

Asset Lifecycle Information Management: Managing your Capital projects and Operations with Bentley solutions

Carsten Gerke
Senior Sales Director
Bentley Plant EMEA



Introducing AssetWise

Creating a New Platform for Operations Information Modeling

Bentley Systems Announces Two Significant Acquisitions to Launch its 'AssetWise' Initiative for Owner-Operators

New Asset Management Platform Will Leverage Enterprise Informatics' Robust Configuration and Change Management Services and Exor Corporation's Strength in Linear Networks

ORLANDO, Fla. – Orlando 2010: ARC World Industry Forum – Feb. 8, 2010 – Bentley Systems, Incorporated, the leading company dedicated to providing comprehensive software solutions for the infrastructure that sustains our world, today announced that it has acquired **Enterprise Informatics, Incorporated** (www.enterpriseinformatics.com) and **Exor Corporation** (www.exorcorp.com). Enterprise Informatics eB Insight software provides configuration and change management capabilities for mission-critical infrastructure asset operations for the energy, nuclear, rail, and government sectors. Exor information modeling software provides for the management and operations of linear networks for infrastructure, including roads and railways. These strategic acquisitions accelerate Bentley's focus on value creation for owner-operators – enabling operations and maintenance to take full advantage of information modeling, and thus realize the potential of "intelligent" infrastructure assets. Bentley's "AssetWise" platform will combine multiple information modeling services to improve the lifecycle management and operational performance, safety, compliance, and governance of infrastructure assets while increasing the return on investment for owner-operators.

"These two acquisitions anchor the next stage in Bentley's progression as an infrastructure software provider," CEO Greg Bentley said. "In AssetWise we see a tremendous opportunity – driven by advances in computing and information modeling, to

What Is Unique about Infrastructure Assets?

- They are large, complex systems...
 - Not simply discrete equipment, schedules and resources
 - Many involve one or more complex networks
 - Transportation, Utilities
 - Networks may need to be overlaid
 - Service life spans of 50 to 100 years
 - Updates and upgrades involve significant engineering and design
- Serve the public
 - Both private and public enterprises
 - Need to support public inquiry, reporting and response
 - Concerned with “level-of-service” and public safety
 - Continuous operation



What Is Unique about Operating Infrastructure Assets?

Heavily governed and regulated

- Public safety is paramount
- High profile accidents often result in new safety/inspection legislation
- Involve several oversight and reporting agencies



Unique information models

- Comprehensive information network models
- Linear referencing (with overlaid networks)
- Trustworthy information, reports and audit trails



Support many functional departments, users and locations

- Managers, supervisors, crews
- Public officials and the public
- Central, district and field offices
- Connected and disconnected (mobile)



Business Needs ...

REDUCE COSTS	<ul style="list-style-type: none">• Project work-sharing under central management• Integrated design to improve design workflow• Reuse design & engineering
SHORTEN SCHEDULES	<ul style="list-style-type: none">• Better design productivity & efficiency• Planning tools to review schedules• Better construction planning/ execution
IMPROVE OPERATIONS	<ul style="list-style-type: none">• Improve data handover from EPC to Operations• Keep documentation & data up-to-date• Maintaining a single 'source of truth'• Reduce plant turnaround time

Lack of Asset Information Management Is Expensive

Infrastructure Projects (CAPEX)

- Increases in capital costs
- Extends project schedules
- Increases project risk



Operation and Maintenance (OPEX)

- Higher operational cost
- Lower asset availability and productivity
- Lost revenues and profitability

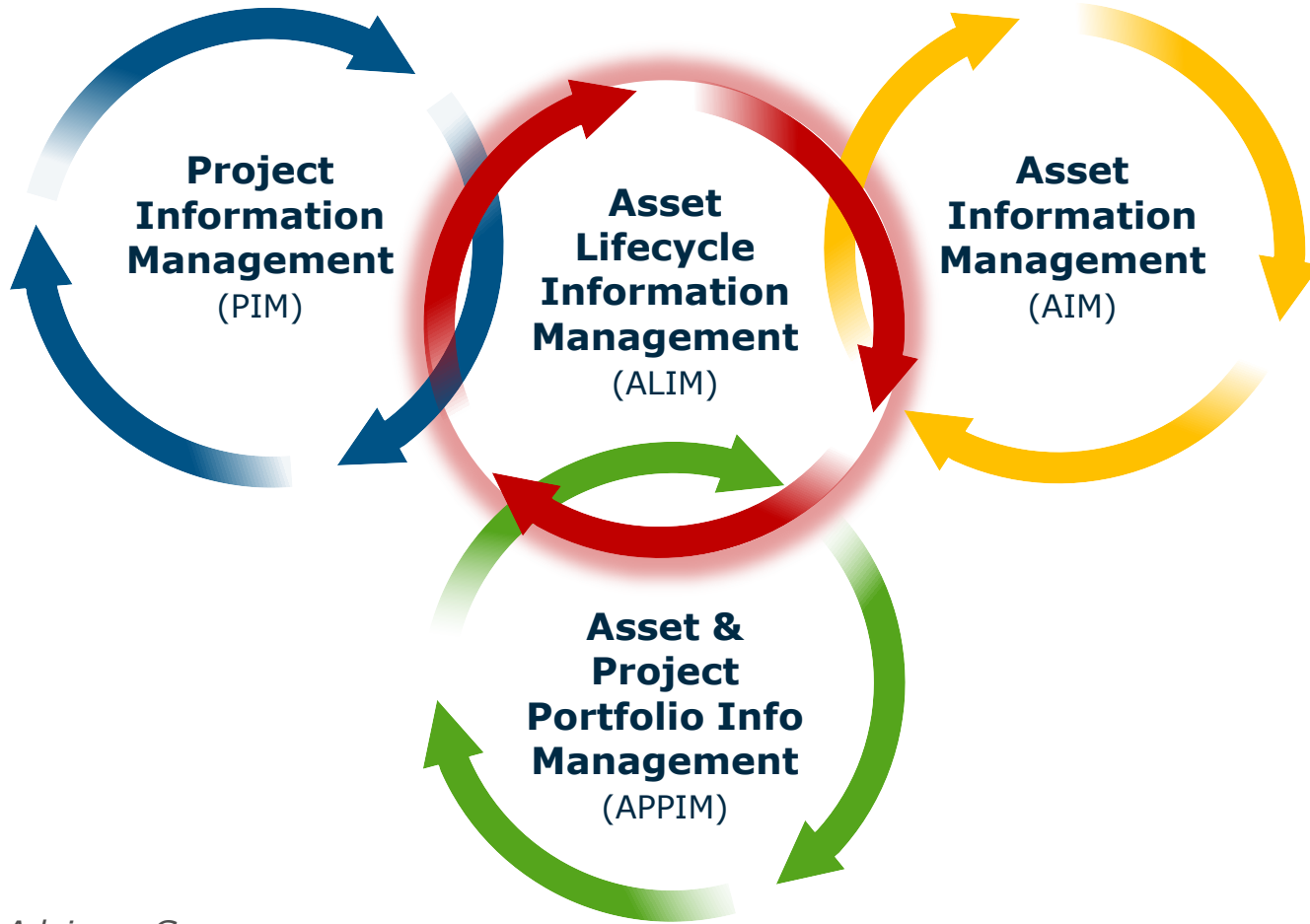


Environmental, Health and Safety

- Risk of non-compliance (fines or shutdown)
- Increasing personnel cost and productivity
- Higher rate and cost of incidents



