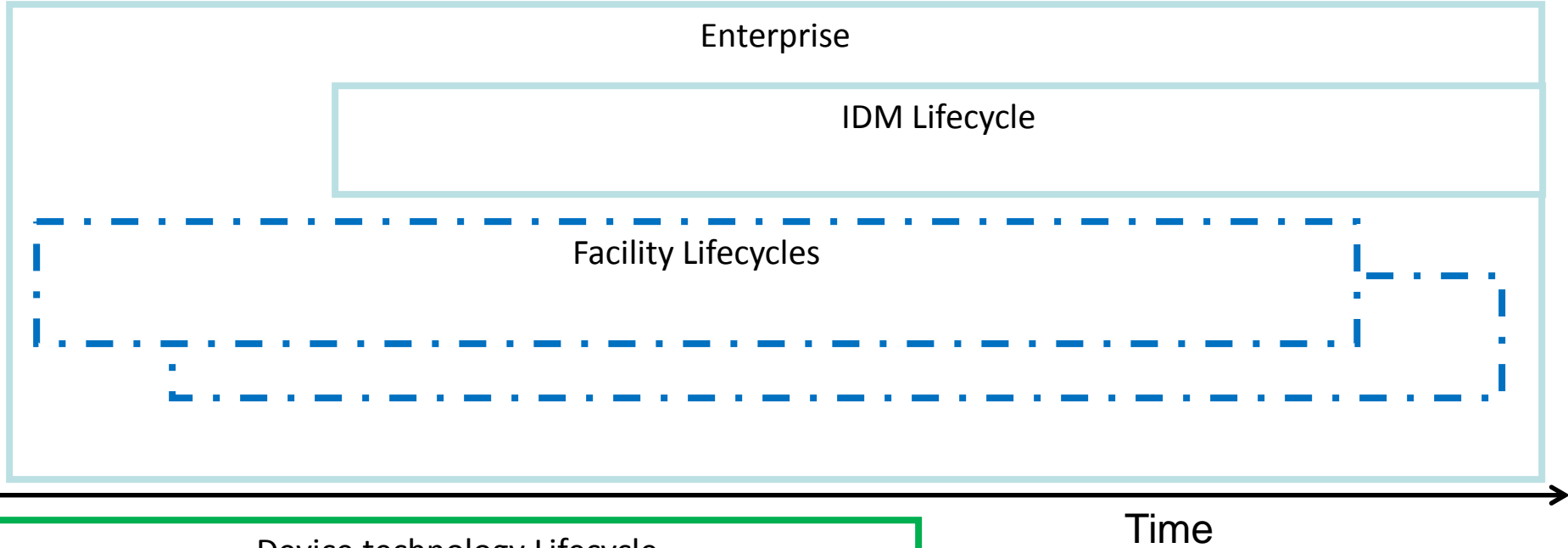
WG C) Program Level Technology, Product, & Enterprise Resource Management

Intelligent device: device having digital communication and supplementary functions such as diagnostics in addition to its basic purpose

