Watson IOT - Demonstration of Maximo - BIM, Asset Health Insight leading to Predictive Maintenance

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Mitie Technology Day | June 2018

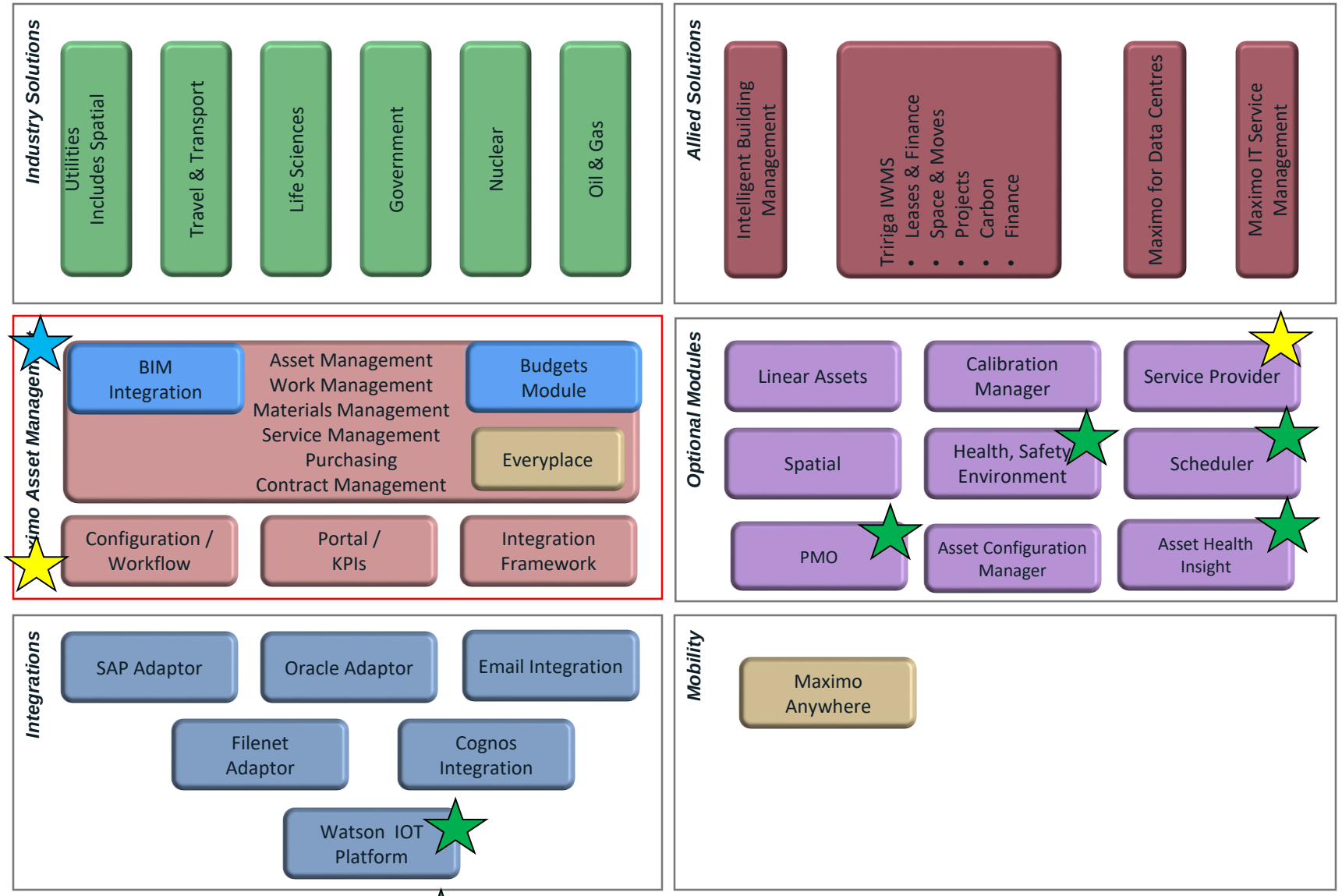
mitie

IBM

Agenda

- Maximo Modules aligned to Mitie
- Maximo and Building Information Modelling (BIM)
- Maximo Asset Health Insights leading to Predictive Maintenance

Maximo Software Modules & Add-Ons



Yellow Mitie Modules – Green potential modules

Maximo Enterprise Asset Management

Asset Management

Locations
- Repair Facilities

Asset
Asset Templates
Failure Codes
Condition Monitoring
Meters
Meter Groups

Work Management

Job Plans
- Revisions

Work Order Tracking
- Assignment Tab
- Hard/Soft Reservations
- Repair Facilities

Safety
Quick Reporting
Labor/Crafts
Tools
Preventive Maintenance
- PM Forecasting

Master PM
Assignment Manager

Materials Management

Item Master
Storerooms
Inventory
- Inventory Usage
- LIFO/FIFO Costing
- Consignment
- Transfer via Shipment
- Default Costing