Asset Lifecycle Management - Spanning Project / Asset Cycles



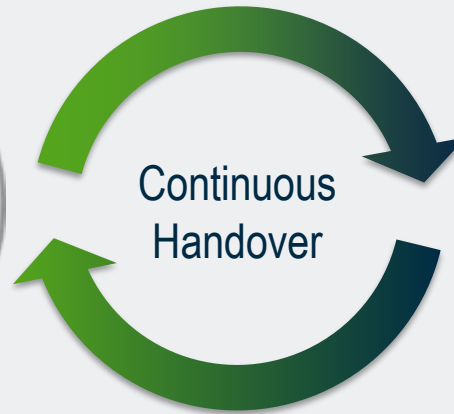
Source: ARC Advisory Group
Information Management Strategies for Asset Lifecycle Management, January 2010
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Bentley's Solutions Span Project/Infrastructure Asset Operations

**Project Performance
Management**
(Design & Build)



**Asset Performance
Management**
(Operate & Maintain)



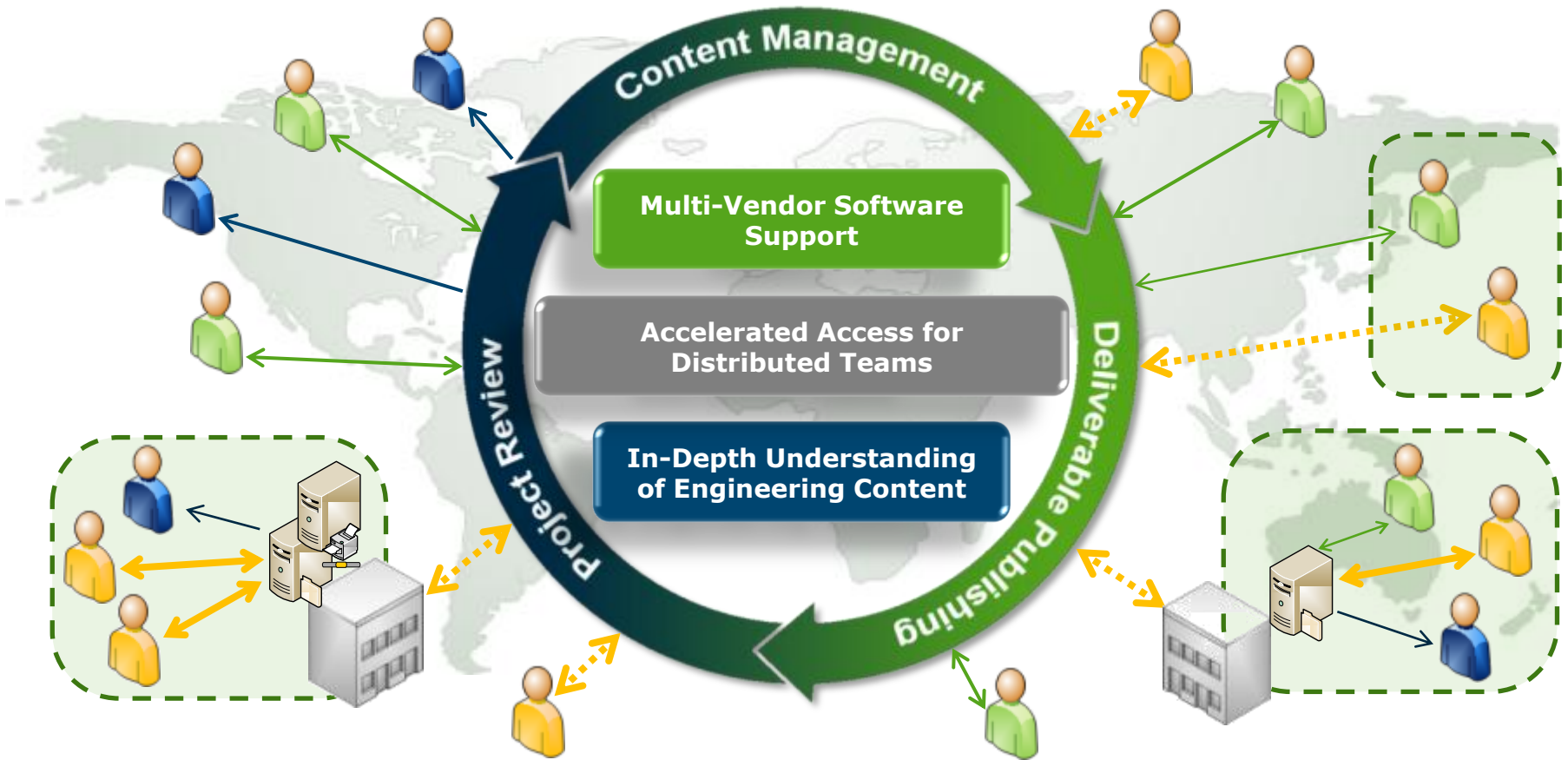
Bringing new assets on stream
within cost, time, quality constraints

ProjectWise

Optimizing return on assets - ensure
they perform safely and profitability

AssetWise

ProjectWise: Project Team Collaboration Platform for the Design and Construction of Capital Projects



Bentley
ProjectWise V8i

Engineering Project Collaboration Platform



Microsoft®
SharePoint® 2010

Business Collaboration Platform

What is AssetWise?

