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Enterprise Asset Management Overview

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Introduction

The US Office of Insular Affairs's (OIA) Insular ABCs Initiative is a multi-phase effort focused on improving the physical condition of the US Insular Area Public Schools (in Guam, Commonwealth of Northern Marianas, American Samoa and the US Virgin Islands). Based on Deferred Maintenance (DM) backlog reported in the August 2013 Phase II report (www.insularabcs.org), the US Army Corps of Engineers' planning team, in Phase III, is working closely with school districts and facility managers to prepare and execute a strategy to remove the DM backlog in an orderly and prioritized manner. This effort is being supported by the development and implementation of IBM's Maximo Enterprise Asset Management (EAM) system. The Enterprise Asset Management system will assist in achieving the overarching goals of the Phase III work effort including:

- Integrate facility managers and contractor subject matter expert's knowledge to develop an interdisciplinary project execution strategy and investment timeline
- Build a framework for local school facility planning processes and identify planning metrics and data points to be tracked for standardized CIP planning development and updates
- Develop general scopes of work and execution strategies for high priority civil/site projects
- Develop and operationalize an enterprise asset management system to help automate facility management, maintenance and repairs schedules, and CIP planning efforts
- Recruit team members to embed with local school districts to execute DM projects, implement the EAM system, and train local stakeholders in its use

Major objectives of the IT work effort include:

- Improve asset visibility - increase awareness of asset locations, conditions, and commitments
- Reduce planned and unplanned asset downtime
- Maximize asset productivity
- Improve service planning and scheduling
- Reduce risk of business disruption
- Exploit EAM records for reporting, cost justification, and compliance
- Improve capacity planning and forecasting

Enterprise Asset Management System

IBM Maximo is an enterprise asset management product that provides the capability to manage the maintenance, repair and operation (MRO) of any asset type throughout its life cycle and incorporate workflow processes within that management cycle. Maximo is an integrated productivity tool and database that helps manage all of an organization's asset types on a single software platform. With Maximo Asset Management, HHF is designing a maintenance strategy

to assist the Insular Areas in managing their asset operations and business processes. Maximo includes a number of applications grouped in modules to facilitate the maintenance strategy. These modules are:

- Asset management – Achieve the control you need to more efficiently track and manage asset and location data throughout the asset lifecycle
- Work management – Manage both planned and unplanned work activities, from initial request through completion and recording of actuals
- Service management – Define service offerings, establish service level agreements (SLAs), more proactively monitor service level delivery and implement escalation procedures
- Materials management – Know the details of asset-related inventory and its usage including what, when, where, how many and how valuable
- Contract management – Gain complete support for purchase, lease, rental, warranty, labor rate, software, master, blanket and user-defined contracts
- Procurement management – Support all the phases of enterprise-wide procurement such as direct purchasing and inventory replenishment

Figure 1 – Maximo Asset Management



The Enterprise Asset Management system encompasses the entire lifecycle management of physical assets of an organization in order to maximize the value and life of those assets. It is a discipline covering areas such as the design, construction, commissioning, operations, maintenance and decommissioning/replacement of a facilities, equipment, and other high-value assets. Asset intensive organizations such as the Department of Education, face harsh realities of dealing with high value facilities and equipment where maintenance budgets fail to provide adequate resources necessary to maintain the assets in acceptable condition. Implementing an EAM has shown to reduce labor costs by 10 to 20%, reduce inventory costs by 10 to 15%, and reduce time lost to equipment failure by up to 25%. More than simply maintaining facilities and equipment, EAM collects data and generates reports for enterprise-wide decision making and planning.

Specifically, the EAMS will be developed using IBM's Maximo Asset Management System that provides a comprehensive solution for managing physical assets on a common platform. Maximo has become an industry leader in the market of asset management; utilized in mining,

utility, manufacturing, transportation, and educational facilities, among others. The integrated and scalable architecture will allow multiple levels of granularity from the highest level (entire insular school inventory) to the lowest level (school custodian – individual work order). The EAMS will help to reduce costs and maximize resources in order to operate within the limited budget available for facility operations. Executive management will also gain the ability to create and analyze key performance indicators (KPI) providing timely information and analysis to address facility needs.

Overall, the system will be designed to manage the entire inventory of assets and locations, including work orders necessary for maintaining and recapitalizing facilities. The system will take into account the current deferred maintenance items as well as future preventive maintenance needs. Creating preventive maintenance schedules will inform budgeting processes and provide data for medium-to-long range capital improvement planning budgets. The first step, basic functionality, includes work order management for the DMRP (e.g., programming and budgeting). In future rollouts, the system will be accessible by administrators (Super/Deputy) for needed KPI's and reporting, as well as facility managers for job plan creation, work scheduling, assignment and status updates. The work order management module is a powerful tool providing the ability to assign individuals the responsibility to act on work, streamline approval processes, track labor hours and costs, account for material and tool needs, and document the entire process from start to finish.

Built on a service-oriented architecture (SOA), Maximo Asset Management delivers a comprehensive view of all asset types, their conditions and locations, and the work processes that support them, to provide an optimal planning, control, audit, and compliance capability. The Maximo database provides critical information about asset resources, including key attributes, their configuration, and their physical and logical relationships to other resources.

Maximo Asset Management provides insight for all enterprise assets, their conditions and work processes, for better planning and control. From the start center, a user can establish key performance indicators (KPIs) to monitor asset conditions and trigger automated action based on changes. They can create, assign, monitor, notify, and report on key process components such as work orders, service desk tickets, and purchase orders, including status, from start to finish. They can also include attachments, such as maps, pictures, and URLs to each record or task to enhance communication and productivity further. With Maximo Asset Management the Insular Areas can manage which users can log in to the system and which sites, applications, and menu options each user can access. Maximo Asset Management is highly customizable and both the user interface and the help can be adapted to suit each Insular Area's business requirements. Administrators can change applications to meet specific business needs as required.

