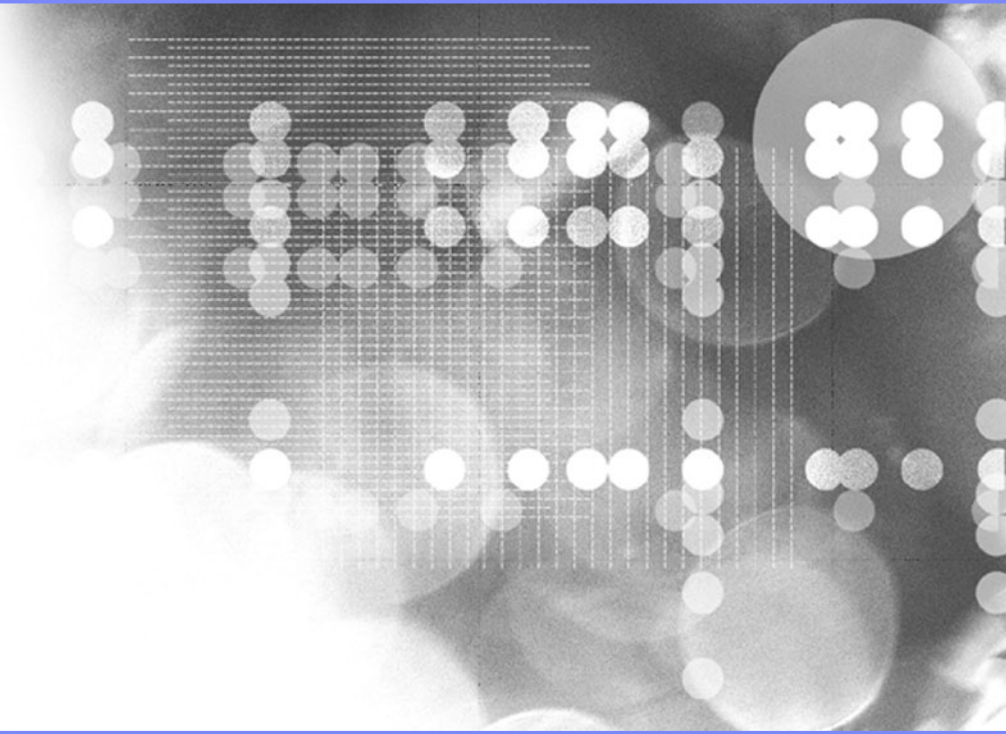# RMA Agents

Christopher Arrington

Topics

- Master Agent/ General Agent

- CIM

- JMX Monitor Policies

- File Transfer

- Events

- Diagnostic Data Capture

- Software Distribution

- Installation/Configuration
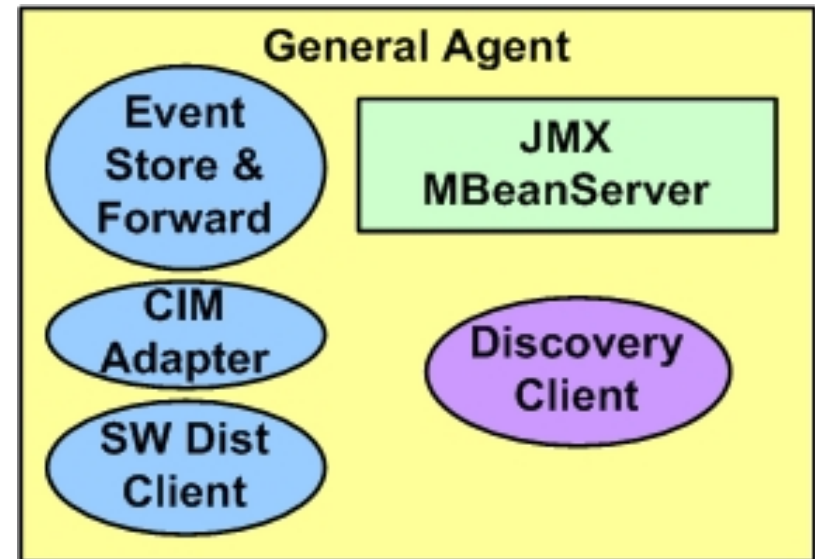
- Hardware/Software Requirements

How Remote Management Agent Works

- Uses JMX (Java Management Extensions)

- MBeans (resources) registered with an MBeanServer on each agent

- General and Master Agents provide access to managed resources

- Master Agent isolates Management Application from Store

- Master Agent manages store-wide policies

- Management Applications access instrumentation for all store devices via the Master Agent

