Guidelines for Customizing Mobile Broadband in Windows 7

January 11, 2010

Abstract

This paper provides information about how to customize mobile broadband in Windows® 7. It provides guidelines for original equipment manufacturers (OEMs) and mobile network operators (MNOs) to provide a branding icon and customize settings in the connection profiles that mobile broadband uses. By using these guidelines, OEMS and MNOs can provide a richer end-user experience for mobile broadband devices.

This information applies to the Windows 7 operating system.

References and resources discussed here are listed at the end of this paper.

The current version of this paper is maintained on the Web at:  
 <http://www.microsoft.com/whdc/connect/wireless/MB_CustGuide.mspx>

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Document History

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# Introduction

This document describes how original equipment manufacturers (OEMs) and mobile network operators (MNOs) can customize the Windows® 7 mobile broadband settings to provide a richer end-user experience.

Windows 7 mobile broadband can be customized in the following ways:

* Operator branding.

OEMs and MNOs can add an icon that displays an MNO’s branding information. In this document, this icon is referred to as the “branding icon.”

* Configuring a mobile broadband connection profile.

OEMs and MNOs can create or update connection profiles with settings that specify the branding icon. Other settings can be added that are customized for the user’s subscription.

# Operator Branding Icons

Windows 7 mobile broadband provides the support to display an MNO’s branding icon and the name of the mobile broadband network to end-users.

Figure 1 is an example of how the branding icon appears in the Windows 7 **View Available Networks** (VAN) user interface (UI).



Figure 1. Branding icon for a mobile broadband connection in the VAN UI

The following is a typical scenario:

1. The user wants to connect to a mobile broadband network.

2. The user right-clicks the connection manager icon from the notification area and selects **Connect to a Network**.

3. Windows 7 presents a list of the available wireless local area networks (LANs) and mobile broadband networks.

4. The user recognizes the familiar branding icon and name of his or her service provider and clicks the icon to connect to the preferred mobile broadband network.

The branding icon must have the following format:

* The size of the icon must be 32 x 32 pixels.
* The icon must be saved as an *.ico* file.

For guidelines about how to create icons that have the same display qualities as Windows graphical elements, see “Icons” in the MSDN® library.

# Mobile Broadband Connection Profiles

Windows 7 mobile broadband connection profiles are XML documents. These documents contain data that is used to identify and establish a network connection, and includes the following data:

* The access point name (APN) or Code Division Multiple Access (CDMA) string.
* If required, the user’s credential information for the network connection.
* A custom icon that is provided by the MNO and represents the network connection.
* The user preferences for auto-connect settings and roaming partners.

Every mobile broadband subscription is identified by a subscriber ID that is defined by one of the following:

* The International Mobile Subscriber Identity (IMSI) for Global System for Mobile (GSM) communication devices.
* The mobile equipment identifier (MEID) for CDMA devices.

Windows 7 mobile broadband defines the following two types of connection profiles:

* Default profile

Every mobile broadband subscription can have only one default profile that is used to connect to the home network operator. Windows 7 mobile broadband also uses the default profile to obtain the auto-connect settings for a device.

If the default profile contains a **DataRoamingProvider** XML element, that provider is selected as the roaming partner when the device enters a roaming area.

When the user connects to the mobile broadband network, the VAN UI displays the icon that is defined in the default profile. The same Icon is shown in the connection manager **Network and Sharing Center** UI.

* Non-default profile

Every mobile broadband subscription can have any number of non-default profiles. These profiles are used only by third-party connection managers to connect to a mobile broadband network.

For an overview of how to create a third-party connection manager, see “Mobile Broadband Schema Reference” in the MSDN library.

**Note**The Windows 7 Connection Manager does not use non-default profiles for a mobile broadband network connection.

For a complete description of the mobile broadband profile XML schema, see “Mobile Broadband Connection Manager Development Guide” on the WHDC Web site.

## Identifying the Default Connection Profile

The default connection profile is specified through the following XML elements:

* The **SubscriberID** XML element is set to the international mobile subscriber identity (IMSI)/MEID values.
* The **IsDefault** XML element is set to a value of “true”.

## Modifying the Default Connection Profile to Install the Branding Icon

To install the branding icon in the VAN UI, the default connection profile must be identified and the profile’s **ICONFilePath** XML element must be edited to specify the path of the icon file for the connection.