Condition Codes
Stocked Tools
Service Items

Purchasing

Request for Quotation
Receiving
Receiving Inspections
Shipment Receiving
Purchase Requisitions
Invoices
- Invoice Reversals

Purchase Orders
- Revisions
- Receipt Tolerance

Desktop Requisitions

Contract Management

Purchase Contracts
Master Contracts
Warranty Contracts
Lease/Rental Contracts
Labor Rate Contracts
- Premium Pay Rates

Payment Schedules

Service Management

Service Groups
SLA Management
Change Management
- Incidents
- Problems
- Changes
- Releases
- Solutions

Enhanced Workflow – Event Driven, Context-based / Escalation Manager

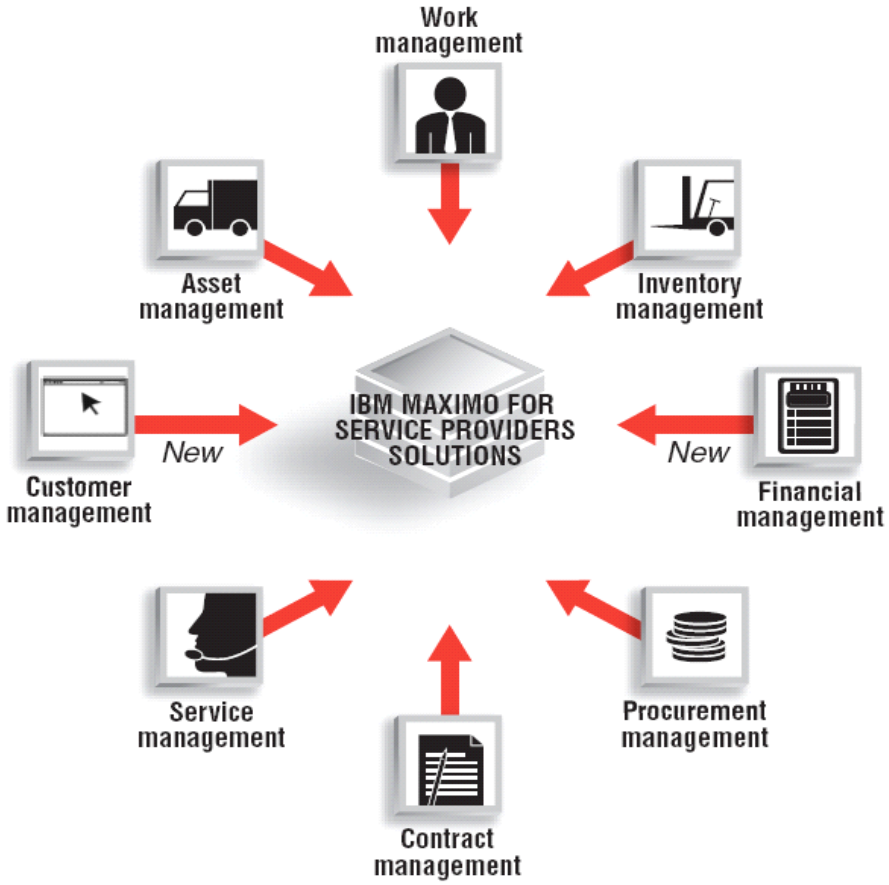
KPIs / Reporting/ Ad-hoc Reporting

Security/Administration/Configuration – Automation Scripts, Migration Manager

Integration/Web Services – Import & Export direct from applications

Service Provider Module

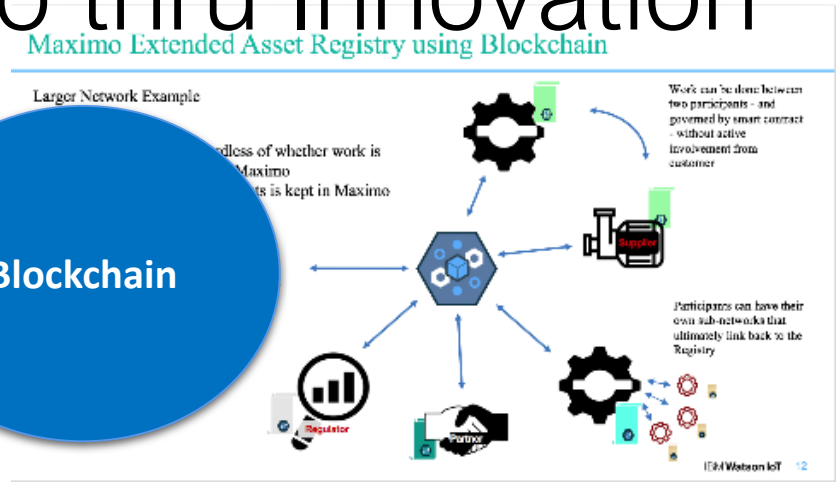
IBM Maximo for Service Providers, as an add-on to Maximo is the most comprehensive solution for billings and managing services. It provides extensive capabilities in Billing, Customer Agreement, and Service management for all asset classes.