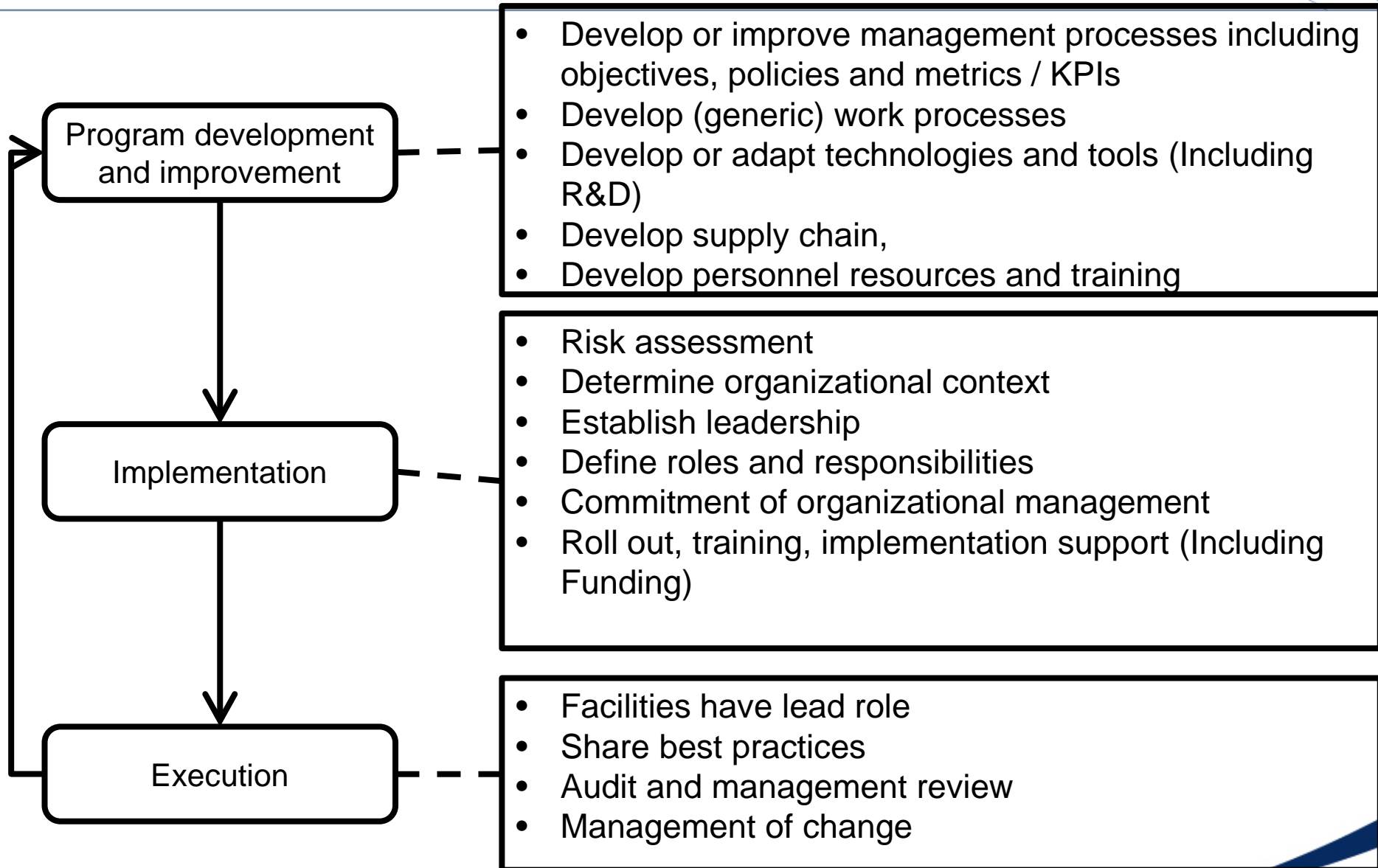
Intelligent device management (IDM): coordinated activities of an organization to realize value from intelligent devices

- IDM is used to achieve
 - Setup, optimization, diagnostics, maintenance and disposal of intelligent devices over the facility lifecycle on an asset management system