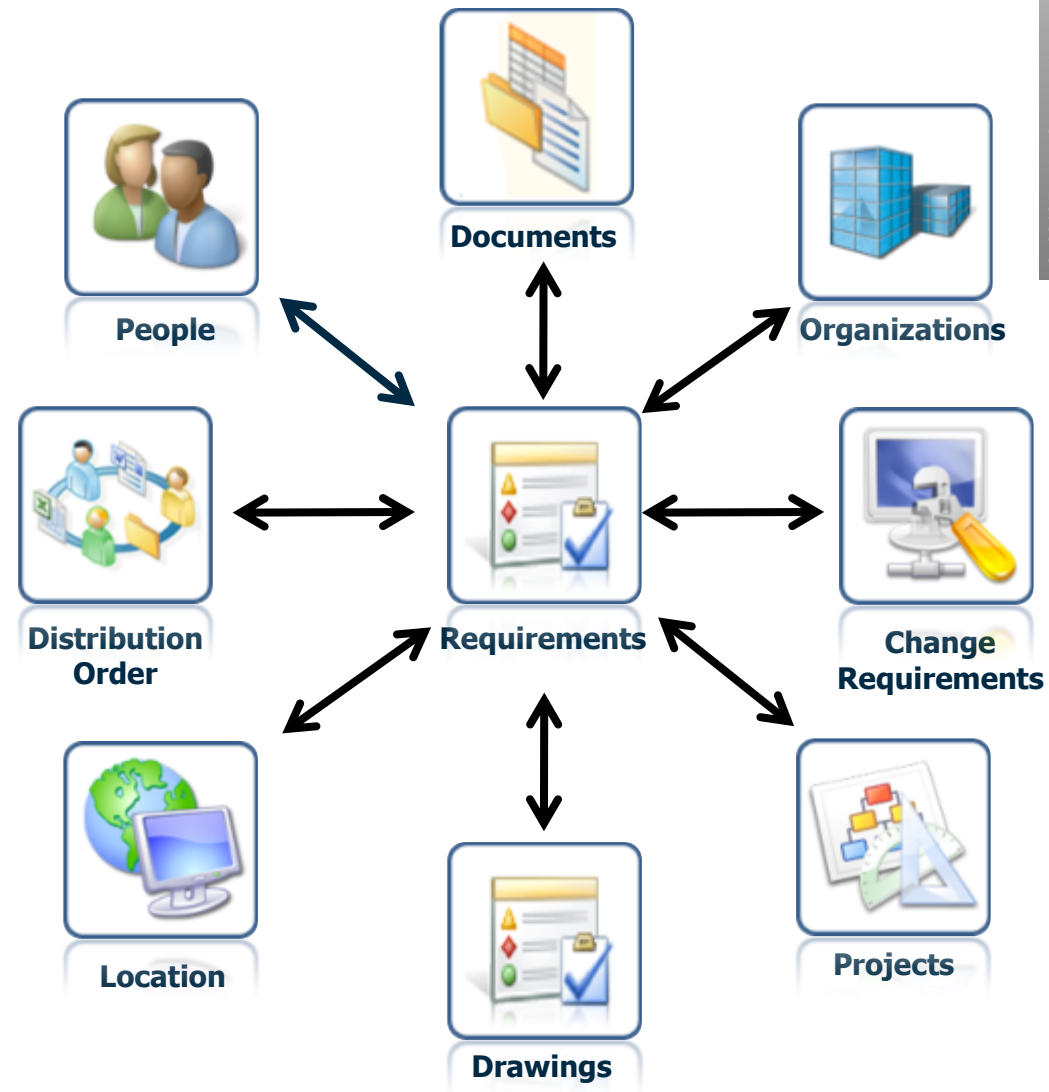
AssetWise is an **information modeling platform** for delivering lifecycle information management to engineers of infrastructure assets...

&

a suite of **applications** and **on-line services** to improve management and operational performance, safety and compliance of infrastructure assets.

Operations Information Modeling

- Classification
- Relationships
- Information Reach
- Templates
- Behavioral Control
- Presentation



AssetWise

Applications and On-line Services



Information Applications

Requirements Management
Document Control
Configuration Management

Records Management
Knowledge Management

Information Services

Renditioning
Printing
Scanning/OCR

Publishing
Interfaces to other CMS/EDMS

Information Integrity

Change Management
Relationship Management
Permissions/Rights

Role Management
Audit Trails

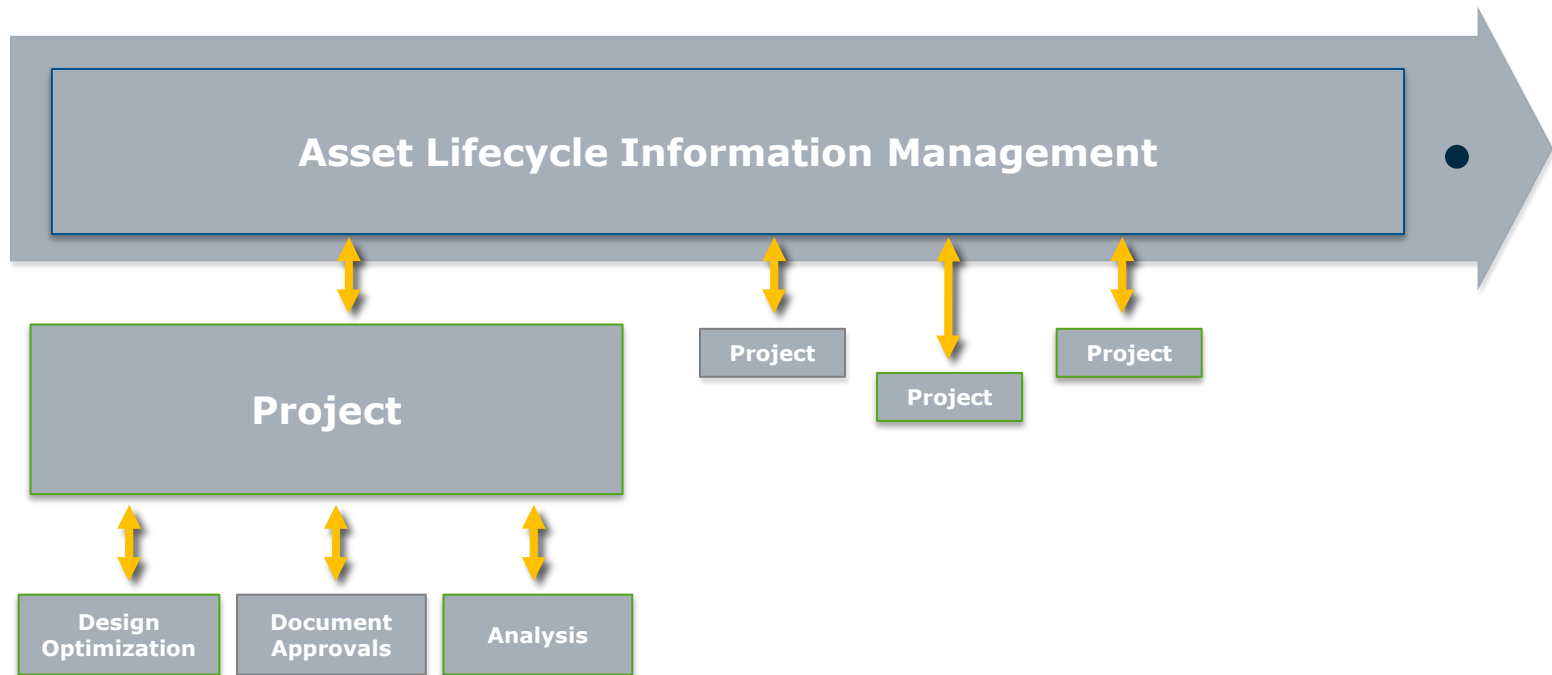
Information Modeling

Tagged Component Hierarchies
Relationship Models
Linear Networks
Spatially Oriented Networks

