BOARD OF SUPERVISORS AGENDA ITEM REPORT
AWARDS / CONTRACTS / GRANTS

○ Award   ● Contract   ○ Grant

= Mandatory, information must be provided

Requested Board Meeting Date: 01/23/2024

or Procurement Director Award: ☐

*Contractor/Vendor Name/Grantor (DBA):

International Business Machines Corporation DBA IBM Corporation

*Project Title/Description:

Maximo Upgrade and Workday Integration

*Purpose:

Amendment: Master Agreement No. MA-PO-23-127, Amendment No. 02. This Amendment revises the Statement of Work to incorporate changes included in Project Change Request 2. Administering Department: Information Technology.

*Procurement Method:

Pursuant to Pima County Procurement Code 11.12.020, Competitive sealed proposals, on 04/04/2023, the Board of Supervisors approved an award of contract for a term effective April 04, 2023 to June 15, 2024 in the award amount of $2,200,000.00.

On 01/12/2024, the Procurement Director approved Amendment No. 01, which revised the schedule of the project to begin on 05/15/2023 and adjusted the payment schedule as described in Project Change Request 1.

PRCUID: 425287

Attachment: Contract Amendment No. 02.

*Program Goals/Predicted Outcomes:

Maximo currently provides Pima County asset and work management tools, and this implementation will update and increase functionality of that software to better integrate with the new ERP System. This will increase County efficiency and interoperability through the implementation of an integrated ERP system.

*Public Benefit:

As the systems being replaced are vital to the operations of the County, a more fully integrated ERP system will allow County departments to more efficiently perform their duties, thereby permitting the County to better serve its constituents in a more cost-effective environment.

*Metrics Available to Measure Performance:

Standard project management measurements to track progress of the project and validate implementation success. Analysis of life-long costs and support metrics during the life of the ERP system.

*Retroactive:

No.

To: COB 1/18/2024
Version 4
33 Pages

THE APPLICABLE SECTION(S) BELOW MUST BE COMPLETED
Click or tap the boxes to enter text. If not applicable, indicate "N/A". Make sure to complete mandatory (*) fields

Contract / Award Information

Document Type: _____   Department Code: _____   Contract Number (i.e., 15-123): _____

Commencement Date: _____   Termination Date: _____   Prior Contract Number (Synergen/CMS): _____

☐ Expense Amount $ _____*   ☐ Revenue Amount: $ _____

*Funding Source(s) required: _____

Funding from General Fund?   ◯ Yes ◯ No   If Yes $ _____   % _____

Contract is fully or partially funded with Federal Funds?   ◯ Yes ◯ No

   If Yes, is the Contract to a vendor or subrecipient? _____

Were insurance or indemnity clauses modified?   ◯ Yes ◯ No
   If Yes, attach Risk's approval.

Vendor is using a Social Security Number?   ◯ Yes ◯ No
   If Yes, attach the required form per Administrative Procedure 22-10.

Amendment / Revised Award Information

Document Type: <u>MA</u>   Department Code: <u>PO</u>   Contract Number (i.e., 15-123): <u>23-127</u>

Amendment No.: <u>02</u>   AMS Version No.: <u>4</u>

Commencement Date: <u>01/23/24</u>   New Termination Date: <u>N/A</u>

                                                         Prior Contract No. (Synergen/CMS): <u>N/A</u>

◉ Expense ◯ Revenue   ◯ Increase   ◯ Decrease   Amount This Amendment: $ <u>N/A</u>

Is there revenue included?   ◯ Yes ◉ No   If Yes $ <u>N/A</u>

*Funding Source(s) required: <u>N/A</u>

Funding from General Fund?   ◯ Yes ◉ No   If Yes $ <u>N/A</u>   % <u>N/A</u>

Grant/Amendment Information (for grants acceptance and awards)   ◯ Award ◯ Amendment

Document Type: _____   Department Code: _____   Grant Number (i.e., 15-123): _____

Commencement Date: _____   Termination Date: _____   Amendment Number: _____

☐ Match Amount: $ _____   ☐ Revenue Amount: $ _____

*All Funding Source(s) required: _____

*Match funding from General Fund? ◯ Yes ◯ No   If Yes $ _____   % _____

*Match funding from other sources? ◯ Yes ◯ No   If Yes $ _____   % _____
   *Funding Source: _____

*If Federal funds are received, is funding coming directly from the Federal government or passed through other organization(s)?

Contact: Procurement Officer, Kelsey Braun-Shirley _{Digitally signed by Kelsey Braun-Shirley Date: 2024.01.16 12:04:56 -07'00'}   Acting Division Manager, Troy McMaster _{Digitally signed by Troy McMaster Date: 2024.01.16 13:05:50 -07'00'}

Department: Procurement Director, Terri Spencer _{Digitally signed by Terri Spencer Date: 2024.01.16 14:37:45 -07'00'}   Telephone: 520.724.8728

Department Director Signature: Javier Baca _{Digitally signed by Javier Baca...}   Date: _____

Deputy County Administrator Signature: _____   Date: *1-18-2024*

County Administrator Signature: _____   Date: 1-18-2024

Pima County Procurement Department

Project: Maximo Upgrade and Workday Integration

Contractor: International Business Machines Corporation dba IBM Corporation
1 Orchard Road
Armonk, NY 10504

Contract No.: MA-PO-23-127

Contract Amendment No.: 02

Orig. Contract Term:	04/04/2023 – 06/15/2024	**Orig. Amount:**	$ 2,200,000.00
Termination Date Prior Amendment:	06/15/2024	**Prior Amendments Amount:**	$ 0.00
Termination Date This Amendment:	06/15/2024	**This Amendment Amount:**	$ 0.00
		Revised Total Amount:	$ 2,200,000.00

CONTRACT AMENDMENT

The parties agree to amend the above-referenced contract as follows:

1. **Background and Purpose.**

   1.1. Background. On April 4, 2023, County and Contractor entered into the above referenced agreement to provide services to upgrade Maximo software in use by the County and integrate it with the Workday Enterprise Resource Planning system.

   1.2. Purpose. County requires additional implementation work for enhancements related to the integration between Maximo and Workday.

2. **Statement of Work.** The parties have revised the Statement of Work as described in **Exhibit C: Project Change Request 2** (5 pages). The enhancements referenced in **Exhibit C** include an integration solution between Workday and Maximo for service journal entries, further documented in **Exhibit C-1: Workday Maximo Journals Specification** (7 pages); tailoring of an interface for work order headers from Maximo to Workday, further documented in **Exhibit C-2: Work Order Header Specification** (3 pages); reconfiguration of Maximo Spatial, further documented in **Exhibit C-3: County Rearchitecture Specification** (14 pages); and custom reporting for Chart of Accounts between Maximo and Workday, further documented in **Exhibit C-4: Maximo Workday CoA Specification** (2 pages).

3. **Enhancement Costs & Payment Schedule.** The enhancements described in **Exhibit C** will increase the project costs by $209,000.00. The PCR 01 Payment Schedule found in Contract Amendment No. 01, Exhibit B is hereby deleted and replaced in its entirety with the PRC 001 + PRC002 Payment Schedule in **Exhibit C.**

All other provisions of the Contract not specifically changed by this Amendment remain in effect and are binding upon the parties.

This contract template has been approved as to form by the Pima County Attorney's Office.

PIMA COUNTY

INTERNATIONAL BUSINESS MACHINES CORPORATION DBA IBM CORPORATION e-Signed by Randall Serak on 2024-01-10

_____
Chair, Board of Supervisors

_____
Authorized Officer Signature

Randall Serak Associate Partner

_____
Date

_____
Printed Name and Title

2024-01-10 14:15:26 PST

_____
Date

ATTEST

_____
Clerk of the Board

_____
Date

APPROVED AS TO CONTENT

_____   Nancy Cole
Department Head

1/10/2024
_____
Date

EXHIBIT C
Pima County Contract No. MA-PO-23-127

PROJECT CHANGE REQUEST – Pima County (Pima County Contract No. MA-PO-23-127)		
Date Requested: **Dec 19, 2023**	Requested By: **Ranjan Sarkar IBM**	PCR Number: **002** Work Number / IBM Contract: W7Q6Y/ CFT68KS

This Project Change Request (PCR) must be approved by both parties: Pima County and International Business Machines ("IBM Consulting" or "IBM") and signed before the PCR becomes binding. All other terms in the Pima County and IBM Maximo Implementation SOW signed by the parties (April 04,2023) not affected by this PCR remain in full force and effect. IBM agrees to provide the Services described in this PCR, provided you accept this PCR without modification, by signing in the space below.