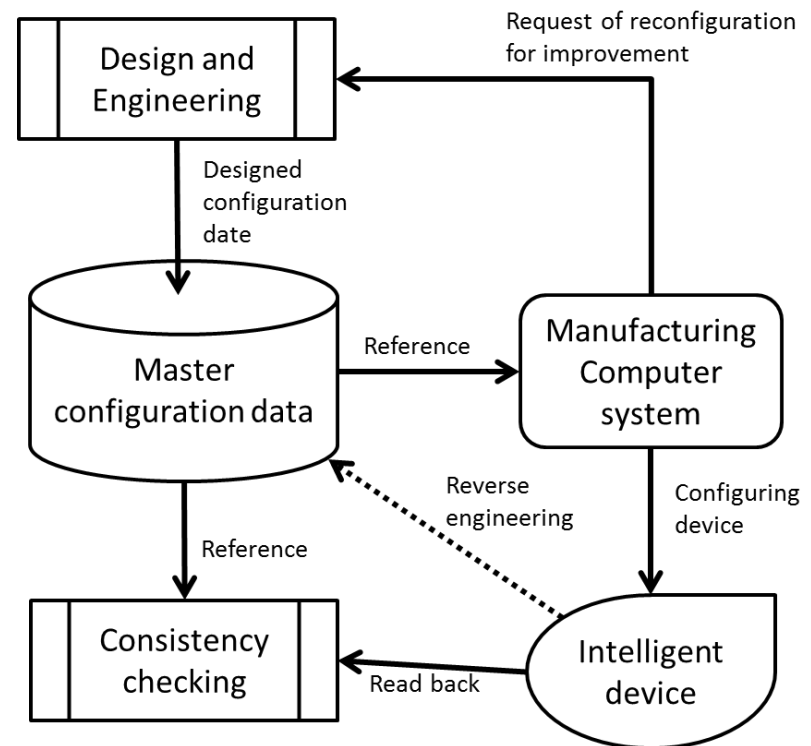
Significant activities in each phase



Configuration Management: To keep configuration of intelligent devices appropriately throughout the lifecycle

Configuration Management Lifecycle

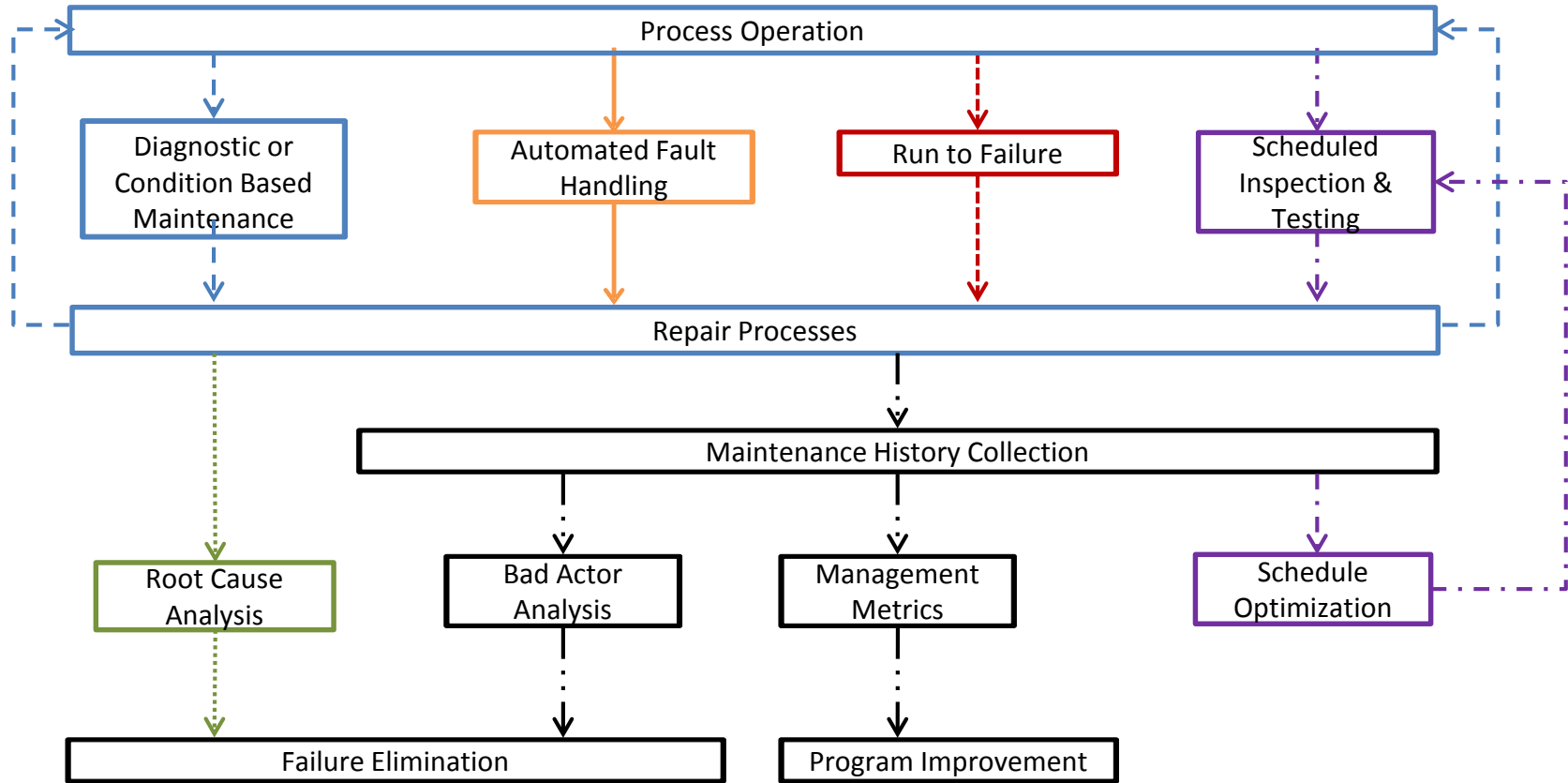
- Project Phase Management
 - Bulk Build, Multiple Database, IT Tools
- Transition Phase Management
 - Generally Neglected or Omitted
- Operation Phase Management
 - Single Loop Focus
 - Project tools Don't work
 - Remote Support may be Necessary



