

IBM Maximo Enterprise Adapter 7.1 for SAP ECC 6

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Objective

- Understand integration features between Maximo Asset Management 7.1 and SAP ECC 6 (ERP 6.0)
 - Understand how standard SAP adapter changed by using the new Maximo 7.1 Integration framework.
 - Understand new enhancements SAP PR BAPI program to interface Maximo PR to SAP PR and Invoices from SAP to Maximo by using one Maximo SAP adapter program.

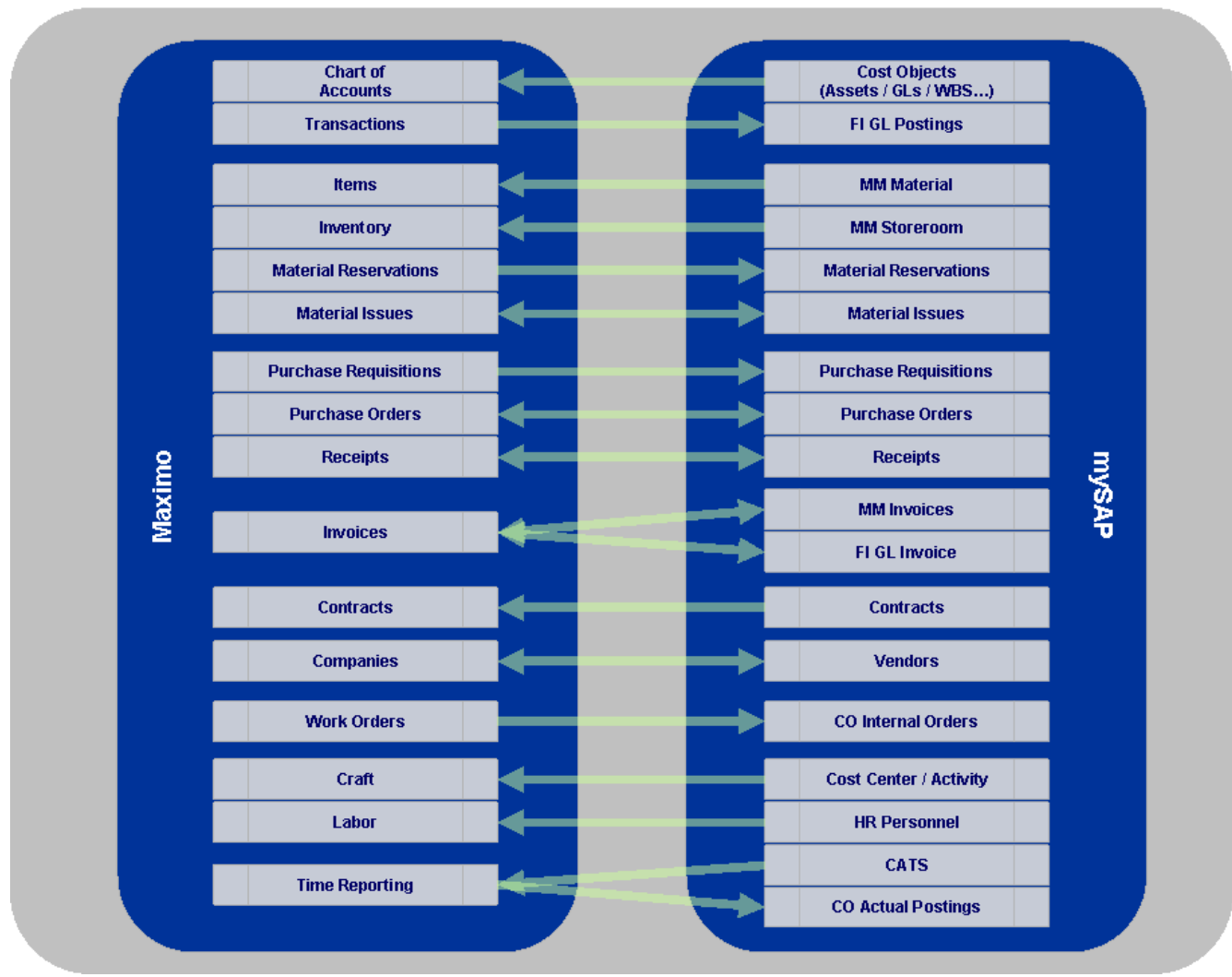
Integration Scenarios

- Scenario 1
 - MAXIMO Work & Asset Management
 - SAP General Ledger, SAP Inventory, SAP Purchasing, SAP Invoicing, SAP Accounts Payable

- Scenario 2
 - MAXIMO Work & Asset Management, Materials Management
 - SAP General Ledger, SAP Purchasing, SAP Invoicing, SAP Accounts Payable

- Scenario 3
 - MAXIMO Work & Asset Management, Materials Management, Purchasing, Invoicing
 - SAP General Ledger, SAP Accounts Payable

Integration Overview



SAP Adapter Integration Components

- **Maximo Side**
 - Maximo enterprise SAP adapter objects in Maximo
 - Java programs
 - External exits