Completed Development

As a starting point from which to work, a single Maximo instance based on the NPS and BIA core configurations was established. The OIA data used to populate the system was drawn from

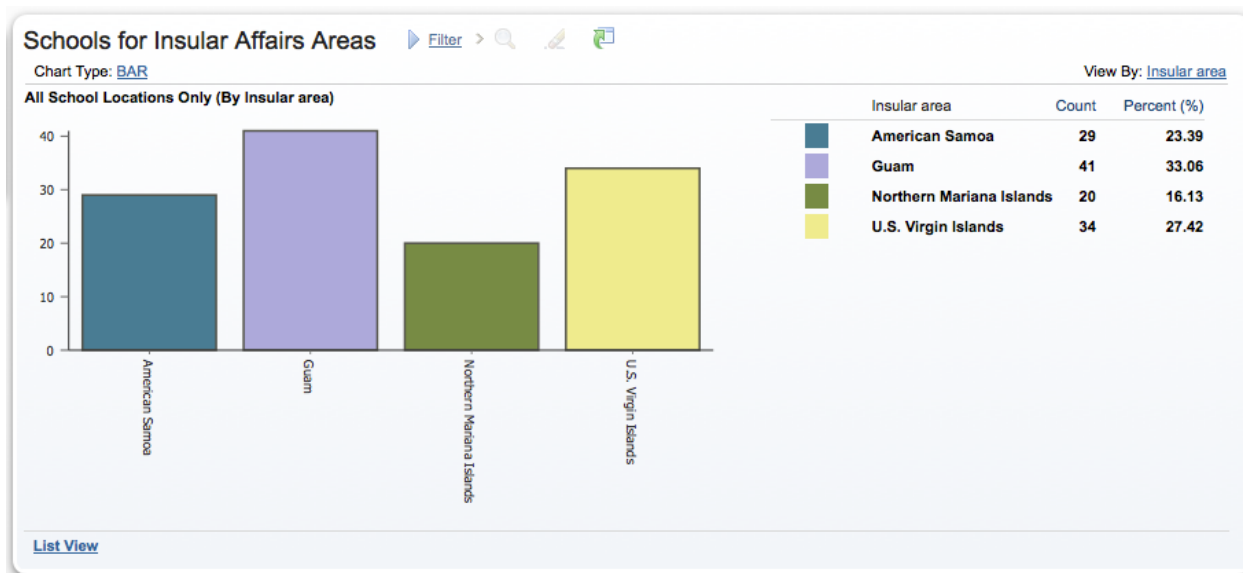


a “pilot” site, Marianas High School, as having the most complete and accurate data available. Evaluation of the baseline configuration for the “pilot” site focused on the core Maximo system modules related to tracking and management of assets and work – specifically, the Site, Location, and Asset hierarchies, and development of work management processes, and planning, executing, and tracking facilities related projects. With the completion of the evaluation and review of the Maximo baseline configuration populated with “pilot” site data, HHF will be able to use the Maximo system as the repository for additional data gathering efforts and continue to build out the system data while working with the individual territories to define asset management business practices and requirements to support rolling out the system to the four Insular Areas.

The services and deliverables described in this document are designed to complement and build upon the initial facility condition assessment and asset inventory project that was completed in Phase II. The assessment and inventory data collected and stored in the ABC FIMS SQL database was used as the starting point to populate the Maximo system. In addition to loading the baseline school and constructed asset data, core asset management standards and business practices were included from the NPS/BIA baseline configuration (where applicable) – for example: asset definitions, equipment specifications, maintenance and work management program standards, facility condition ratings, replacement costs, identification of a deferred maintenance backlog, and business processes related to development of CIP budgets. Where possible, the master data and core business processes were leveraged from the existing reference configurations of Maximo currently supporting NPS and BIA. However, in this phase, the Maximo system was implemented without inputs, business processes, and requirements from local, territorial stakeholders. Rather, the Maximo system was implemented based upon the reference Maximo configurations currently supporting the NPS and BIA within the Department of Interior.

Prior to any deployments of the system to support all schools, an initial pilot site was developed using data collected from Marianas High School in Saipan. The initial pilot site allowed HHF and related stakeholders to become familiar with Maximo, evaluate the core functionality, validate support (and identify gaps) related to the core asset management business practices, and receive high-level, introductory system training. The Maximo system delivered at the end of this phase has been populated with the available “pilot site” data and from the core, reference NPS/BIA master data (non transactional data). Additional data will be added to the system by end users and/or HHF as part of an “organic” expansion and use of the system over time.

