Point of Sale Subsystem

IBM

UnifiedPOS

Retail Peripheral Architecture
IBM Defined Management Services

Version 1.0
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IBM Defined Management Services

This document explains the high level design of the UnifiedPOS Management Services Subsystem and related components. This strategy conforms to the Common Information Model (CIM) from the Distributed Management Task Force (DMTF).

Unified POS Changes

To seamlessly support the integration of UnifiedPOS management services, some changes are required to the UnifiedPOS specification, as well as the device controls provided by members of the committee.

Each component, the control and the service will have the capability to expose the device to UnifiedPOS Management Services. A read/write Boolean property, **AllowManagement** at control, will allow the application to determine if the device should participate in systems management. The default value is true for **AllowManagement** property. The property is initialized at open time.

Also, each Service should implement the **UPOSManagementService** interface. The interface, from UPOS Management Services, it is what the component passes to Management Services when it registers with it. This interface serves as the connection point to Management Services and eventually the CIMOM. Registration occurs when the device is enabled, and un-register when disabled.

When the device is enabled, it should check with its corresponding control and service to determine if it will handle systems management, checking the **CapServiceSupportsManagement** capability and **AllowManagement** property. If **CapServiceSupportsManagement** is true, the Service will accept the responsibility to interact with systems management and register its own **UPOSManagementService** with UPOS Management Services and handle the systems management interface on behalf of the named device. When **CapServiceSupportsManagement** is false and the **AllowManagement** is true the control of the device will register the **UPOSManagementService** with UPOS Management Services. Finally when both are false the device will not participate in systems management.

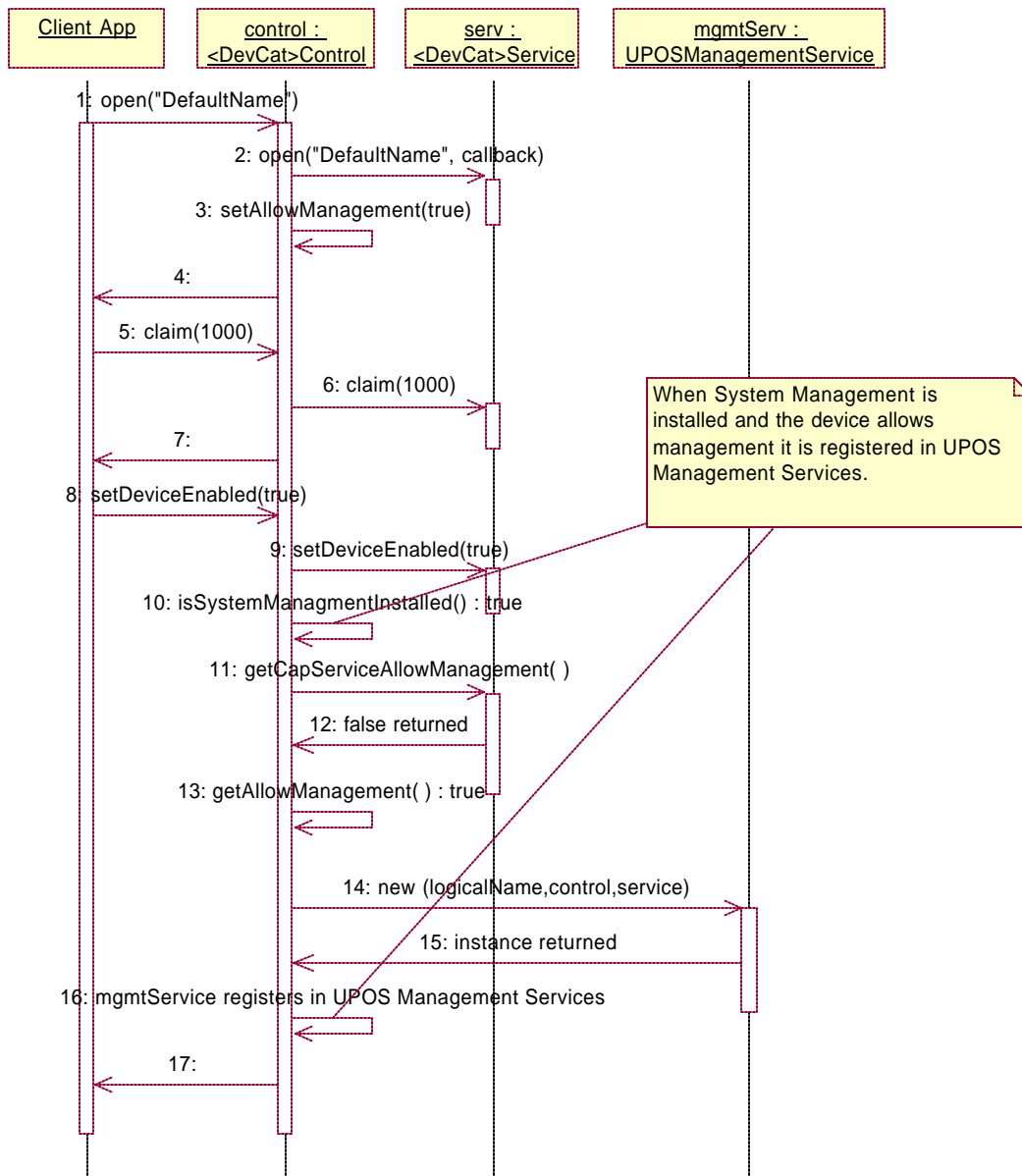**CapServiceSupportsManagement** capability has as default value false