- **SAP ERP**
 - Custom ABAP ERP ABAP programs

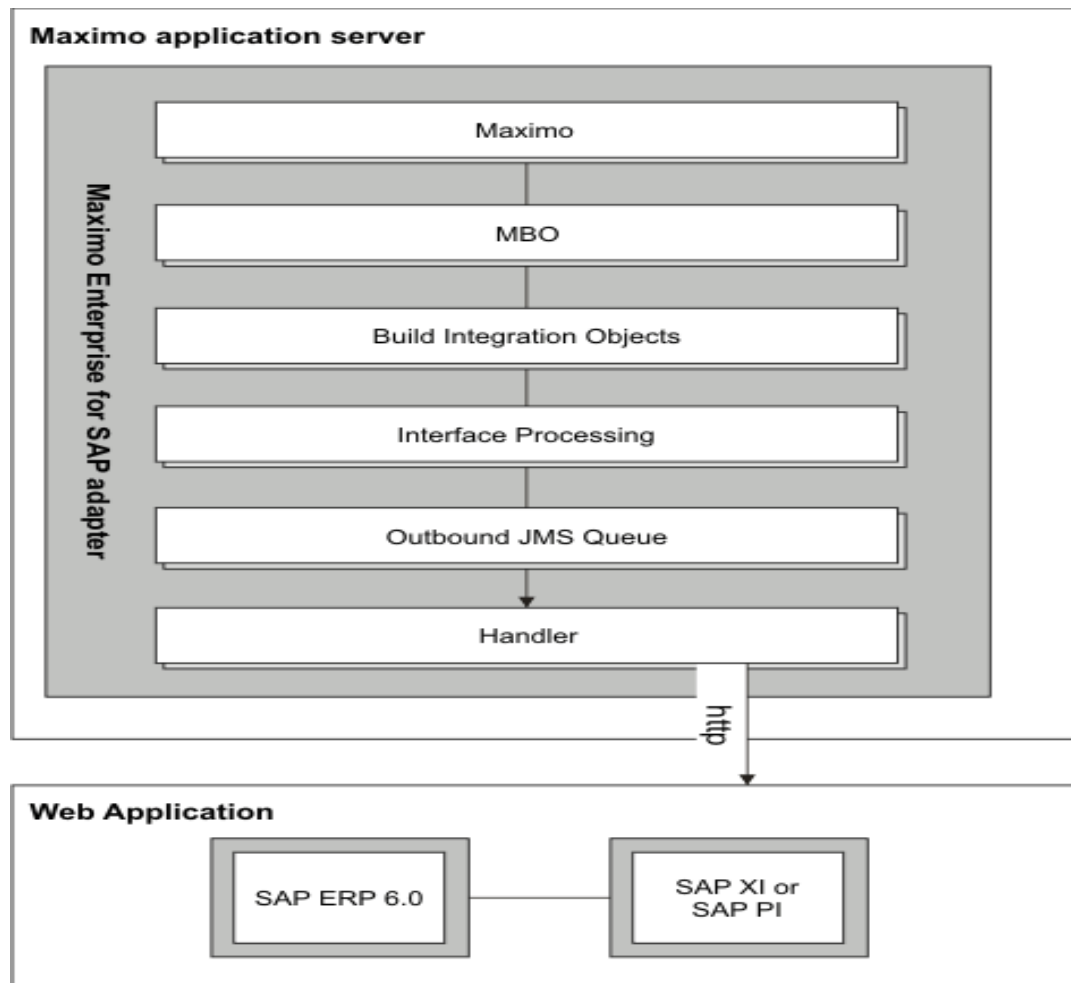
- **SAP Process Integration (PI) or SAP Exchange Infrastructure (XI)**
 - Custom software component for PI/XI objects

- Refers to IBM Maximo Enterprise Adapter 7.1 for SAP ERP 6.0 System Administrator Guide (SAG) Chapter 2 SAP Integration Process.

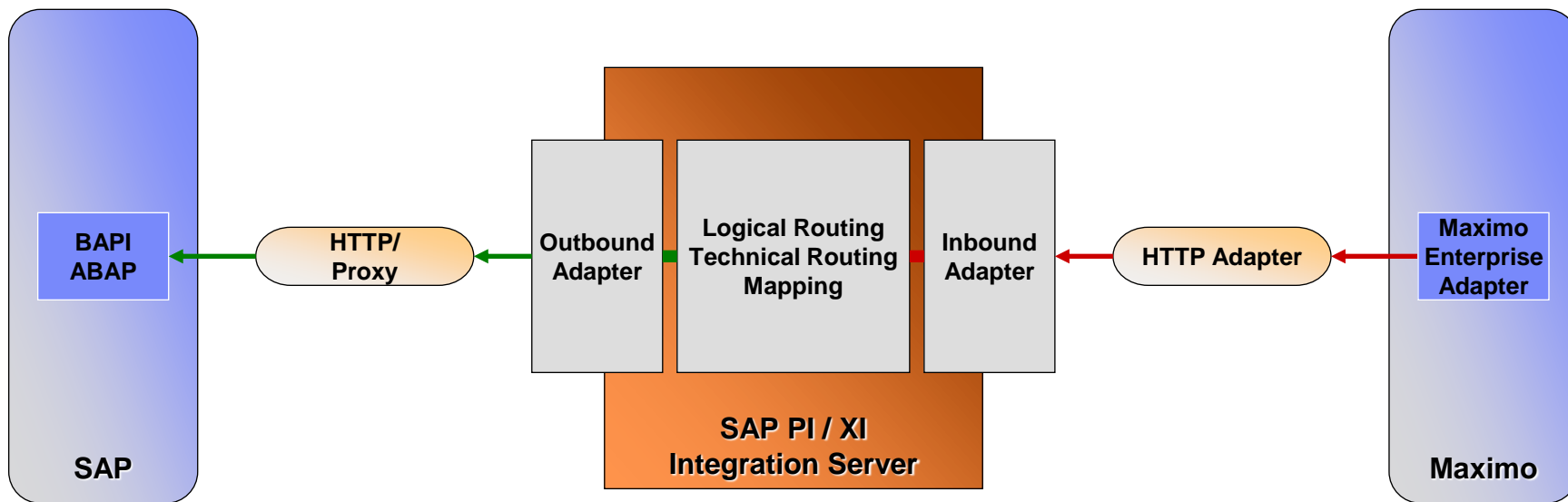
Product Overview – What's New in MX 7.1?

- Changes in SAP
 - SAP changed SAP mySAP2005 name to “SAP ERP 6.0”
 - SAP changed SAP XI to “SAP Process Integration (PI)”
- Changes in Maximo
 - Maximo Framework (Maximo Enterprise Adapter)
- Changes in SAP Adapter
 - Purchase Requisition can use new SAP PR BAPI (Enjoy PR)
 - PR Header Long Descriptions to SAP PR
 - One Enterprise Service supports 3 Invoices integrations from SAP
 - FI, MM Invoices and Invoice Variances from SAP to Maximo

