

## **CITY OF HENDERSON**

# **MAS TRANSITION REQUIREMENTS**

Cloud / SaaS Managed Service Deployment

IBM Maximo 7.6.1.3 → MAS 9.x Upgrade

May 14, 2026

## DOCUMENT CONTROL

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## 1. PURPOSE AND SCOPE

This document defines the functional and technical requirements for transitioning the City of Henderson's IBM Maximo Asset Management environment from version 7.6.1.3 to IBM Maximo Application Suite (MAS) 9.x under a Cloud / SaaS Managed Service deployment model.

The cloud deployment introduces significant architectural changes compared to the current on-premises environment. Most critically, direct database access from on-premises systems to the cloud-hosted Maximo database is not available, and the City's security policy explicitly prohibits VPN tunnels from on-premises databases to the cloud. All integrations that rely on DBLINK, direct DB queries, or PL/SQL execution must be redesigned.

This document is complemented by the MAS Integration Requirements Matrix, which details each individual requirement and associates it with the function it supports for use during Unit Testing.

## 2. CURRENT STATE (AS-IS)

### 2.1 Environment Summary

Attribute	Current State
Maximo Version	7.6.1.3
Database Platform	Oracle
Production DB Size	~350 GB
DocLinks Storage	~400 GB
Active Users (PROD)	435
AppPoints	1,382
Concurrent Users	~400
Current Licensing	CapEx
Active Integrations	13 (see Section 4)

### 2.2 Cloud Impact Assessment Summary

The following integrations require redesign under a cloud deployment due to their dependency on direct database access:

- Cayenta CIS — DBLINK, PL/SQL, PHP page, DB views all require redesign
- AMI / SmartWorks MDMS — TOAD/ETL direct DB access for MME requires redesign
- PeopleSoft — DB-to-DB PL/SQL integration requires full redesign
- ArcadisGen — SQL extraction from Maximo DB requires redesign
- Reports & BI — Direct DB connections for Power BI and Azure Data Lake require redesign
- Asset Cost Rollup — PL/SQL scripts require replacement with Automation Scripts

### 2.3 Java Customizations

The current environment includes a limited number of Java customizations. The primary customization allows users to attach files to multiple assets and locations from the List tab within the Assets and Locations applications. Beginning with MAS, IBM recommends replacing Java customizations with Automation Scripts.

### 3. TARGET STATE (TO-BE)

#### 3.1 Deployment Model: Cloud / SaaS Managed Service

Under this deployment model, MAS 9.x is hosted in the cloud by a SaaS vendor. The vendor manages the full infrastructure stack, including Red Hat Enterprise Linux (RHEL), OpenShift, security patching, and platform maintenance. The City generally controls upgrade scheduling, though vendors may require minimum version compliance for security patches.

Attribute	Target State
<b>MAS Version</b>	9.x (latest GA release)
<b>MAS Application</b>	Maximo Manage with Maximo Spatial Add-on
<b>Database Platform</b>	Oracle (vendor-managed in cloud; higher cost than SQL Server/DB2)
<b>Deployment</b>	Cloud / SaaS (Vendor Data Center)
<b>Infrastructure Mgmt</b>	SaaS Vendor (full stack)
<b>Upgrade Control</b>	City controls scheduling; vendor may require minimum versions
<b>Database Access</b>	Limited or no direct access (multi-tenant). Dedicated DB at additional cost.
<b>DocLinks Storage</b>	Cloud object storage (vendor-managed S3 or equivalent)
<b>Identity Management</b>	Microsoft Entra ID (SAML 2.0 / OIDC)
<b>AppPoints Monitoring</b>	MAS Suite License Service (SLS)
<b>Network Constraint</b>	NO VPN tunnel from on-premises DB to cloud (City security policy)

#### 3.2 Key Considerations for Cloud Deployment

- All DBLINK, direct DB query, and PL/SQL-based integrations must be redesigned to use REST/OSLC APIs or ETL middleware
- VPN tunnel from on-premises databases to cloud is prohibited by City security policy
- Database access is limited; multi-tenant DB provides no direct access; dedicated DB is available at additional cost
- Vendor manages security protocols; City controls MAS/Manage configuration (security groups, MIF, screen changes)
- Latency may increase (estimated 15-25ms Henderson to AWS US West) compared to on-premise <5ms
- Database conversion to DB2 or SQL Server can reduce costs but adds risk; can be deferred post-migration

- A production DB replica may be needed for reporting and ArcadisGen if REST-based alternatives are insufficient



## 4. INTEGRATION TRANSITION REQUIREMENTS

This section describes each integration, its current architecture, the cloud-specific transition approach, and the high-level requirements. Detailed requirements are captured in the companion MAS Integration Requirements Matrix.

