IBM Software Group

IBM® WebSphere® Everyplace® Deployment V6

Software Distribution using Device Manager

business on demand.

Software Distribution

- Software distribution job sends software to targeted devices.

- Software can consist of files, images, databases, installation processes, native software, and others.

- Software Distribution supports two package formats:
  - Proprietary format "meta file",
  - OSGi* standard "bundle" format

- After a software package or an OSGi bundle is registered with Device Manager and copied to the application server, the files that comprise that software cannot be modified on the application server.

- If any files are changed, the software registration must be removed and registered again.

Software Distribution – OSGi standard "bundle" format

- For OSGi devices, such as Windows 32-bit devices, Linux devices, software is distributed as OSGi bundles.

- An *OSGi bundle* bundle is comprised of Java classes and other resources which together can provide functions to device owners and provide services and packages to other bundles.

- A bundle is distributed as a JAR file.

Software Distribution – OSGi standard "bundle" format

An OSGi bundle contains the following resources and information:

- Resources to implement zero or more services. These resources can be class files for the Java programming language and other data, such as HTML files, help files, and icons.

- A manifest file describing the contents of the JAR file and providing information about the bundle. The manifest file uses headers to specify parameters that are needed to install and activate a bundle.

- The dependencies on other resources, such as Java packages, that must be available to the bundle before the bundle can run. The dependencies for these packages are resolved prior to starting a bundle.

- A special class in the bundle to act as the bundle activator. The class is instantiated and invoked to start and stop methods, which are used to start or stop the bundle. Clean-up operations can be performed when the bundle is stopped.

- Optional documentation of the JAR file or one of its sub-directories. The documentation must not be required to run the bundle. Once a bundle is started, the functions and services are exposed to other bundles.

Device Manager Console

An administrator can use the Device Manager console to manage devices by submitting various types of jobs to run on the devices and monitor the job progress.
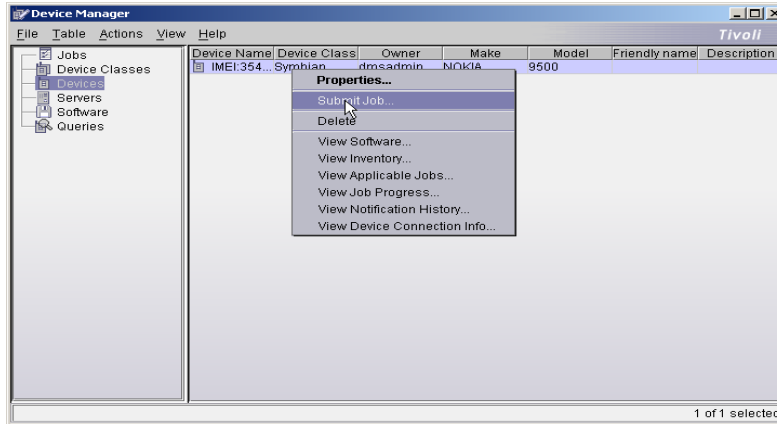
Administration API

- The Administration API is a set of Java classes used to manage devices, jobs, software, and queries.

- The Administration API is implemented as a set of Web services, which communicates using SOAP over HTTP.

- The API consists of a number of proxies, stubs, and support or meta-classes.

- The Administration API was used to develop applications that are shipped with Device Manager.

- External applications, not supplied by Device Manager, can also use the Administration APIs.

Administration API

Administration API is supported in two forms:

▸ The Administration API Java classes are contained in the dmapi.jar file, which is installed on the Device Manager server in the DeviceManager/api/lib directory.

▸ Using a wsdl2java tool or wizard, the Administration API can be generated from Web Services Description Language (WSDL) files that reside on the Device Manager server in the DeviceManager/api/wsdl directory.