Flow of Maximo Outbound Transaction to SAP



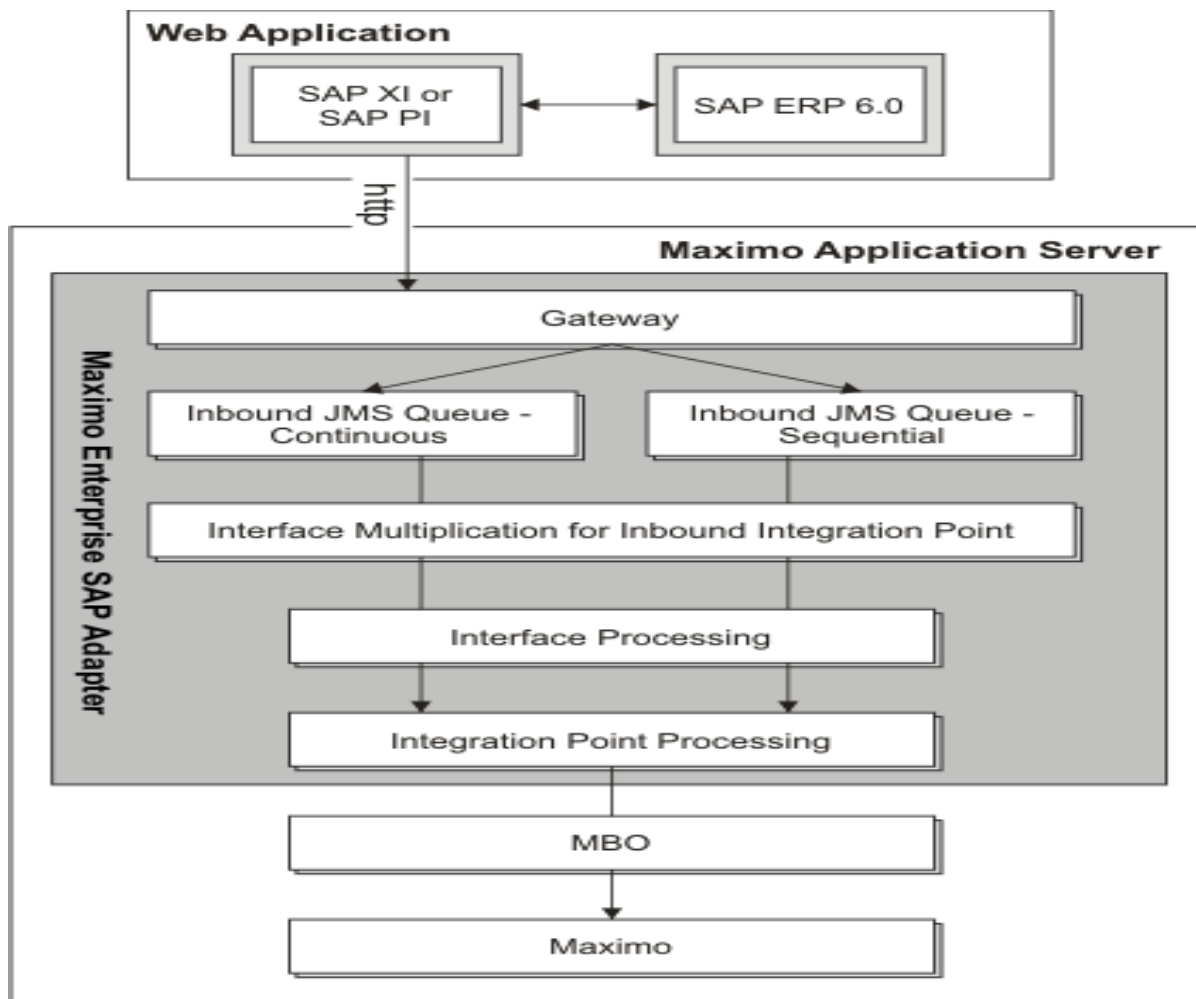
Flow of Maximo Outbound Transaction to SAP (cont)



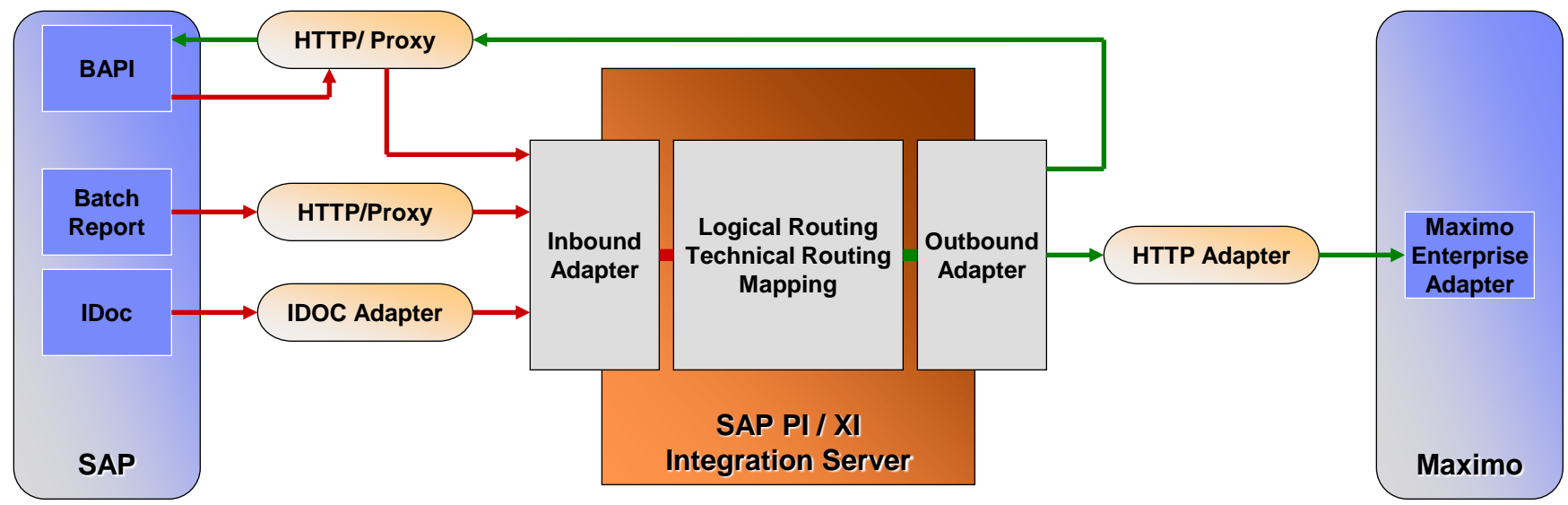
Data to SAP

1. SAP PI/XI receives XML from Maximo
2. SAP PI/XI send Data to proxy
3. Proxy calls the Function Module

Flow of Maximo Inbound Transaction from SAP



Flow of Maximo Inbound Transaction from SAP (cont)



Scenario 1: IDoc

- 1. SAP PI/XI receives an IDoc
- 2. Call BAPI
- 3. Send Data to SAP Pi/XI
- 4. Send XML to Maximo

Scenario 2: Batch Report

- 1. SAP PI/XI receives a Batch Report
- 2. Send XML to Maximo

Deep Dive – Changes in Maximo Integration Framework (MIF)

- End Points
- External System
- Object Structures
- Publish Channels (Outbound Interfaces)
- Enterprise Services (Inbound Interfaces)
- Integration Controls
- Message Re-processing
- Message Tracking

Deep Dive – End Points

- Maximo 6.x
 - External System
 - Handlers
 - Queues
 - Enable/Disable Integration Events
 - Action from External System Application
 - SAP Adapter default Value was “**SAPXI**”

- Maximo 7.1
 - Standard power application ‘End Points’
 - Handler is defined from End Point’s “Action”
 - Option to set the “Override”
 - This override value flag only applies to Invocation Channels
 - You can program the Invocation Channels to set the new “End Point”
 - SAP Adapter default Value is “**SAP2005XI**”
 - Upgrade from MX6.x clients use MX6.x End Point name “**SAPXI**”