Figure 2 - Number of Schools Managed in Maximo



Configuration

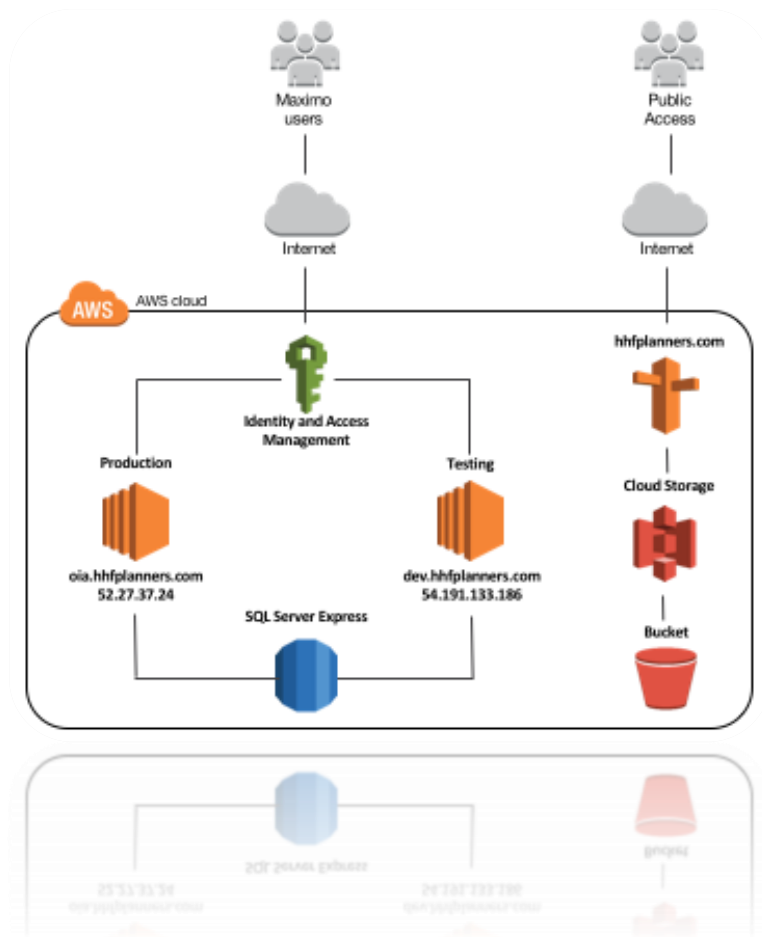
Maximo Asset Management uses multiple software servers. These software packages can be installed on a single physical server or in a multiple server configuration. System requirements depend on the operating system, database platform, and site configuration. Maximo Asset Management is a collection of applications that have different purposes but function in a similar way. Information that a user enters into an application is stored as data in the Maximo database. The relational structure of the database means that a user can view the same data in different ways, from different applications. Maximo Asset Management supports various database servers, including IBM DB2®, Oracle, and Microsoft SQL Server. Maximo Asset Management supports various J2EE servers, including WebSphere® Application Server and WebLogic Server.

We deployed IBM Maximo in the cloud in order to provide a centrally-hosted environment for the Insular Areas with system availability that exceeds 99% uptime. This provides us with the ability to serve facilities information quickly and efficiently from Guam and CNMI to American Samoa and the U.S. Virgin Islands. Utilizing the cloud-based delivery model, we have increased flexibility, the ability to upgrade easily, lower upfront system costs, and have the capacity to plan for predictable operating expenditures.

The current development configuration is supported by two Amazon EC2 on-demand server instances running Windows Server 2012 R2. The application server manages the Maximo Asset Management JavaServer Pages (JSPs), XML, and business logic components. In addition, the current configuration employs IBM WebSphere 8.5, a Java™ 2 Platform, Enterprise Edition (J2EE) application server. Additionally, one Amazon EC2 instance hosts two Microsoft SQL 2012 Express databases, serving the production and testing environments independently. The

development system will be used to prototype configurations and facilitate requirements gathering.

Figure 3 – Amazon Web Services Server Configuration



Task 1: Maximo System Installation and Configuration

The Maximo system was installed with the core, baseline configuration based on the NPS/BIA and loaded with the “pilot” site data. The data load of pilot site data was based upon standardized, available facility condition assessment and inventory data sources. This load included school sites, buildings, and work order related data. In addition, minor screen and database configurations were made to support the use of the NPS/BIA baseline configuration and the following “core” system modules and applications:

- Assets (Assets & Locations)
- Resources (Labor, People, Crafts, and Person Groups)
- Planning (Job Plans)
- Preventive Maintenance (PMs)
- Security (Security Groups, Users)

- Self Service (Service Requests)
- Service Desk (Service Requests)
- Work Orders (Work Order Tracking, Labor Reporting)

The following sequence of events depict the IBM Maximo Asset Management 7.6 implementation task successfully deployed in the client environment:

1. Configure the database
2. Configure the system
3. Add security roles
4. Data migration
 - a. Integration Framework
5. Configure/modify applications
6. Customize applications (as required)
7. Develop interfaces
8. Migrate solution to development
 - a. Migration Manager

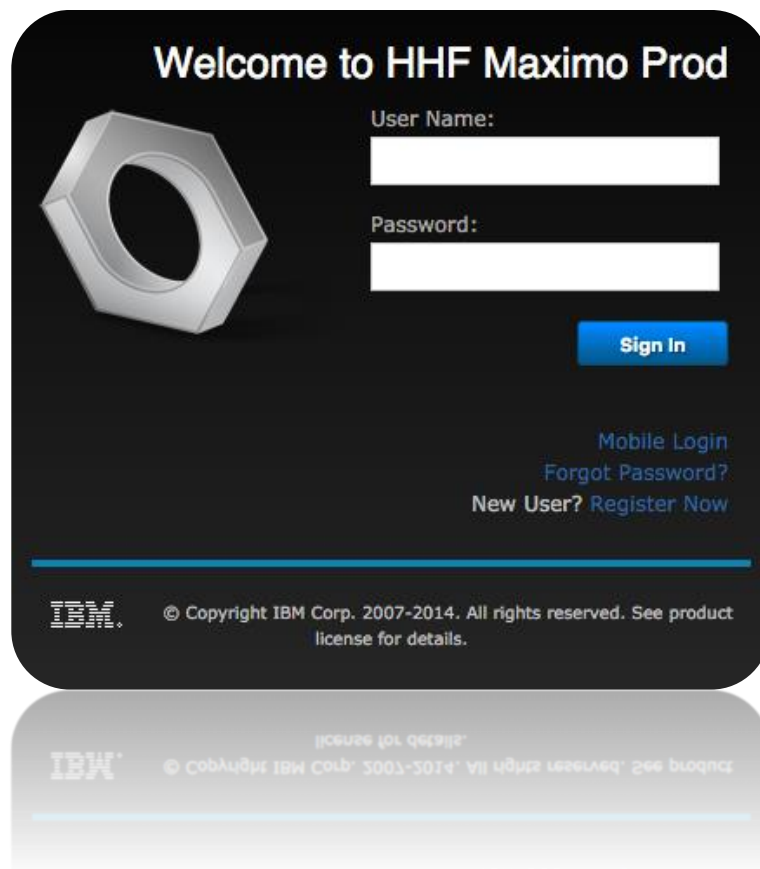
Task 2: Maximo System Ongoing Hosting and Support

Upon completion of the installation and configuration, HHF assumes the responsibility for the Maximo system. This includes the operations and maintenance of the Maximo servers, including application and database backups, disaster recovery and all continuity of operations planning. HHF is currently assuming full responsibility for system deployment and rollout to all insular area schools and users following the initial system use at the “pilot” site.