Models and Drawings
Documents
Unstructured Data
Point Clouds

Platform

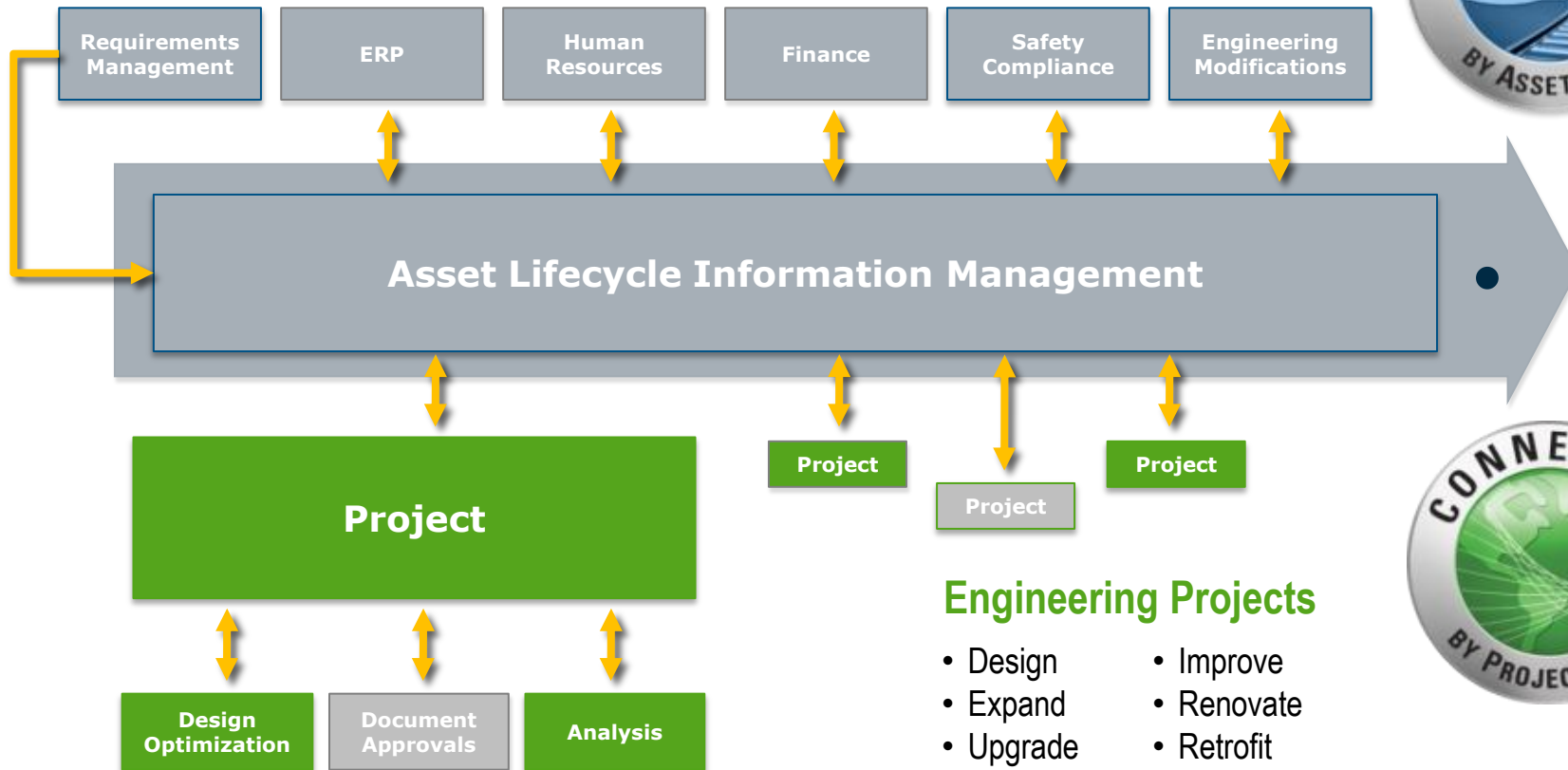
Infrastructure for Asset Engineering



Infrastructure for Asset Engineering

Asset Engineering

- Portfolio Management
- Bid Compliance
- Issue Tracking
- Safety Compliance
- Inspection Management
- Modification Tracking



Engineering Projects

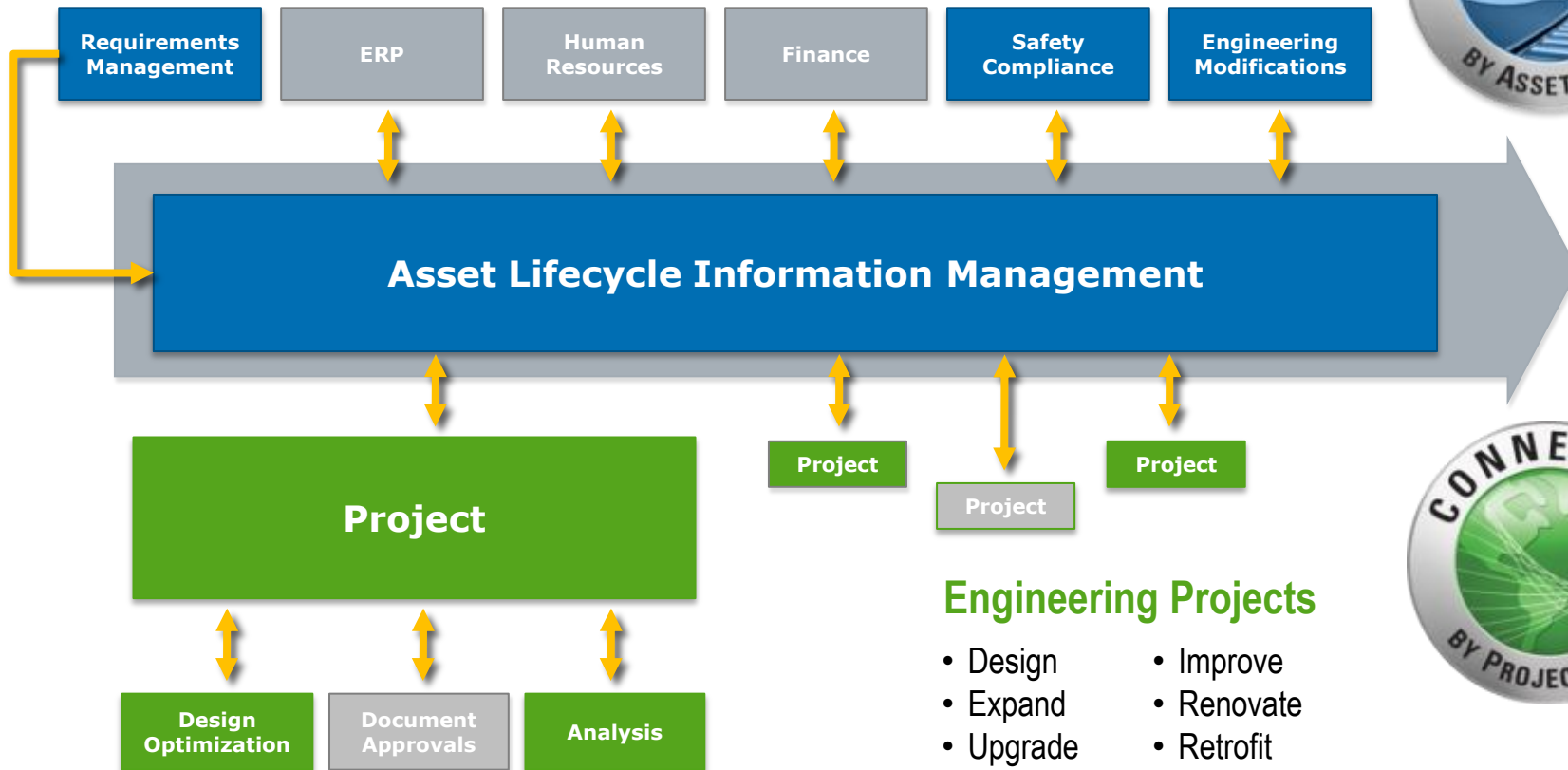
- Design
- Expand
- Upgrade
- Improve
- Renovate
- Retrofit