Mobile broadband offers the following ways to identify and edit the default profile:

* By using a script that calls **netsh** commands.

This simple solution is the way to install the branding icon in a controlled environment. However, this solution might not properly handle large-scale field deployments with different types of mobile broadband devices.

For a complete description of how to install the branding icon by using this method, see “[Using a Script to Install the Branding Icon](#_Using_a_script)” later in this paper.

* By using a Windows executable (*.exe*) that uses the Mobile Broadband API.

This is the recommended solution for all types of field deployments. For a complete description of installing the branding icon by using this solution, see “[Using Mobile Broadband API to Install the Branding Icon](#_Using_Mobile_Broadband)” later in this paper.

# Using a Script to Install the Branding Icon

This section describes an example of how to use scripts to install a branding icon. The example consists of a set of sample scripts that can be used to do the following:

* Install a branding icon for display in the VAN UI for the mobile broadband interface.
* Configure the access string and user credentials for the subscription.

Before you use the scripts in this example, see “[Assumptions](#_Assumptions)” later in this paper.

**Note**This example is only for demonstration purposes. OEMs or MNOs should modify these scripts for a more generalized installation scenario.

## List of Files

The following files are used in this example:

* *Branding.cmd*

This script creates a connection profile that is named *Mynewprofile.xml* by using the data that is provided through the script’s command-line arguments. The script also installs the connection profile through **netsh** commands.

* *Install.cmd*

This script can be used to call *Branding.cmd* with the correct command-line arguments.

* *Profiletemplate.xml*

This template contains the basic set of XML elements to define a connection profile. The template is based on the mobile broadband profile XML schema.

For a complete description of the mobile broadband profile XML schema, see “Mobile Broadband Schema Reference” in the MSDN library.

* *Logo.ico*

This icon file (.ico) contains the image of the branding icon.

**Note**If your icon file is not named “Logo.ico”, you must edit *Install.cmd* and add the name of your icon file.

* *Tag.txt*

This file is used by *Branding.cmd* when it parses the XML elements in *Profiletemplate.xml*.

**Note**This file must not be modified.

**< >**

## Using the Example to Install a Branding Icon

To install a branding icon by using the scripts from this example, follow these steps:

1. Copy the files that are listed in “[List of Files](#_List_of_Files)” to any folder on your computer.

2. If your icon file is not named “*Logo.ico*”, edit *Install.cmd* to update the logo icon file name. You must provide the full path of your icon file.

3. If you want to add an access string and user credentials to the connection profile, edit *Install.cmd* to update the APN, user name, and password for your subscription.

4. Delete all the existing connection profiles through the following **netsh** command:

**netsh** **mbn**  
 **delete profile interface**=*interface-name*   
 **name=***profile-name*

The **netsh** command-line arguments are as follows:

* *interface-name* can be obtained through the following **netsh** command:

**netsh mbn****show interfaces**

* *profile-name* can be obtained through the following **netsh** command:

**netsh mbn show profiles**

5. Run *Install.cmd* to create and install the default profile for the mobile broadband interface.

After you run *Install.cmd*, your branding icon should be visible in the VAN UI.

## Assumptions

If you use the scripts from this example to install a branding icon, consider the following assumptions:

* Only one mobile broadband device can be installed and connected to the computer.
* The mobile broadband device must be in a ready state (inserted, turned on, and unlocked) for the scripts to work properly.
* Currently no default connection profiles exist for the mobile broadband device.
* If a connection profile that is named *DemoOnly* exists on the computer, you should rename it or remove it before you run the scripts.
* The scripts do not preserve any user-defined auto-connect settings.
* The scripts do not handle errors. For example, the *Branding.cmd* script does not handle or report **netsh** errors.

## *Branding.cmd*

The *Branding.cmd* script creates a connection profile that is named *Mynewprofile.xml* by using the data that the script’s command-line arguments provide. The script also installs the connection profile through **netsh** commands.

This script can be run at the command prompt in the following way:

**branding** *logo-icon* **[-a** *apn***] [-u** *username* **[-p** *password***]]**

The following are the command-line arguments for this script:

*logo icon*

The full path of the icon file.

-a *apn*

The APN or access string for the subscription.

-u *username*

The user name for the subscription.

-p *password>*

The user’s password for the subscription.

**Notes**

For a mobile broadband device and subscription that uses mobile IP, the APN, user name, and password are not required.