Change Management Classification



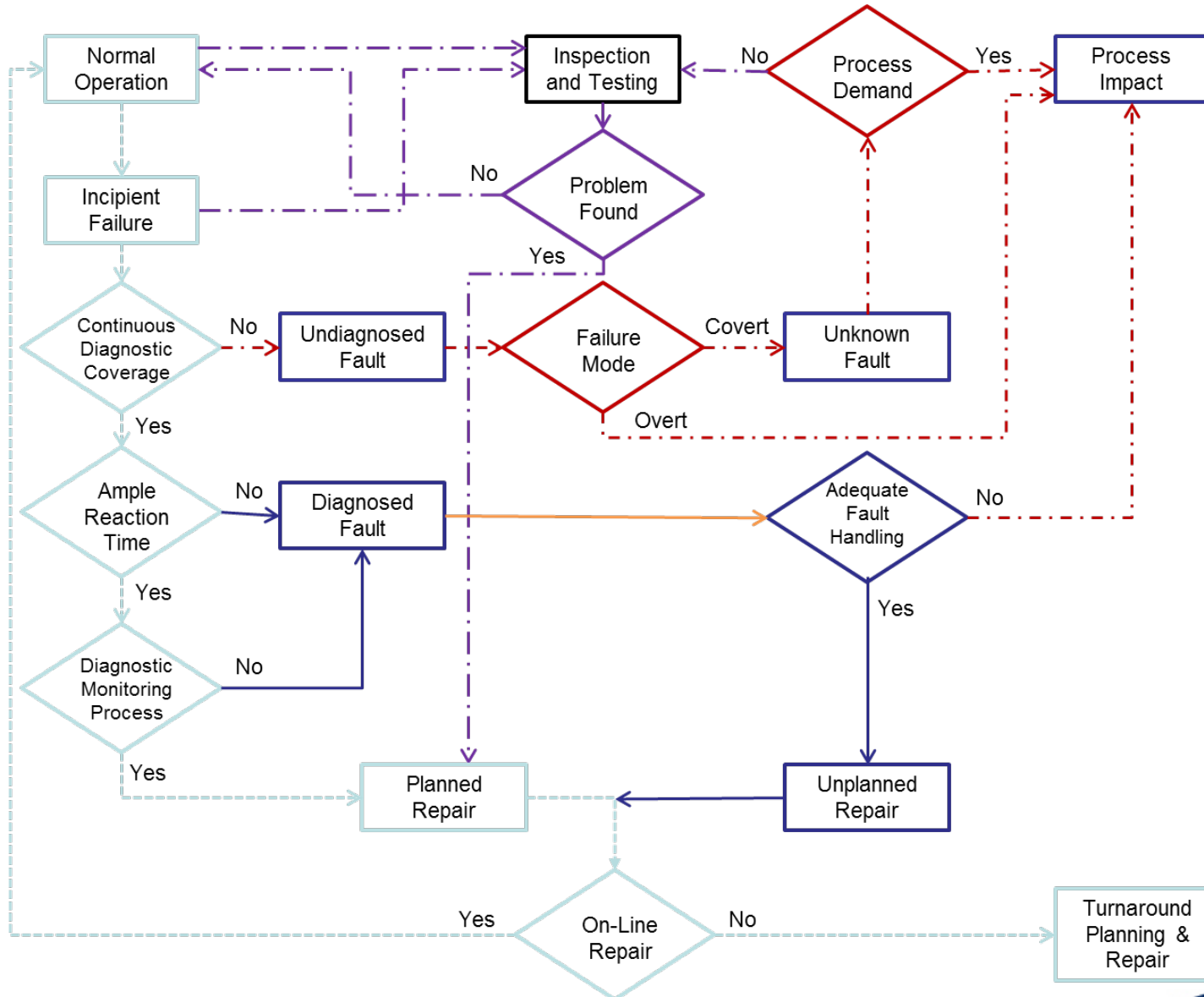
Compatibility classification		Function	Communication	Notes
1 Interchangeable	Identical	Functionally equivalent	Shared communication profile	Same make, model, and revision
2 Backward Compatible	Like	Functionally equivalent plus new features		Same make and model, new revision, old configuration works in new device
3 Interoperable	Similar	Functionally similar	Shared or changed communication Profile	Same make and model, but with breaking changes in functionality, configuration , and/or communication profile
4 Interoperable - Interworkable		Functionally similar but with different specifications		Different model or manufacturer but may fill the same role with engineering or configuration changes
5 Interoperable – Interconnectable	Unlike	Functionally Different	Different Communication Protocol	Made for different functional roles but can share media and may communicate
6 Incompatible – May be Coexistent		Different Capability		Cannot substitute regardless of intended role