Enhancements for Service Providers

- Customer Management
- Financial Management
- Service Management
  - Response Plans
  - SLA

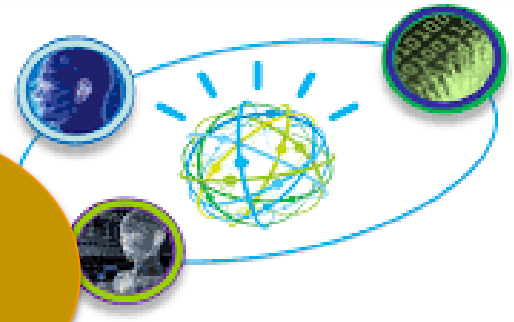
Extending Value to Maximo thru Innovation



Blockchain

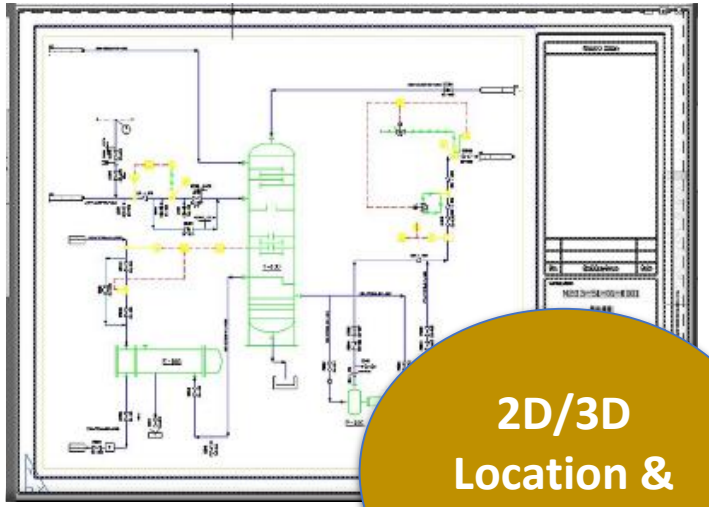
Drone Inspections

IBM WATSON



Cognitive Analytics

Augmented Reality



2D/3D Location & Assets

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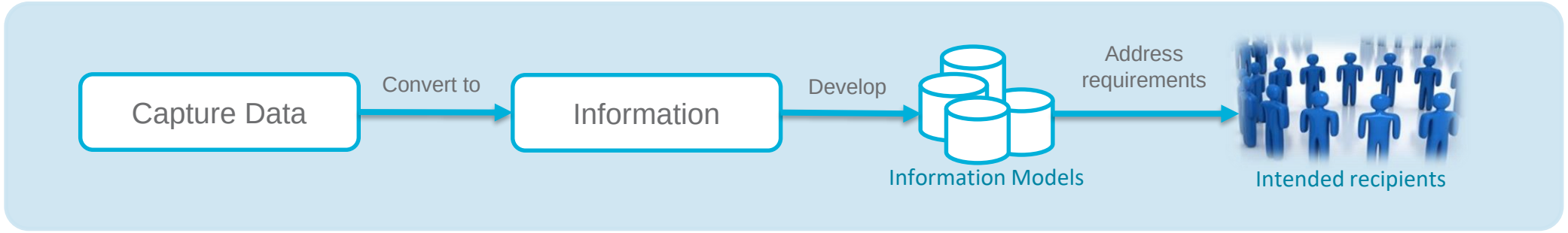
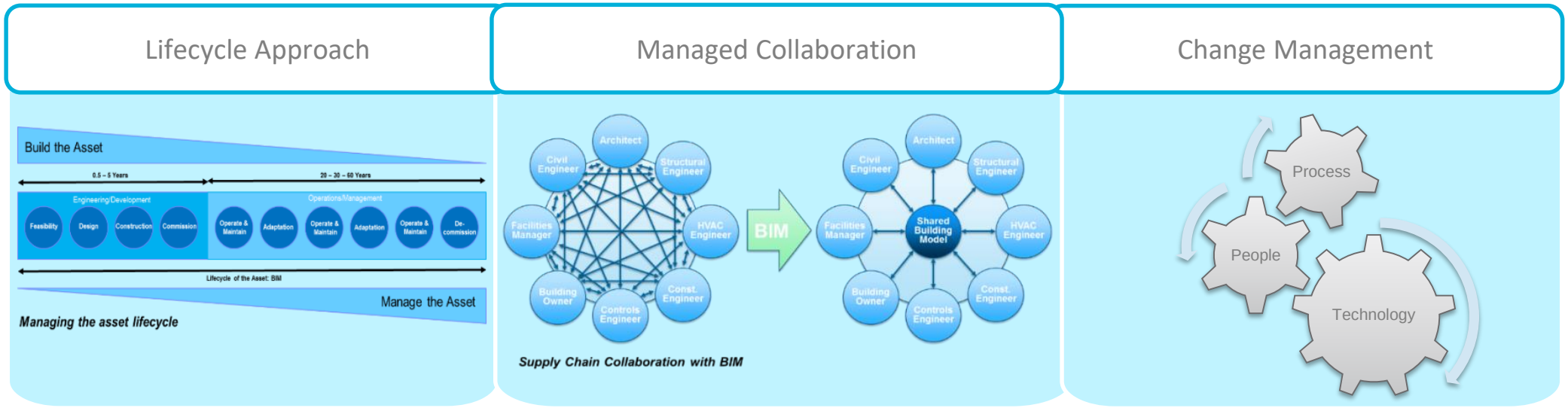
Building Information Modelling (BIM)