The parties agree that this PCR is being executed in order to implement the following enhancements:

1. Integration from Workday to Maximo to incorporate service journal entries. This integration solution will connect the Workday Journal entries into Maximo. When a Workday journal is modified, the modifications are sent back to Maximo and a new work order actuals entry is created under services. The values entered on the actuals is subtracted from the incorrect work order and a new entry is added to the correct work order. All requirements and solution outline is documented in the Workday_Maximo_Journals_specification_v2 document not attached to the SoW.

   When a new Workday journal is added, the work order actuals is updated to match the new journal entry. We have broken down the development of this solution in two parts:

   a. Development, Testing, and Deployment Support to configure the Maximo component for this customization.

   b. Development, Testing, and Deployment Support to configure the App Connect component for this customization.

The Workday report will be built and supported by the Workday team and is not included in our scope of work.

2. Tailoring of the work order header interface from Maximo to Workday organizations functionality, to incorporate additional requirements that are not part of the Maximo-Workday Connector design. The current design covers the functionality to send over the work order information when the work order is approved. This process will send over the work order to Workday and activate the work order to be used throughout the system. When a work order is closed an update from Maximo will be sent to Workday to deactivate the organization. This will restrict users in Workday from using the Maximo work order for entries on journal entries. The work order closure process is currently a manual process maintained by the admin team.

   Due to the core functionality not including Pima County requirements, changes will need to be made to meet Pima's business needs. Woacceptscharges and laboracceptscharges will need to be incorporated into the functionality to drive the activation and deactivation of the work order in Workday. The work order hierarchy functionality and work order task details being added to Workday is not in the scope of work. When a work order is approved, waiting on material, closed, and cancelled are the driving factors when an update is made to Workday. All requirements and solution outline is documented in the Work_Order_Header_Specification_v1 document not attached to the SoW.

3. Maximo Spatial needs to be reconfigured at Pima County. Maximo Spatial for 7.6 used database calls to interact between Maximo, ESRI/GIS, and ActiveG. With the upgrade to Maximo Application Suite this functionality is not supported anymore. Spatial needs to be upgraded and reconfigured to use API calls to talk between the systems. Each system will need to be upgraded to the latest version and configured with the necessary services to connect with the upgraded version of Spatial. The Maximo Spatial changes will only include the configuration changes needed in Maximo. The ActiveG team and ESRI/GIS team will be making their own respective changes and are currently not in scope of this SoW. All requirements and solution outline is documented in the PIMA County_Rearchitecture_Specification_v1 document not attached to the SoW.

4. The current Maximo and Workday solution for chart of accounts doesn't work for Pima County's system. Workday doesn't have a chart of account system. Instead they have a listing of worktags which drive the general makeup of what the general ledger account will be. These general ledger accounts are built on a set of rules which drive the creation of the account. The combination of the account, as Workday is currently designed, is not able to be sent over to Maximo as is. A report is being created, by the Workday team, to build the combination of a general ledger to be sent over to Maximo. Maximo will then take the general ledger and add it to the Chart of Accounts to be used as a source of validation. Valid general ledger accounts will reduce errors between both systems. This custom report is not supported by the core product and needs to be configured for Pima County's system. All requirements and solution outline is documented in the Maximo_Workday_CoA_Specification_v1 document not attached to the SoW.

This PCR is intended to expand the project scope to incorporate the new enhancements listed above. This PCR does not change the outcome of the original SOW schedule. This PCR does include cost adjustments identified in the original SOW date April 04,2023.

This PCR is intended to expand the project scope to incorporate the new enhancements of the original SOW and incorporate costs to accomandate the change in scope.

Standard Assumptions

The Chart of Account solution will delivered after January 12 once the solution and design of the interface is complete.

Charges – Total Additional Charges

The Services will be conducted on a fixed price basis. The fixed price for performing these Services defined in PCR 002 will be **$209,000.** The Fees are exclusive of any travel and living expenses, other reasonable expenses incurred in connection with the Services, and any applicable taxes. IBM will invoice Client for the Services performed on a milestone basis as set forth in the Payment Schedule defined in PCR 001, plus applicable taxes and subject to Pima County's acceptance approval of the Maximo Implementation Billing Milestone Table below.

Enhancement	Cost
Workday to Maximo Journal Entries	$ 55,087.59
Work Order Header to Workday	$ 49,711.45
Maximo Spatial Development	$ 79,080.05
CoA Solution	$ 25,120.91

PCR 001 + PCR002 Payment Schedule

Ref #	Milestone/Phase	Target Delivery Date	Completion Criteria	Amount (USD)	
A1	Project Initiation & Planning	05/2023	Project Kick-off Meeting and Initial Project Plan and support and alignment to ongoing Workday implementation project	$169215.53	
A2	Upgrade/Conversion	6/2023	Start Dev Environment Upgrade to 7.6.1.3 Dev Database Conversion	$169215.53	
A3	Design & Build	7/2023	IT Checkout, Start MAS checkout for SRE upgrade to Mas 8.x. Begin Integration Adapter Design verification. Inventory Functional Design & Build	$169215.53	
A4	Design & Build	8/2023	Complete Integration adapter design. Start build activities. Complete Inventory Functional Design & Build. Start Purchasing Functional Design and Build	$169215.53	
A5	Design & Build	9/2023	Continue Integration adapter build & Unit Test. Complete Purchasing Functional Design and Build	$169215.53	

A6	Upgrade/Conversion	10/2023	Complete Integration adapter build & Unit Test. QA/Test Environment Upgrade to 7.6.1.3. QA/Test Database Conversion IT Checkout, MAS checkout for SRE upgrade to Mas 8.x. Start Test and Validation of ESRI integration	$149408.32	
A7	Testing	11/2023	Start System Integration Testing (SIT)	$149408.32	
A8	Testing	12/2023	Continue System Integration Testing (SIT). Defect Resolutions/ Retest.	$149408.32	
A9	Testing	1/2024	Complete System Integration Testing (SIT). Defect Resolutions/ Retest. Start User Acceptance testing (UAT)	$155588.50 + $52250 = **$207838.50**	
A10	Upgrade/Conversion	2/2024	Complete User Acceptance testing (UAT)	$155588.50 + $52250 = **$207838.50**	
A11	Go-Live Hypercare Support Project Complete	3/2024	Upgrade to 7.6.1.3. Production Database, Database Conversion IT Checkout, MAS checkout for SRE upgrade to Mas 8.x.	$155588.50 + $52250 = **$207838.50**	
A12	Go-Live Hypercare Support Project Complete	4/2024	Go-Live and Hypercare Support. Project Completion	$38931.89 + $52250 = **$91181.89**	

Comments:

In entering into this PCR, you are not relying upon any representation made by or on behalf of IBM that is not specified in the Agreement or the Statement of Work, including, without limitation, the actual or estimated completion date, number of hours to provide any of the Services, charges to be paid, or the results of any of the Services to be provided under the Statement of Work. Each of us agrees that the complete agreement between us about these Services consists of 1) this Project Change Request, 2) the referenced Statement of Work including any previous mutually-approved PCRs, and 3) the IBM Customer Agreement or any equivalent agreement in effect between us as identified below (the Agreement.)
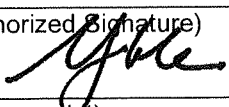
Agreed to: Pima County	Agreed to: **International Business Machines Corporation ("IBM")**
By: (Authorized Signature)	By: (Authorized Signature) Randall Serak on 2024-01-10
Title (type or print): ERP Executive Project Manager	Title (type or print): Associate Partner
Name (type or print): Nancy Cole	Name (type or print) Randall Serak
Date: 1/12/24	Date: 2024-01-10 14:15:35 PST
IBM Customer Number: 7195827	Agreement: Contract No. MA-PO-23-127
SOW Name: Maximo Upgrade and Workday Integration	Project Name: Maximo Upgrade and Workday Integration

EXHIBIT C-1

Workday to Maximo Journal Entries

INTEGRATION OVERVIEW

This integration solution will connect the Workday Journal entries into Maximo.

When a Workday journal is modified, the modifications are sent back to Maximo and a new work order actuals entry is created under services. The values entered on the actuals is subtracted from the incorrect work order and a new entry is added to the correct work order.

When a new Workday journal is added the work order actuals is updated to match the new journal entry.

DATA FLOW

This integration will pull journal transactions from Workday into Maximo.

- Workday Interface:
  Workday provides a user interface for entering new journal entries to correct GLAccount information in Maximo.

- Data entries enter in Services:
  Data entries for the following scenarios will be added to the Maximo actuals for new adds and existing corrections: Manual Journal adjustments, Expense Reimbursements, and P-Card Transactions.

  Manual journal adjustments include: Fix to correct work order on an incorrect transaction, fix to correct work order on an incorrect GL.

  Expense Reimbursements include: Mileage, Gas, and other vehicle expenses. This process follows a different process than the manual journal entries and will need to be incorporated into the API call.