Enterprise

Management Application

Master Agent

Kiosk **GA** — **GA** AEF

POS **GA** — **GA** DIF

MTR **GA** — **GA** SCS
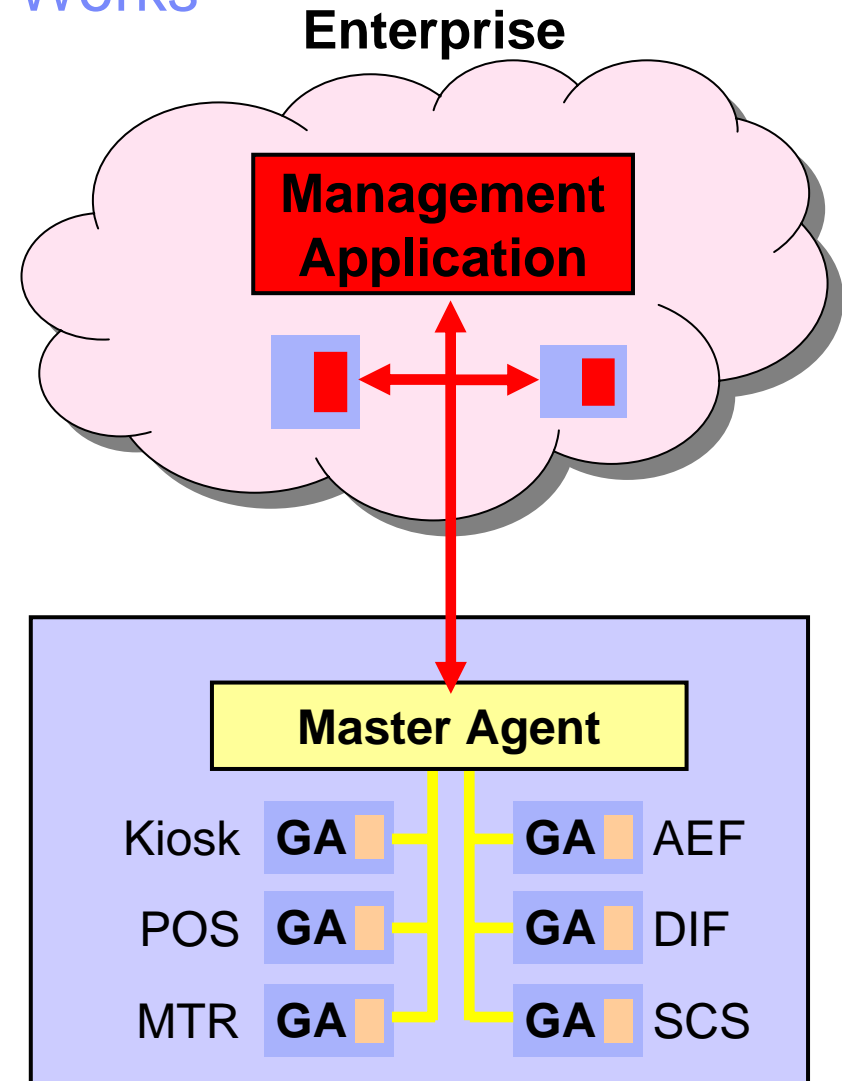
General Agent

- Runs on all store devices

- Exposes manageable attributes

- Issues notifications

- Default MBeans
    - Client Discovery and JVM Health
    - Logging Configuration
    - Event Forwarding
    - CIM
    - File Transfer
    - Software Distribution

General Agent

- Event Store & Forward
- JMX MBeanServer
- CIM Adapter
- Discovery Client
- SW Dist Client
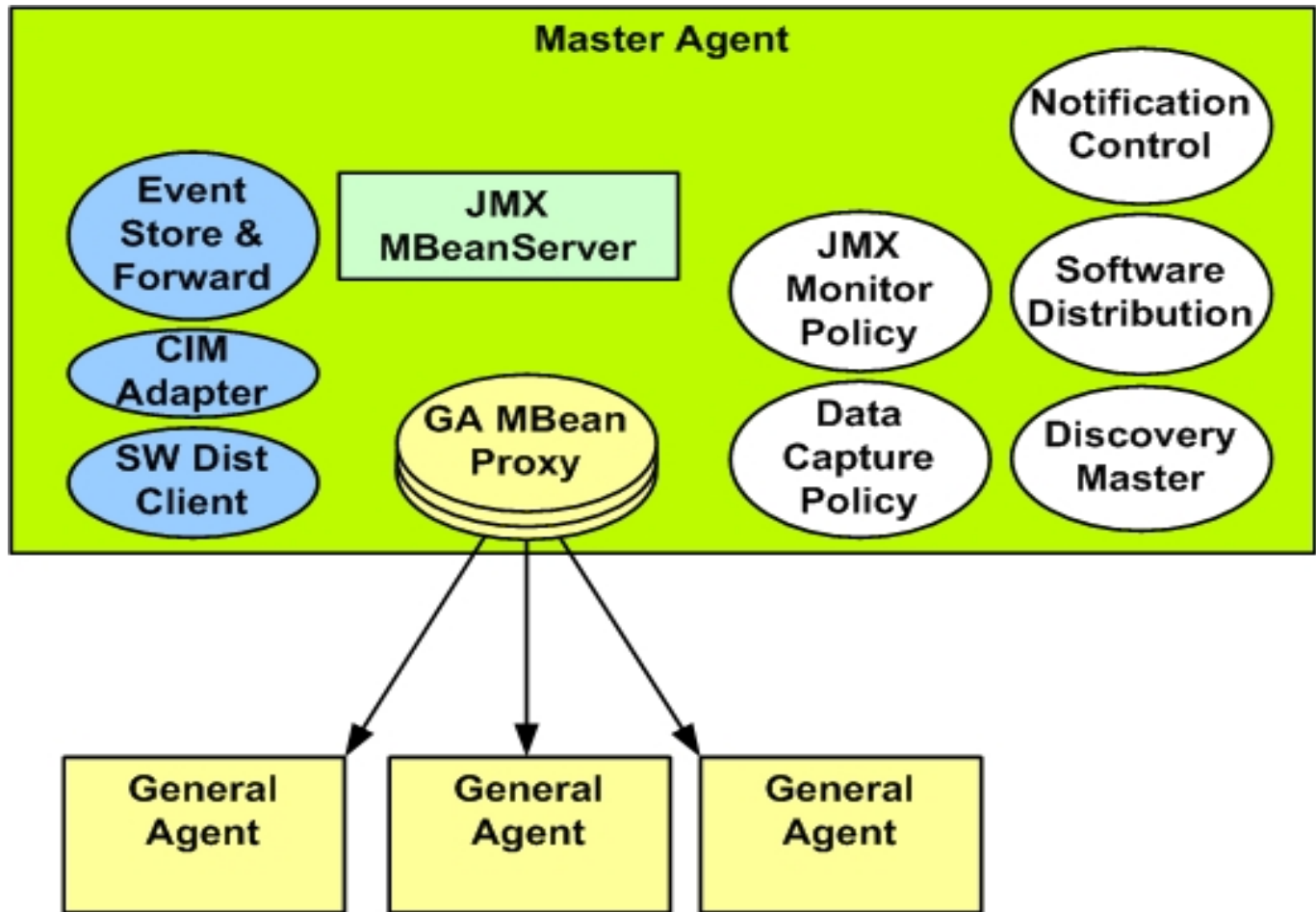
RMA Version 2.0 T3 October 2006

Master Agent

- Same GA core + additional MBeans

- Single point of access to store

- GA instrumentation exposed as MBean proxies

- Collects and re-emits GA events

- Point to implement and control store policy
  - Software Distribution Policy
  - JMX Monitor Policy
  - Data Capture Policy

RMA Version 2.0 T3 October 2006
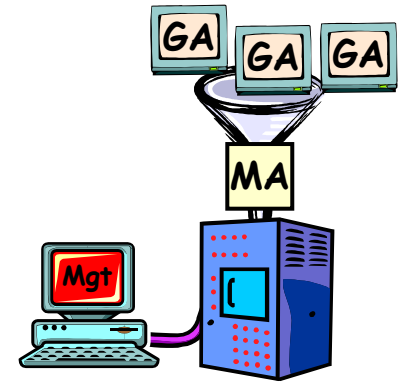
Master Agent

SSL Support for RMI

- RMI used for remote JMX communication

  Between MA and GA

  Between Management Apps and MA

- RMI Sockets can be SSL or Non-SSL (Controlled by GA)

- Same as that used by Store Integrator

- Configuration in SI_HOME/user/rma/classes/ssl.properties

RMI SSL Configuration

- Predefined aliases:

    SSL (Use SSL)

    NOSSL (Don't use SSL)

- Connection from MA to GA controlled by alias "RMA"

- Example: RMA.alias = SSL|NOSSL

- Connection from Management Apps to MA controlled by alias "RMAMA"

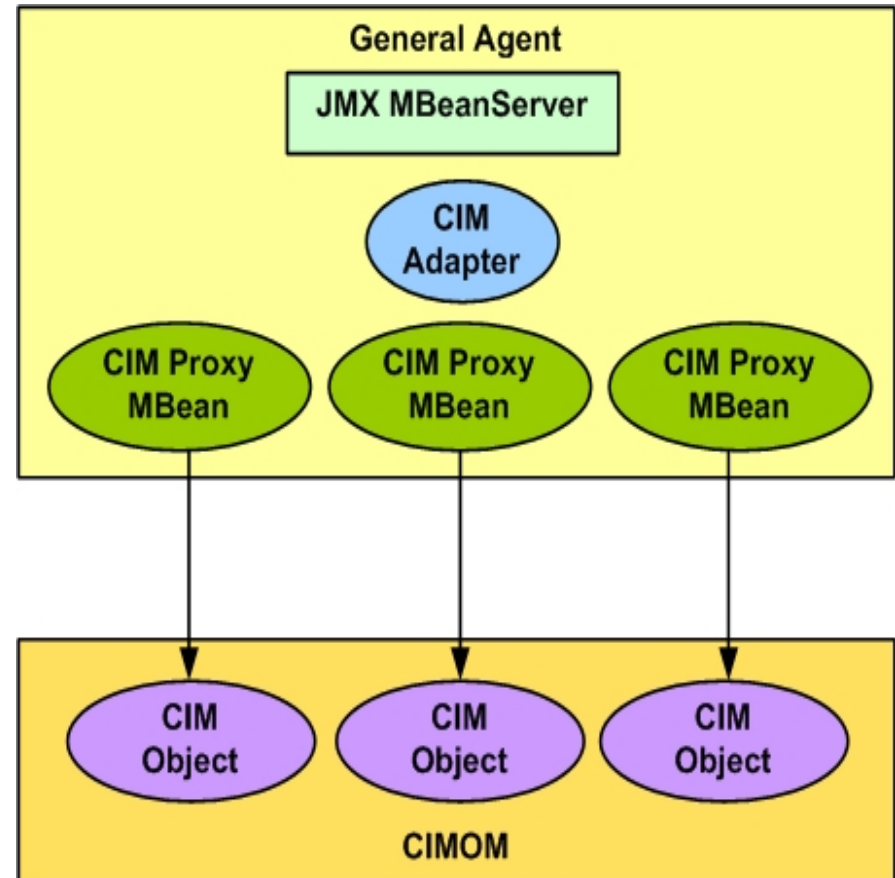- Configuration for aliases on both ends must be compatible or else there will be connection errors

RMA Version 2.0 T3 October 2006

SSL Connection Matrix

	MA: RMA.alias=SSL	MA RMA.alias=NOSSL
SSL GA	Connect	Cannot Connect
NON-SSL GA	Connect	Connect

CIM (Common Information Model)

- Common definition (Schema) of the elements comprising a system (Memory, Process, Disk, etc)

- Describes management information

  - Device characteristics (Physical)
  - Application Characteristics (Logical)

- Instances on a system are registered with a CIM Object Manager (CIMOM)

- Example implementations: WMI, Pegasus

CIMAdapterMBean

- Creates proxy MBeans to local CIM Objects

- Helps to surface SMBios information

- Currently supported CIMOM's: WMI (Windows), Pegasus (IRES)

- Proxies are created for instances based on a filter

General Agent

JMX MBeanServer

CIM Adapter

CIM Proxy MBean   CIM Proxy MBean   CIM Proxy MBean

CIM Object   CIM Object   CIM Object

CIMOM

Monitor Policies

- **JMX Provides Monitoring functionality via MonitorMBeans:**
    - StringMonitor (Matching of String attribute values)
    - CounterMonitor (Numerical values that increase monotonically)
    - GaugeMonitor (Numerical values based on high/low thresholds)

- **Emits MonitorNotifications when condition is met (Re-emitted as a RtlMonitorNotification by the Master Agent)**

- **Master Agent's MonitorPolicyManager automates the creation of these MBeans**

- **Ability to create monitor policies based on arbitrary MBean query strings and/or MBean Class**
    - Can monitor based on CIM Class

- **Can be created programatically or in IBM Director JMX Browser**

File Transfer MBean

- MBean instantiated on each agent to allow it to act as a FTP or FTPS client

- Used by:
  - Software Distribution
  - Data Capture

FTPS Support

- Server's certificate and certifier certificate must be in each client's keystore

- Supports Explicit FTPS (RFC 4217)

- Use keytool (included in JRE) to manage certificates:

```
keytool –import –file cacert.pem –keystore rssstore
```

Event Store and Forwarding

- Each agent stores Notifications (events) until a receiver connects
  - GA to MA

  - MA to Director

- Time and size thresholds persist events

RMA Events

Data Capture Client

- New MBean interface for performing data captures (DataCaptureMBean), with default implementation (DataCaptureMBeanSupport)

- Special Notification class for signalling capture completion (DataCaptureNotification)

- Capture Types or unsolicited

  Unsolicited: System detects an error and captures

  Solicited: Invoked on the component directly

- RMA Implementation puts all RMA log files into a single jar

Data Capture Policy Management

- Used to transfer capture files from clients to a central location

- Optionally invokes captures on other components in response to an unsolicited capture

