IBM Maximo – Asset Configuration Manager

Ken Donnelly, Strategy & Market Management
Rob Powell, Lead Product Architect

9 June 2008
Agenda

- Ken Donnelly, Strategy & Market Management
  - Transportation Solution Map
  - Customers
  - Product Roadmap

- Rob Powell, Lead Product Architect
  - Operational Challenges
  - Maximo Asset Configuration Manager 6.2.2 Features
  - Case Study

- Questions
## Transportation Solution Map

<table>
<thead>
<tr>
<th>Asset Type</th>
<th>Assets</th>
<th>IBM Maximo Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aviation, A&amp;D</td>
<td>Passenger, cargo, business, military, helicopters, small aircraft, weapon systems</td>
<td><strong>Maximo Asset Configuration Manager</strong>, Maximo for Transportation</td>
</tr>
<tr>
<td>Vessels</td>
<td>Cruise ships, container ships, ferries</td>
<td>Maximo for Transportation, <strong>Maximo Asset Configuration Manager</strong></td>
</tr>
<tr>
<td>Rail Rolling Stock</td>
<td>Locomotives, passenger cars, freight cars</td>
<td>Maximo for Transportation, <strong>Maximo Asset Configuration Manager</strong></td>
</tr>
<tr>
<td>Fleet</td>
<td>Tractors, trailers, cars, trucks, support equipment</td>
<td>Maximo for Transportation</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Roads, signs, track, signals, structures</td>
<td><strong>Maximo Linear Asset Manager (New!)</strong>, Maximo Spatial, Partner Solutions</td>
</tr>
<tr>
<td>Stations &amp; Facilities</td>
<td>Buildings, depots, stations, airports, seaports</td>
<td>Maximo Asset Management</td>
</tr>
<tr>
<td>Technology</td>
<td>Servers, work stations, laptops, mobile devices, telephony, control systems</td>
<td>Tivoli Asset Management for IT</td>
</tr>
</tbody>
</table>
Maximo Asset Configuration Manager for Aviation and A&D

<table>
<thead>
<tr>
<th>MRO Activity</th>
<th>Planning</th>
<th>Engineering &amp; Maintenance</th>
<th>Inventory &amp; Procurement</th>
<th>Service Management</th>
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<tbody>
<tr>
<td>Maintenance Engineering</td>
<td></td>
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<tr>
<td>Maintenance &amp; Service Planning</td>
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<tr>
<td>Maintenance Operations</td>
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<tr>
<td>Part &amp; Tool Management</td>
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<tr>
<td>Facilities Maintenance</td>
<td></td>
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</tbody>
</table>

IBM Maximo Asset Configuration Management *

IBM Maximo Asset Management

* - Offered as an Add-On solution to Maximo Asset Management or Maximo for Transportation
Experience – IBM Maximo

- Leader in Enterprise Asset Management
  - Globally #1 – 14.7% Market Share *
  - Consistent leader in Transportation, Facilities Management and Aerospace & Defense

- 40 Aviation Customers
- A&D Customers that include:
  - 11 of the 12 major A&D companies

- 125 Rail Customers
- 80 Marine Customers
- Civilian and Military Agencies

* - based on ARC Advisory Group 2007 EAM Report
IBM Maximo Asset Configuration Manager Roadmap

Maximo Configuration Manager 6.2.1
- Models
- Assets (CM)
- Technical Records
- Work Order Tracking (CM)
- Logs (CM)
- Configuration Managed Items
- Master PM / PM (CM)
- New Asset Assemblies

Maximo Asset Configuration Manager 7.1.0
Direct migration from 6.2.1 to 7.1.0 (no enhancements)

Maximo Asset Configuration Manager 7.1.1
Functional Enhancements

2007

2008

2009

All future roadmap information is subject to change.
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Operational Challenges

- Meeting regulatory compliance
- Streamlining the maintenance program
- Managing the impact of Service Bulletins & Airworthiness Directives
- Supporting Regulatory Audits & Investigations
- Optimizing spare parts inventories
- Managing the “rotable” spares process
- Controlling contract maintenance costs
- Integrating with SOA and Legacy Systems
- Eliminating Data Islands
- Achieving Timely, Painless Information
Maximo ACM is designed specifically to address the needs of organizations operating complex assets within highly regulated, safety critical and dynamic environments.