This script requires that the **SET UNAME=** , **SET PSSWD=** , and **SET APN=** lines include a blank space after each equals sign (=).

@echo off

setlocal

if NOT EXIST %1 goto ERROR

SET UNAME=

SET PSSWD=

SET APN=

del /Q mynewprofile.xml

for /f "tokens=1,2\* delims=: " %%i in ('netsh mbn show ready \*') do (

if "%%i"=="Subscriber" SET SUB\_ID=%%k

)

echo %1

echo %SUB\_ID%

mkdir %systemdrive%\temp

copy %1 %systemdrive%\temp\%1

if "%2" EQU "-a" SET APN=%3

if "%2" EQU "-u" SET UNAME=%3

if "%2" EQU "-p" SET PSSWD=%3

if "%4" EQU "-a" SET APN=%5

if "%4" EQU "-u" SET UNAME=%5

if "%4" EQU "-p" SET PSSWD=%5

if "%6" EQU "-a" SET APN=%7

if "%6" EQU "-u" SET UNAME=%7

if "%6" EQU "-p" SET PSSWD=%7

if "%APN%" NEQ " " echo APN is %APN%

if "%UNAME%" NEQ " " echo Username is %UNAME%

if "%PSSWD%" NEQ " " echo Password is %PSSWD%

for /f "tokens=1,2\*" %%i in (tag.txt) do (

echo %%i

echo %%j

for /f "tokens=1,2\* delims=><" %%a in (profiletemplate.xml) do (

if "%%b" EQU "SubscriberID" (

echo %%a%%i%%b%%j%SUB\_ID%%%i%%c >> mynewprofile.xml

) else (

if "%%b" EQU "ICONFilePath" (

echo %%a%%i%%b%%j%systemdrive%\temp\%1%%i%%c >> mynewprofile.xml

) else (

if "%%b" EQU "AccessString" (

if "%APN%" NEQ " " echo %%a%%i%%b%%j%APN%%%i%%c >>mynewprofile.xml

) else (

if "%UNAME%" EQU " " (

if "%%b" NEQ "UserLogonCred" (

if "%%b" NEQ "/UserLogonCred" (

if "%%b" NEQ "UserName" (

if "%%b" NEQ "IgnorePassword" (

if "%%b" NEQ "Password" echo %%a%%i%%b%%j%%c >> mynewprofile.xml

)

)

)

)

)else (

if "%%b" EQU "UserName" (

echo %%a%%i%%b%%j%UNAME%%%i%%c >>mynewprofile.xml

)else (

if "%%b" EQU "Password" (

if "%PSSWD%" NEQ " " echo %%a%%i%%b%%j%PSSWD%%%i%%c >> mynewprofile.xml

)else (

echo %%a%%i%%b%%j%%c >> mynewprofile.xml

)

)

)

)

)

)

)

)

netsh mbn add profile interface=\* name=mynewprofile.xml

del /Q %systemdrive%\temp\%1

goto END

:ERROR

echo "usage branding.cmd <imagefilename> -a <APN> -u <Username> -p <Password>"

echo " -a -u -p are optional parameters but password without username is not supported"

:END

endlocal

## *Install.cmd*

You can use the *Install.cmd* script to call *Branding.cmd* with the correct command-line arguments.

We recommend that OEMs or MNOs modify and run this script to install a default connection profile with a branding icon.

:: Usage:

:: branding.cmd <branding icon file name>

:: -a <APN>

:: -u <Username>

:: -p <Password>

:: -a -u -p are optional parameters but password without username is

:: not supported

@echo off

set local

branding.cmd logo.ico -a apn -u username -p password

endlocal

## *Profiletemplate.xml*

The *Profiletemplate.xml* file is a template that contains the basic set of XML elements for a default connection profile. This template is based on the mobile broadband profile XML schema. For a complete description of the schema, see “Mobile Broadband Schema Reference” in the MSDN library.

OEMs or MNOs can modify this template to do the following:

* Provide additional mobile broadband profile XML elements and values.
* Modify the value of the **AutoConnectOnInternet** XML element.

**Note**You should not change the **SubscriberID** XML element in this template. When you run *Branding.cmd*, the script updates the value of this element through data returned from the following **netsh** command.

**netsh** **mbn** **show ready**

For *Branding.cmd* to parse this template correctly, every line in the template must start with at least a single space character.