What is BIM

Building Information Modelling is a process involving the collaborative production & management of **digital representations of the physical and functional characteristics of a facility or asset.**





BIM is about managing data throughout the lifecycle, in a collaborative manner to accommodate changes throughout the lifecycle

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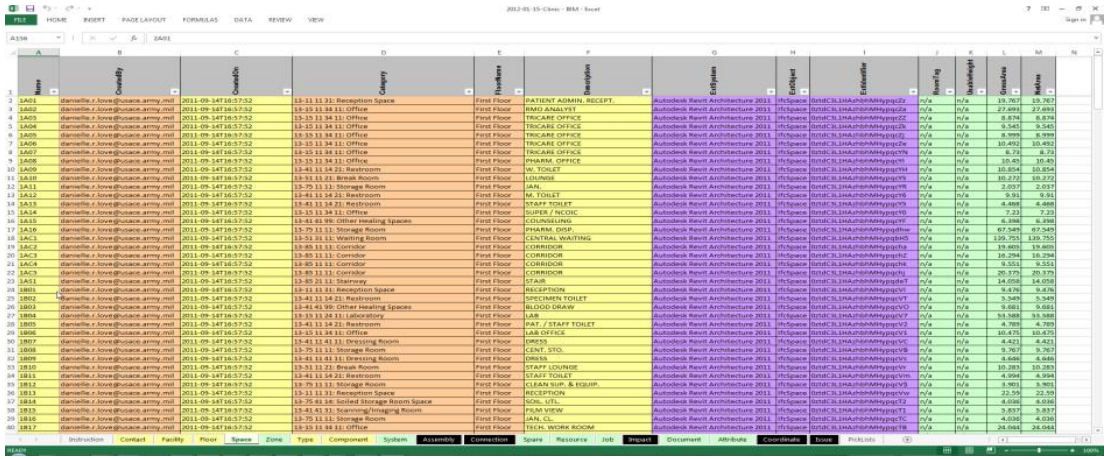
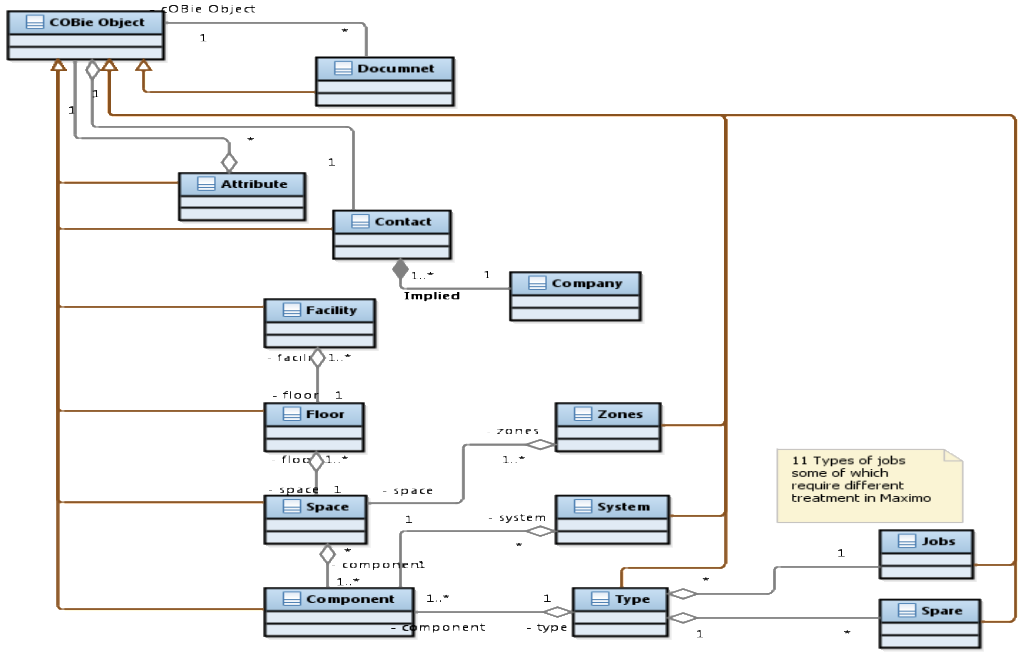
"BIM as a R-evolution", Christina Christodoulopoulou, May 15, 2015