Deep Dive – External System

- Maximo 6.x
 - Enable/Disable Inbound/Outbound Interface
 - Assign control's default value per External System
 - Single End Point
 - Defined from “Action”
 - Install Product/Update
 - SAP Adapter default value was “**SAP1**”

- Maximo 7. 1
 - Enable/Disable the Enterprise Services & Publish Channels for that External System
 - Modify default values for the Integration Controls
 - Do not need to perform Install Product/Update
 - SAP Adapter default value is “**SAP2005**”
 - Upgrade from MX6.x clients use MX6.x External System name “**SAP1**”

Deep Dive – Integration Controls

- Maximo 6.x
 - Controls were associated with the Adapter

- Maximo 7.1
 - Require to list all the controls that are used in the that Enterprise Service/Public/Invocation Channels
 - The default value can be override at the External System
 - When the users are register the Enterprise Services & Publish Channels at the External System then all of those Integration Controls will be added into that External System.
 - o May override the default value at the External System app.

 - Controls can be defined at
 - System
 - Org
 - Site

 - Keeping most of MX6.x SAP Adapter Integration Controls. Following controls are not used in MX7.1
 - SAPBSNAME
 - SAPNAMESPACEPREFIX
 - SAPNAMESPACEURI
 - SAPCOMPSETID
 - WOSEND

Deep Dive – Object Structures

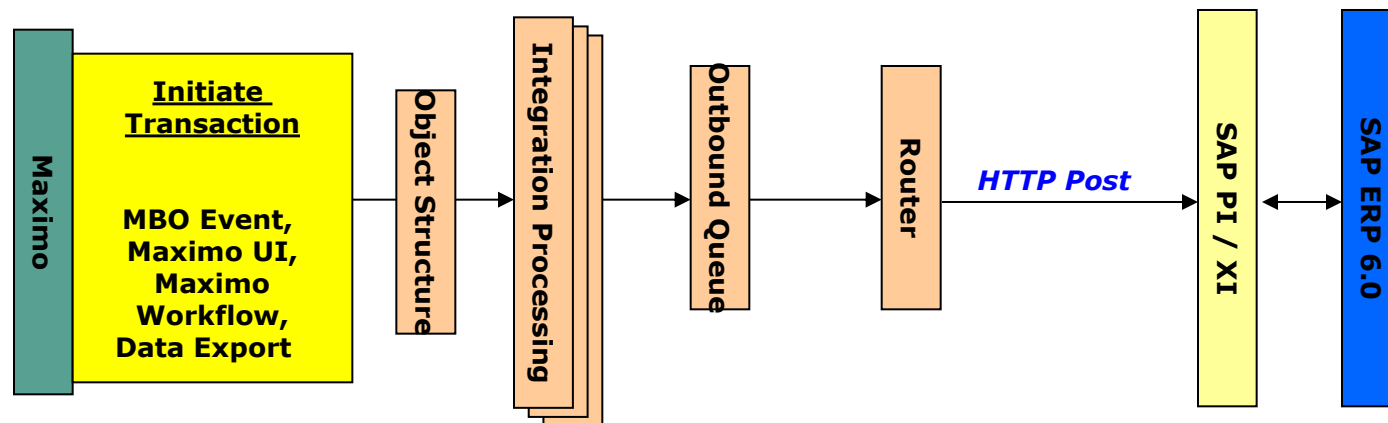
- Maximo 6.x
 - Integration Objects
 - Inbound/Outbound Integration Points

- Maximo 7.1
 - ‘Merged’ integration objects,
 - Merged integration object supported thorough non-persistent MBOs
 - User defined fields added in the MBO definition
 - All External System Adapters shares same Object Structures
 - o Name convention “SAP_”
 - “user defined” are add into the objects as the non-persistent
 - New object, “**SAP_ITEM_LDESC** is added to the ITEM Object Structure
 - Setting restrictions defined in the MBO definition

Deep Dive – Publish Channels (Outbound)

- Maximo 6.x
 - Outbound Interfaces
 - Names were “MX6_PO_TOSAP”

- Maximo 7.1
 - Event based
 - Data Export
 - Adapter association
 - Define all of the Integration Controls that are used in this service
 - Names are “MXPO_TOSAP05”



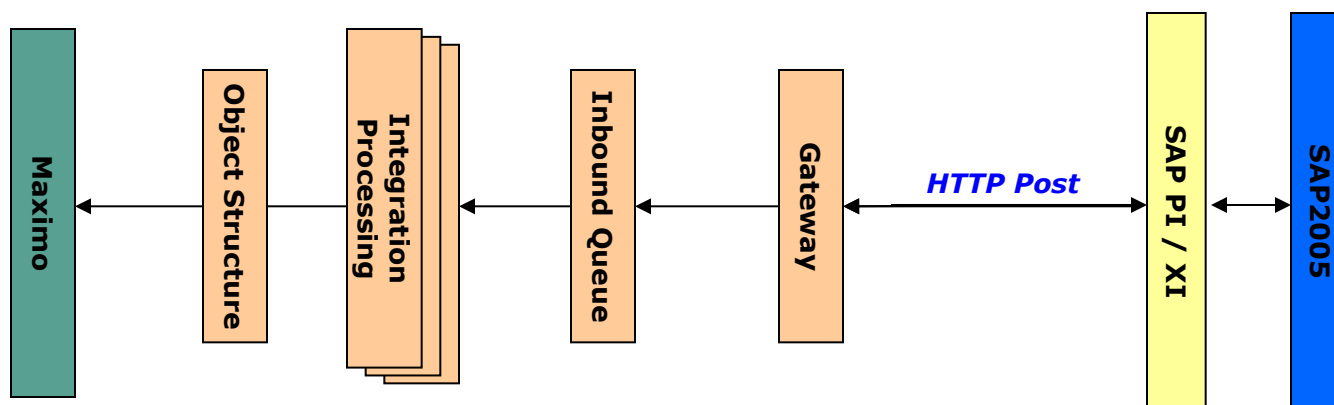
Deep Dive – Enterprise Services (Inbound)

- Maximo 6.x
 - Interface Inbound Processing
 - Names were “**MX6_PO_TOMX**”

- Maximo 7. 1
 - Create/Update/Delete and Sync (if uses web services)
 - “Create” operation provide an option to return the key of the primary MBO that was added. (Add Service)
 - Uses queues
 - Names are “**MXPO_FRSAP05**”

Deep Dive – Enterprise Services (cont)

- Maximo 7. 1
 - Indicates the “Response Enable” if responds is added to the service
 - Adapter association
 - Define all of the Integration Controls that are used in this service