<MBNProfile xmlns="http://www.microsoft.com/networking/WWAN/profile/v1">

<Name>DemoOnly</Name>

<ICONFilePath></ICONFilePath>

<IsDefault>true</IsDefault>

<ProfileCreationType>UserProvisioned</ProfileCreationType>

<SubscriberID></SubscriberID>

<AutoConnectOnInternet>true</AutoConnectOnInternet>

<ConnectionMode>auto-home</ConnectionMode>

<Context>

<AccessString></AccessString>

<UserLogonCred>

<UserName></UserName>

<Password></Password>

</UserLogonCred>

<Compression>DISABLE</Compression>

<AuthProtocol>NONE</AuthProtocol>

</Context>

</MBNProfile>

# Using the Mobile Broadband API to Install the Branding Icon

The mobile broadband API provides a programming interface for managing and accessing mobile broadband devices. This API also provides a programming interface for managing connection profiles.

We recommend that you install the branding icon by using an application that creates or edits connection profiles through the mobile broadband API.

This section discusses the following:

* Creating a new connection profile through the mobile broadband API.
* Editing an existing connection profile through the mobile broadband API.
* Guidelines for setting the XML elements in the connection profile.

For a complete description of the mobile broadband profile API, see “Mobile Broadband API Reference” in the MSDN library.

## Creating a New Profile

If a computer has not yet established a mobile broadband connection, it does not have pre-existing connection profiles. For such a system, you can create and install a new profile by following these steps:

1. Get the subscriber ID (IMSI / MEID).

Every mobile broadband subscription has an associated subscriber ID, which you can obtain in the following way:

1. Call the **IMbnInterfaceManager::GetInterfaces** method to enumerate all available **IMbnInterface** interfaces.
2. Select the relevant **IMbnInterface** interface by checking the **homeProvider** value that was returned through each interface’s **IMbnInterface::GetHomeProvider** method.
3. Call the selected interface’s **IMbnInterface::GetSubscriberInformation** method to obtain the **IMbnSubscriberInformation** interface. This interface provides methods to access information about the subscription, such as the subscriber ID.

**Note** The subscriber ID is available only when the **IMbnInterface::GetReadyState** method returns MBN\_READY\_STATE  
\_INITIALIZED.

2. Get the access string, user name, and password.

These three values are used in a connection request. The access string refers to the APN, and the user name and password are the credentials that are used in the connection request. If the APN is unknown, it can usually obtained by contacting the MNOs’ helpdesk.

These three values may be available in the mobile broadband device as a provisioned context. If so, you can obtain the information in the following way:

1. For the selected **IMbnInterface** interface, call the **QueryInterface** method to obtain the associated **IMbnConnectionContext** interface.
2. Call the interface’s **IMbnConnectionContext:GetProvisionedContexts** method to access a list of MBN\_CONTEXT structures for the corresponding Home Provider.
3. Select the appropriate MBN\_CONTEXT structure based on connection type. This structure contains details about the APN, user name, and password.

**Note**For a mobile broadband device and subscription that uses mobile IP, the APN, user name, and password are not required.

3. Create an XML string that is based on the mobile broadband profile XML schema.

By using the data obtained through the previous steps, create an XML string that complies with the mobile broadband profile XML schema. For guidelines about how to create the XML string, see “[Guidelines on Creating or Editing the Profile’s XML String](#_Guidelines_on_Creating/Editing)” later in this paper.

For a complete description of the mobile broadband profile XML schema, see “Mobile Broadband Schema Reference” in the MSDN library.

4. Create the profile.

To create the profile, call the **IMbnConnectionProfileManager::CreateConnectionProfile** method and pass the XML string through the method’s *xmlProfile* parameter.

## Editing an Existing Profile

If you use a computer to connect to a mobile broadband network, a default connection profile is created. You can edit the existing profile by following these steps:

1. Get a list of all profiles.

Call the **IMbnConnectionProfileManager::GetConnectionProfiles** method to obtain a list of all **IMbnConnectionProfile** interfaces that can be modified.

2. Get the XML string for each **IMbnConnectionProfile** interface.

For each **IMbnConnectionProfile** interface, call the **IMbnConnectionProfile::GetProfileXmlData** method to obtain the profile as an XML string.