Controls Class Diagram *Created in IBM Release 1.9.1*

The following diagram shows the new properties and capabilities added to the common controls and the relationships between the new **UPOSManagementService** classes.
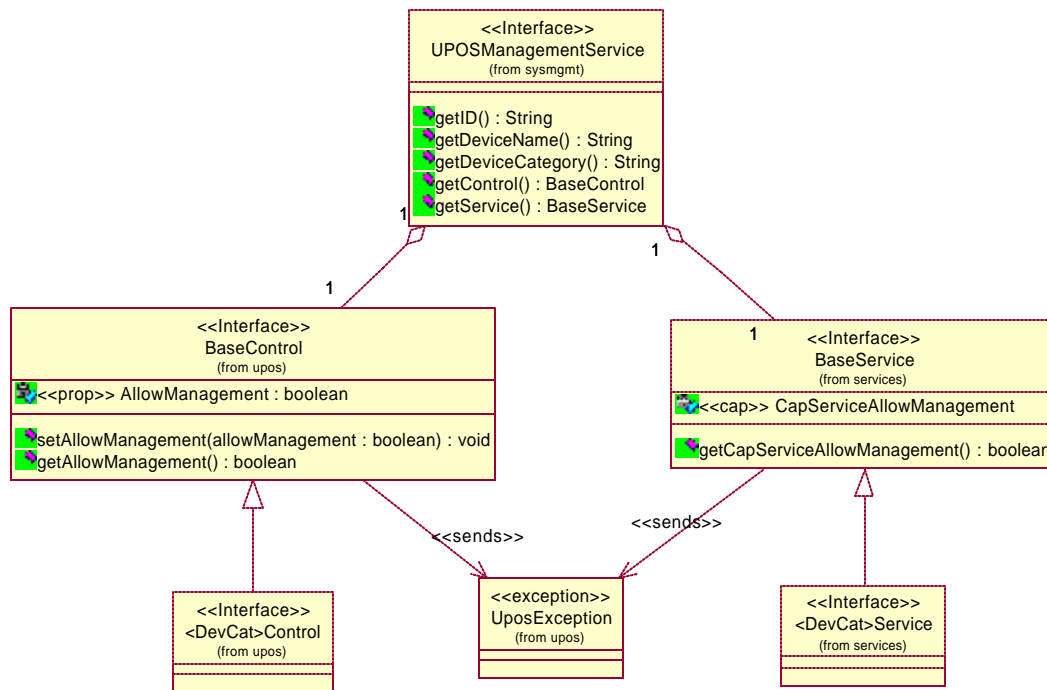
Device Registration Sequence Diagram *Created in IBM Release 1.9.1*

The following sequence diagram show the new sequences added to the Device Control to register the device with IBM Management Services at setDeviceEnabled() time.

Client App	control : <DevCat>Control	serv : <DevCat>Service	mgmtServ : UPOSManagementService

1: open("DefaultName")

2: open("DefaultName", callback)

3: setAllowManagement(true)

4:

5: claim(1000)

6: claim(1000)

7:

8: setDeviceEnabled(true)

9: setDeviceEnabled(true)

10: isSystemManagmentInstalled() : true

11: getCapServiceAllowManagement( )

12: false returned

13: getAllowManagement( ) : true

> When System Management is installed and the device allows management it is registered in UPOS Management Services.

14: new (logicalName,control,service)

15: instance returned

16: mgmtService registers in UPOS Management Services

17:

CIM Class Names for UPOS Device Category Names

The correlations of UnifiedPOS programmatic names and CIM class names are defined in the following table.