Deep Dive - Troubleshooting in Maximo

- Use Maximo Integration framework
 - Message Tracking
 - Message Reprocessing

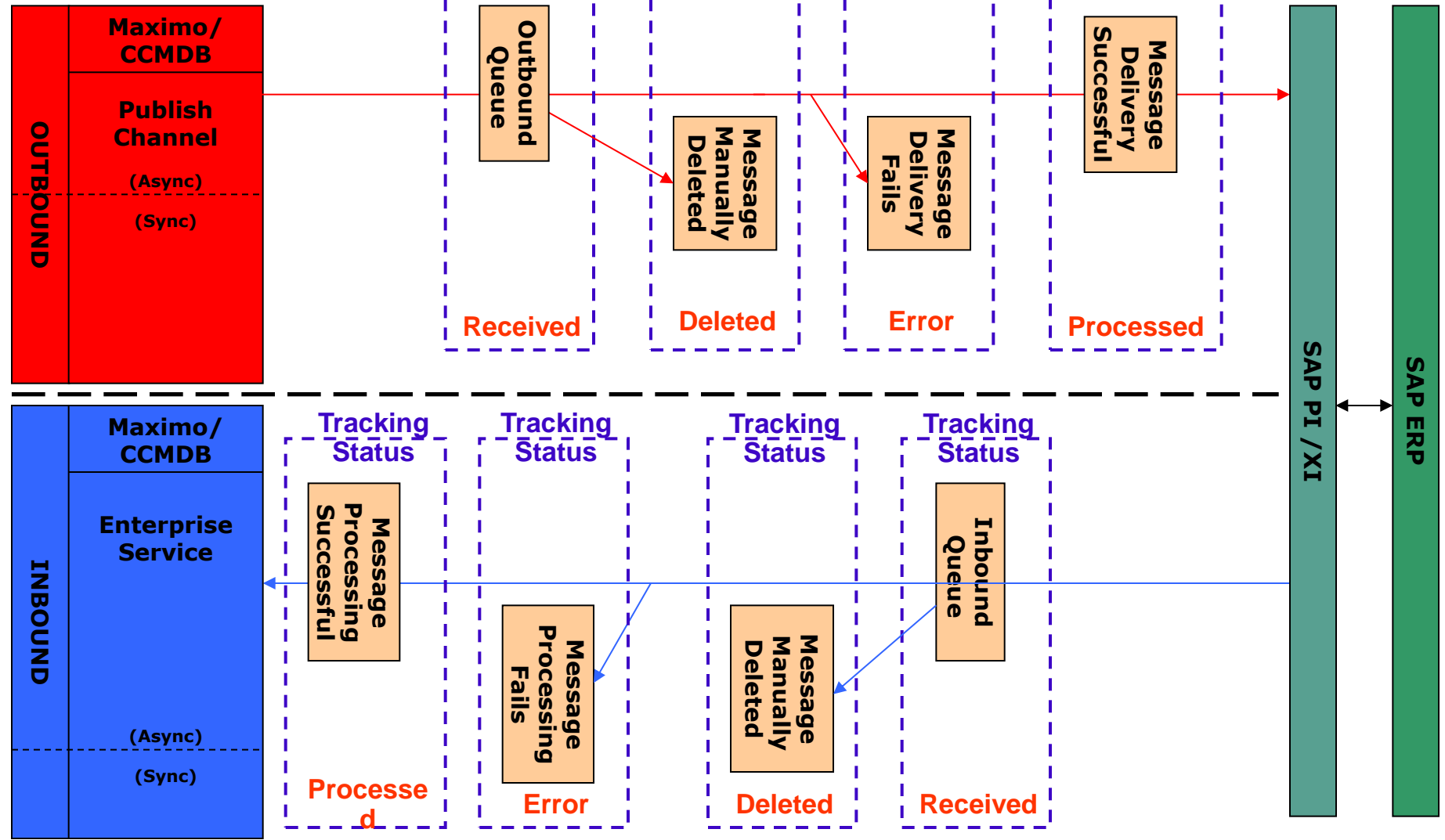
Deep Dive – Message Tracking

- New Standard power application
- Registers the processing “path” of a transaction of “queue-based”
- Track INBOUND and OUTBOUND processing actions
 - Enterprise Service / Publish Channels messages
- Maintain a record of all processing actions associated with a particular transaction
- Allow users the use of external keys to uniquely identify messages
- Allow users to enable/disable transaction tracking functionality
 - Tracks:
 - Receipt into Queue
 - Errors
 - Successful processing/delivery
 - Manual Deletes

Deep Dive – Message Tracking - Configuration

- Associated to specific Enterprise Services and/or Publish Channels
- By default, the transaction tracking functionality will be DISABLED
- Users should be able to ENABLE/DISABLE by without an MXServer re-start