What is configuration management?
- A process for establishing and maintaining consistency of a asset’s performance, functionality, and physical attributes with its requirements, design and operational information throughout its life.
- Which parts and maintenance processes are valid in which position on an asset structure or sub-assembly based on the approved configuration

ACM additions to standard Maximo:
- 5 new applications
- 5 “ACM“ versions of MXES applications
- 50 new ‘PLUSA’ tables
Configuration Management Process (Generic)

Asset Life Cycle

Configuration Management Process

AS Designed
Design Releases

AS Built
Design Authority

AS Maintained

Maximo ACM
OEM

Build Standards

Safety Technology Cost

Modifications, Service Bulletins, Engineering Orders

PLM / PDM

Change Control

Change Request

Change Review

Impact Cost Effectivity

Approval

Plan

Embody

Update

Time
# IBM Maximo Asset Configuration Manager

## Reference Data
- Models
- Positions
- Items
- Maintenance Programme
- Configuration Rules
- Meters

## Validation – Build Data Interpreter

## Operational Data
- Aircraft, Engines, Loco’s etc
- Serialised Components
- Install / Remove
- Scheduled Maintenance
- Tech Records SB / AD / EO
- Life Usage
Assets (CM)

- Manage configuration managed assets using specific capability designed for complex assets
  - Asset status board – high level view of asset status
  - Asset View Tree – a colour coded asset hierarchy that gives clear visibility of asset’s configuration status
  - Multiple information tabs that provide both current information relating to the asset and a complete history
  - The ability to ‘go back in time’ to any date since the receipt of the asset to view the configuration of the asset, including installed assets, life usage (meters), maintenance status etc.
  - Run Build Data Interpreter (BDI) – process that compares and validates the Asset against the Model / Variation:
    - Applies CM ‘rules’ – automatically generates PM Work Orders based on ‘Alert’
    - Displays ‘problems’ associated with assets
    - Converts from one configuration to another
## Assets (CM) – Asset ‘Status Board’

<table>
<thead>
<tr>
<th>Asset</th>
<th>Description</th>
<th>Location</th>
<th>Registration</th>
<th>CM Item</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>29011</td>
<td>MODEL 230</td>
<td>FLORIDA</td>
<td>N310AC</td>
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<td>29011</td>
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<td>412</td>
<td>12530</td>
</tr>
<tr>
<td>11939</td>
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<td>FLORIDA</td>
<td>N205AC</td>
<td>412</td>
<td>11939</td>
</tr>
<tr>
<td>12325</td>
<td>MODEL S-75 [ARRIEL AS1 ENGINES]</td>
<td>FLORIDA</td>
<td>N480AC</td>
<td>S-76</td>
<td>12325</td>
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<tr>
<td>12532</td>
<td>MODEL 212</td>
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<td>N100AC</td>
<td>212</td>
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<tr>
<td>25766</td>
<td>MODEL 737</td>
<td>FLORIDA</td>
<td>N8010X</td>
<td>737</td>
<td>25766</td>
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<tr>
<td>25169</td>
<td>MODEL 737</td>
<td>FLORIDA</td>
<td>N8000X</td>
<td>737</td>
<td>25169</td>
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<tr>
<td>28045</td>
<td>MODEL A380 [200]</td>
<td>FLORIDA</td>
<td>N750EC</td>
<td>A380 [200]</td>
<td>28045</td>
</tr>
<tr>
<td>12485</td>
<td>MODEL 206L-1 [SEARCH AND RESCUE]</td>
<td>FLORIDA</td>
<td>N650AC</td>
<td>206L-1 [SEARCH AND RESCUE]</td>
<td>12485</td>
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<tr>
<td>28630</td>
<td>MODEL CRJ</td>
<td>FLORIDA</td>
<td>N626CJ</td>
<td>CRJ</td>
<td>28630</td>
</tr>
<tr>
<td>24680</td>
<td>MODEL CRJ</td>
<td>FLORIDA</td>
<td>N625CJ</td>
<td>CRJ</td>
<td>24680</td>
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<td>FLORIDA</td>
<td>N622BR</td>
<td>CRJ</td>
<td>24682</td>
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<tr>
<td>24676</td>
<td>MODEL CRJ</td>
<td>FLORIDA</td>
<td>N621BR</td>
<td>CRJ</td>
<td>24676</td>
</tr>
</tbody>
</table>
### Assets (CM) – Asset View