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Engineering Projects

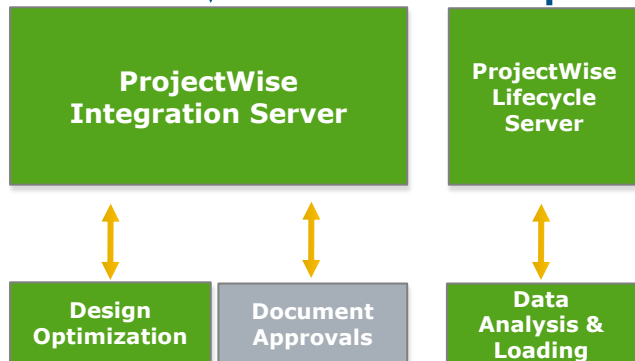
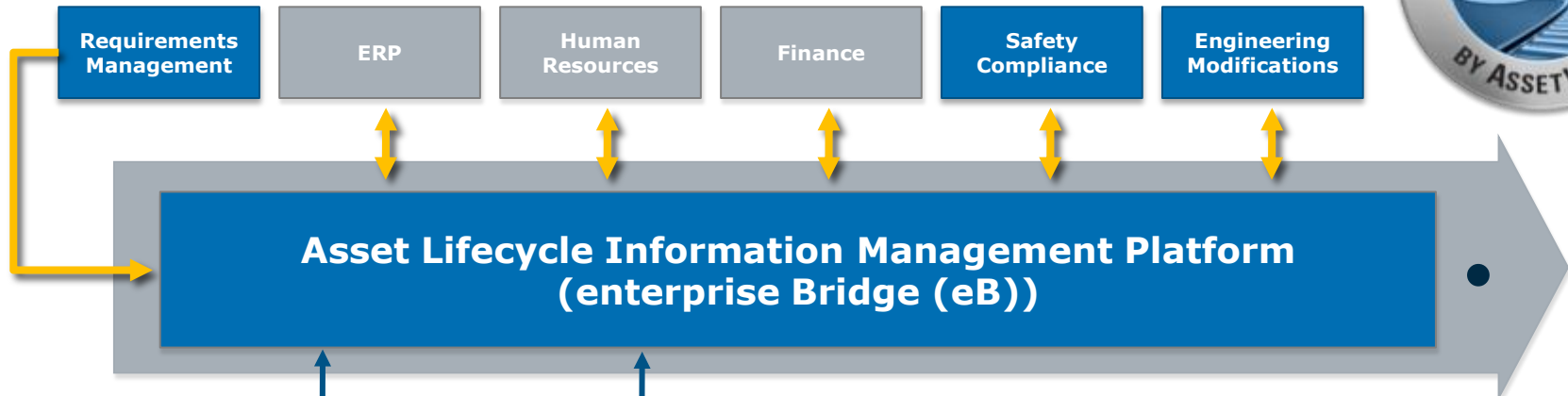
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Infrastructure for Asset Engineering

AssetWise enterprise Bridge (eB)

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- Modification Tracking



ProjectWise Integration Server

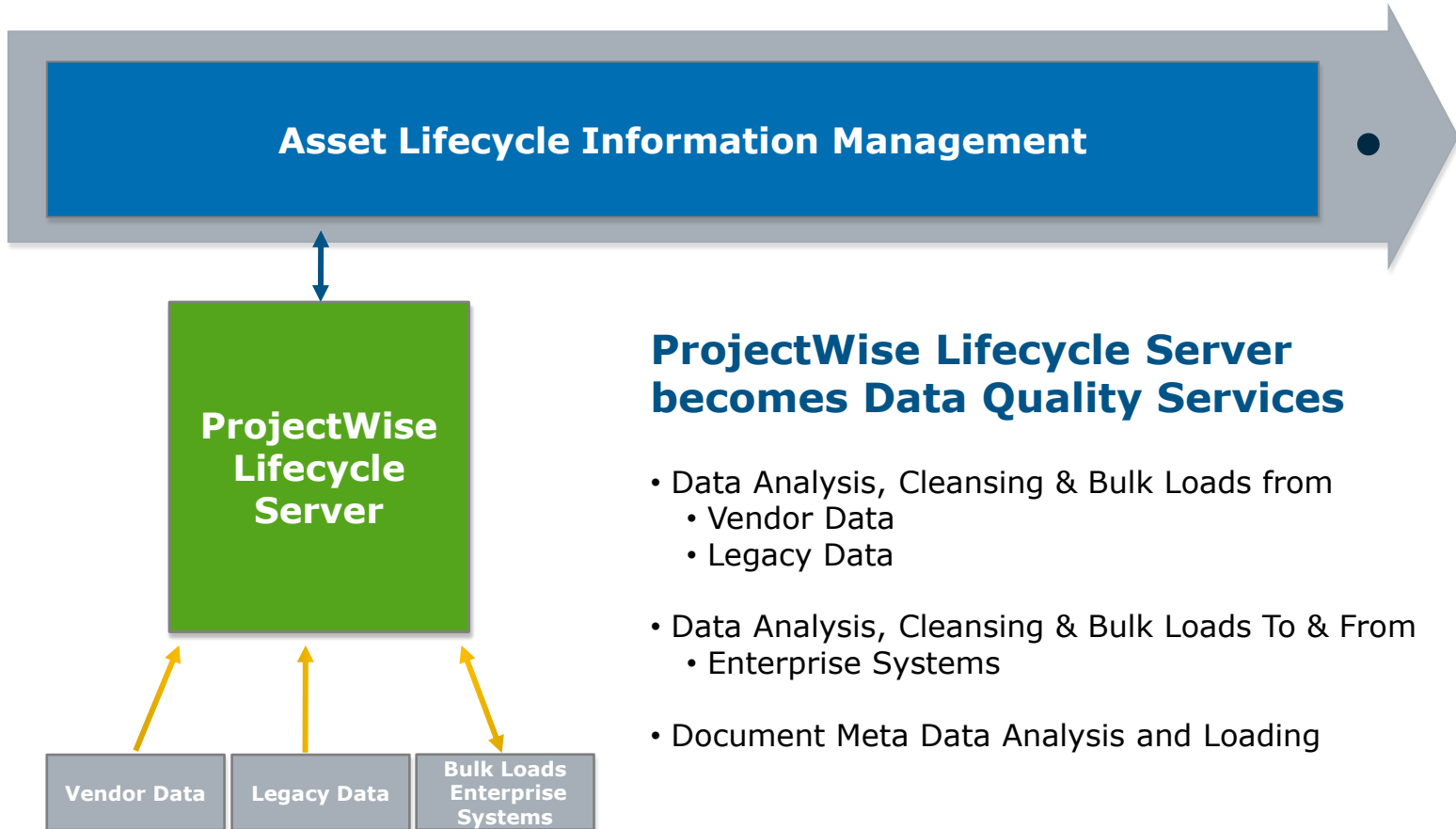
- Document Management
- Engineering Collaboration
- Design Application Configuration