With appropriate user credentials, the Insular ABCs Maximo application can be accessed from the following address: <http://oia.hhfplanners.com/maximo>. Clients may access the Maximo application from the following browsers:

- Internet Explorer 8.0 or higher
- Mozilla Firefox 31 or higher
- Google Chrome 37 or higher
- Apple Safari 7.0 or higher

Figure 4 – Maximo Production Application



In Progress Development

HHF Planners is currently establishing a single, enterprise repository to manage and track the portfolio of public school assets located in the insular areas of Guam, CNMI, American Samoa, and U.S. Virgin Islands. The objective of this phase was to complete a rapid, cost effective stand-up of Maximo that leverages a combination of the data and standards developed during the facility condition assessment, in Phase II, along with the reference configurations of Maximo currently serving the National Park Service (NPS) and Bureau of Indian Affairs (BIA). The initial goal of the Maximo system is to provide a system to establish a foundation for improved asset accountability, consistent preventive maintenance planning and scheduling, and provide a reference method to begin tracking CIP budgets. Over time, and as the data in the system is populated, users will have the ability to conduct portfolio-wide lifecycle cost analysis, condition ratings, and ultimately help the individual schools and local authorities effectively manage the total cost of facility ownership. In the immediate term, the system will provide HHF with a Maximo configuration that will meet the initial project management needs of HHF and provide the foundation for supporting a future rollout and on-boarding of the Insular Area schools. The desired end-state for the Maximo system will be a full lifecycle asset

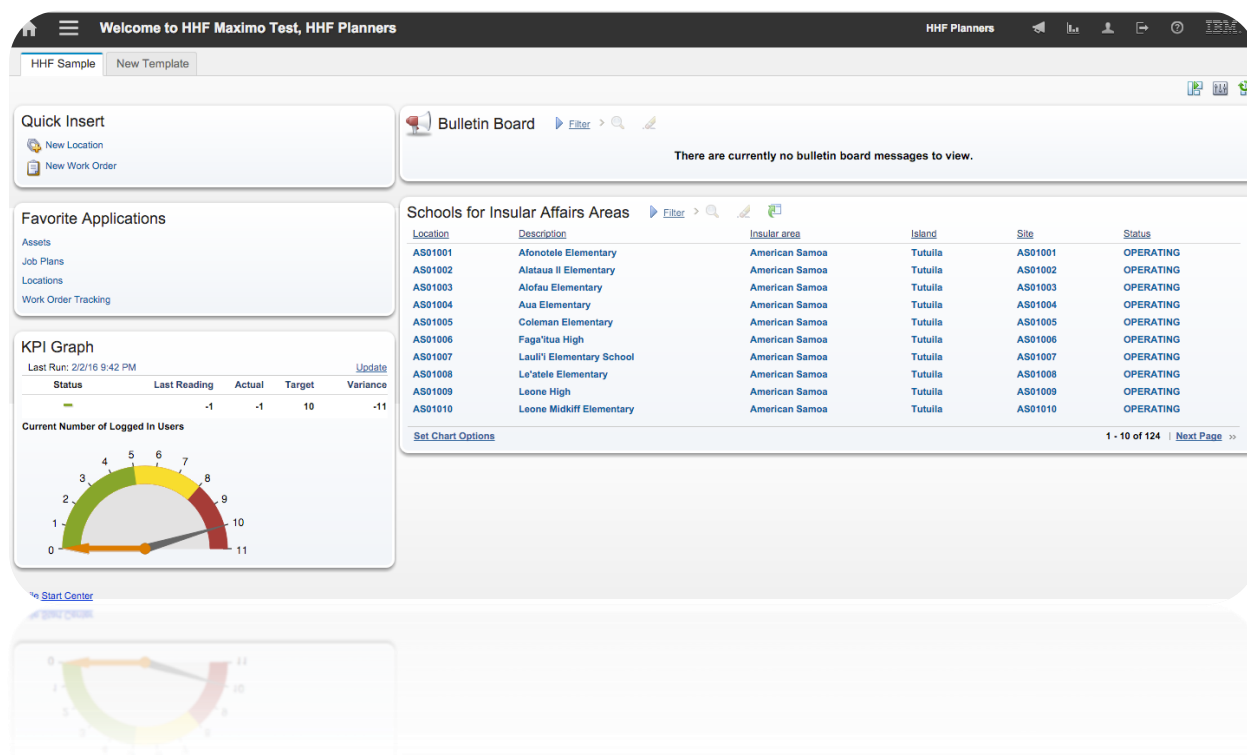
and work management support system based on business processes and best practices within the individual territories.

Start Center

The Maximo start center is the first screen a user will see right after they log in. They will have a default start center which is a grouping of modules that relate to the user's work and can include all of the Maximo modules or a selection of modules. In these start centers, there are portlets that can be configured to allow quick access to the tools and key performance indicators (KPI) that users access typically. Administrators can configure the default Start Center that users see when they access the system.

Start Centers are assigned to security groups. Therefore, the first time a user logs into the system, they see a Start Center based on a template for their security group. If a user belongs to more than one security group, the user might see tabs at the top of the page, where each tab is a Start Center page for a different security group. Users are able to customize their start centers to display shortcuts and their most important applications.