### 4.1 Cayenta CIS

Attribute	Details
<b>Cloud Impact</b>	HIGH — Requires Full Redesign
<b>Current Architecture</b>	Database Link (DBLINK) from Cayenta Oracle DB to Maximo Oracle DB. ~10 PL/SQL stored procedures on Cayenta side. Interface tables for inbound/outbound. PHP page queries Maximo DB directly. Database views on WO table via DBLINK.
<b>Transition Approach</b>	DBLINK architecture is not feasible in a cloud deployment. VPN tunnel from on-premises DB to cloud is explicitly prohibited by City security policy. Integration must be redesigned to use MAS REST/OSLC APIs. Cayenta-side development or ETL middleware (e.g., FME) required. PHP page must be rebuilt against REST APIs.

#### Requirements:

- Redesign integration to use MAS 9.x REST/OSLC APIs for all data exchange (WO create, WO status, publish channels)
- Replace ~10 PL/SQL stored procedures with API-based equivalents on the Cayenta side or via ETL middleware (FME)
- Replace DBLINK-based DB views with REST API queries or scheduled data extracts
- Rebuild PHP page to use MAS REST API for WO lookup and hyperlinks (eliminate direct DB dependency)
- Evaluate and potentially expand FME capacity to handle Cayenta data volumes
- Coordinate with Cayenta vendor on REST API integration approach (internal discussions underway)
- Test bi-directional WO flow end-to-end using the new API-based architecture
- Define error handling, retry logic, and monitoring for API-based data exchange

### 4.2 AMI / SmartWorks MDMS

Attribute	Details
<b>Cloud Impact</b>	MEDIUM-HIGH — MME Flow Requires Redesign
<b>Current Architecture</b>	<ul style="list-style-type: none"> <li>• Indirect integration: SmartWorks (cloud) → Cayenta → Maximo.</li> </ul>

	<ul style="list-style-type: none"> <li>Two WO flows (stuck check, meter check).</li> <li>Python script calls Maximo REST API. Mass Meter Exchange (MME) uses TOAD ETL pulling CSV from Maximo DB.</li> </ul>
<b>Transition Approach</b>	Python REST API script is cloud-compatible. Cayenta-routed WO flows depend on Cayenta integration redesign. TOAD/ETL direct DB access for MME must be replaced with REST API-based data extraction or scheduled data export.

## Requirements:

- Validate Python script REST API calls against MAS 9.x cloud endpoints
- Replace TOAD ETL direct DB query for MME with REST/OSLC API-based data extraction
- Design permanent API-based integration (SmartWorks APIs + Maximo APIs)
- Test step-check and meter-check WO creation flows end-to-end
- Define automated scheduling and monitoring for new MME data extraction

## 4.3 Comcate

Attribute	Details
<b>Cloud Impact</b>	LOW — Minor Update Required
<b>Current Architecture</b>	<ul style="list-style-type: none"> <li>Comcate pushes SRs to Maximo via reverse proxy.</li> <li>Maximo sends status updates back via web services.</li> <li>Token-based auth refreshed every 4 hours, stored in database.</li> </ul>
<b>Transition Approach</b>	Integration is largely cloud-compatible. Update authentication to API Key method. Validate reverse proxy and web service endpoints against cloud MAS URLs.

## Requirements:

- Migrate token-based authentication to API Key authentication for MAS 9.x
- Validate reverse proxy configuration for cloud MAS 9.x endpoint URLs and IP whitelisting
- Test SR creation flow and status-update web services end-to-end
- Review automation script for token handling; consider system property storage
- Note: Comcate upgrade/replacement discussion expected April 2027

## 4.4 PeopleSoft

Attribute	Details
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<b>Cloud Impact</b>	HIGH — Requires Full Redesign
<b>Current Architecture</b>	<ul style="list-style-type: none"> <li>• DB-to-DB integration. Maximo queries PeopleSoft via PL/SQL on the Maximo Oracle DB.</li> <li>• Data stored in a custom Maximo table (no interface tables).</li> <li>• Weekly frequency.</li> </ul>
<b>Transition Approach</b>	Direct DB-to-DB integration is not feasible in cloud. Must be replaced with API-based or ETL middleware approach. Automation scripts, MAS Integration Framework (MIF), or FME can serve as alternatives.