BS1192-4:2014 - COBie

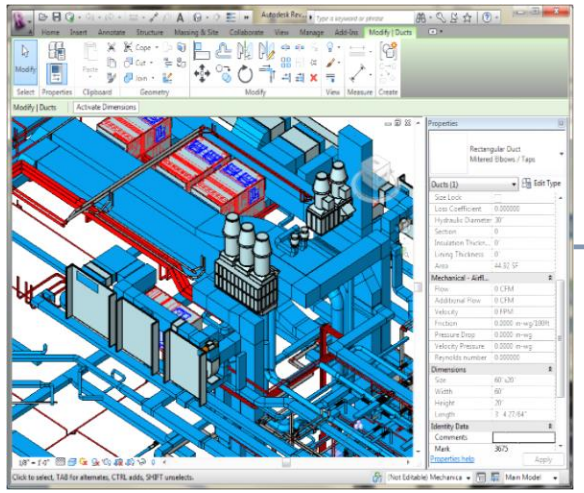
buildingSMARTalliance™
a council of the National Institute of Building Sciences

- Construction Operations Building information *e*xchange
- An Open Standard managed by BuildingSmart. Subset of ISO 16739 IFC
- A relational data model stored as a spreadsheet
- System agnostic. Use of COBie ensures information can be prepared & used without the need for knowledge of the sending & receiving applications or databases
- Ensures that information exchange can be reviewed & validated for compliance, continuity and completenessAim of integrating commercially valuable information
  with other parts of the employer's business
- COBie holds information about
  the spatial locations, equipment,
  systems & components that make up the Facility
- ***UK Government's chosen information exchange schema for federated BIM***

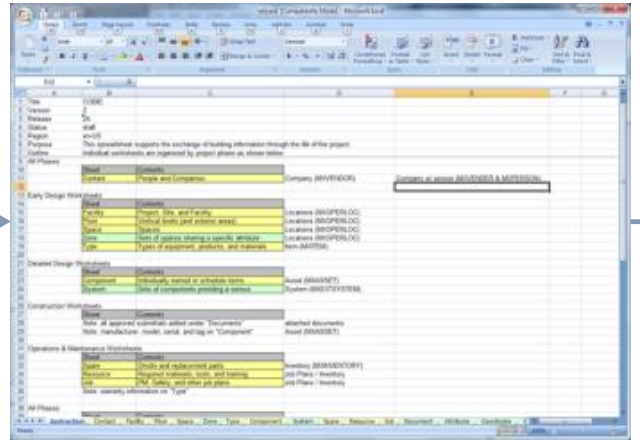




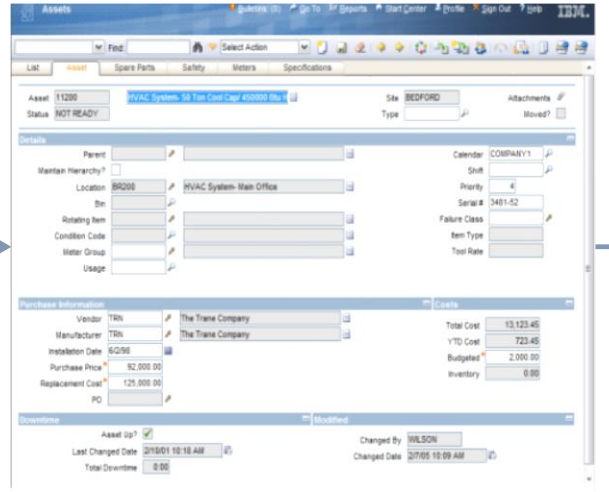
BIM import architecture

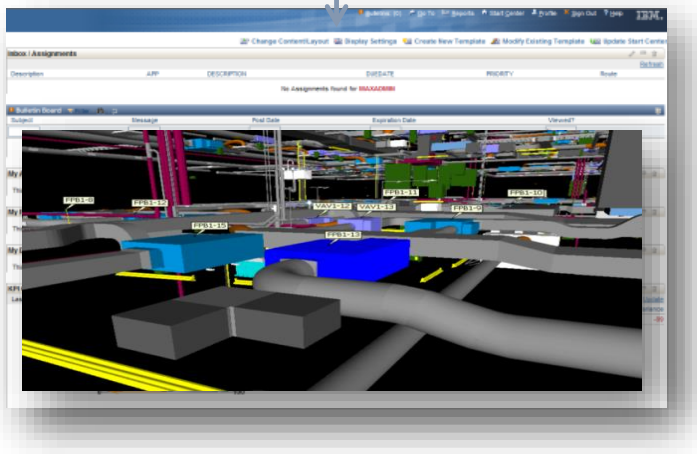


AutoDesk Revit



COBIE Exported from Revit





Two way, 3D navigation in Maximo
using NavisWorks Manage

Open Source COBIE Tools http://www.dcstrategies.net/resources/cobie-toolkit
http://www.aec3.com/en/6/6_04.htm
http://buildingsmartalliance.org/index.php/projects/commonbimfiles