  P-Card Transactions follows a different process than the manual journal entries and will need to be incorporated into the API call.
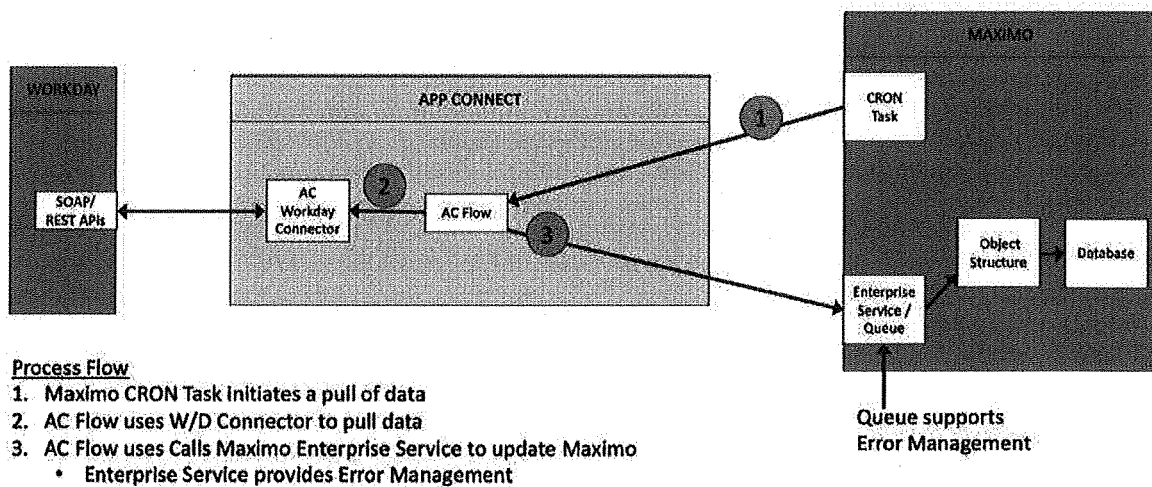
- Data Entry and Validation:
  Users input necessary data for correction, including mandatory information needed to create transactions. Workday validates the entered data to ensure accuracy and completeness.

- Generation of Unique Transaction ID:
  Workday generates a unique transaction ID for each correction transaction.

- API Communication with Workday:
  Workday provides API details for journal transactions with the unique transaction ID.

- EXTERNALREFID cleanup
  When using the EXTERNALREFID in our research, we noticed this field has duplicates. To use this field for integration from Workday to Maximo we cannot have duplicates. We will be updating the existing records following the continuous automation process and clean up the records to remove duplicates. A SQL statement will be created for this task to remove duplicates.

- Transaction Request to AppConnect:
  Maximo cronjob initiates an API call to AppConnect, sending a request to Workday to extract new journal transactions.
  Parameters:
  1. ORGID
  2. OVERRIDEFROMDATE
  3. OVERRIDETODATE
  4. ENDPOINT

- Maximo Enterprise Service Invocation:
  AppConnect makes API calls to Maximo enterprise services and moves all Journal Entries from Workday into the SERVRECTRANS table. Each service call includes the relevant details passed from Workday. The memo field will be used to provide details on the request entered in Maximo.

- Purchasing and receipts is following the purchasing process.
  Any process involving the purchasing of inventory or materials will be following the PR/PO process and updates to inventory counts will not be executed for this process. If inventory needs to be adjusted after the item has been procured, an adjustment will need to be made in Maximo to update the counts.

- Maximo Transaction Processing:
  The invoked Maximo enterprise services process the services transaction using the provided data. Only services will be invoked. Tools, Items, Materials, and Labor will not be included in the transaction processing.

- Workday Restriction Processing:
  Work orders are only allowed to receive new journal entries from Workday when the work order is in an approved state and before the work order is closed. Once the work order is closed, workday will deactivate the work order to avoid errors.

- Error Handling:
  Maximo Message Reprocessing application will be utilized to reprocess errored-out transactions.

The diagram below hi-lights the approach of pulling Account data from Workday to Maximo. This approach, which is driven by a Maximo CRON Task, is expected to be used for other Workday-to-Maximo data flows as well.

Maximo 'Pull' of Account data from Workday

Process Flow
1. Maximo CRON Task initiates a pull of data
2. AC Flow uses W/D Connector to pull data
3. AC Flow uses Calls Maximo Enterprise Service to update Maximo
   - Enterprise Service provides Error Management

Queue supports
Error Management

- All purchasing and Receipt process will be completed through the PR/PO process and inventory adjustments will need to be completed in Maximo.
- All updates from Workday will use ServRecTrans.

Benefits:

- Streamlined process: Journal entries flow seamlessly from Workday to Maximo.
- Data accuracy: The integration minimizes the risk of manual errors during data transfer.
- Efficient tracking: Journal entries are promptly and accurately recorded in Maximo for further processing.

MAPPING

Workday Journals		Maximo Objects		WORKDAY API	
Service		SERVRECTRANS			
OBJECT	ATTRIBUTE			Required	Default Value
WORKORDER	WONUM	UPPER 12		Yes	
WORKORDER	ORGID	UPPER 8		Yes	
WORKORDER	SITEID	UPPER 8		Yes	
SERVRECTRANS	ENTERBY	UPPER 12		Yes	
SERVRECTRANS	ENTERDATE	DATE		Yes	
SERVRECTRANS	QUANTITY	DECIMAL 15		Yes	
SERVRECTRANS	UNITCOST	AMOUNT 14		Yes	
SERVRECTRANS	LINECOST	AMOUNT 14		Yes	

SERVRECTRANS	FINANCIALPERIOD	ALN 6	No	
SERVRECTRANS	TRANSDATE	DATETIME	Yes	
SERVRECTRANS	DESCRIPTION	ALN 150	Yes	
SERVRECTRANS	CURRENCYLINECOST	DECIMAL 15	No	
SERVRECTRANS	PRORATED	YORN 1	Yes	N
SERVRECTRANS	SOURCESYSID	ALN 10	Yes	
SERVRECTRANS	EXTERNALREFID	ALN 10	Yes	
SERVRECTRANS	ISSUETYPE	UPPER 20	No	
SERVRECTRANS	COSTINFO	YORN 1	Yes	N
SERVRECTRANS	REFWO	UPPER 12	Yes	
SERVRECTRANS	ORGID	UPPER 8	Yes	
SERVRECTRANS	ACTUALSTASKID	INTEGER 12	No	
SERVRECTRANS	TASKID	INTEGER 12	No	
SERVRECTRANS	LINETYPE	UPPER 15	Yes	Service
SERVRECTRANS	INSPECTEDQTY	DECIMAL 15	No	
SERVRECTRANS	ACCEPTEDCOST	DECIMAL 15	No	
SERVRECTRANS	STATUS	UPPER 12	Yes	APPR
SERVRECTRANS	GLDEBITACCT	GL 79	Yes	
SERVRECTRANS	GLCREDITACCT	GL 79	Yes	

SAMPLE PAYLOAD

```xml
<?xml version="1.0" encoding="UTF-8"?>
<SyncMXSERVRECTR xmlns="http://www.ibm.com/maximo"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
 <MXSERVRECTRSet>
  <WORKORDER action="Change">
   <WONUM>1097</WONUM>
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   <SITEID>BEDFORD</SITEID>
```

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      "financialperiod": "202002",
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  "orgid":"PIMA",
  "wonum": "2000002101"
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}
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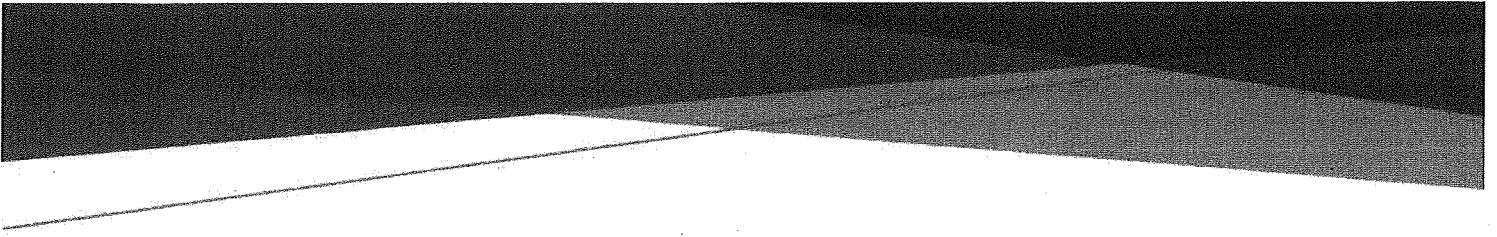
EXHIBIT C-2

WORK ORDER HEADER SPECIFICATION

Overview

Tailoring of the work order header interface from Maximo to Workday organizations functionality, to incorporate additional requirements that are not part of the Maximo-Workday Connector design. The current design covers the functionality to send over the work order information when the work order is approved. This process will send over the work order to Workday and activate the work order to be used throughout the system. When a work order is closed an update from Maximo will be sent to Workday to deactivate the organization. This will restrict users in Workday from using the Maximo work order for entries on journal entries. Below is the design and the current requirements.