#### Requirements:

- Replace PL/SQL-based DB queries with MAS REST API, automation scripts, or ETL middleware (FME)
- Design new data flow: PeopleSoft → middleware like FME or Web API → MAS 9.x (Vendor, GL Components, GL Accounts)
- Replace direct inserts into Maximo base tables with MIF-based or API-based data loading
- Implement appropriate error handling and logging for the new integration method
- Design for extensibility: accommodate future craft and labor code data exchange
- Test weekly data synchronization end-to-end with the new architecture

### 4.5 ArcadisGen (Asset Planning & Forecasting)

Attribute	Details
<b>Cloud Impact</b>	HIGH — Requires Redesign
<b>Current Architecture</b>	<ul style="list-style-type: none"> <li>• SQL statements pull WO data from Maximo Oracle DB to a staging table in a separate on-premises database.</li> <li>• ArcadisGen (SaaS) consumes from staging table.</li> </ul>
<b>Transition Approach</b>	VPN tunnel from on-prem DB to cloud is not permitted. SQL extraction from Maximo cloud DB is not feasible. Must replace with MAS REST/OSLC API-based data extract, scheduled data export, or data replication to on-premises reporting replica.

#### Requirements:

- Replace SQL-based extraction with MAS REST/OSLC API queries or scheduled data exports

- Evaluate option: MAS data replication to on-premises reporting database, then SQL extraction to staging table or use ETL tool such as FME to query MAS REST API and load to staging table
- Ensure staging table population continues on current schedule for ArcadisGen SaaS consumption
- If DB replica approach is chosen, define replication frequency and latency requirements
- Test WO data completeness for condition assessment and forecasting use cases

## 4.6 GIS (Geographic Information System)

Attribute	Details
<b>Cloud Impact</b>	LOW — Minor Configuration Required
<b>Current Architecture</b>	<ul style="list-style-type: none"> <li>• Bi-directional sync using GeoWorx Sync (GIP) and Maximo Spatial.</li> <li>• 33-35 asset, ~13 location feature classes. On-premise GIS.</li> <li>• Whitelist-based security.</li> </ul>
<b>Transition Approach</b>	GIS remains on-premises. Requires VPN tunnel or secure network path from cloud MAS to on-premise GIS (note: this is cloud-to-on-prem direction, which differs from the prohibited on-prem-to-cloud tunnel). IP whitelisting for the cloud MAS source IP.

### Requirements:

- Deploy and configure Maximo Spatial add-on in cloud MAS 9.x
- Configure network connectivity: cloud MAS → on-premise GIS (IP whitelisting for cloud source IP)
- Validate all 10-12 asset and 2 location feature classes sync correctly
- Migrate map security from whitelist-based to HTTPS + token-based authentication
- Test bi-directional data sync for both GeoWorx-managed and Spatial-config-managed feature classes
- For the Work Order and Service Request layers, the Maximo Spatial configuration must be updated to align with the MAS version of Maximo Spatial, which no longer supports multiple layers using the same GIS Object in Map Manager. Each layer must be configured with a unique GIS Object. Maximo will require a script to update the record's GIS Object when the status changes from open to closed.

## 4.7 GeoNexus GIP (GIS/Maximo Data Synchronization)

Attribute	Details
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<b>Cloud Impact</b>	LOW — Minor Update
<b>Current Architecture</b>	Versioned geodatabase (geoDB) connection for GIS-Maximo data sync. Bi-directional.
<b>Transition Approach</b>	Transition to REST endpoint-based approach with MAS 9.x (planned direction). Cloud deployment accelerates the move to REST-based sync.

**Requirements:**

- Validate GIP connectivity to MAS 9.x Maximo REST endpoints
- Validate bi-directional sync for all GIP-managed feature classes

## 4.8 LDAP / Active Directory Authentication

Attribute	Details
<b>Cloud Impact</b>	MEDIUM — Architecture Change Required
<b>Current Architecture</b>	LDAPSYNC cron task synchronizes user accounts from Active Directory into Maximo.
<b>Transition Approach</b>	Migrate to MAS 9.x identity management using Entra ID. MAS SaaS vendors typically manage the identity provider configuration at the Suite level.