# Data Capture Policy
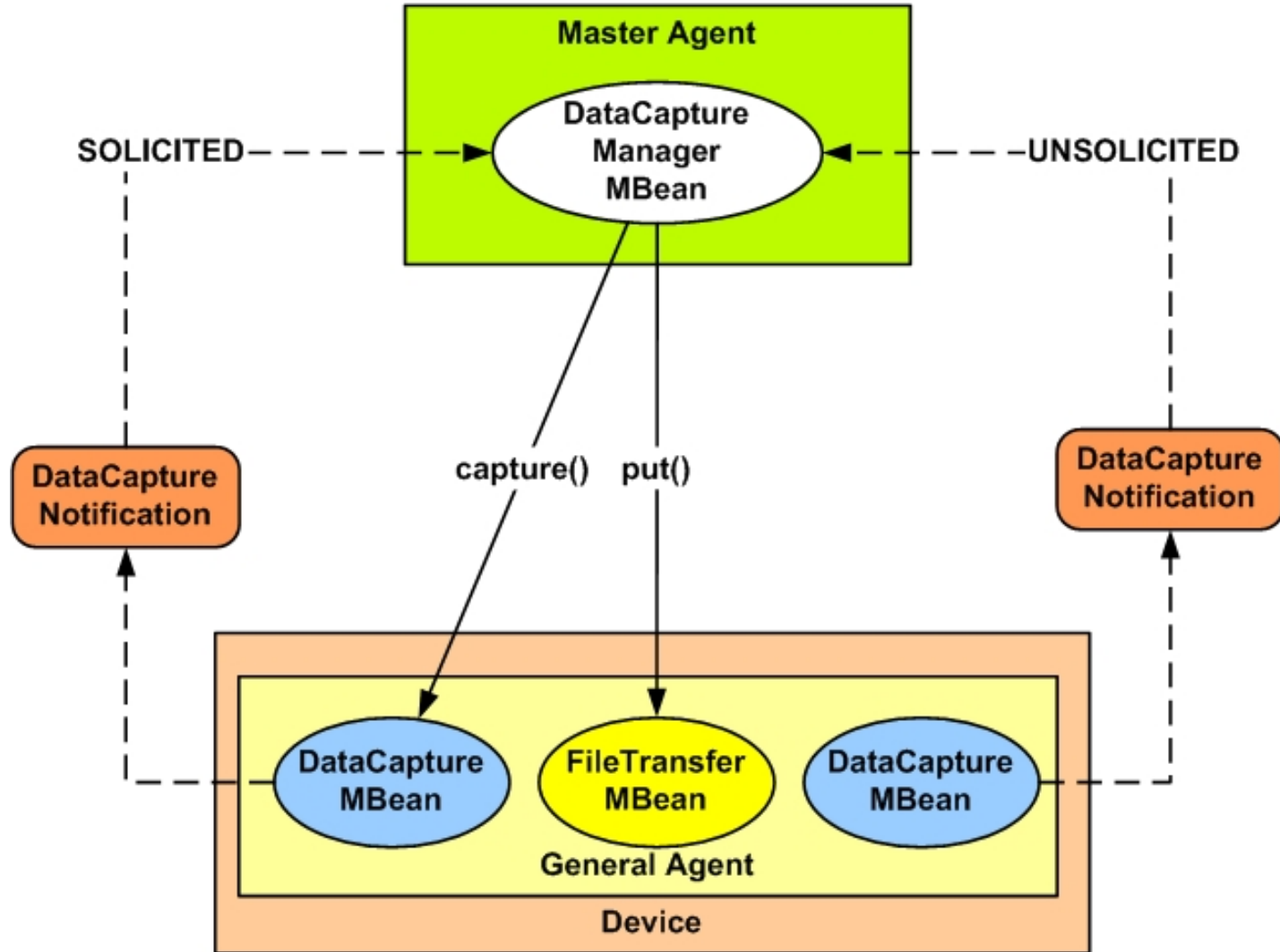
RMA Software Distribution

- Policy based, Master Agent triggers client(s) to retrieve and apply (install/uninstall) packages

- Packages are comprised of files and a list of instructions

Software Policy

- Set of information that RMA uses to install software on a set of clients

- Information includes:
  - Selection criteria for applying the policy, can be one of:
    - List of devices to apply to
    - Combination of platform type and/or app roles
  - Target directory on client (Location of downloaded files)
  - FTP Information
  - Policy XML File Name
  - Scheduling information
  - Error recovery options (For certain recoverable errors)
  - Target System State (Optional)
  - Throttling options (Optional)