Figure 5 – Maximo Start Center Application

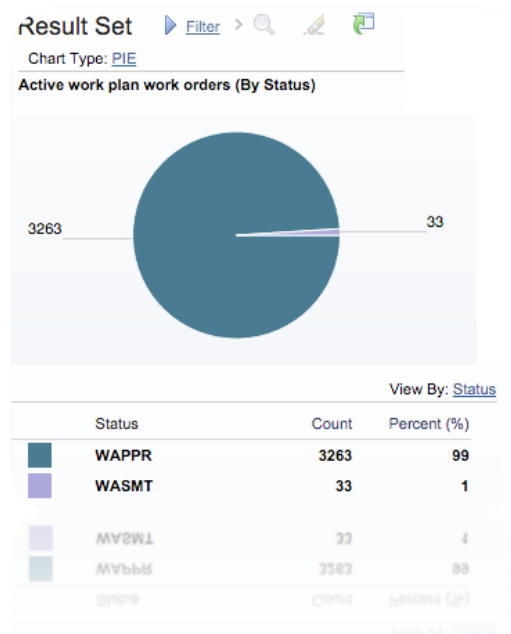


Work Orders Module

- View detailed planning information: work plan, scheduled costs, labor, materials, equipment, failure analysis and related documents via Work Order Tracking screen.
- Enter simple or detailed day-to-day maintenance requests via Work Request screen.

- Record maintenance work and close work orders from the shop floor via Quick Reporting screen.
- Schedule work orders based on real-time update of criticality.
- Define and sequence work for multiple assets based on location and/or equipment.
- WBS for related work orders or projects.
- Compare real-time budgets or estimates against actuals and historical work orders
- Track inside/outside machinery that must be off-line prior to work being performed.

Figure 6 – Work Order Status Result Set



Reporting

BIRT (Business Intelligence and Reporting Tools) is the embedded reporting tool in Maximo Asset Management. BIRT has standard reports that cover many applications and include analysis, detail, hierarchical, and drill down reports. Reports can update the database, hyperlink to one another to enable more detailed analysis, and refresh data dynamically. The Insular Areas can customize the BIRT reports or develop new reports to suit their business needs.

With ad hoc reporting, any user can quickly create their own custom reports from any application. They can select what type of report they want to create, which fields to include, and whether to group and sort the results. They can also define unique report parameters, and specify whether they want the report to run on the records of the application. They can then save and share the reports with others, or run the report only once. If they save a report, it can be scheduled and automatically emailed to other users. They can also download the contents of the report to other file formats, such as Microsoft Excel, for additional analysis.

Preventive Maintenance Module

- Generate PM work orders individually, batched or automatically.

- Accommodate multiple criteria for work order generation.
- Generate seasonal preventive maintenance work orders for planned shutdowns.
- Sequence multiple job plans and consolidate multiple procedures on one PM master.
- Cluster PM work orders to take advantage of unplanned downtime.

Future Development

Future phases of the Maximo development will require detailed business process requirements gathering and Maximo configuration work to meet the needs of individual territories and OIA stakeholders. In addition to incorporating changes based on business processes, future phases would also cover such things as incorporating additional asset classes into Maximo (i.e. fleet, heavy equipment, IT assets, etc.), development and deployment of interfaces to external systems (i.e. financial systems, HR systems, construction cost estimating, etc.) and development and deployment of additional custom Maximo reports. Adding Maximo Industry Solutions or Add-On products may also be candidates for future phase expansion of the Maximo system (Maximo Spatial, Scheduler, Mobile, Fleet, Linear Asset Manager, etc.). Potential future phase “out of box” Maximo Modules and applications that could be configured and released to users are:

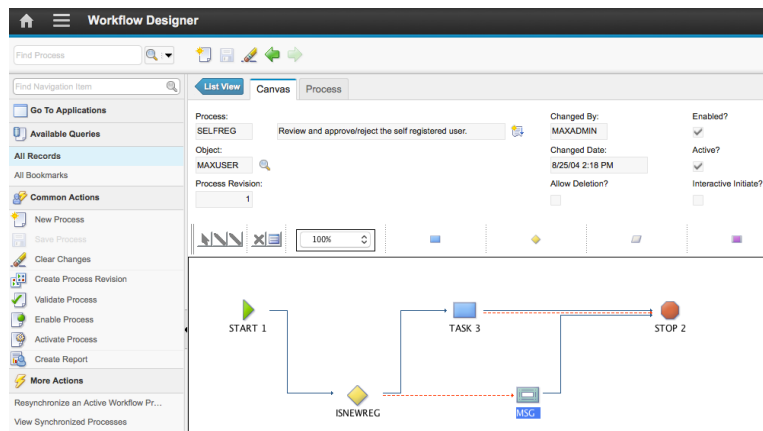
- Assets (Failure Coding, Meters, Asset Templates)
- Contracts (Lease / Rental Contracts, Warranty Contracts)
- Financial (Chart of Accounts integrated to financial system, Cost Management)
- Inventory Management (Item Master, Inventory)
- Purchasing (PRs, POs, Receiving, Companies)
- Planning (Safety Plans, Routes)

Design Maximo Workflows

Maximo Workflow features let the user automate repetitive business processes and record management processes. Automating these processes provides a means for greater efficiency and accountability throughout the organization. Maximo Workflow provides a means of electronically reproducing your business processes so that they can be applied to Maximo records. Using Workflow to manage records lets you do the following:

- Consistently apply the organization’s business practices to Maximo records, such as work orders and service requests.
- Manage the movement of a record through a process from start to finish.
- Route a record and appropriate instructions to the appropriate individual(s) so that they can act on it.
- Ensure that individuals act on records assigned to them in a timely manner.
- Guide users through their interaction with a record.
- Ensure that an audit trail exists for each record and process.

Figure 7 – Service Request Work Flow



Implement Additional Modules

Equipment Module

- Track equipment, associated costs, histories and failures of serialized equipment.
- Use asset modeling to determine relationships between a piece of equipment, its physical location & the systems with which it may be associated.
- Create hierarchies identifying operating locations as part of multiple systems.
- Build an equipment history to roll up maintenance costs.
- Build failure code hierarchies to record equipment problems for analysis.
- Set measurement points, perform trending and defect analysis through condition monitoring.
- Assign stores, repair shops, and vendors as location records to facilitate continual tracking of equipment as it is moved.
- Analyze the potential for failure based on a piece of equipment's location and the possible effects on systems with which it is associated.