Standards
IFC: http://www.iaitech.org/ifc/IFC2x4/beta3/html/index.htm
gbXML: http://www.gbxml.org/
COBIE: http://www.wbdg.org/resources/cobie.php
OMNIClass: http://www.omniclass.org/

COBIE = Construction Operations Building Information Exchange

Asset Health Insights – AHI

- Why Asset Health?
- What is Maximo Asset Health Insights?

Asset Lifecycle Decisions can be Improved…

- Many organizations have more Preventive Maintenance than they have staff to execute
- Unnecessary PMs inflate costs and potentially introduce failures through disruption
- PMs are performed on assets that should be refurbished or replaced
- Replacement of assets based on who screams loudest

40% of preventive maintenance costs are spend on assets with negligible affect on uptime [1]

30% of preventive maintenance activities are carried out too frequently [2]

45% of all maintenance efforts are ineffective [2]

Asset Health becomes a key driver

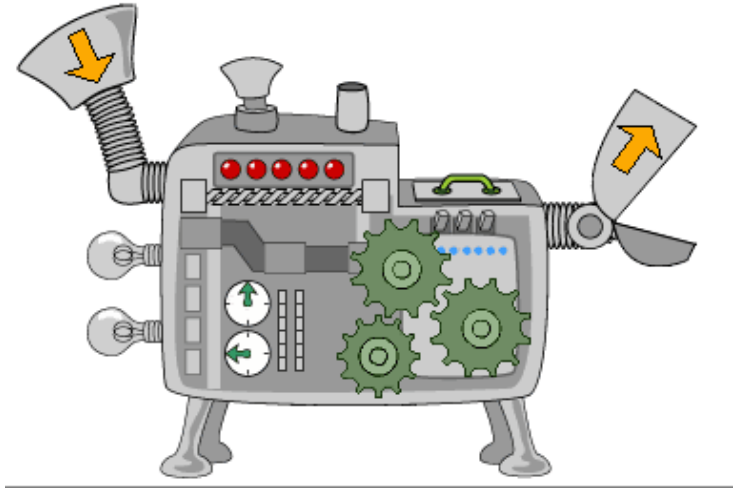
- To inform maintenance decisions
- To reduce risks associated with failure
- To develop refurbishment and replacement plans

1 Source: T.A. Cook, Maintenance Efficiency Report 2013, August 2013. http://uk.tacook.com/fileadmin/files/3_Studies/Studies/2013/T.A._Cook_Maintenance_Efficiency_Report_2013_En.pdf?tracked=1

2 Source: Oniqua Enterprise Analytics, Reducing the Cost of Preventative Maintenance, http://www.plant-maintenance.com/articles/PMCostReduction.pdf

Vision

We are doctors
responsible for the health of our assets



Our assets are patients
who are now telling us when they are in pain

Maximo Asset Health Insights brings Maximo, IoT, and environmental data together in order to provide a holistic asset health picture and allow you to take the next best logical action based on that health picture.

Why Consider Leveraging Asset Health?

1 Reduce the cost and impact of asset failures

- Identify problems prior to failure
- Perform maintenance while the asset is working to reduce disruptions to operations
- Reduces overtime and expedited parts costs for emergency repair
- Initiate root cause analysis to eliminate future risk

2 Reduce maintenance workload and costs with PM optimization

- Defer unneeded maintenance
- Identify ineffective maintenance strategies and job plans
- Institute preventive maintenance to eliminate corrective maintenance

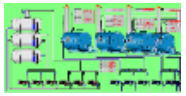
3 Optimize Capital Investment

- Data driven analysis linking repair, refurbish, and replace
- Includes condition based assessment of remaining useful life
- Enables planning for cost, parts, budgets for asset replacement

Maximo Asset Health Insights can integrate with the IBM Watson IoT Platform

1 Real Time data from low cost add-on sensors

2 Real time filtered data from automation systems



Accelix™ No Barriers.