Design and Requirements

From WO Status	To WO Status	WOACCEPTSCHARGES Flag	LABORACCEPTSCHARGES Flag	Custom Workorder in Workday expected results
WAPPR	APPR	Y	Y	Activate
WAPPR	APPR	N	N	Deactivate
APPR	APPR	Y	Y	Activate
APPR	APPR	N	N	Deactivate
APPR	WAPPR	N	N	Deactivate
APPR	WAPPR	Y	Y	Deactivate
APPR	CLOSE	Y	Y	Deactivate
APPR	CLOSE	N	N	Deactivate
APPR	CAN	Y	Y	Deactivate
APPR	CAN	N	N	Deactivate
APPR	WMATL	Y	Y	Deactivate
APPR	WMATL	N	N	Deactivate
WMATL	APPR	N	N	Deactivate
WMATL	APPR	Y	Y	Activate

The trigger points for this integration are APPR, WMATL, CLOSE, WAPPR, and CANCEL. Depending on when the WOACCEPTSCHARGES and LABORACCEPTSCHARGES flag is checked will determine when the workorder in Workday will be active or inactive. The specifics can be seen from the table above. The data being sent back and forth to Workday is the workorder number, whether the workorder is active or inactive in Workday, and workorder description. While we are sending WOACCEPTSCHARGES, and LABORACCEPTSCHARGES those are used to drive the status of the workorder in Workday.

Parent, child, and task workorders are being sent to Workday, but due to the current restriction in Workday, we are not appending all workorder, children, and task numbers as one number. That design discussion will need to occur out of this PCR as the solution is not well defined. Workorders will also not have a defined hierarchy to children or tasks as part of this design work. To build a proper hierarchy in

Workday, using App Connect, would require time outside of our current schedule to properly build the solution. Alternatives are being looked at but are not currently in scope of this build.

Workday will not be sending updates back to Maximo, as the driving force of the changes will be Maximo. There will be a manual process to close the WO in Maximo to avoid closing the work out in case there is a reference document open in both systems. There will not be a need to reopen a closed work order.

EXHIBIT C-3

PIMA County

MAS 8.x Maximo Spatial – ArcGIS Enterprise (version 11.1) Integration

By : A-Hadi Hor (abdel-hadi.hor@ibm.com)

Introduction

Integrating ArcGIS Enterprise with Maximo Spatial REST involves connecting the Enterprise GIS system with IBM Maximo Asset Management, which is used for managing and maintaining assets such as utility infrastructure, Transportation, equipment, and facilities. This integration will allow to leverage the spatial capabilities of ArcGIS Web GIS Services within Maximo, enhancing the ability to visualize, analyze, and manage assets, Work orders, and service requests in a geospatial context.

ArcGIS Enterprise with Maximo Spatial Integration Steps

- ### Requirements:

Ensure that you have the necessary licenses and software installations for both ArcGIS Enterprise and IBM Maximo Asset Management, including the Maximo Spatial add-on.

- ### Configure ArcGIS Server:

Set up and configure ArcGIS Server as part of the ArcGIS Enterprise installation.

- ### Enable Maximo Spatial REST Service:

In Maximo, enable the Maximo Spatial REST service. This service provides a REST API that allows to communicate with Maximo from the GIS environment.

- ### Configure ArcGIS Enterprise:

Configure ArcGIS Enterprise to recognize and interact with the Maximo Spatial REST service. This typically involves setting up a connection in ArcGIS Server.

- ### Data Synchronization:

Determine which data is needed to synchronize between Maximo and ArcGIS. This could include asset locations, work orders, service requests, inspections, and more. Make sure that both systems use consistent identifiers (e.g., unique asset IDs) to be able to link layers.

- ### GIS Data Preparation:

Ensure that GIS data layers in ArcGIS Enterprise are properly configured to match the Maximo data schema. This may involve creating or modifying feature classes and attribute schemas.

- ### Spatial Data Loading:

Load the spatial data from Maximo into ArcGIS Enterprise using geoprocessing tools or scripts to automate this process. Ensure that the data remains synchronized over time.

- ### Geospatial Analysis:

Use ArcGIS tools to perform geospatial analysis on your Maximo asset data.

Examples:

- Analyze the proximity of assets to one another,
- Perform network analysis, or visualize work order distribution on a map.

● Map Integration

Create Web GIS Maps within ArcGIS Enterprise that incorporate Maximo asset data. Maximo users can use these WebMaps to view asset locations, work order status, and other relevant information.

● Real-Time Updates

Implement mechanisms to ensure that changes made in Maximo are reflected in your ArcGIS system in real-time or through scheduled updates.

● Security and Permissions

Implement appropriate security measures to ensure that only authorized users can access and modify data in both Maximo and ArcGIS. Set up permissions and authentication as needed.
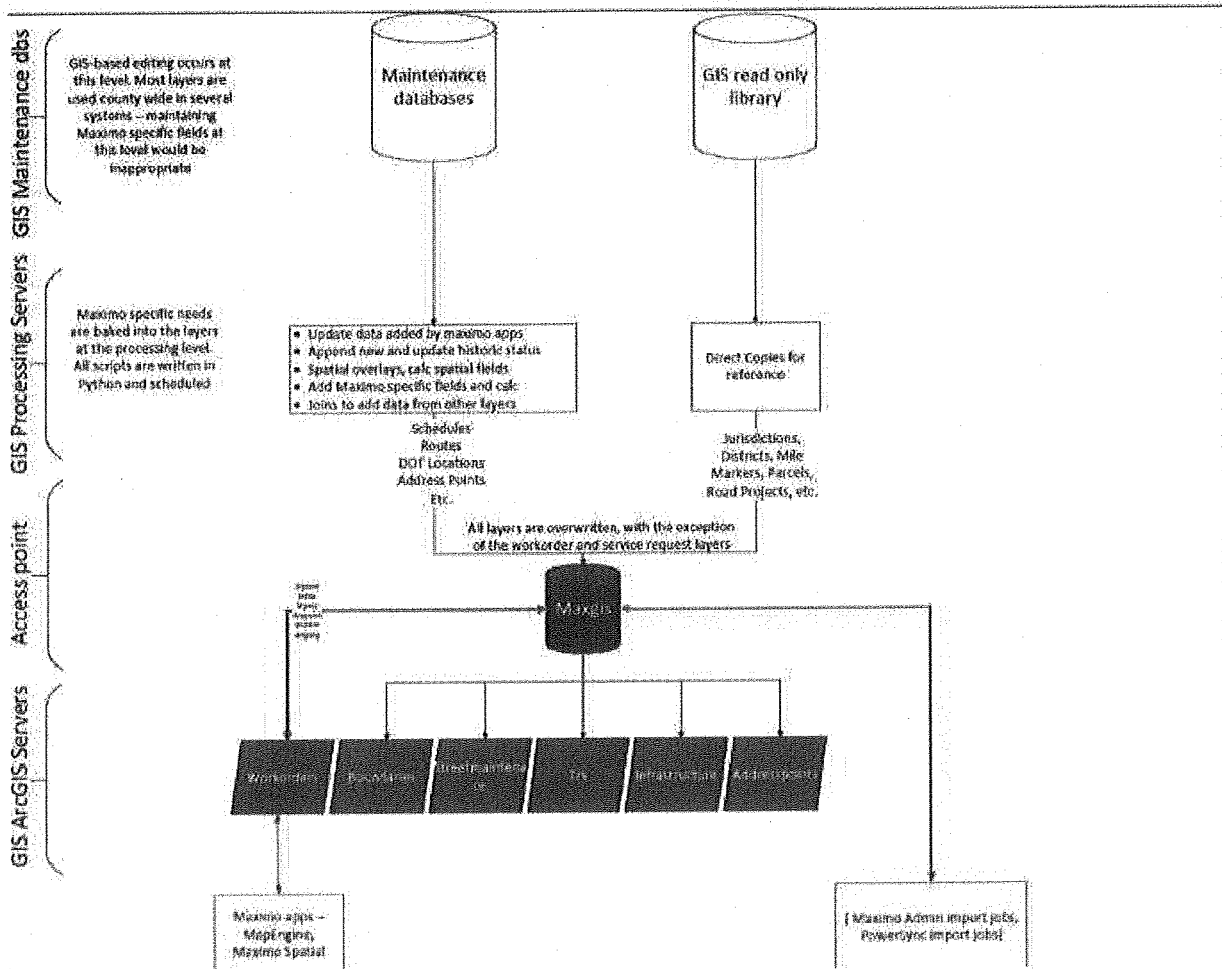
● Testing and Validation

Thoroughly test the integration to ensure that data synchronization, geospatial analysis, and map visualization work as expected. Resolve any discrepancies or issues that arise during testing.