Work Manager Option

- Develop daily plans and manage backlogs to lower response time and equipment downtime.
- In dispatch mode, enter work, assign employees and track ongoing jobs in real time.
- Centralized dispatching and shop floor dispatching are supported.
- In planning mode, assign employees to future work orders scheduled and track employee availability.
- Plan upcoming work based on priority of work and craftsperson availability.

Inventory Module

- Specification of attributes and the ability to search by attribute for Items, Equipment and Locations.
- Over 2,000 material classification templates.
- Track stocked and non-stocked items through multiple stores.

- Track items, costs and balances by bin, lot and storeroom.
- Replenish stock from vendor, ventral store, or other storeroom, when quantities fall below minimum levels.
- Reorder items automatically by shelf life.
- Track item costs by last cost, average cost or user-defined standard cost.
- Automatically reorder materials through user-defined EOQ, ROP, and Safety Stock algorithms.
- Use ABC analysis to assign inventory item priorities governing frequency of physical item counts.
- Access material forecasting and time availability information.
- Create temporary stores for carriers responsible for items in transit.
- Employ just-in-time methodologies by utilizing WO Reservation Dates as well as lead time to generate POs.
- Identify out-of-stock items or make substitutions with alternate parts, vendor and location tracking capabilities.
- Establish EOQs, ROPs and safety stock by individual storeroom.
- Issue parts directly or in batch to work orders and GL Account Codes.
- View work order reservations for inventory items.
- Display all assets on which a given part is used.
- Mandate a date/time stamped and system verified authorization before changes in inventory can be made.
- Access latest cost information and item levels instantly.

Purchasing Module

- Create RFQ for multiple vendor bids on materials and services.
- Create purchase requisitions or purchase orders for materials and services.
- Create purchase requisitions from scratch or from the Inventory or Work Orders Module.
- Automatically create purchase orders from purchase requisitions; create purchase orders in batch from line items of multiple purchase requisitions.
- Store standard descriptions for use on PR, PO, or invoice items.
- Create agreement purchase orders to purchase parts over time.
- Automatic release of agreement POs.
- Create special orders by entering item descriptions as line items for parts not in inventory database.
- Use direct purchasing to order and issue parts and services directly to work orders or GL Account Codes.
- Analyze vendor performance when ordering parts.
- Use Invoice Matching to complete purchasing cycle within Maximo for seamless interface with other enterprise financial applications; automatically perform two-way (PO/Invoice) and three-way (PO/Receipt/Invoice) matches.
- Define an unlimited number of currencies to track purchases from different countries.

- Optimize purchasing efficiency with electronic commerce.

Plans Module

Job Plans

- Track multiple quantities and costs by operation or job plan.
- Divide job plans sequentially, each with its own parts, labor and tool estimates.
- Automatically retrieve the most current rate and cost information for material, labor and tool cost estimates.
- Duplicate job plans for modification.

Safety Plans

- Hazardous material identification.
- Identification of hazards that can be eliminated by Lockout/Tagout.
- Identification of hazards that cannot be eliminated with their resulting precautions.
- Ability to identify affected equipment and locations.
- Associate and track permits.

Inspections

- Define Inspection plans and schedules for inspection.
- Record Inspection information thereby enabling auditability of statutory requirements.
- Analyze Inspection data to support Predictive Maintenance.

Labor Module

- Store information by employee, craft, or contractor.
- Maintain personnel files for each employee's attendance, vacation, sick, and non productive work time; track overtime history and individual pay rates.
- Create craft records including regular and overtime pay rates.
- Associate labor records with craft records for organizing labor by craft.
- Report actual labor on work orders in timecard format.

Calendars Module

- Create schedules for equipment, craft, and labor records.
- View calendars via start/end date illustrating shifts, holidays, and vacations.
- View calendars by month or day displaying total work hours available.
- Associate calendars with labor and craft records to plan work based on equipment and labor availability.

Resources Module

- Maintain detailed company, service contract, and tool records for use in other modules to plan and analyze maintenance work.

Compliance Assurance Systems Features

- Track regulatory compliance activities by agency: planning, implementation and documentation.
- Control, verify and document precautions, storage, treatment, transportation and disposal of hazardous materials and wastes.

- Set up and track countless compliance details, such as instrument calibration, emissions data, groundwater waste volume, radioactive waste, operating hours, operator training and certification, scheduled parts replacement, equipment specifications, and hazardous container locations.
- Document safety and emergency processes and procedures.
- Facilitate safety, regulatory and permit sign-offs.
- Identify and track step-by-step safety and lockout/tagout procedures.
- Establish links to regulatory agencies, documents, filings, service bulletins and recall information.
- Preview current best practices and standards to aid compliance decision making and modeling.
- Create a clear, complete audit trail.

Integration Features

- Risk free integration with multiple financial systems including commercial integration to SAP, Oracle and PeopleSoft.
- Eliminates duplicate handling of data and ensures upgradeability to future versions of Maximo with commercial APIs.
- Supports double entry accounting for complete integration with your own financial system.
- Manage purchasing process via Maximo or integrate with your own financial system.
- Take advantage of user-defined financial calendars to correlate directly with your accounting periods.
- Summarize transactions for integration while providing detailed audit trail information in Maximo.
- Preserve your corporate General Ledger codes through Maximo's customizable, multi-segment General Ledger account field.
- Use Application Launching to register and launch applications from within any Maximo module.
- Use Documents function to establish relationships between drawings and equipment; launch drawings and images in their native application.
- Use Chart of Accounts to validate and control financial GL accounts.
- Access Maximo data directly, query or update the database, and run reports with Interactive SQL.