- **Optimizing maintenance process**
- **Selecting appropriate strategy**

- Reactive maintenance (Run to failure)
- Scheduled maintenance
- Predictive maintenance
- Condition based maintenance

Condition Management



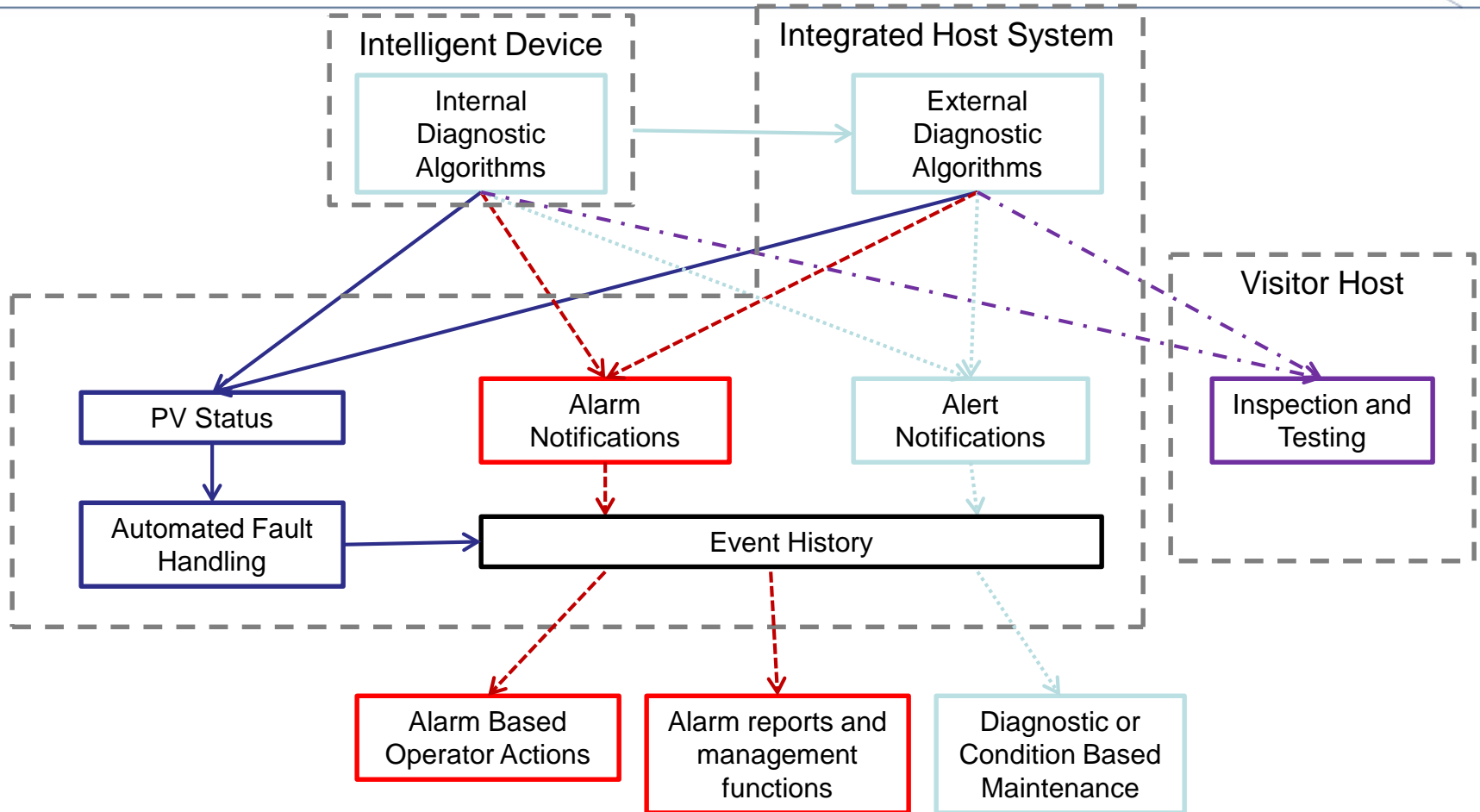
Notification Types