Software Policy XML File

- Represents a package that gets deployed to clients in the store

- Information about resources files **(package files)**

- Install/Uninstall Instructions

- Client executes only platform-specific info

- Retrieved from FTP server

IBM
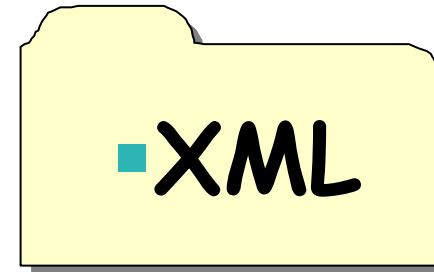
Policy XML File Example

```
<SoftwarePolicy:SoftwarePolicy xmlns:xsi=http://www.w3.org/2001/XMLSchema-instance
    xsi:schemaLocation="http://www.pc.ibm.com/ibm/si/mgmt
    /com/ibm/retail/si/mgmt/swdist/SWPolicyXMLSchema.xsd"
    xmlns:SoftwarePolicy="http://www.pc.ibm.com/ibm/si/mgmt">

    <SoftwarePolicy:SWPolicyDescriptor>
            <SoftwarePolicy:Description>MyApp</SoftwarePolicy:Description>
    </SoftwarePolicy:SWPolicyDescriptor>

    <SoftwarePolicy:SWPolicyTarget targetOS="Windows">
      <SoftwarePolicy:SWPolicyResourceFiles>
            <SoftwarePolicy:Component filename="setup.exe" size="1223121"/>
            <SoftwarePolicy:Component filename="response.txt" size="1112"/>
      </SoftwarePolicy:SWPolicyResourceFiles>

      <SoftwarePolicy:Installation>
        <SoftwarePolicy:Exec executable="${client.target.path}\setup.exe" expectedRC="0"/>
        <SoftwarePolicy:Exec executable="mkdir /TEST1" expectedRC="0"/>
      </SoftwarePolicy:Installation>

      <SoftwarePolicy:DeInstallation>
         <SoftwarePolicy:Exec executable="${env.APPHOME}\uninst.exe" expectedRC="0">
            <SoftwarePolicy:ExecArg value="-removeAll"/>
         </SoftwarePolicy:Exec>
      </SoftwarePolicy:DeInstallation>

    </SoftwarePolicy:SWPolicyTarget>
</SoftwarePolicy:SoftwarePolicy>
```
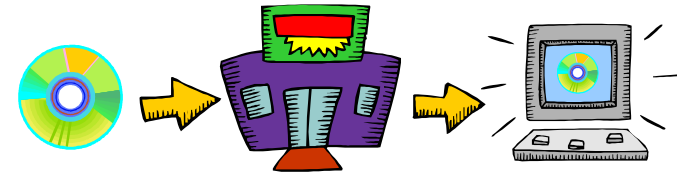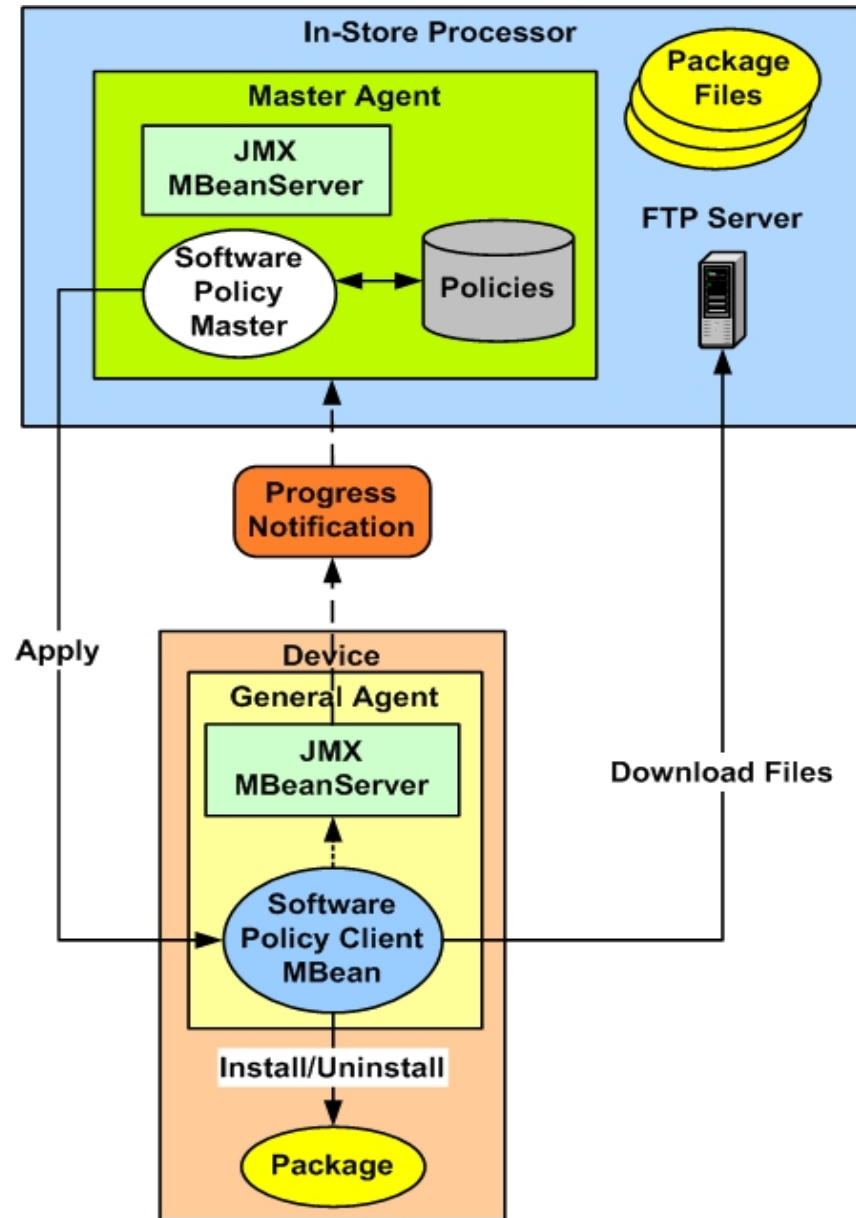
Software Policy MBeans

- **Software Policy Master MBean**

  Manages and schedules Software Policies over a POS device network

- **Software Policy Registry MBean**

  Maintains registry of policies specifying resources and actions to distribute software

- **Software Policy History MBean**

  Maintains history of active and completed policies

- **Software Policy Client MBean**

  Executes software policies, issues state notifications

RMA Software Distribution

Software Policy Client MBean

- Runs on each client device

- Excepts requests to execute policies
    - Retrieves and parses policy XML file
    - Retrieves resource files
    - Performs software distribution steps
    - Persists Policy State (for reboot)
    - Sends progress notifications
    - Sends completion notifications

SWD Changes in V2

- Master Agent interfaces changed, but client (GA) interfaces unchanged
  - V2 MA can deploy packages to V1 clients
  - STDOUT and STDERR from logged at INFO level in RMA Logs

System State Manager

- Allows a device to perform a set of actions before executing a software policy

- Predefined states:
  - NOOP (Default, does nothing)
  - SW_MAINT
  - DATA_MAINT
  - Etc.

- Implement the SystemStateHandler interface to provide custom handlers for states

- Example: Code that shuts down POS App before updating

RMA Version 2.0 T3 October 2006

RMAPackageDistributorMBean

- Automates the creation of SW policies for 1 or more clients

- Unpacks and processes a package jar file:

    Creates software policies for each device

    Transfers package files to FTP server

- Package file must contain:

    All package files in their target directory structure

    Software policy XML file (policy.xml)

    Deployment properties file (deployment.properties)