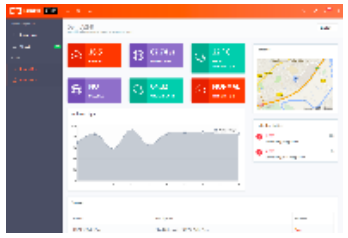
3 Historical sensor and weather data

IBM Watson IoT

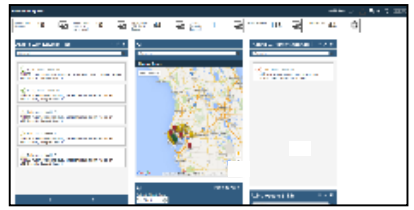
- **Contextualizes** device data
- **Monitors** streaming data to detect situations
- **Filters** the data for analysis by Maximo Users
- **Analyzes** the data to predict next failure date
- **Stores** data for further analysis

IBM Watson IoT Platform

4 PM on Cloud Analytics

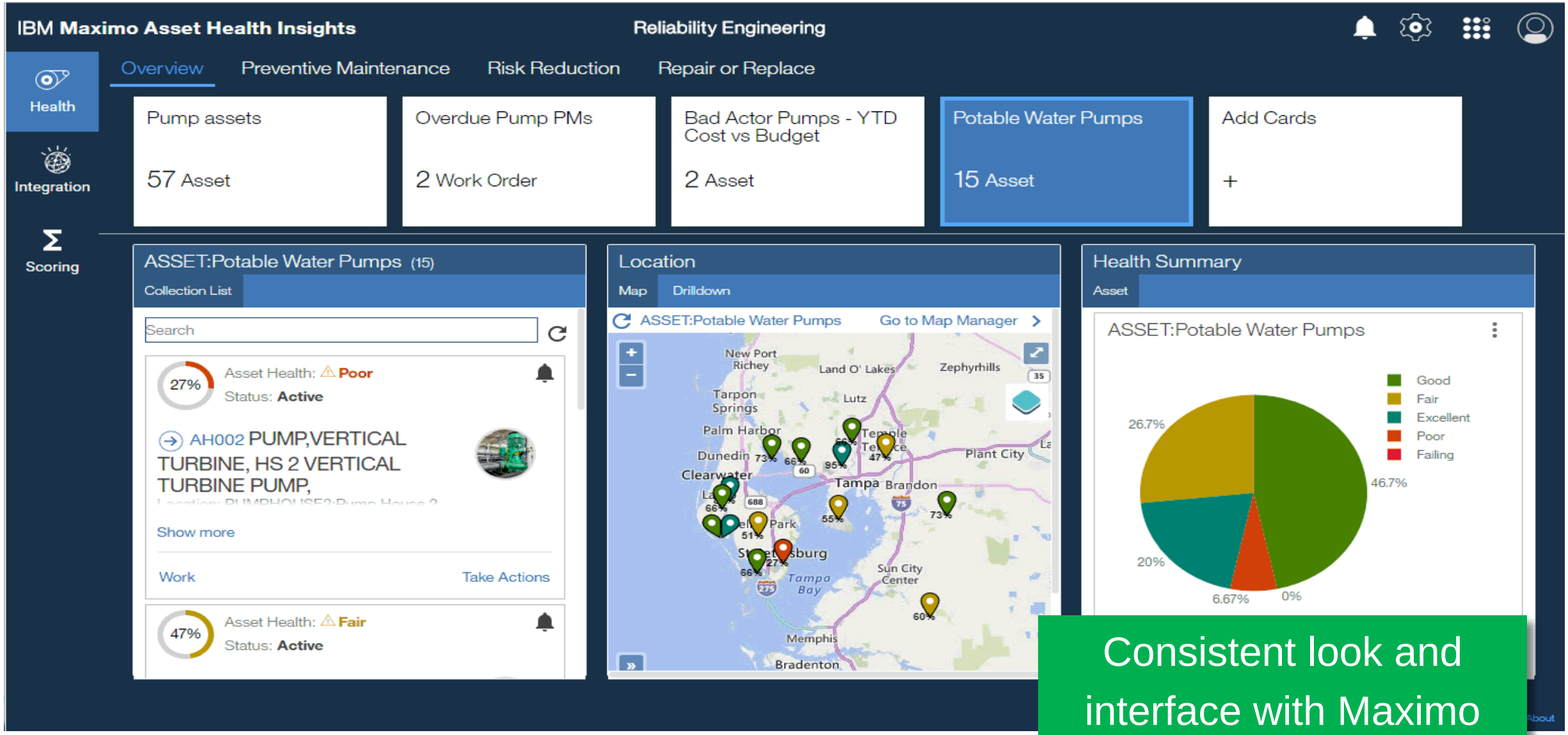


IBM Maximo Asset Health Insights



- Enables Immediate action and/or
- Provides engineers with rich set of sensor and asset data to determine proper course of action

- **Visibility into asset condition**, from asset lifecycle perspective
- **Consolidates Asset data**, historical and real-time, including data from external data systems, weather data, etc.
- Work center view enables **proactive asset maintenance** and **capital replacement** decisions