**Requirements:**

- Configure MAS 9.x identity provider integration with Microsoft Entra ID (SAML 2.0 or OIDC)
- Implement user provisioning via SCIM 2.0 or equivalent
- Map existing AD security groups to MAS 9.x security groups and application roles
- Coordinate with SaaS vendor on identity management configuration responsibilities
- Test SSO authentication flow for all 435 active users
- Plan for authentication cutover with zero user disruption

## 4.9 Reports & Business Intelligence

Attribute	Details
<b>Cloud Impact</b>	HIGH — Requires Redesign
<b>Current Architecture</b>	<ul style="list-style-type: none"> <li>• Power BI with direct DB connection and Data Warehouse.</li> <li>• Azure Data Lake pipeline reads from Maximo and PeopleSoft weekly.</li> <li>• City wants semantic models in Power BI.</li> </ul>

<b>Transition Approach</b>	Direct DB connections are not feasible in cloud deployment. City must replace with API-based data extraction, published semantic models against Azure Data Lake, or vendor-provided data replication/Data Pond. A replicated on-premises reporting database is an option.
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**Requirements:**

- Replace Power BI direct DB connections with semantic models built against Azure Data Lake or Data Pond
- Redesign Azure Data Lake pipeline to use MAS REST/OSLC APIs or vendor data replication instead of direct DB reads
- Evaluate vendor-provided Data Pond/data analytics capabilities for reporting
- Assess the feasibility and cost of an on-premises replicated reporting database
- Migrate or redesign BIRT reports for MAS 9.x compatibility

#### 4.10 EAM360 Mobile (Technician Application)

Attribute	Details
<b>Cloud Impact</b>	LOW
<b>Current Architecture</b>	Third-party mobile solution with local data storage on devices (zip file). Includes a map package interacting with GIS layers.
<b>Transition Approach</b>	Follow EAM360 vendor-prescribed MAS upgrade process. Cloud deployment should not significantly affect EAM360 since it communicates via APIs.

**Requirements:**

- Confirm EAM360 version compatibility with cloud MAS 9.x
- Follow EAM360 MAS upgrade/migration procedure per vendor documentation
- Validate map package functionality with cloud MAS 9.x and GIS layers
- Test field technician workflows end-to-end on mobile devices against cloud endpoints

#### 4.11 Asset Cost Rollup

Attribute	Details
<b>Cloud Impact</b>	HIGH — Requires Redesign
<b>Current Architecture</b>	PL/SQL scripts executed directly on the Maximo Oracle database.
<b>Transition Approach</b>	Direct PL/SQL execution on the Maximo DB is not feasible in cloud. Must be replaced with Automation Scripts running within MAS 9.x or scheduled API-based calculations.

#### Requirements:

- Replace PL/SQL rollup scripts with MAS 9.x Automation Scripts
- Validate calculation accuracy matches current PL/SQL results
- Assess performance requirements and optimize automation script execution
- Implement scheduling via MAS cron tasks to replicate the current execution frequency

### 4.12 DocLinks / File Servers (Attachment Storage)

Attribute	Details
<b>Cloud Impact</b>	MEDIUM — Cloud Storage Migration
<b>Current Architecture</b>	~400 GB of attached documents in the current DocLinks storage.
<b>Transition Approach</b>	Migrate to cloud-managed storage. SaaS vendors typically provide S3-based or equivalent cloud object storage. NFS on Kubernetes PV is also an option depending on vendor architecture.

#### Requirements:

- Determine vendor-provided storage architecture (S3, vendor-managed object storage, NFS)
- Develop a migration plan for ~400 GB of existing DocLinks content to cloud storage
- Configure MAS 9.x DocLinks to point to the cloud storage location
- Validate document access, upload, and retrieval post-migration
- Address network latency considerations for large file uploads/downloads
- Verify the Java customization replacement (Automation Script) works with the cloud storage backend

### 4.13 SharePoint Links

Attribute	Details
<b>Cloud Impact</b>	LOW
<b>Current Architecture</b>	O&M Manuals, map files, and documents stored in SharePoint referenced in Maximo via links.
<b>Transition Approach</b>	SharePoint links should remain functional since they are URL references, not file storage dependencies. Validate authentication path from cloud MAS to SharePoint.