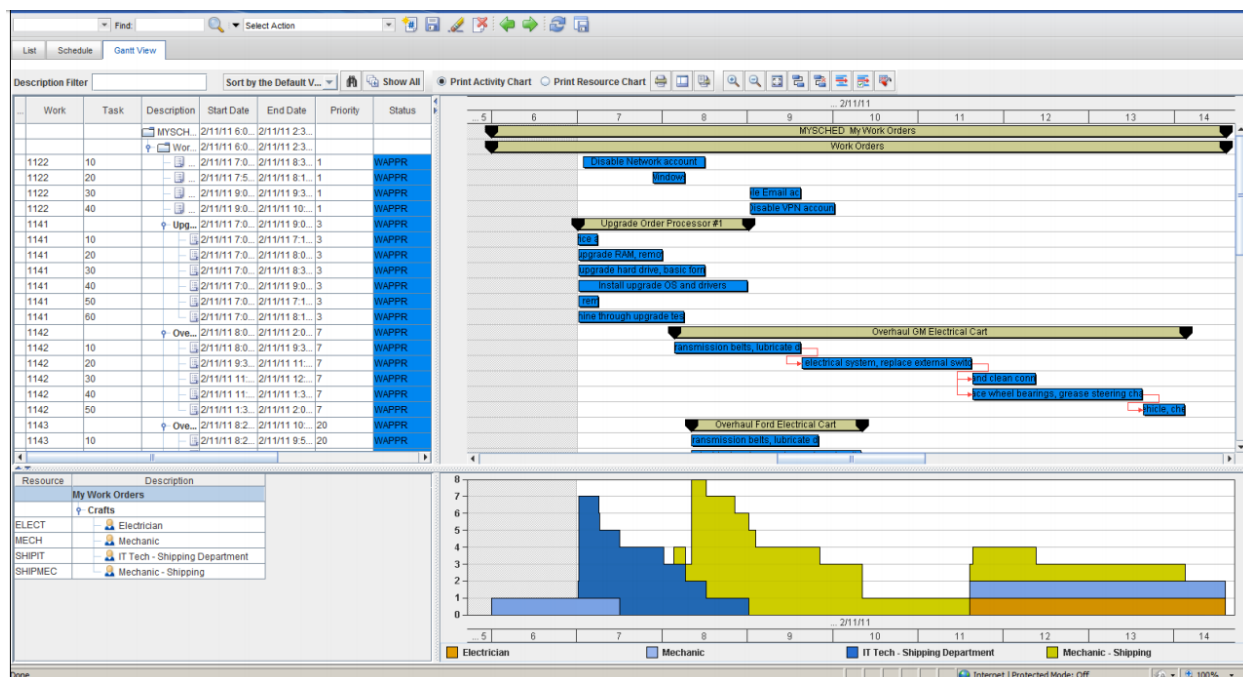
Implement Maximo Add-ons

Scheduler Module

With Maximo Asset Management Scheduler, planners can view upcoming or forecasted work graphically, reschedule work against the availability of the resources, and adjust the work schedule. Scheduler provides the ability to view and schedule work orders and tasks in a Gantt chart, view and manage work schedules, review progress toward completion targets, and dynamically adjust for changes in resource availability. With the graphical assignment and graphical dispatch included with Maximo Scheduler a user can manage dependencies between

work orders and tasks, identify and manage critical activities through critical path method, and manage work orders grouped logically and scheduled together to reduce asset downtime. A dispatcher can also view the various routes that the labor assignments require and adjust the route accordingly. Maximo Scheduler provides one dynamic view of emergency, planned, and unplanned work competing for available resources.

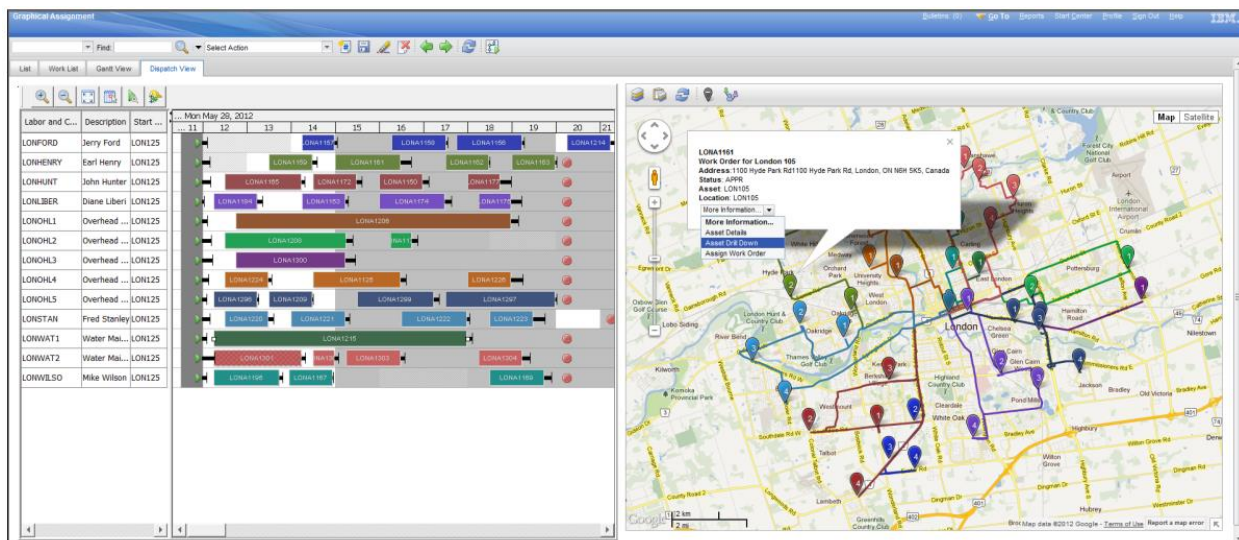
Figure 8 – Maximo Scheduler Module



Dispatch View

The dispatch view contains a calendar view and map view of work order routes. After assigning work in the Gantt view, use the apply street level routes button in order to create work order routes by assigned labor. The dynamic schedule bars have the same ability to create, split or delete assignments as Gantt view. A user can then drag bars to manually change the sequence of work orders for a specific labor or crew to perform.