ProjectWise Lifecycle Server

- Data Quality Analysis
- Milestone Data Loads from Design



Lifecycle Server in Asset Engineering



ProjectWise Lifecycle Server becomes Data Quality Services

- Data Analysis, Cleansing & Bulk Loads from
 - Vendor Data
 - Legacy Data
- Data Analysis, Cleansing & Bulk Loads To & From
 - Enterprise Systems
- Document Meta Data Analysis and Loading

Trusted Information

- AssetWise eB (enterprise Bridge) provides the means to ensure trusted information is available across the enterprise where, when and to who it is required.
- AssetWise eB solutions are about...
 - Delivering trustworthy information
 - To COMPLY, CONFORM, and OPERATE
 - Optimizing process and communication efficiency
 - Minimizing business risk
 - Reducing the cost of meeting compliance requirements



Ensuring Information Trustworthiness

- Identification and Classification

- What is it?

- Relationships/Links/Context

- What is it for?

- Responsibility

- Who owns/uses/needs it?

- Control of Change

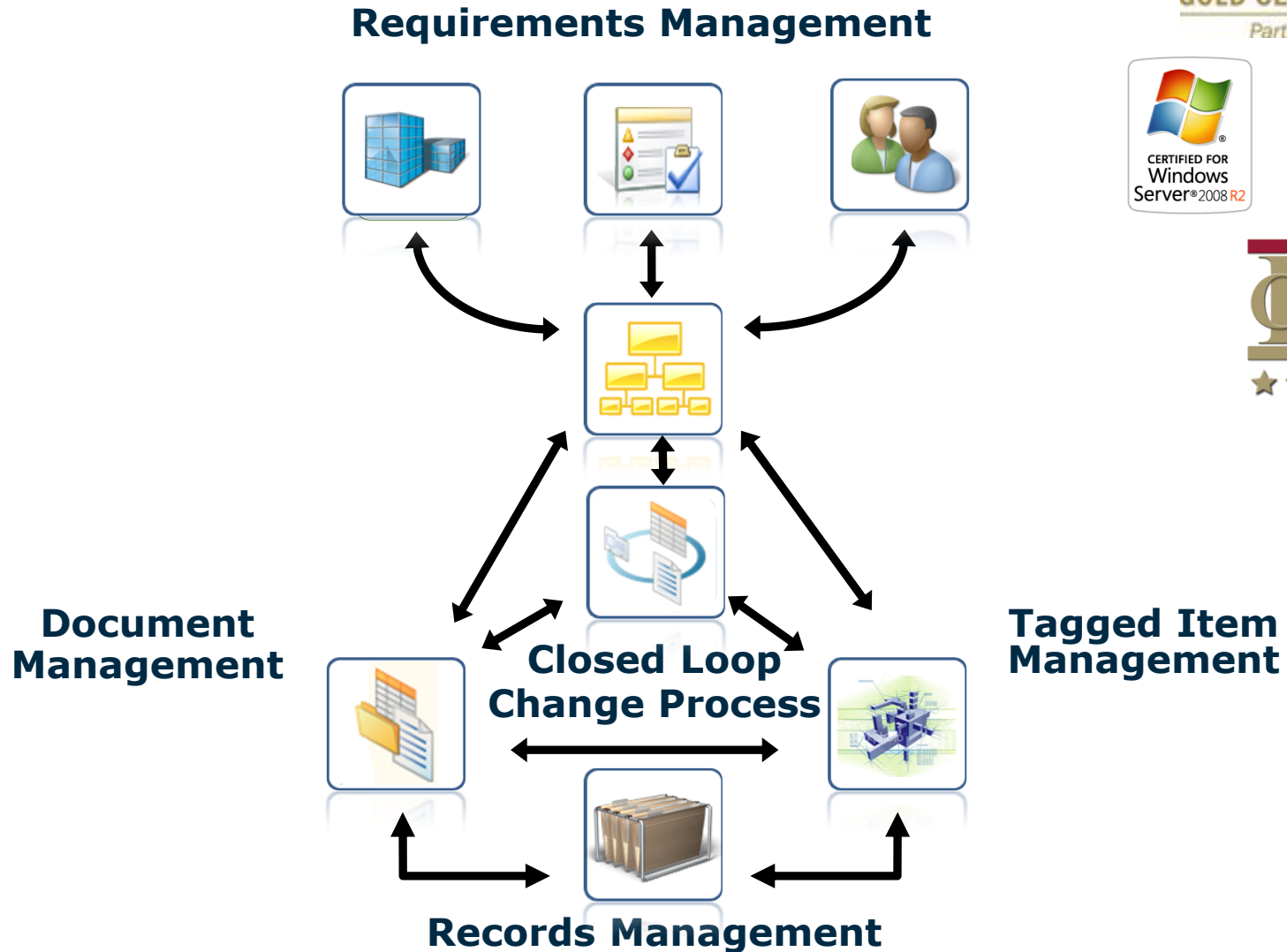
- Who can change what? Where are all copies?

- What is the impact, cost and scope of change?

- What/who/when changed?