	Time-Critical Operator Response Required	Response (if any) is Not Time-Critical
Abnormal Condition	Alarm	Alert
Expected or Normal Condition	Prompt	Status Message

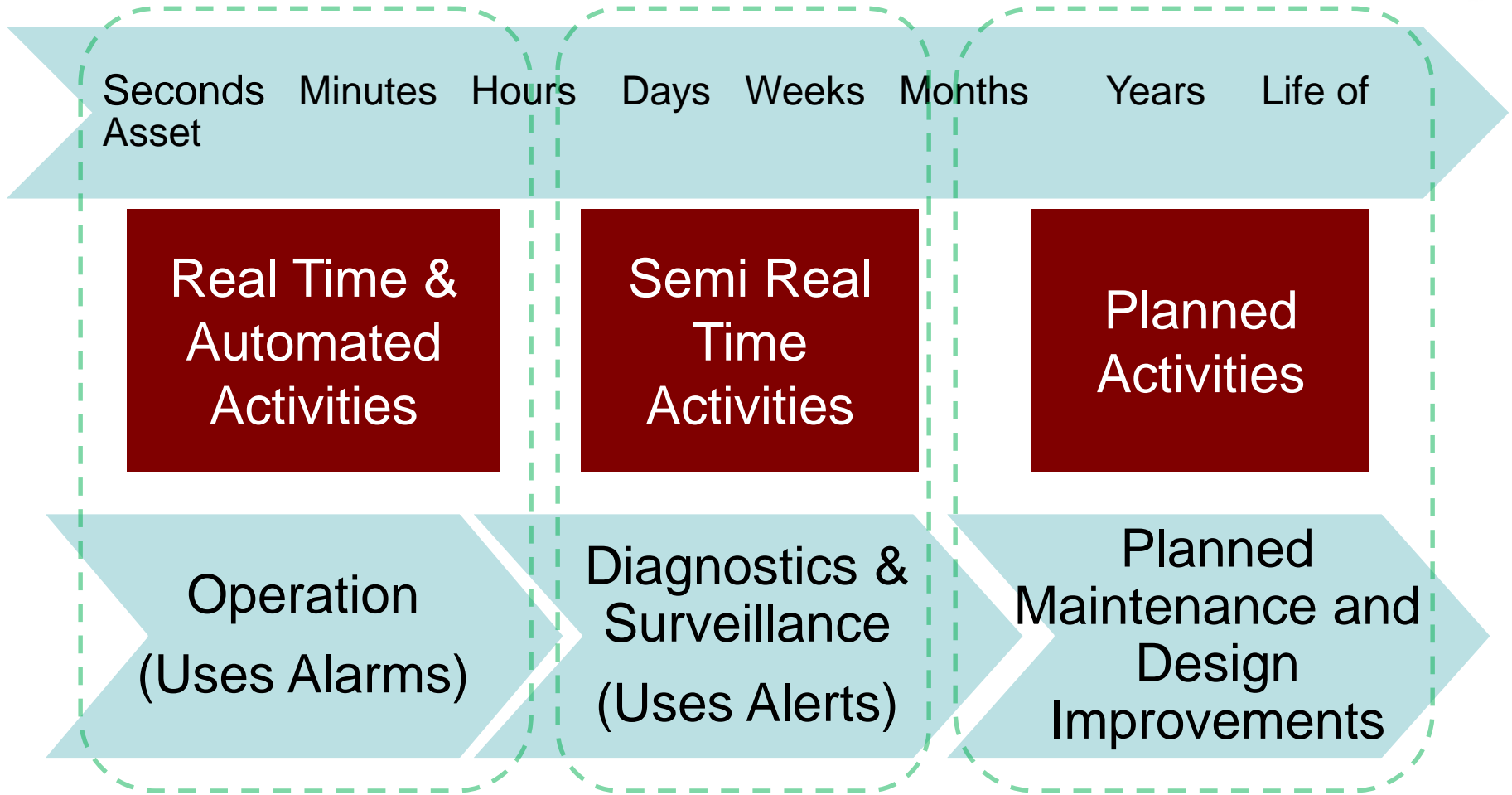
- Most Diagnostic Alerts Go Directly to a Black Hole
 - Diagnostics Notifications May Need to go to Engineering, Maintenance, and/or Operations