Figure 9 – Maximo Scheduler Dispatch View



Maximo Spatial

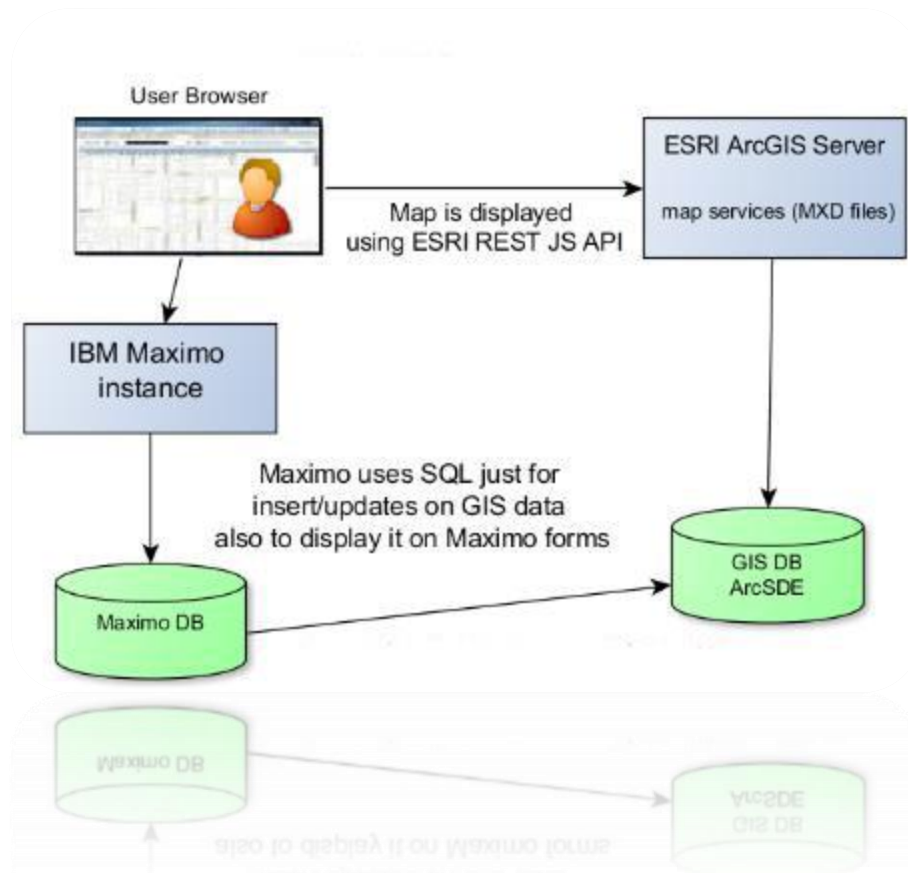
IBM Maximo Spatial Asset Management allows users to view complex GIS information inside the IBM enterprise asset management solution. It provides a geospatial context of work, assets and relevant land-based features. It allows a user to dynamically visualize and analyze asset relationships with geographic information system technology. The ability to visualize information can improve reliability, longevity and efficient work execution. Maximo Spatial provides a seamless user experience with dynamic GIS functionality – instead of simply viewing a static map.

Maximo Spatial helps to accurately define work locations. When a service request is initiated, a map identifies the location of the incident, leading to a more efficient deployment of necessary resources. Users can then plan and schedule work by mapping open work orders and projects can be optimized for the deployment of skills and materials to avoid costly and disruptive revisits to nearby project locations. Assets and work orders can be located by address, or the map can be queried by drawing an area to reveal all assets and work orders within the area of interest. Dispatchers can assist in the routing of personnel and material to a single location or multiple locations can be optimized for time or fuel consumption. In addition, it provides for the ability to overlay traffic volume, weather conditions, and asset life-span information which improves work prioritization, optimizes scheduled outages, and facilitates future maintenance planning.

In order to utilize Maximo Spatial, Arc GIS Server must be deployed. An ESRI ArcGIS Server creates, organizes, maintains, analyzes and visualizes information related to location. Among these core capabilities, mapping, the visualization of location-based data, is by far the most recognizable function that GIS systems perform. Other fundamental GIS capabilities that are highly valuable in the asset management context include proximity functions to more quickly determine adjacency, nearness, shortest distance, and shortest path.

Maximo Spatial, the first Java-based EAM solution built on ArcGIS Server, enables organizations that own, operate and manage geographically dispersed assets to accrue significant business benefits by leveraging their location-based information investments. Maximo Spatial enables asset and service management users to view assets in a geospatial context, so they can easily and dynamically visualize the spatial relationships among managed assets and the roads, buildings, pipelines, and other mapped features around them, enabling better, smarter, and faster business decisions.

Figure 10 – Maximo Spatial ArcGIS Server Configuration



Maximo Mobile

Maximo Mobile gives the user remote access from most mobile devices to Maximo Asset Management processes such as work and asset management in connected and disconnected environments. Users are able to access critical data and complete tasks virtually anywhere with secure, trusted transactions. By entering data on the spot, there will be a reduction in data entry errors and miscommunications by allowing users to simply do their work in the field even while disconnected.

Maximo Mobile provides the ability to create mobile applications for use by field technicians that require mobility when accessing Maximo applications. It provides your mobile workers the

ability to complete more work and reduce nonproductive activities, paperwork and data entry. Field technicians are able to view current and sequenced assignments for themselves or their crew and obtain directions when required. Field technicians will receive dynamic updates of sequenced work reflecting newer higher priority work, reassignments, or emergencies.

Figure 11 – Maximo Mobile Devices