Administration API – WSDL files

- The WSDL files can also be accessed from the Device Manager server using a URL.
- WSDL is a standard for describing Web services in XML. WSDL supports interoperability and portability between languages and platforms.
- A WSDL file contains the following characteristics of a Web service:
  - Name
  - Methods
  - Parameters and parameter types
  - Protocol
  - Encoding style
  - Location

Command Line Interface Commands

- Managing devices
  - **Register (add) a device**
  - **List registered devices**
  - **Modify device information**
  - **Delete a device**
- Managing groups
  - **List registered groups**
- Managing software
  - **Add software**
  - **List registered software**
  - **Delete software**
- Managing jobs
  - **Submit (add) a job**
  - **List registered jobs**
  - **List job progress data**
  - **Cancel a job**
  - **Delete a job**
  - **Creating a connection query for job targeting**

- Managing queries
  - **Add a query**
  - **List registered queries**
  - **Delete a query**
- **Installation and configuration commands**
  - **Installing the Device Manager files.**
  - **Running a configuration command**
  - **Changing a configuration password**.
- OSGi bundle commands
  - **Tuning for the automatic prerequisite resolution with OSGi bundles.**
  - **Creating a native application OSGi bundle**.
  - **Creating an OSGi bundle for ECUs**.
- Job delay profile command
  - **Creating job delay profiles.**
- Palm OS device command
  - **Converting a text file to a Palm database file.**

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OSGI-related job Types

High-level job types include…
- Inventory Collection
- Software Distribution
- Software Removal
- Native Bundle Software Distribution
- Software List Updates (client-driven software pull)
- Bundle Control
- Run Command
- Device Configuration

"Building-block" job types include…
- Custom Command
- Command Script
- Node Discovery

Software Distribution Jobs

Used to send one or more software bundles to the device.

Key features include…

- Automatic prerequisite resolution to resolve OSGi service/package/resource requirements
  - ▸ Based on software registered with the Everyplace Deployment server, distributes the requested bundles and their pre-requisites to the device only when they have not already been installed in the device.

- Pre-requisite resolution engine is tunable
  - ▸ Individually configurable for each class of device
  - ▸ Bundle combinations exceeding the resources of the client automatically rejected

Native Software Distribution Jobs

Used to send "native" software content to the device…

- The NativeAppBundle tool can be used to wrap a native application (e.g. file system content) in an OSGi bundle for subsequent distribution.

- Operations that can be performed within a NativeAppBundle:
  - Lay down files or directories on the local filesystem
  - Launch installers or other executables, as associated with the "life-cycle" of the bundle (e.g. Install, Start, Stop, and Uninstall have distinct hooks)

- The NativeAppBundle wrapper makes the package appear as a "normal" OSGi bundle, but has special Bundle Activation and manifest definitions that are used at the client run-time during installation in order to install native content.

Native Software Distribution Jobs (cont.)

- A small bundle (one without the native image) remains resident on the OSGi system
  - ▸ This enables the deployed native apps to show up in the OSGi bundle inventory
  - ▸ On native packages that have an appropriate uninstall (or other) command specified, the SoftwareRemoval and BundleControl jobs can be used to uninstall the native application or control start/stop state of the application

- Pre and post install operation hooks have been added in WEDM 6

- Can also be used to wrap and deliver Eclipse Features…
  - ▸ For the WED 6 client, Eclipse feature sets may be wrapped and delivered to run-times via the NativeAppBundle tool.

    This encapsulates all of the plugins and feature definitions associated with any Eclipse feature to be delivered (applicable to Eclipse environments such as WebSphere Everyplace Deployment).

Bundle Control and Software Removal Jobs

Used to control the state and operation of bundles.