- Requires an FTP Server reachable by the MA and all clients

- Requires a one time configuration step to store FTP Information (Info is stored encrypted)
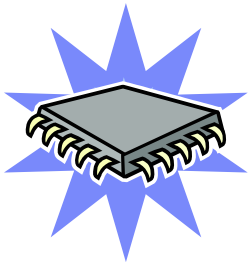
RMA Version 2.0 T3 October 2006
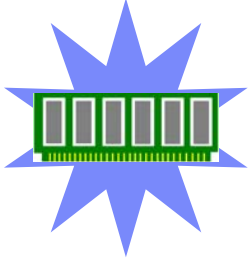
RMA Package Distributor
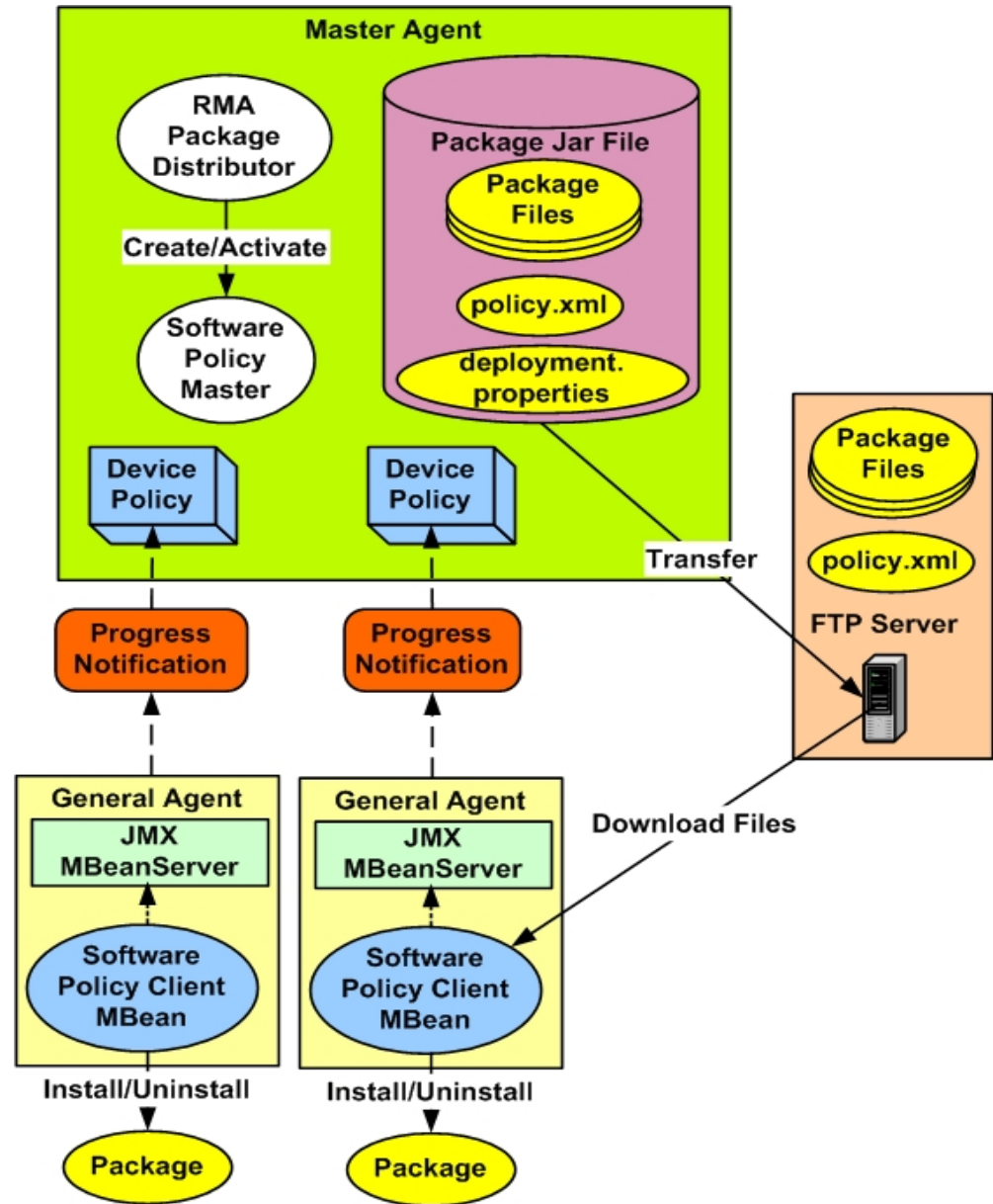
Installation On Windows or Linux

Hardware Requirements (Master Agent)

- ISP runs Remote Management Master Agent (One per store)
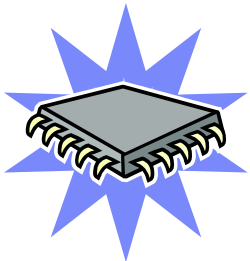- Installed as a service on Windows or Linux

1 GHz processor or faster

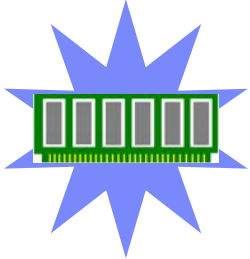At least 100MB of free memory (32MB used by JVM)

-Depends on the number of clients

Hardware Requirements (General Agent)
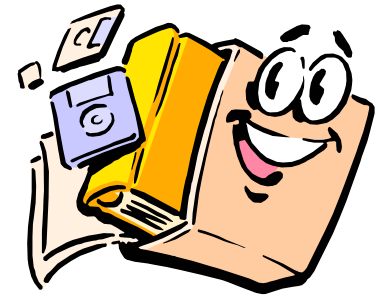
- Installed as a service on Windows or Linux
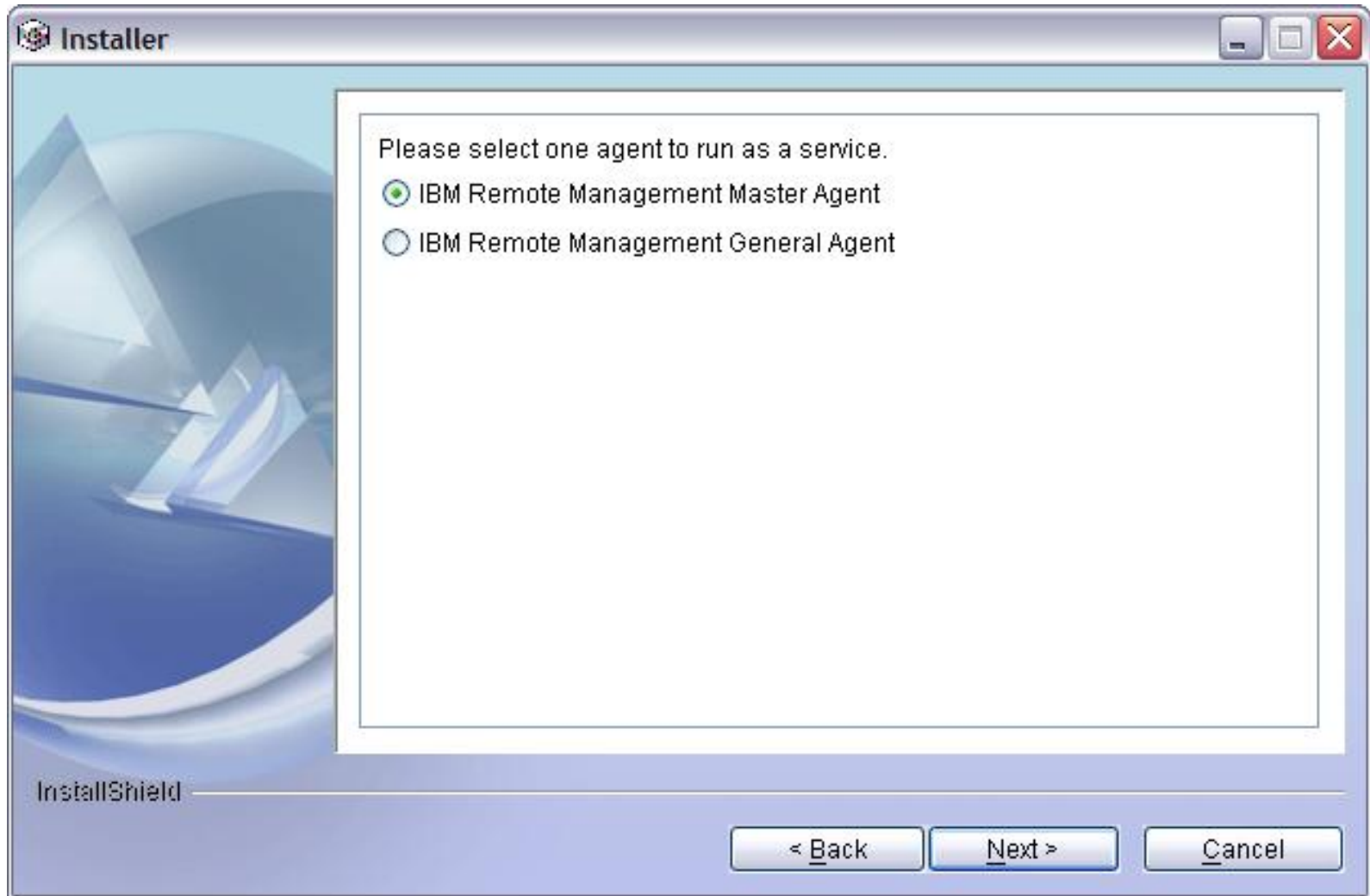
1 GHz processor or faster