PIMA County Current Architecture

PIMA County currently uses a **tightly coupled model integration** between Maximo 7.6.x Spatial - and ArcGIS Server 10.3 integration. This approach will reduce or eliminate data duplication. From a practical standpoint, this means that the attributes for spatially enabled Maximo entities (e.g., Assets and Locations) exist only in one consolidated system. Using one database (MAXGIS) to link, view and share the data by both the GIS and Maximo systems. the data in the MAXGIS Maximo layers will also be the subject of continuous manipulation and updates through geoprocessing and scripts (as described in the PIMA diagram below)

- Overwrite layers
- Appending new data
- Adding new fields to existing objects
- Field calculations
- Creating joins and relates as needed

GIS-based editing occurs at this level. Most layers are used county wide in several systems – maintaining Maximo specific fields at this level would be inappropriate

Maintenance databases

GIS read only library

Maximo specific needs are baked into the layers at the processing level. All scripts are written in Python and scheduled

- Update data added by maximo apps
- Append new and update historic status
- Spatial overlays, calc spatial fields
- Add Maximo specific fields and calc
- Joins to add data from other layers

Direct Copies for reference

Schedules
Routes
DOT Locations
Address Points
Etc.

Jurisdictions, Districts, Mile Markers, Parcels, Road Projects, etc.

All layers are overwritten, with the exception of the workorder and service request layers

Maxgis

Workorders   ...   Infrastructure   ...   Infrastructure   Assets/assets

Maximo apps – Map region, Maximo Spatial

Maximo Admin import jobs, Powersync import jobs

It is also important to mention in the real-world GIS editing workflow it is unlikely that GIS edits are available immediately to Maximo. This is because enterprise GIS edits typically are performed using the ArcGIS versioned editing model. GIS editors perform edits in their own "versions" of the geodatabase. The database views used to integrate Maximo and GIS data typically would not see these edited versions. In reality, GIS editors may wait hours, days, or even weeks before posting edits that would be viewable by Maximo users and PIMAC has to take this into account as well.

High Level Proposed Approach

The diagram below shows how the Maximo Spatial and GIS feature layers (from features services) are configured, connected and synched in the backend.

Maximo Spatial - Map Component Architecture
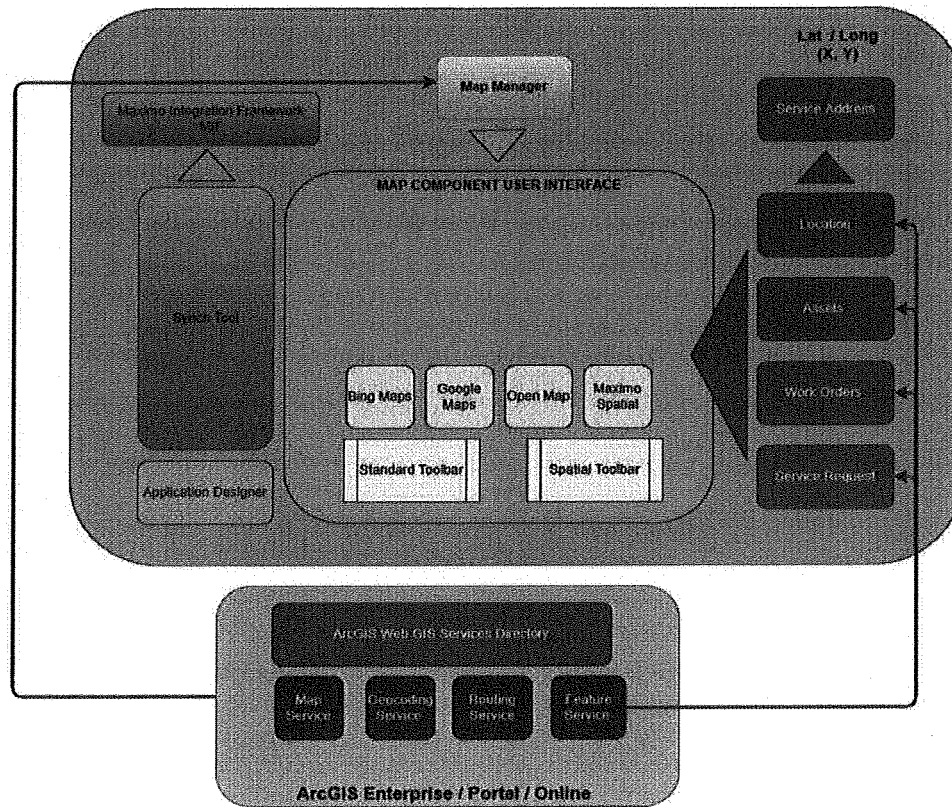
Maximo Spatial – ArcGIS Web GIS Service REST Based

For most of all the services, applications and workflows at PIMAC, we need only a Maximo Spatial Integration with Enterprise GIS that will involve the integration of Maximo, and the feature services and Map Manager are components used in this integration process.

1. **Feature Services**: Feature services are a fundamental component of GIS systems. They allow to publish and share spatial data as web services. Maximo can interact with these feature services through REST to retrieve and update spatial data.
2. **Map Manager**: Map Manager is a component that plays a key role in Maximo's integration with Enterprise GIS. It is responsible for managing and configuring the spatial data integration within Maximo.

**Setting up and Configuring the Map Manager will require**:

a. Configuration: In Maximo, configure the integration with GIS by setting up connections to ArcGIS servers and defining mapping rules between Maximo's asset data and GIS layers. These configurations are done within the Map Manager.
b. Data Synchronization: Map Manager helps synchronize data between Maximo and the GIS. This includes retrieving spatial data from GIS layers (such as the location of assets) and displaying them within Maximo.

c. Spatial Analysis: With the integration in place, Maximo users can perform spatial analysis within Maximo, such as finding the nearest asset to a specific location or visualizing the distribution of work orders on a map.

d. Work Order Assignments: Maximo can use spatial data to optimize work order assignments. For example, it can assign a maintenance task to the nearest available technician based on the asset's location.

e. Reporting: create spatial reports and dashboards in Maximo to visualize asset and work order data on maps, which can provide valuable insights for decision-making.

f. Data Updates: When changes occur in Maximo (e.g., asset maintenance or updates), the integration ensures that these changes are reflected in the GIS as well, ensuring data consistency.
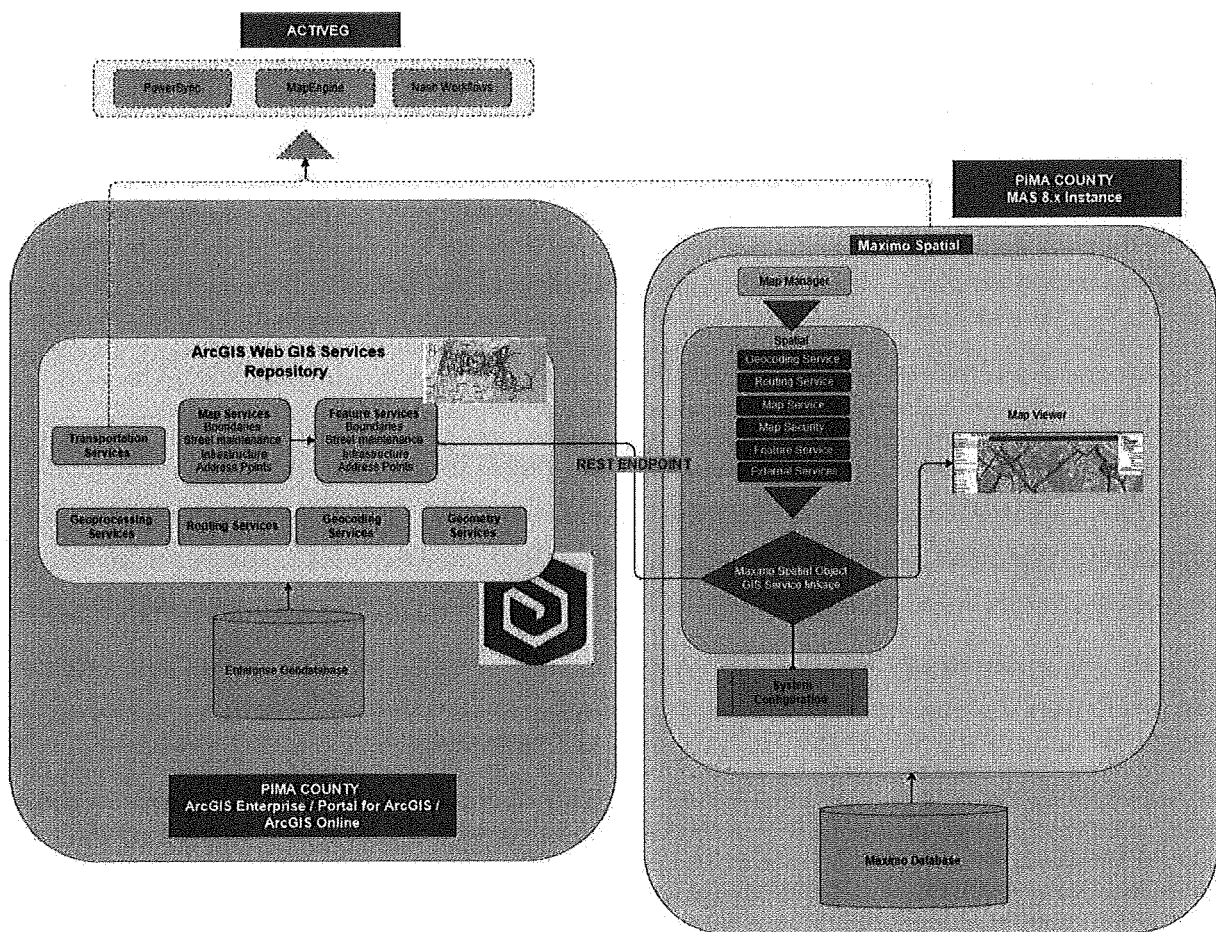