UnifiedPOS Device Programmatic Names	CIM Class Name	Supported since
	UPOS_LogicalDevice	1.9.1
BumpBar	UPOS_BumpBar	
CashChanger	UPOS_CashChanger	
CashDrawer	UPOS_CashDrawer	1.9.1
CAT	UPOS_CAT	
CheckScanner	UPOS_CheckScanner	1.9.1
CoinDispenser	UPOS_CoinDispenser	
HardTotals	UPOS_HardTotals	1.9.1
Keylock	UPOS_Keylock	1.9.1
LineDisplay	UPOS_LineDisplay	1.9.1
MICR	UPOS_MICR	1.9.1
MotionSensor	UPOS_MotionSensor	1.9.1
MSR	UPOS_MSR	1.9.1
PINPad	UPOS_PINPad	
PointCardRW	UPOS_PointCardRW	
POSKeyboard	UPOS_POSKeyboard	1.9.1
POSPower	UPOS_POSPower	
POSPrinter	UPOS_POSPrinter	1.9.1
RemoteOrderDisplay	UPOS_RemoteOrderDisplay	
Scale	UPOS_Scale	1.9.1
Scanner	UPOS_Scanner	1.9.1
SignatureCapture	UPOS_SignatureCapture	
SmartCardRW	UPOS_SmartCardRW	
ToneIndicator	UPOS_ToneIndicator	1.9.1

Refer to "<installdir>\sysmgmt\UPOSMgmtSrvProv.mof" file for a complete class definition.

IBM UnifiedPOS Provider

The IBM Provider act as driver and interface between the abstract world of the Common Information Model (CIM) and the UnifiedPOS device characteristics of Retail Hardware.

Following describes the providers supported by IBM:

Instance Provider:

An instance provider supplies instances of one or more given classes. For example, an instance provider can supply information regarding a POSPrinter device.

CIM Method	WMI Equivalent	Supported by	
		Windows	IRESv2
GetInstance	GetObjectAsync	Yes	No
ModifyInstance	PutInstanceAsync	No	No
DeleteInstance	DeleteInstanceAsync	No	No
EnumerateInstances	CreateInstanceEnumAsync	Yes	No
EnumerateInstanceNames		No	No
ExecQuery	ExecQueryAsync	No	No

Method Provider:

A method provider allows CIMOM access to the methods of a class.

CIM Method	WMI Equivalent	Supported by	
		Windows	IRESv2
InvokeMethod	ExecMethodAsync	No	No

Windows Event Provider (WMI):

An event provider is a COM object that supplies WMI notifications of intrinsic and extrinsic events. An intrinsic event reports an internal data change to WMI, while an extrinsic event reports a user-defined event not described by an intrinsic event.

For example, an event in response to changes, creation, or deletion of the UnifiedPOS_POSPrinter class would classify as an intrinsic event. An event that is generated on the basis of something other than the modification, creation or deletion of an existing WMI object is an extrinsic event.

IBM UnifiedPOS provider provides intrinsic events regarding the instance creation and deletion, and all the supported UnifiedPOS Status Update Events(SUE) as extrinsic events.

Linux Indication Provider (IRES v2):

Events or Indications for Linux are not supported.

Configuration:

A properties file is defined to customize some of the functions of the UnifiedPOS Management Services as described below:

File Name: sysmgmt.properties file located in <install dir>\sysmgmt directory.

> **Property:** provider.eventSocket.Port
> **Default value:** 42114
> **Description:** Port number used by Windows Event CIM Provider.

> **Property:** provider.response.timeout
> **Default value:** 30000
> **Description:** Timeout value from CIM Provider to UPOS Management Services..

> **Property:** upos.requestSocket.Port
> **Default value:** 42115
> **Description:** Port number used by UPOS Management Services.

WMI Component:

The Microsoft WMI components are required to run the IBM UnifiedPOS Management Services on Windows. These components can be downloaded from:

> http://www.microsoft.com/downloads/details.aspx?familyid=013BB284-3946-44A9-AC3C-BF2A569EAA72&displaylang=en

Optionally, the WMI components can be obtained by installing the Microsoft .NET component.

IBM does not install Microsoft WMI components during installation.

Know Issues Related to WMI:

Installation on Windows 2000:

Because few required dlls are missing on base Windows 2000 installation, ensure that the WMI components are installed from one of the methods described above.

Uninstallation on Windows 2000:

IBM UnifiedPOS installer uses the "wmic" command to delete the mof classes from WMI. Since windows 2000 does not have the mentioned utility, the mof classes created at installation time are not removed at un-installation time.