At least 40 MB of free memory (32MB used by JVM)

Remote Management Agent Software

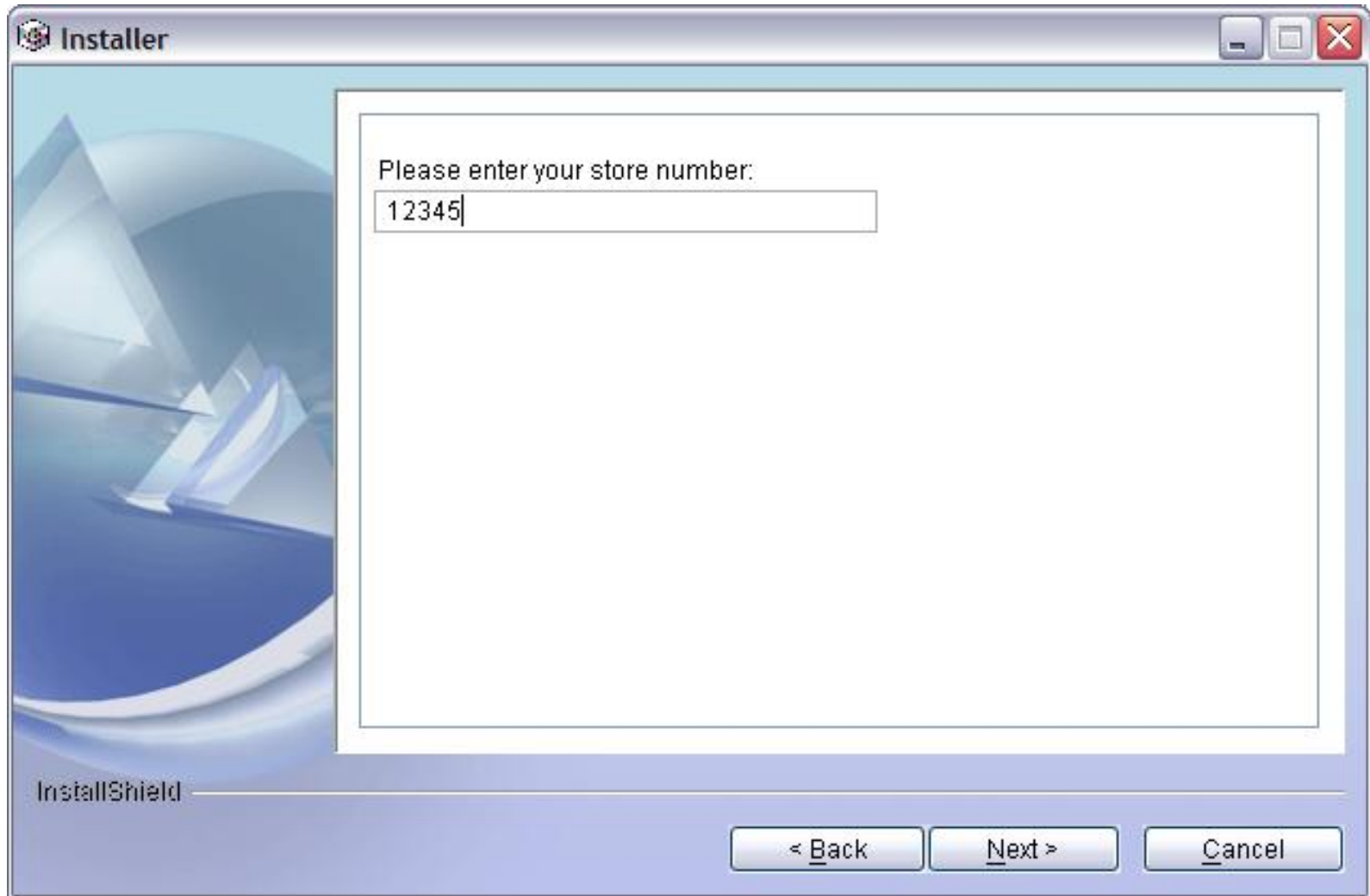- IBM Remote Management Components

  Master Agent

  General Agent

- Requires IBM JDK or JRE, version 1.4.2
- Operating Systems

  NLPOS V9 SSP2

  Microsoft Windows Embedded Point of Service (WEPOS)

  Windows XP SP2

  Windows Server 2003

  4690 (When loaded by SIGUI, AEF, or DIF)

- FTP Server (Required by Software Distribution and Data Capture)

Agent Selection

Store Number (Master Agent Only)

Interface selection

Installer

Please select the network interface the agent will use:

Name: lo0 Address: /127.0.0.1
Name: eth1 Address: /192.168.6.1
Name: eth3 Address: /9.44.162.128
Name: eth0 Address: /192.168.11.1