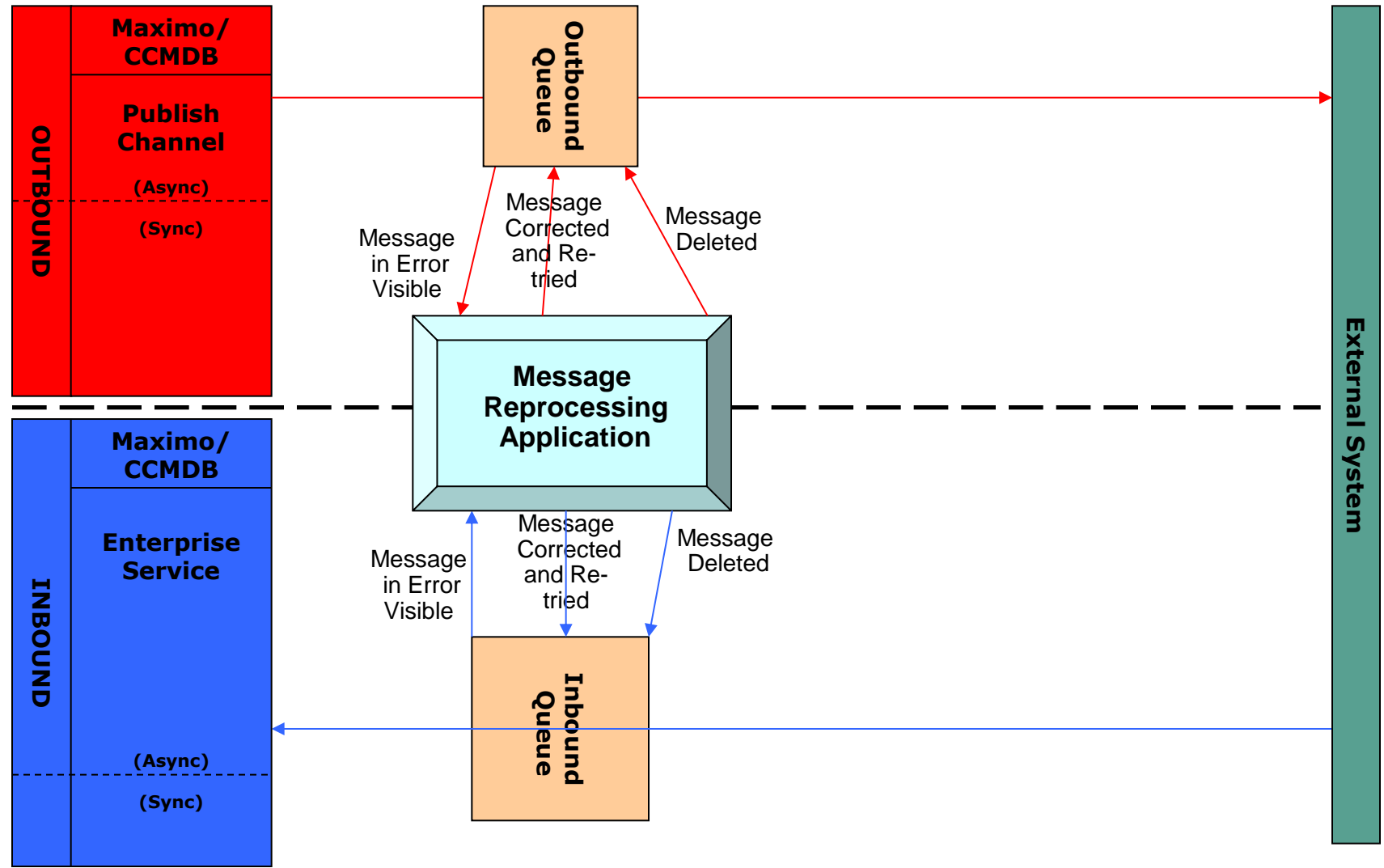
Message Tracking



Deep Dive – Message Re-processing

- Maximo 7.1
 - New Application
 - **MAXINTERROR** - Table where errors are registered
 - **MAXINTERRORMSG** - Table where errors retries are registered
 - GUI based error handling processing
 - View messages in error
 - Correct and Retry messages in error
 - Delete messages in error
 - Outbound errors – normally communication - ie. cannot post transaction due to network/server down
 - Inbound errors – normally business object validation – ie. GL Account invalid

Message Reprocessing



Maximo 7.1.x Integration Applications

Deep Dive – Changes in SAP Adapter

Deep Dive – Maximo PR Publish Channel (Outbound Interface)

■ New Functionalities

- Option to use new SAP PR BAPI
 - Supports additional data for the SAP Enjoy PR features
 - Adapter Requirements
 - o Configure ZBC_SAPMXCONFIG
 - Mark “X” to BAPIME51N variable
 - o New Program
 - Z_BC_CREATE_PURCHASEREQ_N_BAPI

Deep Dive – Maximo PR Outbound Interface

■ New Functionalities

– Maximo PR Header Long Descriptions to SAP PR

- Support for only new PR BAPI
 - The PR header descriptions can be only access from SAP transaction code ME52n or ME53n.
 - Old BAPI uses SAP transaction code ME52/ME53 which does not support Long Description
- Mapping
 - Maximo PR.DESCRPTION to SAP PR MHTEXT1
 - Maximo PR.DESCRPTION_LONGDESCRIPTION to SAP PR MHTEXT2 ~MHTEXT10.

Deep Dive – SAP Invoices interface to Maximo

- Maximo 6.x
 - Used 3 separate Inbound Interfaces as follows
 - MX6_INVOICE_TOMX
 - MX6_INVOICEFI_TOMX
 - MX6_INVOICEVAR_TOMX

- Maximo 7.1
 - Use **one** Enterprise Service (MXINVOICE_FRSAP05) that will integrate MM / FI Invoices (Credit Memos) and Invoice Variances

Troubleshooting in SAP

■ Errors from SAP to Maximo

– Idocs remain in unprocessed in SAP

- Cause: Connection Error from SAP ERP to SAP PI / XI
- Correction:
 - o Schedule the report RSARFCEX at least daily

If you see any connection or performance errors, refer to the corresponding SAP Notes, or contact Support.

– Errors in SAP PI / XI

- Maximo SAP Adapter does not use integration-specific configurations or methods for PI message processing. It uses the global SAP process integration settings and procedures
- The Runtime Workbench of the SAP process integration provides monitoring and error handling (reprocessing of messages) Use this tool in the following cases:
 - o To track the status of messages
 - o To find errors that have occurred and establish their causes
 - o To restart messages, if the retry interval of the queues has passed
 - o To set up Alert services for getting information about errors by E-mail, fax, text message, and so on

Troubleshooting in SAP (cont)

- Errors from Maximo to SAP
 - Error handling can be use in two methods in SAP: Externally (SAP PI) or Internally (SAP ERP) depending on how you configure the SAP application Server

 - External Error Handling (SAP PI / XI)
 - Uses SAP RETURN table to store the transaction status in RETURN_TYPE field
 - Value “E” indicates it has error
 - Required actions on this error must be done in SAP PI by either of the following methods:
 - SAP PI Message Monitoring, supports the edit of payloads.
 - A third-party product you use with PI for Monitoring and Error Handling.

Troubleshooting in SAP (cont)

■ Errors from Maximo to SAP (cont)

– Internal Error Handling (SAP ERP)

- Depends on the process mode of the transaction coming into SAP. This process mode is maintained in the ZBC_INBPROGRAMS table, in the BDCPR_MODE_ACT field.
 - o Process mode is BDC, the function module creates a Batch-Input-Map
 - o Process mode is BAPI, the function module stores the record in table ZBC_BAPI_ADMIN. Use the program ZBC_BAPIADMIN to reprocess these errors
- For both process modes:
 - o An E-mail is sent to the specified receivers containing all necessary information about the error
 - o A record is written into the log table ZBC_MSIF
 - o The RETURN table is manipulated to contain only a Success Message (RETURN-TYPE=S)

Troubleshooting in SAP (cont)

■ Errors from Maximo to SAP (cont)

– Internal Error Handling (SAP ERP)

- Batch-Input-Map

- o Contains the record of the inbound session
- o Use transaction code **sm35** to review the map and correct faulty or insert missing data to process the transaction in SAP

- BAPI Error Handling

- o ZBC_BAPI_ADMIN table contains the error message and the “process-specific” table name
Example, Work Order error data is written to ZBC_BAPI_WORKOR, Reservation error data is written to ZBC_BAPI_RESERV, and so on. These tables match the structures which were used to send the data into SAP.
- o Use ZBC_BAPIADMIN to make correction
Double-click on an entry to jump to the process-specific table