For the services, applications that require ActiveG tier and its application (PowerSync, MapEngine, and Nash Workflows) such as transportation, it is recommended to :

- Re-Design the new Map and Feature services by making sure it uses GIS datasets from the ArcGIS Enterprise database (newly upgraded)
- Republish the new Map and feature services in ArcGIS Server /Portal / ArcGIS Online
- Configure the Routing and geocoding services
- Set security of the Map and feature service on Map Manager.

- Create GIS Objects in Map Manager that can be mapped only to the GIS Layer in the ArcGIS Enterprise
- Configure GIS Object from Maximo Spatial (Assets/Work orders, Services Requests) with GIS feature layers to make sure they are in Synch.
- Consume the REST Endpoint on ACTIVEG

Solution Outline

The current integration approach at PIMA County is based on using one single "central" database **MAXGIS** shared between both the GIS Enterprise and Maximo Asset Management system (se diagram below).
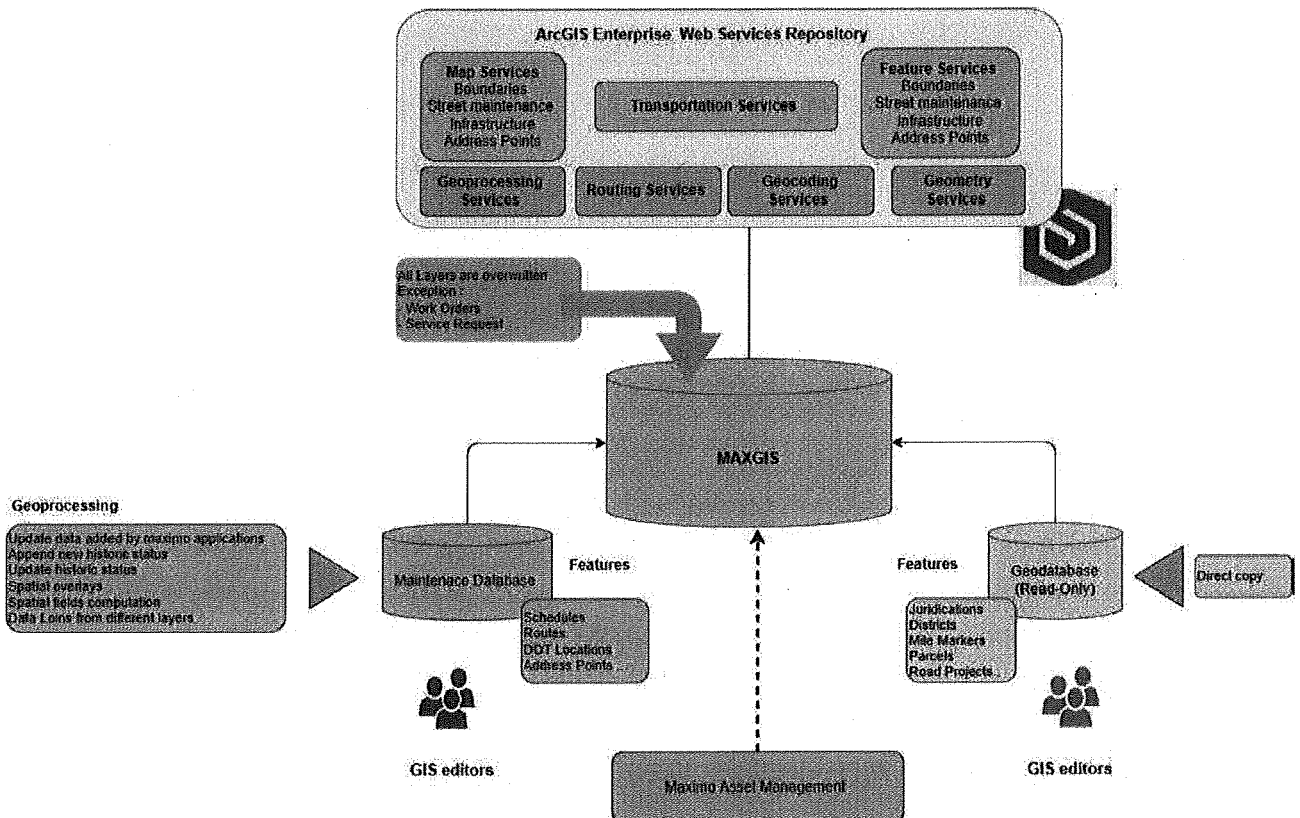
It is important to indicate that using a single database and one single point for all Web Maps and features services (hosted on ArcGIS Enterprise/Portal/ArcGIS Online) for Maximo Spatial and GIS could provide GIS basic functionalities such as creating geometries and updating attributes. overwriting layers, spatial analysis, some data consistency, streamlined integration, and unified reporting. However, this approach, on the other hand, will always depend on the multiple geoprocessing tasks and updating scripts to keep the data updated in all the applications and services, it also comes with challenges related to:

1. **Complex Data Management:** Combining asset and spatial data in a single database can lead to complex data management, especially as the volume of data grows. Data structures and schemas must accommodate both types of data effectively.

2. **Data Governance:** Ensuring data governance and security can be more challenging with a single database, as different departments or users may have varying access requirements for spatial and asset data.

3. **Performance Considerations:** Depending on the scale of data and system usage, performance can become a concern. Querying and reporting on complex spatial and asset data may require robust hardware and database optimization.

4. **Backup and Recovery:** Backup and recovery procedures must consider both asset and spatial data, and any issues or downtime in one area can affect the other.

5. **Maintenance Challenges:** Maintaining a single database for both Maximo Spatial and GIS may require specialized expertise, which can be a challenge for resource allocation and training.

6. **Compatibility and Upgrades:** Ensuring compatibility during software upgrades and updates for both Maximo and GIS can be more complex when they share the same database.

The proposed integration will eliminate the automation geoprocessing scripts and there will be no need to overwrite data, Both Maximo spatial and Enterprise ArcGIS will maintain their own databases and data synchronization will integrate these two databases, this can be achieved using various methods

- **APIs (application programming Interfaces)** – through ArcGIS and Maximo REST APIs, it will be possible to access, and update data. APIs can be used to establish a connection between the two systems and enable data synchronization.
- **ETL (Extract, Transform, Load) Processes:** ETL processes can be employed to extract data from one system, transform it into the required format, and load it into the other system. This approach allows for data transformation and mapping to ensure compatibility.
- **Data Connectors:** Middleware or data connectors can be used to facilitate data exchange between the two systems. These connectors are responsible for mapping and transferring data between the GIS and Maximo databases.

During the integration process, data mapping is crucial. This involves defining how GIS spatial data relates to asset data in Maximo. For instance, we'll need to establish links between GIS feature classes (layers) and Maximo asset types, specifying which attributes in each system correspond to each other using the Out-Of-The-Box Maximo Spatial Map Manager.

To keep data synchronized in real-time or near real-time, scheduled update processes can be set up. These processes periodically query both systems for changes and apply updates as needed to ensure that spatial and asset data are consistent.

The table below highlights some other benefits of using the the proposed ArcGIS Enterprise – Maximo Spatial integration.