Features include…

- Multiple sequenced bundle control steps are supported

- Supported actions include:
  - ▸ Start
  - ▸ Stop
  - ▸ Uninstall
  - ▸ UninstallDeep – Uninstalls the requested bundle and recursively uninstalls any other pre-requisite bundles that are not in use by other bundles

- Uninstall and UninstallDeep are also mapped to "Software Removal" job type (shared implementation with bundle control)

Inventory Jobs – OSGi specific function

**Collects information about the set and state of installed bundles
and services in the OSGi run-time. Specific information
collected includes:**

- Bundle table:
  - Bundle Name, Version, Description, Vendor and Bundle State

- Package table:
  - Package Name and Version

- Service table:
  - Service Name

- Resource table:
  - Available Resource Names and Values

Inventory Jobs – Example OSGi Bundle

Inventory

Device name = ED4WL-SMBIOS:KPTPLDA-UNKNOWN_UUID-SYSTEM-1120153141724
Device class = Win32

	Application Packages View		State	Desc...	Name ▲	Vendor	Version
	Computer Table	...	RESOLVED		Apache Lucene	Eclipse.org	1.4.3
	Computer System Memory Table	...	ACTIVE		Configuration Admin Service	IBM	1.4.0.20050627
	File Header Table	...	RESOLVED		Core Resource Management	Eclipse.org	3.0.1
	Hard Disk/Storage View	...	RESOLVED		Core Resource Management Win32 Fragment	Eclipse.org	3.0.0
	Installed Files View	...	ACTIVE		Core Runtime	Eclipse.org	3.0.2
	Installed Partition Table	...	ACTIVE		Core Runtime Plug-in Compatibility	Eclipse.org	3.0.0
	IPX Address Table	...	ACTIVE		Enterprise Management Agent	IBM	1.8.0.20050627
	IP Address Table	...	ACTIVE		Enterprise Management Agent Configuration	IBM	6.0.0.20050627
	Memory Modules Table	...	ACTIVE		Enterprise Management Agent Extension for Win32 x86	IBM	1.8.0.20050627
	Modem View	...	ACTIVE		Enterprise Management Agent Servlet	IBM	1.8.0.20050627
	Mouse View	...	RESOLVED		Expression Language	Eclipse.org	3.0.0
	Network Adapter Table	...	ACTIVE		HTTP Service	IBM	2.1.3.20050627
	OSGi Bundle Table	...	RESOLVED		HTTP Service for Web Container	IBM	1.0.0.20050627
	OSGi Packages Table	...	ACTIVE		HTTPAdaptor Plugin	IBM	1.8.0.20050627
	OSGi Resources Table	...	ACTIVE		HTTPSAdaptor Plugin	IBM	1.8.0.20050627
	OSGi Services Table						

View Details

Submit Job   Close

Inventory Jobs –Win32 and Linux-specific

Collects information about the set of native software, hardware and other information on the machine. Specifics include…

- Win32 and Linux
  - Registered software
  - Targeted/filtered file scan capabilities
  - SMBIOS information
  - OS version and other System information
  - Hardware (memory, disks, partitions, etc.)

- Additional Win32-specific inventory
  - Windows Services
  - User Information
  - Installed patch information
  - Registry entries (including subtrees)

Inventory Jobs—Sample Win32 Registered Software

Inventory

Device name = ED4WL-SMBIOS:KPTPLDA-UNKNOWN_UUID-SYSTEM-1120153141724
Device class = Win32

Application Packages View
Computer Table
Computer System Memory Table
File Header Table
Hard Disk/Storage View
Installed Files View
Installed Partition Table
IPX Address Table
IP Address Table
Memory Modules Table
Modem View
Mouse View
Network Adapter Table
OSGi Bundle Table
OSGi Packages Table
OSGi Resources Table
OSGi Services Table