Troubleshooting in SAP (cont)

- Errors from Maximo to SAP (cont)

- Internal Error Handling (SAP ERP)

- BAPI Error Handling
 - **List of ZBC_BAPI_XXXX process-specific**

<i>tables</i>	Process	Table Structure name
GL Postings	ZBC_BAPI_GLINVOI	ZBC_M2S_GLINVOICES
Invoices	ZBC_BAPI_INVOIC	ZBC_M2S_MMINVOICES
Issues	ZBC_BAPI_ISSUES	ZBC_M2S_ISSUES
Labor Hours	ZBC_BAPI_LABHOUR	ZBC_M2S_LABORHOURS
Purchase Order	ZBC_BAPI_PURCHO	ZBC_M2S_PURCHASEORDER
Purchase Req	ZBC_BAPI_PURREQ	ZBC_M2S_PURCHASEREQ
Receipt	ZBC_BAPI_RECEIP	ZBC_M2S_RECEIPTS
Reservation	ZBC_BAPI_RESERV	ZBC_M2S_RESERVATIONS
Work Order	ZBC_BAPI_WORKOR	ZBC_M2S_WORKORDERS

Install – Planning

▪ Prerequisite knowledge

- To install the SAP adapter, you need database administration privileges and authorizations, as well as the following skills
 - Database utilities such as Oracle® Enterprise Manager™, SQL*Plus®, Microsoft® SQL Server Enterprise Manager, or Microsoft® Query Analyzer
 - Database administration
 - SAP administration
 - SAP Exchange Infrastructure administration
 - Configuring the System Landscape Directory
 - Importing integration objects
 - Configuring integration objects
 - Configuring integration scenarios
 - Operating system-specific knowledge for your Windows® or UNIX® platform

Install – Planning (cont)

- **Prerequisites to installing the MEA for SAP** Before you install the Maximo Enterprise Adapter for SAP ERP 6.0 (SAP adapter) you must have the following software installed and running
 - Maximo application server
 - Maximo Asset Management Version 7.1
 - Application server (BEA WebLogic® or IBM WebSphere®) with Java Message Service (JMS)
 - Apply all Maximo Asset Management fixes. You can access the IBM Software Support Web site for Maximo Asset Management to get the latest fixes and technical notes about Maximo Asset Management.
 - o <http://www-306.ibm.com/software/sysmgmt/products/support/IBMMaximoAssetManagement.html>
 - SAP ERP 6.0
 - SAP Process Integration 7.0 or Exchange Infrastructure 3.0 (standard product) or other middleware to integrate data between Maximo and SAP ERP (customization product)

Install – Planning (cont)

- Operation Requirement
 - AIX
 - Linux
 - Solaris
 - Windows

- Platform Requirement
 - IBM Websphere
 - BEA Weblogic

- Database Requirement
 - DB2
 - Oracle
 - SQL Server

Install – Planning (cont)

- MEA SAP adapter provides following software:
 - Maximo Side
 - Maximo enterprise SAP adapter objects in Maximo
 - Java programs
 - External exits
 - SAP Side
 - Custom ABAP ERP programs
 - Custom software component for PI / XI objects

Configure - Requirements

▪ **SAP configuration requirements**

- To install the SAP adapter, you must grant the appropriate authorization to your development and implementation teams.

- **Development authorization**
 - To install the SAP adapter, you must grant base development authorization for administration, configuration, and monitoring to your development team.
 - Grant base development authorization for the following implementation tasks:
 - ABAP™ Workbench development. The user must be registered as a developer in SAP.
 - ALE and Intermediate Document (IDoc) configuration.
 - Administration and monitoring the transaction codes shown in Refer to IBM Maximo Enterprise Adapter for SAP ERP 6.0 Installation Guide (IG) **Chapter 2 Installation requirements.**

Configure – Requirements (cont)

▪ **SAP configuration requirements**

– **Implementation authorization**

- To install the SAP adapter, you must grant authorization to access and customize the SAP sub modules to be integrated with Maximo to your implementation team.
- Your implementation might include customizing the following objects:
 - Internal Order Document Type and number range
 - PR Document Type and number range
 - PO Document Type and number range
- Authorize implementation team members to use the transaction codes for transactions that are part of the integration. For more information and a list of commonly used transaction codes, see the *IBM Maximo Enterprise Adapter for SAP ERP 6.0 System Administrator Guide (Appendix E: BDC transaction codes and BAPI programs)*

Configure – Requirements (cont)

- **SAP Process Integration / Exchange Infrastructure configuration requirements**
- **Implementation authorization**
 - Before you can install the SAP adapter, you must configure SAP Exchange Infrastructure.
 - To configure SAP Exchange Infrastructure, you must complete the following basic configuration tasks in SAP Exchange Infrastructure:
 - In the Exchange Infrastructure System Landscape Directory configure the business systems to be integrated with Maximo.
 - Configure the technical communication between Exchange Infrastructure and the SAP ERP system using both XI- and the IDoc Adapter.
 - Grant dialog user roles in Exchange Infrastructure for the implementation team (Refer to IG)

Configure – Maximo 7.1

- **Configuring the SAP adapter in Maximo**
 - **Specifying the End Point for the SAP Adapter**
 - **Activating Cron Tasks for Sequential queues**
 - **Setting up the SAPMASTERDATAUPDATE cron task**
 - **Item Status (New in Maximo 7.1)**
 - Set Item Status to Active
 - Refer to IBM Maximo Enterprise Adapter for SAP ERP 6.0 Installation Guide (IG) **Chapter 4 Configuring the SAP adapter in Maximo.**

Configure – SAP ERP 6.0

- **Configuring the SAP application server**
 - Import of ABAP transport programs
 - Customizing IDcos
 - Configuring custom tables
 - Creating integration user
 - Creating a number range object for BAPI error handling
 - Refer to IBM Maximo Enterprise Adapter for SAP ERP 6.0 Installation Guide (IG) **Chapter 5 Configuring the SAP application server.**

Configure – SAP PI / XI

- **Configuring the SAP PI / XI**
 - **Configuring the System Landscape Directory**
 - **Importing integration objects**
 - **Configuring integration objects**
 - **Configuring integration scenarios**
 - **Adjusting interface determination objects manually**
 - Refer to IBM Maximo Enterprise Adapter for SAP ERP 6.0 Installation Guide (IG) **Chapter 6 Configuring the SAP XI**

Project Management

- 7.1 version requires Maximo Asset Management 7.1 and SAP ERP 6.0

- SAP Adapter supports various business scenarios
 - Determine customer needs and enable interfaces appropriately