#### Invalid assets ‘roll-up’ through hierarchy

Tabs provide complete history of information relating to the asset that is highlighted in the hierarchy.
Detailed information relating to the invalid condition is displayed.
Models (CM)

- Define complex asset configurations
  - Multiple Variations in a single Model

- Define configuration rules
  - ‘Select and click’ process for setting rules
  - Variation independent rules
  - Multiple Item number effectivity by Variation
  - Cross and Higher Part effectivity by Variation

- Associate Master Preventative Maintenance Schedules
  - By variation
  - By multiple meters
  - Create maintenance schedule relationships using ‘PM Actions’
Models (CM)

- Build Items, ‘functional positions’ where Items (parts) may be fitted.
- Labels – typically based on industry coding structures to identify systems.
- CM Items (configuration managed parts) that may be fitted in to Build Items.

As Build Items are selected the Labels and CM items change to display the related records.
Models (CM)

The Model hierarchy is created via a user friendly interface.

Configuration ‘rules’ are defined

The Model and all of the defined rules are used to create new assets via the New Asset Assemblies application
## Case Study – Northwest Airlines

### The Company
- Used for Compass Airlines division
- Northwest Terminal at Detroit Metro

### The Challenge
- Startup new regional carrier, Compass Airlines
- Implement proven systems to smooth launch
- Streamline maintenance processes & reduce delays

### The Solution
- Maximo for Transportation and Maximo Configuration Manager for Aviation MRO
- Maximo Asset Management for DTW airport facilities

### The Benefits
- Expect increased asset efficiency and productivity
- Automated compliance regulation processes
- Met FAA requirements and now operate 30 aircraft
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- Questions
For More Information

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Additional Slides
The CM system needs to maintain its own cross-referenced catalog of “item” records ( “Part Numbers”), for several reasons:

- The CM system must be able to create and manage system-generated “items” that represent “models” and “variations of models”.
- The CM system must allow the creation of “temporary” or “locally tracked” items.
- Maximo’s Item Master catalog has some functional restrictions, including the inability to change an Item's part number retrospectively.
### CM Item Master

#### Details

<table>
<thead>
<tr>
<th>CM Item</th>
<th>200SQL1150-2</th>
</tr>
</thead>
</table>

- **Item Set**: SET1
- **Part**: 200SQL1150-2
- **Revision**: (empty)
- **Vendor**: (empty)
- **Serial Format**: AA-999
- **Item**: 200SQL1150-2
- **Serial Range Expression**: AV-100, AV-499, VY-555, VY-735

#### Serial Ranges for CM Item

1. **Serial Range UOC**: AV-100, AV-499
2. **Serial Range UOC**: VY-555, VY-735

#### Master PMs for CM Item

<table>
<thead>
<tr>
<th>Master PM</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>316454</td>
<td>1000 FH STARTER GENERATOR OH</td>
</tr>
<tr>
<td>316456</td>
<td>500 FH STARTER GENERATOR IN</td>
</tr>
<tr>
<td>316452</td>
<td>250H ST GEN</td>
</tr>
</tbody>
</table>
Based on standard Maximo Master PM with ACM enhancements: -

- Multiple CM Item applicability
- Multiple ‘Master PM Actions’, e.g.
  - Activate
  - Deactivate
  - Complete (Claim)
- Life span – ‘Start’ and ‘Stop’ dates
- Due Date Expression
- Alert and Warning – by meter and calendar
**Master PM (CM)**