Notification Configuration



- Notifications for IDM must be directed (by configuration) from the appropriate source to the appropriate destination with appropriate priority
- This configuration is application dependent – not out of the box
- Both Host and Device configuration is required
- Most visitor hosts cannot connect to integrated host systems, however some testing can be accomplished through integrated hosts

What Is Diagnostic Based Surveillance?



- Diagnostic based Surveillance provides for:
 - Reactive Response in Semi Real Time to Diagnostic Alerts,
 - Fills a Gap between Operation and Traditional Planned Activities,
 - Makes use of Diagnostic Capabilities of Field Devices

- Alerts can be managed with Alarm Management Tools
 - Sorted reports of recent alerts
 - Reports of long standing alerts
 - Reports of alerts that occur infrequently over a long time period
 - Reports that characterize certain types of failures
 - Capture rationale on alert criticality
 - Capture recommended actions for an alert
- Alert Management Tools can be built in to Asset Management Systems or separate tools

Boundaries and Liaison Efforts

- ISA18 WG 8 has started work on Alerts
 - Alert requirements are different from alarms and are not covered
 - ISA108 is working with ISA18
- ISA84 will do some work on critical device availability requirements
 - Safety standards have gaps in coverage of intelligent device diagnostics effectiveness requirements
 - Diagnostic coverage does not equal effectiveness
 - Diagnostic effectiveness is necessary for many safety applications
 - ISA108 will work with ISA84
- ISA99 is working on IDM issues
 - “If it isn’t secure, it isn’t safe.”
 - IIoT, level 0 and 1 networks, and remote access have new efforts under consideration
 - ISA108 will work with ISA99

- Large Incentives for Intelligent Device Management
 - Most Efficient System for Maintenance
 - Reduced Impact of Failures
- Barriers are Significant
 - Changes in Engineering Practices
 - Culture Change for Maintenance
 - Management Ownership
- Standards Will Help
 - Working Groups are being formed
 - We do not have enough leaders, writers, and editors to work on all documents at once
 - Get Engaged

THANK YOU FOR YOUR
ATTENTION