IBM Maximo Asset Health Insights
Reliability Engineering
Health
Integration
Scoring
Overview
Preventive Maintenance
Risk Reduction
Repair or Replace
Pump assets
57 Asset
Overdue Pump PMs
2 Work Order
Bad Actor Pumps - YTD Cost vs Budget
2 Asset
Potable Water Pumps
15 Asset
Add Cards
+
ASSET:Potable Water Pumps (15)
Collection List
Search
27%
Asset Health: Poor
Status: Active
AH002 PUMP,VERTICAL TURBINE, HS 2 VERTICAL TURBINE PUMP,
Show more
Work
Take Actions
47%
Asset Health: Fair
Status: Active
Location
Map
Drilldown
ASSET:Potable Water Pumps
Go to Map Manager
New Port Richey
Land O' Lakes
Zephyrhills
Tarpon Springs
Lutz
Palm Harbor
Dunedin
Clearwater
Tampa
Brandon
Plant City
Park
Tampa Bay
Sun City Center
Memphis
Bradenton
Health Summary
Asset
ASSET:Potable Water Pumps
Good
Fair
Excellent
Poor
Failing
26.7%
46.7%
20%
6.67%
0%
Consistent look and interface with Maximo 7.6 Work Centers

Drill into Specific Contextual Data for Assets

Asset Detail for AH002

Asset Health | Weather | Meter Reading

63%

Asset Health: **FAIR**
Method: **SGR**
Industry Score: **2.48**
Scoring Status: **Success**
Update Date: **4/19/17 8:22 PM**

Refresh Score | Scoring System

PUMP,VERTICAL TURBINE, HS 2 VERTICAL TURBINE PUMP,
Status: **Active**
Location: PUMPHOUSE2:Pump House 2

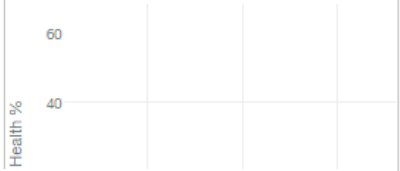
SAINT PETERSBURG FL 33510
Pinellas County

Drivers for SGR (3)

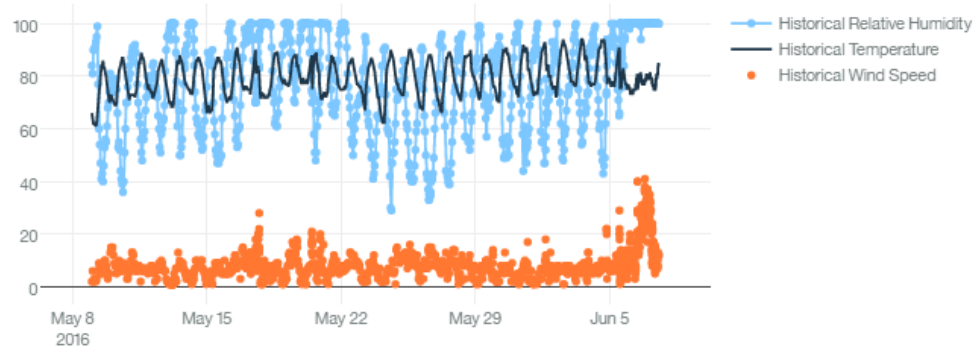
91% LIFE	100% CONDITION	The score will be displayed after the next data synchronization. Cost
Weight 33%	Weight 33%	Weight 33%
Use Factors? N	Use Factors? Y >	Use Factors? N

Time Period
Month (Default)

Health and Driver History



Historical Weather

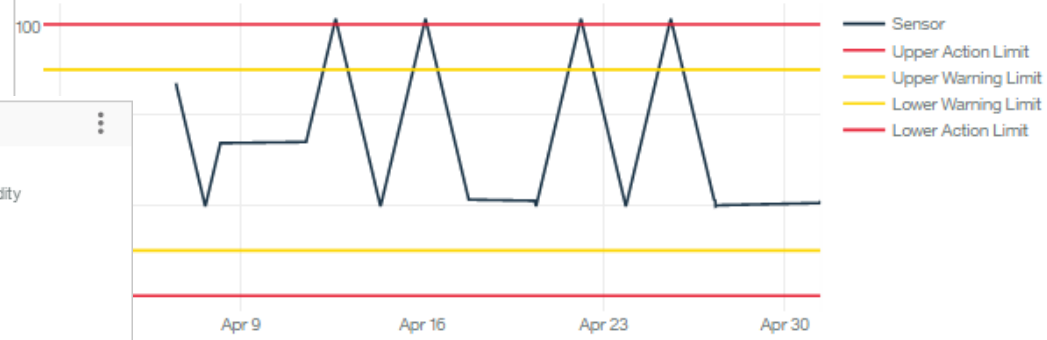


Asset Health | Weather | Meter Reading

Month (Default)

Run Hours (Continuous meter)

Temperature in Fahrenheit (Gauge meter)



Q&A