...	File path	Package name ▲	Version	Publisher
ED...		Tivoli Storage Manager Client	05.01.0515	Tivoli
ED...		VNC 4.0 Beta 4	4.0b4	RealVNC Ltd.
ED...		Viewpoint Manager (Remove Only)		
ED...		Viewpoint Media Player		
ED...		Viewpoint Toolbar (Remove Only)		
ED...		Visual SlickEdit 8.0		
ED...		WebFldrs	9.50.7522	Microsoft Corporation
ED...		WildTangent Web Driver		
ED...	C:\\Program Fil...	WinPcap 3.0		Politecnico di Torino
ED...	C:\\Program Fil...	WinSCP 3.7.1	3.7.1	Martin Prikryl
ED...	C:\\WINZIP\\	WinZip	8.1 SR-1 (5266)	WinZip Computing, Inc.
ED...		Windows 2000 Hotfix - KB329115	20031024.155236	Microsoft Corporation
ED...		Windows 2000 Hotfix - KB820888	20030604.152521	Microsoft Corporation
ED...		Windows 2000 Hotfix - KB822831	20030611.114034	Microsoft Corporation
ED...		Windows 2000 Hotfix - KB823182	20030618.121409	Microsoft Corporation

View Details

Submit Job   Close

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Inventory Jobs—Sample Linux Registered Packages

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Inventory

Device name = ED4WL-SMBIOS:KPN7646-ADF04B5DBDB87D1190260E6A66DD38CC-root-1121098990650
Device class = Linux

Management Tree	Application Packages View
UNIX System Parameters Table	Computer Table
	Computer System Memory Table
	Hard Disk/Storage View
	Installed Files View
	Installed Partition Table
	IP Address Table
	Memory Modules Table
	Network Adapter Table
	OSGi Bundle Table
	OSGi Packages Table
	OSGi Resources Table
	OSGi Services Table
	PCI Device Table
	Installed Processors View
	SMBIOS Data View
	Device Detail
	Device Information
	Accounts

...	...	Package name ▲	Version	Publis
ED...		Ethernet settings tool for PCI ethernet c...	1.8-2	Red Hat, Inc.
ED...		Extensions for Tcl and Tk	8.3-92	Red Hat, Inc.
ED...		Extra modules for version 2 of the GNO...	0.99.10-3	Red Hat, Inc.
ED...		Eye of GNOME image viewer	2.2.2-1	Red Hat, Inc.
ED...		FAM, the File Alteration Monitor.	2.6.8-9	Red Hat, Inc.
ED...		Fast compression and decompression ...	4.2.4-33	Red Hat, Inc.
ED...		File Roller is a tool for viewing and creat...	2.2.3-4.E	Red Hat, Inc.
ED...		Files used by both Samba servers and ...	3.0.2-6.3E	Red Hat, Inc.
ED...		Filter Perl module	1.29-3	Red Hat, Inc.
ED...		Finds files on a system via a central dat...	2.7-3	Red Hat, Inc.
ED...		First Steps	8.1.0-56	International Busir
ED...		Font configuration and customization lib...	2.2.1-8.0	Red Hat, Inc.
ED...		Font extensions for Nautilus	0.3-4	Red Hat, Inc.
ED...		Font utilities required for installing fonts	4.3.0-78.EL	Red Hat, Inc.
ED...		Fonts for the Ghostscript PostScript(TM)...	5.50-9	Red Hat, Inc.

View Details

Submit Job   Close

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Inventory Jobs—Sample Computer OS/System Inventory

Inventory Details

This table displays the selected view of device inventory by keyword and value.

Parameter Name	Current Value
Device Name	ED4WL-SMBIOS:KPTPLDA-UNKNOWN_UUID-SYSTEM-1120153141724
Computer alias	SHELLYY
Boot time	Mon Jul 11 04:15:12 EDT 2005
Computer model	IBM 2366GU1
Computer scan time	Mon Jul 11 11:52:35 EDT 2005
Number of function keys	12
Keyboard type	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
Daylight	T
OS install date	2004-02-10T08:58:23Z
OS major version	5
OS minor version	0
Name	Microsoft Windows 2000 Professional
OS sub version	Build 2195: Service Pack 4
Type	Windows 2000
Server scan time	Mon Jul 11 11:53:40 EDT 2005
Registered organization	IBM
Registered owner	IBM_User
System serial number	KPTPLDA
Time zone plus minus	-
Time zone daylight name	Eastern Daylight Time