Aspect	Maximo Spatial - ArcGIS Enterprise Integration Benefit
Spatial Data Integration	Maximo Spatial seamlessly integrates with ArcGIS Enterprise, allowing users to bring in spatial data from various sources, such as GIS databases, shapefiles, CAD, Imagery and online maps.
Asset Location and Visualization	PIMA County Users can visualize assets and their associated data on maps within Maximo. This helps in understanding the geographic context of assets, which is crucial for planning, maintenance, and decision-making.
Real-Time Asset Tracking	Maximo Spatial can track the real-time location of assets using GPS or other tracking technologies. This is valuable for monitoring mobile assets and optimizing their routes and usage.
Work Order Planning and Scheduling	ArcGIS integration allows planners and schedulers to optimize work orders based on the spatial location of assets, minimizing travel time and costs.
Spatial Analysis	Users can perform spatial analysis directly within Maximo, leveraging the capabilities of ArcGIS. This includes spatial queries, proximity analysis, and geospatial calculations to make informed decisions.
Environmental Compliance	Maximo Spatial can help PIMA County ensure compliance with environmental regulations by mapping sensitive areas, monitoring environmental parameters, and generating reports for regulatory authorities.
Emergency Response and Incident Management	During emergencies or incidents, Maximo Spatial provides a real-time view of assets and resources, helping PIMA Country to respond effectively and allocate resources efficiently.
Dashboard and Reporting	Users can create interactive dashboards and reports that combine asset data with spatial visualization. This aids in monitoring asset performance, identifying trends, and making data-driven decisions.
Inventory Management	Spatial integration enables better inventory management by tracking the location of spare parts and materials, reducing stockouts, and optimizing stocking levels based on asset locations.
Asset Lifecycle Management	Maximo Spatial helps organizations manage the entire asset lifecycle, from planning and design to decommissioning, by providing visibility into spatial relationships and dependencies.
Mobile Workforce Enablement	Field technicians equipped with mobile devices can access spatial information and work orders in real-time, improving their efficiency and accuracy in asset maintenance and inspections.
Data Quality and Accuracy	By integrating with ArcGIS Enterprise, Maximo ensures that spatial data is accurate and up-to-date, reducing errors in asset management and maintenance.
Scalability and Customization	PIMA County can scale the solution to meet their specific needs and customize workflows, forms, and reports to align with their unique asset management requirements.
Security and Access Control	Maximo Spatial and ArcGIS Enterprise provide robust security features, ensuring that sensitive spatial and asset data is protected and accessible only to authorized personnel.
Compliance and Reporting	The integration facilitates compliance with regulatory requirements by providing accurate records and audit trails related to asset management and spatial data.

Here's an outline of the steps involved in setting up Maximo Spatial with ArcGIS:
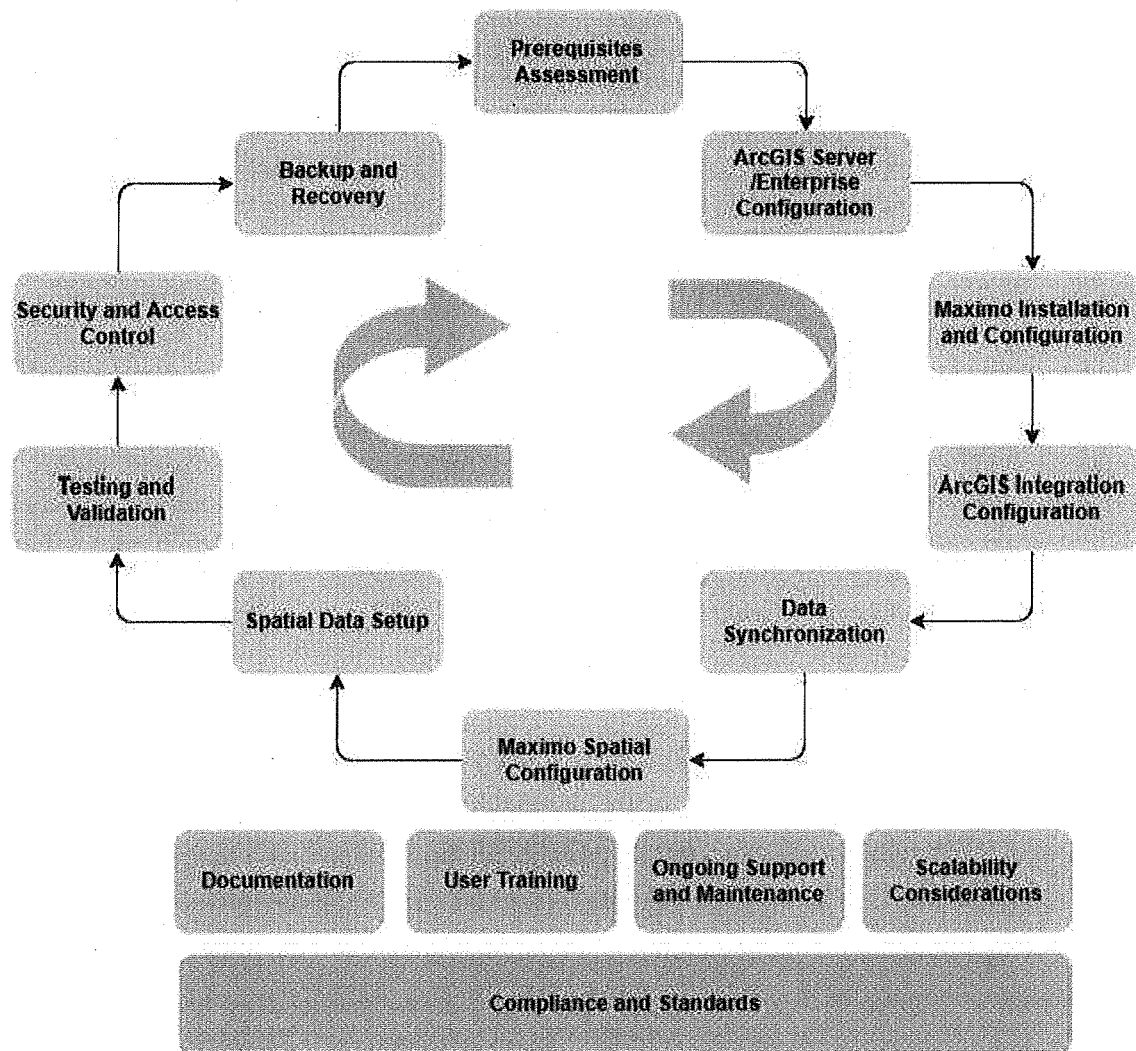
1. Prerequisites Assessment:

Ensure the following prerequisites are in place:

- A working installation of IBM Maximo Asset Management.

- An instance of Esri ArcGIS Server or ArcGIS Enterprise set up and configured.

2. ArcGIS Server Configuration:

- Ensure that the ArcGIS Server is configured with the necessary services, including map services, feature services, and image services.

3. Maximo Installation and Configuration:

- Install and configure IBM Maximo Asset Management on your server following IBM's installation guidelines.

- Ensure that Maximo is properly configured to meet PIMAC needs, including configuring security, user access, and business rules.

4. ArcGIS Integration Configuration:

- Configure the integration between Maximo and ArcGIS. This typically involves:

    - Providing the connection details of your ArcGIS Server or ArcGIS Enterprise.

    - Defining which spatial layers in ArcGIS correspond to Maximo asset types and locations.

    - Mapping Maximo asset attributes to GIS attributes.

5. Data Synchronization:

- Establish a data synchronization process to keep Maximo and ArcGIS data up-to-date with changes made in either system. This may involve scheduled batch updates or real-time synchronization.

6. Maximo Spatial Configuration:

- Configure Maximo to use spatial data. This includes setting up map services, enabling spatial functionality in Maximo applications, and defining how spatial data is displayed within Maximo.

7. Spatial Data Setup:

- Prepare spatial data for your assets in a format compatible with ArcGIS (e.g., shapefiles, feature classes). Ensure that the data includes geographic coordinates or other spatial attributes.

8. Testing and Validation:

- Thoroughly test the integration to ensure that spatial data displays correctly in Maximo and that asset location information is synchronized accurately between Maximo and ArcGIS.

9. Security and Access Control:

- Implement security measures to control access to spatial data within Maximo and ArcGIS. Ensure that users only have access to the data relevant to their roles.

10. Backup and Recovery:

- Establish backup and disaster recovery procedures to safeguard both Maximo and ArcGIS data in case of unexpected issues or data loss.

It is critical to also consider the following.

➢ Documentation:

- Document the integration process, configurations, and synchronization procedures comprehensively for reference and troubleshooting purposes.

➢ **User Training:**

- Train Maximo users and administrators on how to use the spatial capabilities within Maximo effectively. Ensure they understand how to access and work with spatial data.