Engineering Change Management



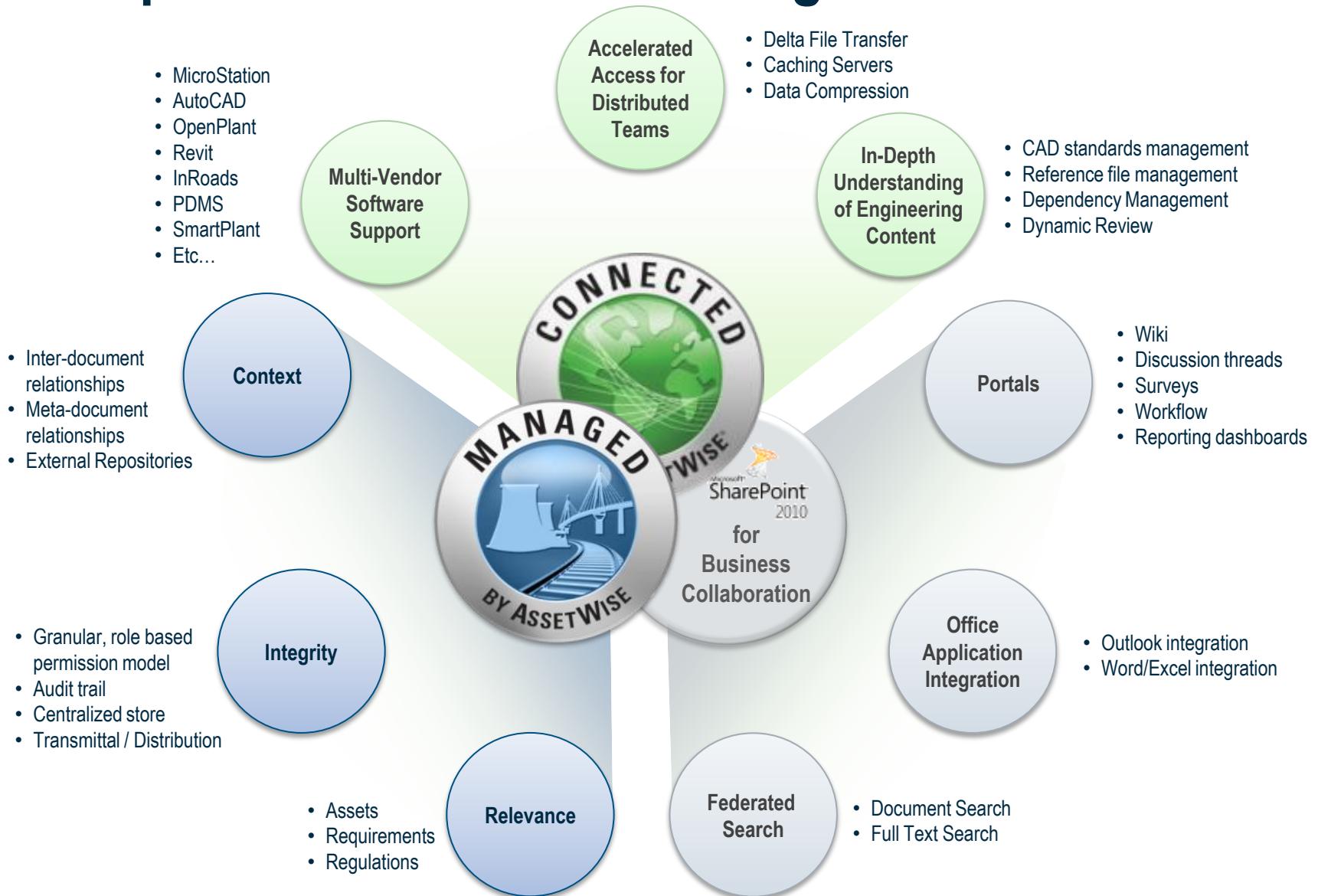
Microsoft
GOLD CERTIFIED
Partner



Interoperable Information Management Platforms



Interoperable Information Management Platforms



AssetWise Benefits



Increase Return on Asset (ROA)

- Increase the useful life of the asset
- Sustain asset value
- Increase asset productivity



Manage Business Risk

- Meet regulatory compliance requirements
- Ensure public safety
- Increase access to “trusted” information



Improve Operational Performance

- Increase infrastructure availability
- Shorten planned outages
- Improve maintenance efficiency (wrench time)

AssetWise for Road/Bridge Networks

Pains

- Lack of accurate linear asset information
 - Delays and/or reduces federal funding allocations
 - Impacts decision making and priority setting
 - Increases project delays and cost of maintenance
 - Increases risk to public safety



Advantages

- Accurate linear asset information
 - Ensures asset information integrity to improve operational efficiency
 - Supports federal and public funding initiatives to increase allocations
 - Supports public transparency and safety to lower cost/risk of regulatory compliance

BRIDGE

CATEGORY: Overpass
STREET: Fairbrook Rd.
INSPECTED: 30 April 2007
INSPECTOR: R. Flannery
HEIGHT: 22.5 feet
ROUTE: CA-I15-N
SEGMENT: MP-127
OFFSET START: 2018 feet
OFFSET FINISH: 2078 feet

STREET LIGHT:

CATEGORY: FWY illumination
REPAIR DATE: 10 Oct 2009
REPAIR TYPE: Bulb
HEIGHT: 21 feet
MOUNTING BRACKET: Pole arm
LAMP TYPE: 1 Low Pressure Sodium
SEGMENT: MP-127
OFFSET: 1592 Feet

STREET SIGN

CATEGORY: merge
ILLUMINATED: no
MOUNTING HT: 11.5 feet
MOUNTING: pole
ROUTE: CA-I15-N
SEGMENT: MP-127
OFFSET: 1480 feet

TRAFFIC LIGHT

CATEGORY: FWY entrance
ILLUMINATED: yes
REPAIR DATE: 15 Mar 2008
REPAIR TYPE: Bulb
MOUNTING HT: 10.5 feet
MOUNTING: pole
ROUTE: CA-I15-N
SEGMENT: MP-127
OFFSET: 1516 feet

BARRIER

CATEGORY: Cement wall
LENGTH: 128 feet
ROUTE: CA-I15-N-M27
SEGMENT: MP-127
OFFSET: 1352 feet

POT HOLE

CATEGORY: Hwy defect
DAMAGE REPORTED: 12 Jul 2009
REPAIR PRIORITY: High
DATE REPAIRED: 15 Jul 2009
ROUTE: CA-I15
SEGMENT: MP-127
OFFSET START: 1270 feet
OFFSET FINISH: 1274 feet

AssetWise for Road/Bridge Networks

Applications and Online Services



AssetWise Users for Road/Bridge Networks



AssetWise for Rail Networks

Pains

- Lack of accurate Rail asset information
 - Increases risk to public safety
 - Impacts decision making and priority setting
 - Increases project delays and cost of maintenance
 - Delays asset renewals and capacity improvement

Advantages

- Accurate Rail asset information
 - Improves public safety decisions and priorities
 - Asset knowledge avoids run-to-fail situations
 - A “single source of truth” of asset information
 - Empowers maintenance decision support
 - Supports asset renewals and capacity improvements projects



Signal

Id 1381452
Latitude 40.374509118
Longitude -72.549791989
Mile Post 23
Number W2030
Offset (ft) 17
Signal Type HND
Track Serving 2
Travel Direction West

Catenary Pole (support electric)

AdjacentTrack 4
Elevation 2982
Latitude 41.304558511
Longitude -73.638804863
Number 48+908
Y Offset (ft) 37.000000

Person

Name: Jeffrey Rudy
Department: Rail Operations
Location: New Jersey – Station N1
Title: Controls Engineer
Training Certification: Current

Rail Defect

Track 4
ConditionMeasure -1.0058599710464478
DefectNumber 09-30932
Description Crosslevel
Detected Date 2010-04-05
14:34:29.66
Start MPOffset (ft) 4719
End MPOffset (ft) 4727
ExceptionLevel 2
Speed 85
SurveyNumber 309034

Document

Number: SL-2319-2
Title: SOP – Signal Light Maintenance
Classification: Standard Operating Procedure
Status: LATEST APPROVED (ISSUED)
Warnings: CHANGE PENDING

Track 2

Actual Length: 74829.0
Latitude: 42.374509118
Longitude: -75.549791989
TrackType : Low Speed Main

AssetWise for Rail Networks

Applications and Online Services



Information Applications

Document Control
Records Management
Knowledge Management

Requirements Management
Configuration Management

Platform

Information Modeling | Information Integrity | Information Services

Rail Information Model (eB Insight)

Multiple Linear Reference System (Exor)