### Master PM (CM)

### Item Information

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>316454</td>
<td>1000 PM STARTER GENERATOR CM</td>
</tr>
</tbody>
</table>

### CM Items

<table>
<thead>
<tr>
<th>CM Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>200SGL1243</td>
<td>STARTER GENERATOR</td>
</tr>
<tr>
<td>205-062-200-129</td>
<td>STARTER GENERATOR</td>
</tr>
<tr>
<td>230S6-043</td>
<td>STARTER GENERATOR</td>
</tr>
<tr>
<td>230S2-048</td>
<td>STARTER GENERATOR</td>
</tr>
<tr>
<td>200SGL1110</td>
<td>STARTER GENERATOR</td>
</tr>
<tr>
<td>205-062-200-129</td>
<td>STARTER GENERATOR</td>
</tr>
<tr>
<td>407-758-065-125</td>
<td>STARTER GENERATOR</td>
</tr>
<tr>
<td>407-758-065-121</td>
<td>STARTER GENERATOR</td>
</tr>
<tr>
<td>ITEM-TEST-0041</td>
<td>STARTER GENERATOR</td>
</tr>
<tr>
<td>ITEM-TEST-0051</td>
<td>STARTER GENERATOR</td>
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</table>

### Work Order Information

<table>
<thead>
<tr>
<th>Work Type</th>
<th>Work Order Status</th>
<th>Lead Time (Days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM</td>
<td>ASOC</td>
<td></td>
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</tbody>
</table>

### Master PM Actions

<table>
<thead>
<tr>
<th>Action Type</th>
<th>Secondary Master PM</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPLETE</td>
<td>316454</td>
<td>500 FH STARTER GENERATOR CM</td>
</tr>
</tbody>
</table>

(Creates) when Primary PM is Completed
Based on standard Maximo Master PM with ACM enhancements: -

- Created automatically by the ACM Build Data Interpreter (BDI – covered later), based on configuration rules (Model and Variation).
- Created from Master PM (CM) – specific to an Asset.
- Multiple ‘Master PM Actions’
  
  **Activate**
  **Deactivate**
  **Complete (Claim)**
- Life span – ‘Start’ and ‘Stop’ dates
- Alert and Warning – by meter and calendar
## PM (CM)

### Preventive Maintenance (CM)

<table>
<thead>
<tr>
<th>PM</th>
<th>Frequency</th>
<th>Seasonal Dates</th>
<th>Job Plan Sequence</th>
<th>Site</th>
<th>Status</th>
<th>Attachments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AVIATION</td>
<td>ACTIVE</td>
<td></td>
</tr>
</tbody>
</table>

### Asset Information
- **Asset ID:** 12465
- **Description:** MODEL 2061-1 [SEARCH AND RESCUE]

### Work Order Information
- **Job Plan:**
- **Work Type:**
- **Work Order Status:** YODCH
- **Priority:** 0
- **Earliest Next Due Date:**

### Resource Information
- **GL Account:**
- **Storeroom:** AVIATION
- **Storeroom Site:**

### Work Order Generation Information
- **Use Last WO's Start Information to Calculate Next Due Frequency:**
- **Generate WO Based on Meter Reading (Do Not Estimate):**
- **Generate WO When Meter Frequency is Reached:**

### Life Span
- **Start Date:**
- **Stop Date:**

### Alert and Warning Interval State
- **Warning Interval:**
- **Units to Go:**

### Time-Based Frequency
- **Motor Based Frequency**
  - **Frequency:**
  - **Alert Interval:**
  - **Warning Interval:**
  - **Units to Go:**

### Last Work Order Information
- **Motor Reading:**
- **Motor Reading Date:**
- **Next Motor Reading:**
- **Units to Go:**
- **Estimated Next Due Date:**

### Next Work Order Projections
- **Next Motor Reading:**
- **Units to Go:**
- **Estimated Next Due Date:**
New Asset Assemblies

- Create new assets based on Maximo ACM Model / Variation
- Automatically creates the asset hierarchy
- Ability to auto-generate Asset numbers / Serial Numbers
- Ability to apply life usage meters (and modify for existing life)
- Once created the Build Data Interpreter (BDI) automatically applies the maintenance schedule based on the Model / Variation created.
# New Asset Assemblies