- Resource Needs
 - Strong with Maximo
 - Strong on SAP ERP and SAP PI / XI
 - Technical Resource: JAVA, ABAP

- SAP Adapter Clients with various of SAP versions

Migration - MX 6.2 to 7.1 Upgrade

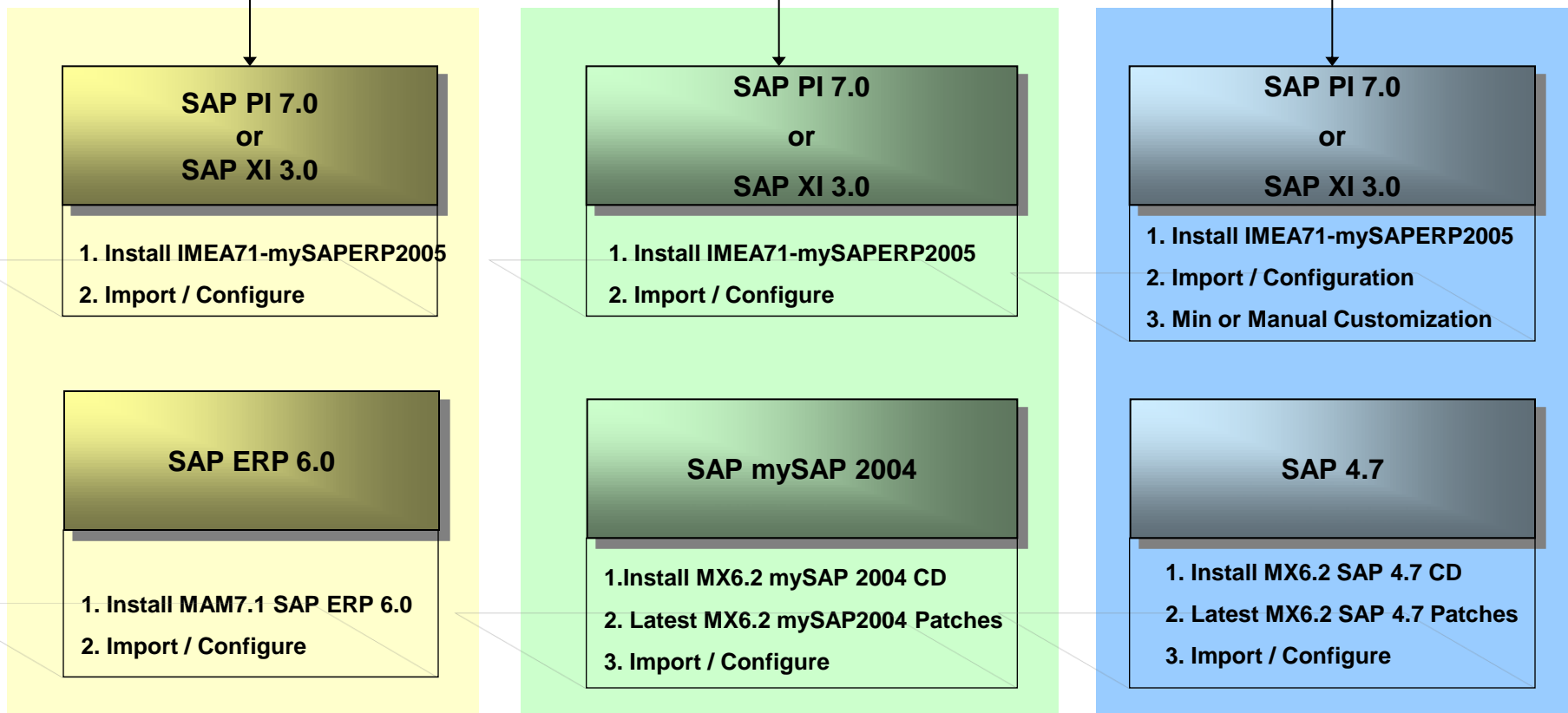
- No Reinstallation of Adapter
- Maximo 6 to 7
- Uses Maximo metadocxml approach to add/delete metadata and system data
- Metadocxml contains difference between **upgraded (MX7.1 Maximo Only) 6.2 MAXIMO SAP ERP 6.0 (mySAP 2005) ADAPTER and MAXIMO 7.1 SAP ERP 6.0 ADAPTER**
- Uses Maximo upgrade program to make Adapter Validation and Upgrade Calls Outs
- Must apply the latest Maximo 6.2 SAP Adapter patch for:
 - mySAP 2005 – Patch 3+
 - mySAP 2004 – Patch 4 +
 - SAP 4.7 – Patch 4+

MX7.1 SAP Adapter Clients with various of SAP versions

- Support
 - The standard MX 7.1 SAP Adapter release with SAP ERP 6.0 (mySAP 2005) version

- Customizations (*SAP Adapter clients, do not use SAP ERP 6.0 version*)
 - ERP System
 - Use proper Maximo 6.2 SAP adapter version's CD
 - Apply latest of Maximo 6.2 SAP Adapter patches
 - Import / configure
 - PI / XI System
 - Install IBM Maximo Enterprise Adapter 7.1 with mySAPERP2005
 - Import and configure
 - Minimum or manual customizations
 - Any issues can be re-produced in standard SAP ERP 6.0 release, hot fix will be provided to clients
 - If issues are related to the SAP release version specific, then it's not standard support.

IBM Maximo Asset Management 7.1 with Multiple SAP versions



SAP Adapter for MX 7.1 with Prior SAP ERP 6.0 versions

- Following functionalities are Not supported
 - BAPIs
 - New SAP Purchase Requisitions (me51n)
 - SAP FI Invoices
 - SAP GL Postings
 - Time Reporting to CO
 - Table Maintenances for SAP adapter custom tables
 - SAP Adapter CO Posting report cannot run multiple times a day to Maximo

SAP Adapter for MX 7.1 with Prior SAP ERP 6.0 versions – (cont.)

- For SAP R/3 4.7 version
 - Manual XI design changes are required
 - SAP Inventory Movement IDOC Type to INVCON01
 - o SAP Adapter for SAP ERP 6.0 version uses IDOC type INVCON02.
 - o SAP 4.7 only allows INVCON01

Reference Materials

- Product Guides available on IBM Support Site
 - <http://publib.boulder.ibm.com/infocenter/tivihelp/v3r1/index.jsp?topic=/com.ibm.itmaxea.doc/welcome.htm>
- IBM Learning
 - <http://www.ibm.com/training>
 - Integration Using the IBM Maximo 6 Enterprise Adapter
- General Product Information
 - http://www-306.ibm.com/software/tivoli/products/maximo-enterprise-adapter-sap/features.html?S_CMP=rnav/

QUESTIONS??