Close

Inventory Jobs—Sample Win32 Services Inventory

Inventory

Device name = ED4WL-SMBIOS:KPN7735-01D21241E1C87D11B48F0DE922B32B36-micah_cross-1121254551422
Device class = Win32

PCI Device Table	Application Packages View
PC System Parameters Table	Computer Table
Printer View	Computer System Memory Table
Installed Processors View	File Header Table
Registry Table	Hard Disk/Storage View
Service Information Table	Installed Files View
SMBIOS Data View	Installed Partition Table
Device Detail	IPX Address Table
Device Information	IP Address Table
Accounts	Memory Modules Table
Management Tree	Modem View
USB Device View	Mouse View
Video Card View	Network Adapter Table
	OSGi Bundle Table
	OSGi Packages Table
	OSGi Resources Table
	OSGi Services Table
	Patch Table

Description	Display Name ▲	Path	Na
... Allows error reporting for services and...	Error Reporting Service	C:\WI...	ER!
...	Ethernet Packet Service	C:\WI...	npa
... Enables event log messages issued ...	Event Log	C:\WI...	Eve
... Provides management for application...	Fast User Switching Compatibility	C:\WI...	Fas
... This service implements the secure h...	HTTP SSL	C:\WI...	HT
... Enables Help and Support Center to r...	Help and Support	C:\WI...	hel;
... Enables generic input access to Hum...	Human Interface Device Access	C:\WI...	Hid
...	Hummingbird Inetd	C:\WI...	HC
... IBM Everyplace Client for Win32	IBM Everyplace Client	C:\Pr...	Eve
... IBM_HTTP_SERVER/1.3.28.1 Apach...	IBM HTTP Administration 1.3.28	\"C:\li...	IBM
... IBM_HTTP_Server/6.0 Apache/2.0.47 ...	IBM HTTP Administration 6.0	\"C:\li...	IBM
... IBM_HTTP_SERVER/1.3.28.1 Apach...	IBM HTTP Server 1.3.28	\"C:\li...	IBM
... IBM_HTTP_Server/6.0 Apache/2.0.47 ...	IBM HTTP Server 6.0	\"C:\li...	IBM
...	IBM Rational Agent Controller	C:\Pr...	IBM
... Controls the running of an IBM WebS...	IBM WebSphere Application Server V5 ...	\"C:\l...	IBM

Submit Job   Close

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Inventory Results

Inventory can be used for several potential applications…
(Applicable to all device classes in WEDM…)

- Asset and state tracking
  - Automated customized scans can be scheduled
  - Raw inventory results could be used (polled) for report creation or automated job submission

- Job/device target filtering
  - Any field data available via inventory can be used for mass device and job targeting
  - Example filters include Operating System name and version information or installed software
  - Can even target "unknown" devices (once enrolled characteristics are matched.)

Node Discovery and Custom Command Job

Node Discovery job details…

- Can "tree-walk" the management tree

- Search depth can be specified

- The results are saved in the Inventory

- From the inventory data (via console), jobs can be submitted that utilize the data (example provide in subsequent slides.)

Custom Command job details…

- Can be used to get/replace/delete nodes in the management tree

- Note that this is not applicable for all management nodes and operations—most operations for OSGi derivative device classes are "abstracted" to higher level operations such as "Inventory" and "Software Distribution".

Device Configuration Job

Provides the generic ability to inventory and change device management account information

- This job manages the ./SyncML/DMAcc tree and sub-nodes. This mapping is abstracted via specific configuration parameters.

- Additional configuration hooks for the agent and run-time are described on the following slides.

Bundle and Agent Configuration

Provides the generic ability to inventory and change bundle configuration information. Bundles can be written to enable control of unspecified configuration items (O/S settings, attached device configuration, etc.)