## New Asset Assemblies (CM)

<table>
<thead>
<tr>
<th>New Asset</th>
<th>Site</th>
<th>Status</th>
<th>Asset Created?</th>
</tr>
</thead>
<tbody>
<tr>
<td>99996</td>
<td>AVIATION</td>
<td>DRAFT</td>
<td></td>
</tr>
</tbody>
</table>

### Details

- **Existing Asset**: 
- **CM Item**: 206L-1
- **Model**: BELL 206L-1 HELICOPTER
- **Location**: 
- **Asset Status**: OPERATING
- **Receipt Date**: 5/6/08 1:51 AM
- **Variation**: WATER TRANS
- **Serial**: 
- **Registration**: N-87S6

### Sub Assembly Prefixes

<table>
<thead>
<tr>
<th>Asset Prefix</th>
<th>Serial Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>X.</td>
<td>Y.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Asset Suffix</th>
<th>Serial Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>7000</td>
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</tbody>
</table>

### Initial Readings

<table>
<thead>
<tr>
<th>Meter</th>
<th>Description</th>
<th>Initial Reading Date</th>
<th>Initial Count</th>
<th>Copy to End Item?</th>
<th>Force Copy to Sub Assemblies?</th>
</tr>
</thead>
<tbody>
<tr>
<td>JDCT</td>
<td>Derived Cycles</td>
<td>5/6/08 1:51 AM</td>
<td>0.00</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>FH</td>
<td>[FH] Flight Hours</td>
<td>5/6/08 1:51 AM</td>
<td>0.03</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

[Download]
New Asset Assemblies

<table>
<thead>
<tr>
<th>Label</th>
<th>Position</th>
<th>Build Item</th>
<th>Parent</th>
<th>Asset</th>
<th>CM Item</th>
<th>Serial</th>
</tr>
</thead>
<tbody>
<tr>
<td>2215</td>
<td>#1</td>
<td>AUTOPILOT SERVO</td>
<td>RP9999</td>
<td>X-5000</td>
<td>622-5184-301</td>
<td></td>
</tr>
<tr>
<td>2215</td>
<td>#2</td>
<td>AUTOPILOT SERVO</td>
<td>RP9999</td>
<td>X-5001</td>
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<td>2442</td>
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<td>BATTERY</td>
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Logs (CM)

- Asset Log (aka ‘flight log’, ‘drivers log’) – records information relating to individual trips (sector, sortie etc).
- Record meters
- Record ‘problems’ discovered in service
  - Generate Incident Ticket
  - Generate Work Orders
Technical Records

- Manage all types of ‘design change’, e.g. Service Bulletins, Modifications, Engineering Orders etc
- Automatically identify effectivity of change across the asset base by Model, Variation, Item, Position
- Define part number replacement rules
- Define maintenance plan to embody change:
  - With existing Master PM
  - At a meter count
  - Between meter counts
  - One-off or recurring inspection
- Manage embodiment campaign – review asset status and compliance
Technical Records

<table>
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<tr>
<th>Publication</th>
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<th>CM Item 1</th>
<th>Serial Range Expression</th>
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<th>Superseding CM Item</th>
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Item Details:
- CM Item: 200SG132Q
- Inoperative Date: 
- Valid Until Removed: Yes
- Superseding CM Item: 50SG122Q
- Operative Date: 
- Upgrade: No

Duplicate Row
New Row
Work Order Tracking (CM)

- Based on standard Maximo Work Order Tracking with enhancements:
  - Associated with Model, Variation and Registration
  - Asset Install / Remove process (specific for CM Assets)
  - Work Order Deferral process – separate approval process
  - Work Order ‘Packaging’ process
Work Order Tracking (CM)
Work Order Tracking (CM)
# Work Order Tracking (CM)

To install or remove an asset, select the appropriate tree node below and click OK.

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### Installation Details

- **Remove Asset:** No
- **Remove to Location:** FLORIDA
- **Follow on Work Type:** None

### Work Order Details

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