AssetWise Users for Rail



AssetWise for Nuclear Power Generation

Pains

- Lack of accurate asset information
 - Higher risk of non-compliance with NRC regulations
 - Increases cost and duration of plant shutdowns
 - Delays asset renewals and capacity improvement
 - Increases “wrench-time” and re-work

Advantages

- Accurate, asset information
 - Meets regulatory requirements reducing risk of non-compliance
 - Manages the impact of change efficiently and reliably
 - Captures and retains operating experience and knowledge
 - improves plant safety and security
 - shortens plant shutdowns
 - lowers operational costs



Person

Name: Larry Roberts
Department: Mechanical Operations
Title: Controls Engineer
Training Certification: Current

Requirement

Number: REQ00091
Name: REACTOR COOLANT ISOLATION PARAMETERS
Classification: FUNCTIONAL
Status: SATISFIED

Knowledge Item

Number: KI-2010-00146
Description: CALCULATION ZZ-224 - STROKE TIME
REVISIONS FOUND TO IMPACT THIS CONDITION
Type: ANALYSIS
Category: SAFETY
Status: COMPLETE

Component

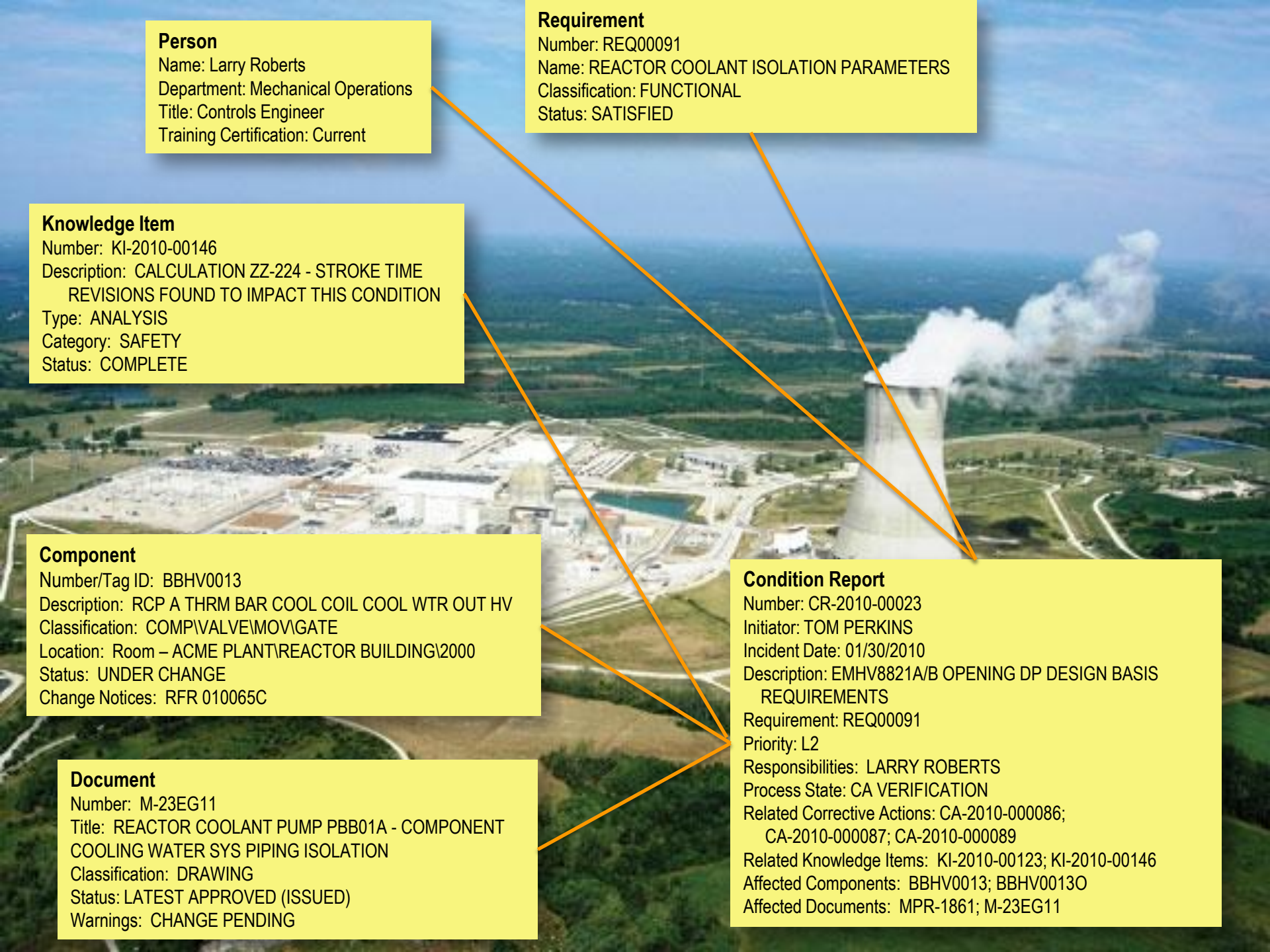
Number/Tag ID: BBHV0013
Description: RCP A THRM BAR COOL COIL COOL WTR OUT HV
Classification: COMP\VALVE\MOV\GATE
Location: Room – ACME PLANT\REACTOR BUILDING\2000
Status: UNDER CHANGE
Change Notices: RFR 010065C

Document

Number: M-23EG11
Title: REACTOR COOLANT PUMP PBB01A - COMPONENT
COOLING WATER SYS PIPING ISOLATION
Classification: DRAWING
Status: LATEST APPROVED (ISSUED)
Warnings: CHANGE PENDING

Condition Report

Number: CR-2010-00023
Initiator: TOM PERKINS
Incident Date: 01/30/2010
Description: EMHV8821A/B OPENING DP DESIGN BASIS
REQUIREMENTS
Requirement: REQ00091
Priority: L2
Responsibilities: LARRY ROBERTS
Process State: CA VERIFICATION
Related Corrective Actions: CA-2010-000086;
CA-2010-000087; CA-2010-000089
Related Knowledge Items: KI-2010-00123; KI-2010-00146
Affected Components: BBHV0013; BBHV0013O
Affected Documents: MPR-1861; M-23EG11



AssetWise for Nuclear

Applications and Online Services



AssetWise Users for Nuclear

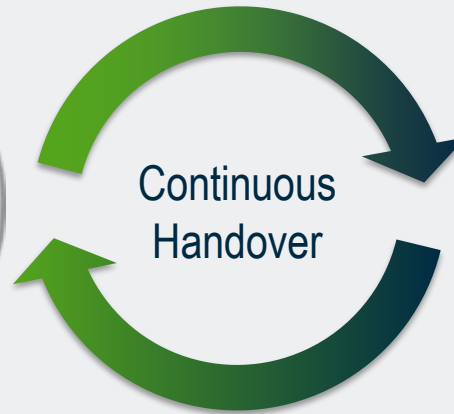


Bentley's Solutions Span Project/Infrastructure Asset Operations

**Project Performance
Management**
(Design & Build)



**Asset Performance
Management**
(Operate & Maintain)



Bringing new assets on stream
within cost, time, quality constraints

ProjectWise

Optimizing return on assets - ensure
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AssetWise



AssetWise

Vision and Update