#### Requirements:

- Validate MAS 9.x DocLinks configuration supports SharePoint URL references in cloud environment

- Test link resolution from cloud MAS 9.x to SharePoint (authentication, SSO, network path)
- Address any URL pattern changes required for cloud MAS 9.x



## 5. JAVA CUSTOMIZATION REPLACEMENT REQUIREMENTS

IBM recommends replacing all Java customizations with Automation Scripts beginning with MAS. The City's primary Java customization enables users to attach files to multiple assets and locations from the List tab in the Assets and Locations applications.

### 5.1 Functional Requirements

- Users must be able to attach files to multiple assets simultaneously from the Assets List tab
- Users must be able to attach files to multiple locations simultaneously from the Locations List tab
- The attachment workflow must replicate the current user experience
- Attached files must be stored in the cloud DocLinks storage (vendor-managed S3 or equivalent)

### 5.2 Technical Requirements

- Develop an Automation Script to replace the Java customization
- The script must leverage the MAS 9.x Maximo Manage API for DocLinks operations
- The script must handle bulk operations efficiently without performance degradation
- The script must be compatible with MAS 9.x security and role-based access controls
- Unit tests must validate: single attachment, multiple attachments, large file handling, error handling

## 6. DOCLINKS AND ATTACHMENT STORAGE REQUIREMENTS

In a cloud deployment, the SaaS vendor typically provides managed cloud object storage (S3 or equivalent). The ~400 GB of existing DocLinks content must be migrated to this cloud storage target.

- Coordinate with SaaS vendor on storage architecture and migration tooling
- Develop and execute migration plan for ~400 GB of existing DocLinks content
- Configure MAS 9.x DocLinks to point to cloud storage location
- Validate document access, upload, and retrieval post-migration
- Address and test network latency and bandwidth for large file operations
- Verify SharePoint URL references continue to resolve from cloud environment
- Verify backup/recovery procedures provided by the SaaS vendor

## 7. AUTHENTICATION AND IDENTITY MANAGEMENT REQUIREMENTS

Requirements are substantially the same as for on-premises. MAS 9.x uses Entra ID as the identity provider. In a SaaS model, the vendor typically manages the Suite-level identity provider configuration.

- Coordinate with SaaS vendor on identity provider configuration (Entra ID via SAML 2.0 / OIDC)
- Implement user provisioning via SCIM 2.0
- Map existing AD security groups to MAS 9.x security groups and application roles
- Test SSO authentication flow for all users against cloud endpoints
- Plan for zero-downtime authentication cutover during go-live

## 8. DATABASE REQUIREMENTS

Oracle will be retained as the database platform in the cloud. Vendors generally accept Oracle but at a higher cost than SQL Server or DB2. Database conversion is an additional risk factor and can be deferred.

- Confirm vendor support for Oracle as the cloud database platform and any cost implications
- Determine database tenancy model: multi-tenant (limited access) vs. dedicated (full access, higher cost)
- If dedicated DB: define DBA access levels and responsibilities
- Assess need for an on-premises replicated reporting database for BI and ArcadisGen
- Define database backup, disaster recovery, and data sovereignty requirements with vendor

## 9. ADDITIONAL MAXIMO SPATIAL CONFIGURATION

In addition to the defined transition requirements, the Maximo Spatial configuration must be expanded to include seven (7) additional GIS layers, each corresponding to a new GIS object. This expansion must incorporate all required configuration components, including endpoints, object relationships, and security settings.

The new configuration must also ensure compatibility and testing with GeoNexus GIP to support data synchronization in a manner consistent with the existing GIS layers.

Configuration activities within the GeoNexus GIP platform itself are outside the scope of this effort.

## 10. ASSUMPTIONS AND DEPENDENCIES

The requirements described in this document are based on the following assumptions and dependencies.

### 10.1 Assumptions

- The City provides access to appropriate stakeholders for each integration
- Doc Attachments refers to Maximo DocLinks
- No VPN tunnel from on-premises databases to the cloud (City security policy)
- The SaaS vendor is responsible for the full infrastructure stack
- Oracle database conversion (to DB2/SQL Server) is out of scope for this phase
- EAM360 and GeoNexus vendors provide supported MAS 9.x upgrade paths
- FME capacity expansion may be required for Cayenta integration redesign

### 10.2 Dependencies

- Cayenta internal discussions regarding REST API approach must be resolved before integration redesign
- Comcate upgrade/replacement decision (April 2026) may affect integration scope
- EAM360 vendor must confirm cloud MAS 9.x compatibility
- Managed services vendor must validate IBM infrastructure calculator sizing estimates
- SaaS vendor must confirm Oracle support, dedicated DB availability, and data replication options