InstallShield

< Back   Next >   Cancel
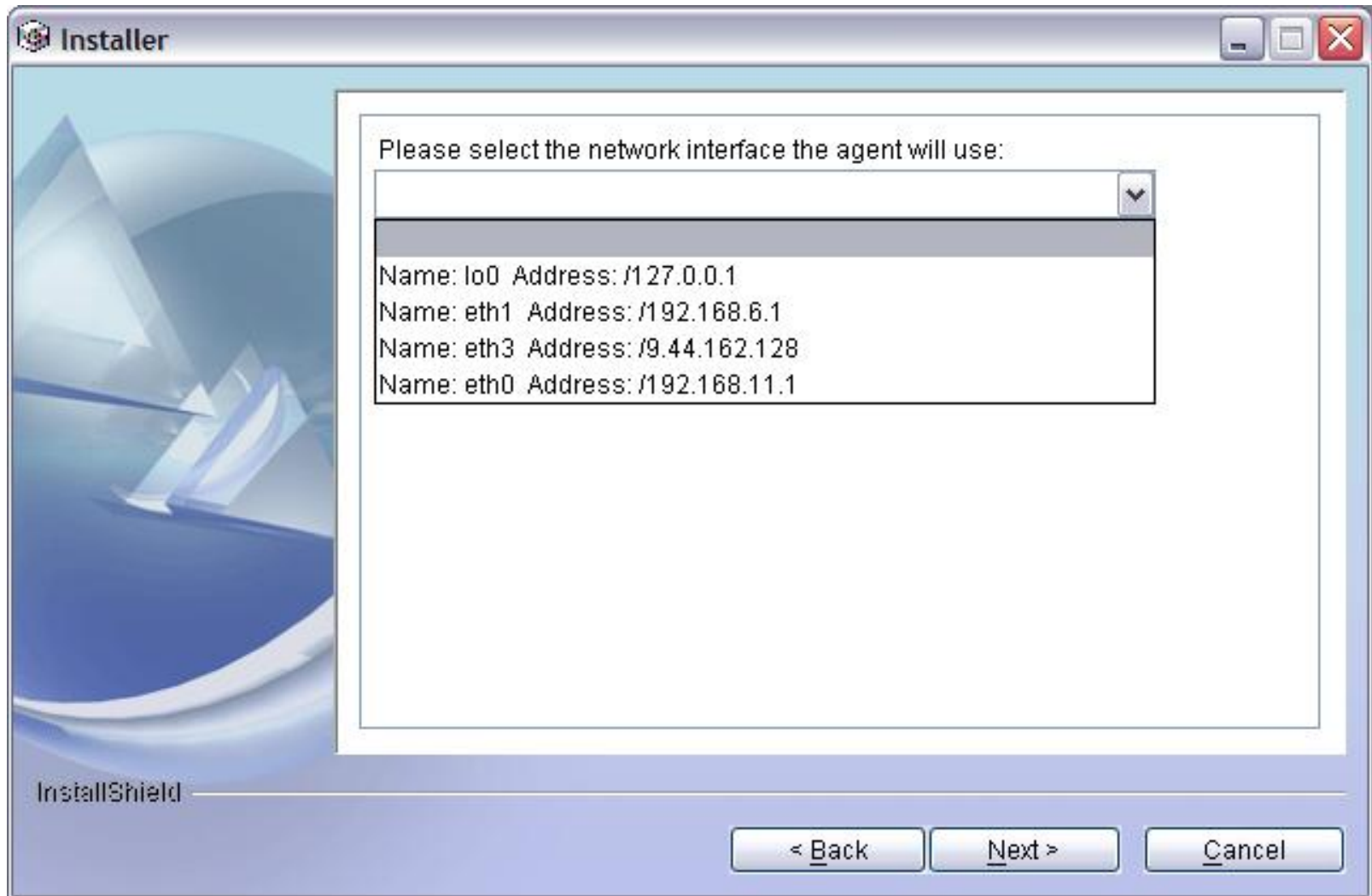
Install Changes

- New configuration\data directory SI_HOME/user/rma

- Directory is not deleted when RMA is uninstalled or upgraded

- Installer migrates V1 files under RMA_HOME

- Silent install

No more RMA Viewer Web App

- VIEWER component no longer available

- Replaced by Retail Extensions for IBM Director

AgentStartupMBean

- Used to extend the startup sequence of the Master Agent / General Agent by instantiating additional MBeans and/or adding Notification Listeners

- Processes one or more XML Files during startup, which describe the MBeans to create

- Add XML files to %SI_HOME%\user\rma\config\startup directory

Example XML File

```xml
<?xml version="1.0" ?>
<AgentStartupConfig>
<MBeans>
   <MBean className="com.ibm.retail.AEF.mgmt.AEFServiceability"
     objectName="masteragent:Id=AEFServiceability,SIFComponent=MGMT,SIFMBean=true">
   </MBean>
</MBeans>
<NotificationListeners>
    <NotificationListener
        listener="masteragent:Id=AEFServiceability,SIFComponent=MGMT,SIFMBean=true"
    mbean=":Id=NotificationControl,SIFComponent=MGMT,SIFMBean=true"/>
</NotificationListeners>
</AgentStartupConfig>
```

Agent Roles

- Set of roles and associated models that further describe the device

- Gives more criteria for applying policies

- Default Roles installed

  RMA-MA, model RMA-V2

  RMA-GA, model RMA-V2

- IBM Machine Model/Type automatically added

  i.e. 4800-721 = Role=4800, Model=721

Adding Agent Roles

- Roles info kept in SI_HOME/user/rma/config/roles

- To add additional roles, add XML file to SI_HOME/user/rma/roles/ext

```xml
<?xml version="1.0" ?>
<AgentConfig>
    <Roles>
        <Role name="MyApp">
            <Model>MyApp-V1</Model>
        </Role>
    </Roles>
</AgentConfig>
```

Starting a GA in a Component JVM

- Done to instrument an application or device

- Starting a GA in a component JVM requires:
  - COMMON to be installed
  - The following jars in the classpath:
    - COMMON_HOME\simgmt.jar
    - COMMON_HOME\siutil.jar
    - COMMON_HOME\commons-logging.jar
    - COMMON_HOME\ext\mx4j.jar
    - COMMON_HOME\ext\mx4j_rmt.jar

Products that integrate with RMA

- **MTR**
  - Full instrumentation of device using MBeans
- **IRES (Current version includes V1 Master Agent)**
  - Cannot distribute software with V2 and IBM Director
- **UPOS/JavaPOS for POS Peripherals**
  - CIM Instrumentation for POS Peripherals (i.e. Printer)
  - Windows and IRES machines running JavaPOS 1.9.2
- **4690 (Not as a service, only through SIGUI, AEF, DIF)**
- **Store Integrator**
  - AEF, DIF, SIGUI
- **WEPOS**
  - Preloaded with RMA General Agent

Resources

- User's guide

  - http://www2.clearlake.ibm.com/store/support/html/pubs.html#RMA

  - Installation instructions

  - Programming examples

- Javadoc

  - http://www2.clearlake.ibm.com/store/support/html/pubs.html#RMA