- The OSGi ConfigurationAdmin service data is mapped onto OMA DM tree at ./OSGi/BundleConfiguration and its sub-nodes.
- Solution provides device management capability with no changes required on the device agent or server
- Some additional OSGi agent configuration such as default account and polling values are mapped to ./OSGiAgent
- NodeDiscovery jobs can be used to fetch the configuration data
- Select the configuration items to be modified from the inventory data and launch a CustomCommand job to change the values

Examples on the following slides…

Bundle Configuration – Example of setting log service settings

Inventory

Device name = ED4WL-SMBIOS:KPN7735-01D21241E1C87D11B48F0DE922B32B36-micah_cross-1121254551422
Device class = Win32

PCI Device Table	Application Packages View		
System Parameters Table	Computer Table		
Printer View	Computer System Memory Table		
Installed Processors View	File Header Table		
Registry Table	Hard Disk/Storage View		
Service Information Table	Installed Files View		
SMBIOS Data View	Installed Partition Table		
Device Detail	IPX Address Table		
Device Information	IP Address Table		
Accounts	Memory Modules Table		
Management Tree	Modem View		
USB Device View	Mouse View		
Video Card View	Network Adapter Table		
	OSGi Bundle Table		
	OSGi Packages Table		
	OSGi Resources Table		
	OSGi Services Table		
	Patch Table		

	Data	URI
...	Computer Alias	./Inventory/UNIX System Params
...	MCROSS	./Inventory/UNIX System Params/Computer Alias
...	1	./Inventory/Video
...	Index/ID/Adapter N...	./Inventory/Video/1
...	BundleControl/SW...	./OSGi
...		./OSGi/BundleConfiguration/com.ibm.osg.service.deviceagent.nativeinstall.v
...	com.ibm.osg.servic...	./OSGi/BundleConfiguration/com.ibm.osg.service.deviceagent.nativeinstall.v
...	200	./OSGi/BundleConfiguration/com.ibm.osg.service.log.Log/log.size
...	4	./OSGi/BundleConfiguration/com.ibm.osg.service.log.Log/log.threshold
...	com.ibm.osg.servic...	./OSGi/BundleConfiguration/com.ibm.osg.service.log.Log/service.pid
...	certificates	./OSGi/BundleConfiguration/com.ibm.pvc.osgiagent.protocol.agentadaptor.h
...		./OSGi/BundleConfiguration/com.ibm.pvc.osgiagent.protocol.agentadaptor.h
...	password	./OSGi/BundleConfiguration/com.ibm.pvc.osgiagent.protocol.agentadaptor.h
...	JSSE SSL Enabler	./OSGi/BundleConfiguration/com.ibm.pvc.osgiagent.protocol.agentadaptor.h
...	com.ibm.pvc.osgia...	./OSGi/BundleConfiguration/com.ibm.pvc.osgiagent.protocol.agentadaptor.h

Submit Job   Close

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Bundle Configuration – Example of setting log service settings

Submit Job: Job Parameters

UI Alert Command
Add Command
Copy Command
Delete Command
Exec Command
Get Command
Replace Command

Group 1
Command grouping
no selection   Remove   Add Group
Command number

Target URI
./OSGi/BundleConfiguration/com.ibm.osg.service.log.Log/log.size
Alternate data source
no selection
Data
500

Group 2
Command grouping
no selection   Remove
Command number

Target URI
./OSGi/BundleConfiguration/com.ibm.osg.service.log.Log/log.threshold

Back   Next   Cancel   Help

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Run Command Job

Used to run a command on the device and optionally capture stderr, stdout and the return code.

- Example uses include…
  - ▶ Launch a command to perform an installation
  - ▶ Capture output from a command line utility (e.g. ls)

- Job can be set to "fail" on non-zero return codes

- Can be used in conjunction with other features in DM such as "interactive jobs" in order to design and implement an automated intelligent processing flow during device connect sessions.

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