➢ **Ongoing Support and Maintenance:**

- Plan for ongoing support and maintenance of the Maximo Spatial and ArcGIS integration. This includes addressing software updates, patches, and providing user support as needed.

➢ **Scalability Considerations:**

- Consider how the integration will scale as the organization's assets and spatial data grow. Ensure that the integration architecture can handle increased data volumes and user loads.

➢ **Compliance and Standards:**

- Ensure that the integration complies with industry standards and regulations, especially in sectors involving critical infrastructure and sensitive spatial data.

Installation and configuration Tasks & Sub-Tasks.

Configuring Maximo Spatial with ArcGIS involves multiple tasks and sub-tasks to ensure seamless integration. Below is a breakdown of these tasks and their associated sub-tasks:

1. Pre-Installation Tasks:

➢ **1.1 System Requirements Assessment:**

- Check hardware, software, and network requirements for Maximo, ArcGIS, and Maximo Spatial.

➢ **1.2 Software and Licensing:**

- Acquire necessary licenses for MAS EAM, ArcGIS, and Maximo Spatial.

2. Maximo EAM Installation:

➢ **2.1 Maximo EAM Installation:**

- Follow IBM's installation instructions for Maximo EAM provided by IBM consulting team.

➢ **2.2 Database Configuration:**

- Configure the database server to support MAS Spatial.

➢ **2.3 Security Configuration:**

➢ Set up security roles and permissions within MAS.

3. ArcGIS Installation:

- **3.1 ArcGIS Installation:**

  - ➢ Install and deploy the required version of ArcGIS Enterprise 11.x (PIMAC GIS Team)

  - ➢ Setup ArcGIS Server /Portal for ArcGIS/ArcGIS Online

- **3.2 Licensing:**

  - ➢ Activate ArcGIS (Desktop and Enterprise) licenses as needed (Contact Esri Customer Service / PIMAC GIS team).

4. Maximo Spatial Installation:

- **4.1 Maximo Spatial Installation:**

  - ➢ Install the MAS 8.x - Maximo Spatial add-on (IBM Consulting)

5. Database Configuration:

- **5.1 Database Schema Setup:**

  - ➢ Create or modify database tables and schemas to accommodate Maximo Spatial.

6. Maximo Configuration:

- **6.1 Spatial Data Sources:**

  - ➢ Define spatial data sources and connections within Maximo.

- **6.2 ArcGIS Server Configuration:**

  - ➢ Specify the ArcGIS server connection details.

- **6.3 Map and Feature Services:**

  - ➢ Configure map/feature services in Maximo to access spatial data.

  - ➢ List of services and layers of information

    - [Map Services: Boundaries/Street Maintenance/Infrastructure/AddressPoints]
    - [Transportation]
    - [Feature Services: Boundaries/Street Maintenance/Infrastructure/AddressPoints]
    - [Geoprocessing/Routing/Geocoding/Geometry]

    https://gisdata.pima.gov/arcgis1/rest/services/GISOpenData

    https://www.pima.gov/1943/GIS-Maps

- **6.4 Security and Permissions:**

  - ➢ Set up security roles and permissions for Maximo Spatial functions.

7. ArcGIS Configuration:

- **7.1 Map Services**:
  - ➤ Configure ArcGIS map services to be accessed from Maximo.
  - ➤ Providing the connection details of your ArcGIS Server or ArcGIS Enterprise.
  - ➤ Defining which spatial layers in ArcGIS correspond to Maximo asset types and locations.
  - ➤ Mapping Maximo asset attributes to GIS attributes.

8. Spatial Data Integration:

- **8.1 Data Import/Integration**:
  - ➤ Import existing spatial data or digitize new features in ArcGIS.
- **8.2 Geocoding and Address Matching**:
  - ➤ Configure geocoding services for address matching in Maximo.

9. Map Display and Customization:

- ➤ **9.1 Symbology**:
  - Define map symbology for asset features.
- ➤ **9.2 Labeling**:
  - Customize feature labeling on maps.
- ➤ **9.3 Pop-up Information**:
  - Configure pop-up windows with attribute information for map features.

10. Testing and Validation:

- ➤ **10.1 Data Display**:
  - Verify that spatial data is displayed correctly in Maximo.
- ➤ **10.2 Spatial Functions**:
  - Test spatial functions to ensure they work as expected.

11. Security and Permissions Review:

- ➤ **11.1 Security Testing**:
  - Verify that security roles and permissions are correctly implemented.

12. User Training:

- ➤ **12.1 Training Materials**:
  - Develop training materials for Maximo users and GIS professionals.
- ➤ **12.2 Training Sessions**:

- Conduct training sessions to educate users on Maximo Spatial functionality.

13. Documentation:

➢ **13.1 Configuration Documentation:**

- Create comprehensive documentation of configurations and workflows.

14. Maintenance and Ongoing Support:

➢ **14.1 Backup and Disaster Recovery:**

- Implement backup and disaster recovery procedures.

➢ **14.2 Performance Monitoring:**

- Set up monitoring tools for system performance.

➢ **14.3 Software Updates and Patches:**

- Keep software up to date with updates and patches.

➢ **14.4 User Support and Training:**

- Provide ongoing support and troubleshooting assistance to users.

➢ **14.5 Scalability Planning:**

- Plan for future scalability as data volumes and usage grow.

➢ **14.6 Compliance and Security Updates:**

- Ensure that security measures remain compliant with standards and regulations.
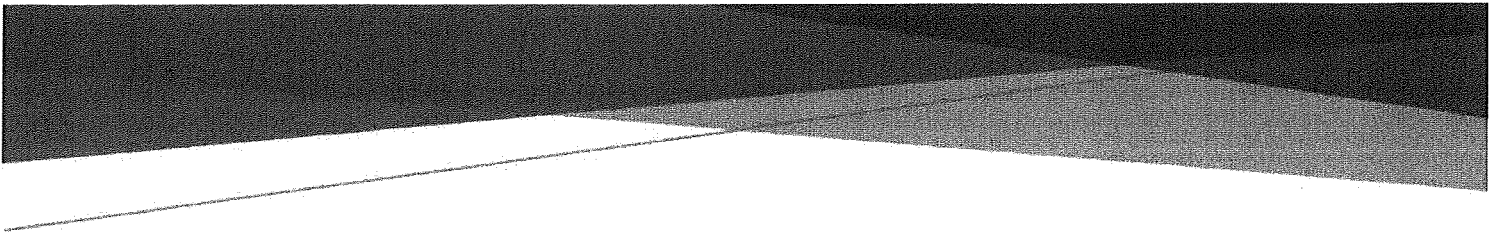
EXHIBIT C-4

MAXIMO WORKDAY COA SPECIFICATION

Design Overview

The current Maximo and Workday solution for chart of accounts doesn't work for Pima County's system. Workday doesn't have a chart of account system. Instead, they have a listing of worktags which drive the general makeup of what the general ledger account will be. These general ledger accounts are built on a set of rules which drive the creation of the account. The combination of the account, as Workday is currently designed, is not able to be sent over to Maximo as is. A report is being created, by the Workday team, to build the combination of a general ledger to be sent over to Maximo. Maximo will then take the general ledger and add it to the Chart of Accounts to be used as a source of validation. Valid general ledger accounts will reduce errors between both systems. This custom report is not supported by the core product and needs to be configured for Pima County's system.

Design Details

While the report is being built by the Workday team and this design is not the current scope of this PCR, the App Connect and Maximo customizations would need to be built to connect to the report. App Connect would need to build custom flows to connect to the report. Those flows will need to account for the GL Account being set, how it maps back to Maximo, and if the GL Account is active or not. In addition to this, the flows would need to account for differences between the Workday report and the Chart of Account in Maximo. When a GL Component is removed from Workday to Maximo, this will deactivate any GL Account with that component. When a GL Component is added new combinations will be added to the Chart of Accounts. Configurations and customizations in Maximo will need to be created to help facilitate this process.

Maximo has 4 major components for this customization:

- Cron Job – build and customize.
- Enterprise Service
- Publish Channel
- Automation Script

The Cron job will need to be built and customized to use an API to call the report details. The Cron job will need to be modified to include specific parameters to be added to connect to App Connect. The enterprise service will need to be defined. There will be custom processing rules which need to be built, object structures need to be mapped and configured to support the API call of the report, custom rules will be built to map to the externalrefid to have the enterprise service talk to App Connect. Similar configurations would need to be built for the publish channel to map to App Connect as well. An automation script will be needed to map any additional rules needed to account for out of the box Maximo not supporting for the Chart of Accounts function. While the inactive GL Component will deactivate the associated GL Accounts in the CoA, the addition of new GL Components or a re-activation of an existing component might not support the proper removal and addition of the GL Account back into the CoA. The automation script will account for any of these discrepancies.