Therefore, it is required to manually delete the mof files created during IBM UnifiedPOS installation. The detailed steps are described below:
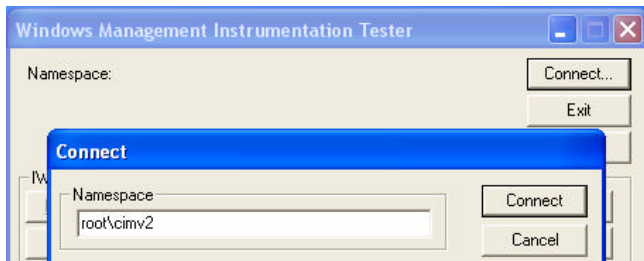
1.- Press Start-> run menu item.

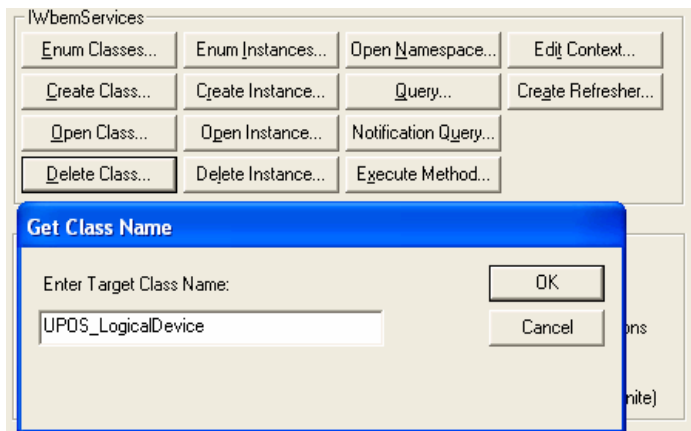2.- Type "wbemtest" at open field and press the "OK" button.

At "Windows Management Instrumentation Tester" window :
3.- Click on "connect…" button.

At Connect window:
4.- type "root\cimv2" at Namespace label.
5.- Click "connect" button.

6.- Click on "Delete Class…"

At "Get Class Name" window

7.- Type "UPOS_LogicalDevice" and click "OK" button.

8.- The parent "UPOS_LogicalDevice" and all its childs should have been removed from WMI.

9.- Repeat 6 and 7 steps for "UPOS_DecoupledProvider" and "UPOS_SysMgmtEvent" classes.

Problem Determination:

The IBM Provider has a facility to enable System Management tracing to collect trace information. Following is described how to enable\disable.

Activate Java Trace:

1. Go to "c:\POS\IBMJPOS\Config" directory and open the "jutil.properties"
2. Turn on the "com.ibm.jutil.tracing.TurnOnAllNamedTracers=ON" trace.
3. The location for these files is "<HOME>/.ibmjpos" where <HOME> is the absolute path to the user's home directory.

   Note: The last steps assumed as install directory "c:\pos"

Activate Provider logging:

1. Create a system environment variable called = "UPOS_SYSMGMT_LOG" with value="1"
   a. An example for Windows XP:
      i. Right click on "My Computer" and select properties
      ii. Select "advanced" tab.
      iii. Click on "Environment variables".
      iv. In "System variables" select "new".
      v. At "variable name:" write "UPOS_SYSMGMT_LOG".
      vi. At "variable value:" write "1";
      vii. Click on "OK" at "New System variables" window.
      viii. Click on "OK" at "environment variables" window.
      ix. Click on "OK" at "System Properties" window.
   b. An example for Linux:
      i. Edit the "/etc/profile" file
      ii. Add the following line "export UPOS_SYSMGMT_LOG=1"
2. Restart the system
3. The "UPOS_SysMgmt.log" location is "c:\pos\log" directory for windows and "/var/log" directory for Linux.

Reference:

Documents referenced and utilized for the implementation of UnifiedPOS Management Services:

- UnifiedPOS Retail Peripheral Architecture Version 1.8 http://www.nrf-arts.org/
- Common Information Model Version 2.2 http://www.dmtf.org/standards/cim
- Common Information Model Schema 2.9 http://www.dmtf.org/standards/cim/cim_schema_v29
- Java WBEM Services 1.0 API http://wbemservices.sourceforge.net/javadoc/api/index.html
- JSR 48: WBEM Services Specification http://jcp.org/en/jsr/detail?id=48
- SBLIM Project http://sblim.sourceforge.net/index.html
- CMPI Specification v1.3 http://www.wbemsource.org/doc.tpl?CALLER=documents.tpl&dcat=&gdid=3712
- Pegasus site http://www.openpegasus.org