3. Parse the XML string to find the default profile for the subscription.

Profiles for the subscription have a **SubscriberID** XML element that is set to the value of the device’s IMSI/MEID. You can obtain the IMSI/MEID data by calling the **IMbnInterface::GetSubscriberInformation** method.

The default profile for the subscription has an IsDefault XML element that has a value of “true”.

4. Edit the XML string that is based on the mobile broadband profile XML schema.

By using the data that was obtained through the previous steps, edit the profile’s XML string that is based on the mobile broadband profile XML schema. For guidelines about how to edit the XML string, see “[Guidelines on Creating/Editing the Profile’s XML String](#_Guidelines_on_Creating/Editing)” later in this paper.

5. Update the profile.

To update the profile, call the **IMbnConnectionProfile::UpdateProfile** method and pass the XML string through the method’s *strProfile* parameter.

For a complete description of the mobile broadband profile XML schema, see “Mobile Broadband Schema Reference” in the MSDN library.

## Guidelines on Creating or Editing the Profile’s XML String

Follow these guidelines when you create or edit a profile’s XML string:

* The valid values for the **ConnectionMode** XML element are “manual”, “auto”, and “auto-home”. The setting for this XML element defines the profile’s auto-connect setting.

You can also use the optional **AutoConnectOnInternet** XML element to specify whether the mobile broadband device automatically connects to the Internet. The default value of this element is “true”. This causes the device to auto-connect regardless of whether alternative connection paths exist on the computer. Set this element to “false” if you want the mobile broadband device not to automatically connect when an Ethernet or a Wi-Fi device connects to the Internet.

* The **ICONFilePath** XML element is an optional tag that specifies the location of the icon file. This should contain the full path of the icon file on the computer, such as *c:\icons\myico.ico*.

The user or application must have permissions to access the file. If not or if the path is invalid, the **IMbnConnectionProfileManager::CreateConnectionProfile** or **IMbnConnectionProfile::UpdateProfile** methods return HRSULT\_FROM\_WIN32(ERROR\_FILE\_NOT\_FOUND.

* The order of the XML elements in the XML string must be the same as they are in the mobile broadband profile XML schema. If the order of the XML elements in the XML string are changed, the **IMbnConnectionProfileManager::CreateConnectionProfile** or **IMbnConnectionProfile::UpdateProfile** methods return an E\_MBN\_INVALID\_PROFILE error.
* If you receive a HRESULT\_FROM\_WIN32(ERROR\_ALREADY\_EXISTS) error while you create a profile, the workaround is to either change the name of the profile or append a number to it.

For example, if the name of the profile is *My profile.xml*, change the profile name to *My profile2.xml*.

* If you receive an E\_MBN\_DEFAULT\_PROFILE\_EXIST error while you create a profile, the workaround is to create a non-default profile that third-party connection managers can use.
* If you want to update the password, you must add the **Password** XML element that has the updated password value in the XML string. The XML string that is obtained through the **IMbnConnectionProfile::GetProfileXmlData** method does not contain the current password.
* The mobile broadband profile XML schema does not allow XML elements that have empty values.

For a complete description of the mobile broadband profile XML schema, see “Mobile Broadband Schema Reference” in the MSDN library.

## Deploying an Application that Installs the Branding Icon

OEMs and MNOs can distribute their application in several ways. The following are some examples:

* For removable devices, the application can be distributed together with the device drivers and run as part of driver installation.
* For devices that have a Subscriber Identity Module (SIM) and are embedded in the computer, the application can be run on first use of the computer or the correct connection profile can be preinstalled on the computer.

# Resources

For the latest information about the Windows family, see the [Windows Web site](http://www.microsoft.com/windows) at <http://www.microsoft.com/windows>.

#### Mobile Broadband Home Page

<http://www.microsoft.com/mobilebroadband>

#### Windows Hardware Developer Central:

Home page

<http://www.microsoft.com/whdc/default.mspx>

Developing Managed Code Application That Uses the Mobile Broadband API

<http://www.microsoft.com/whdc/connect/wireless/MBCMgr_W7OS.mspx>

Mobile Broadband Connection Manager Development Guide

<http://www.microsoft.com/whdc/connect/wireless/MBCMgr_DevGuide.mspx>

#### MSDN Library:

Icons

[http://msdn.microsoft.com/en-us/library/aa511280.aspx](http://msdn.microsoft.com/en-us/library/aa511280.aspx%20)

Mobile Broadband API Reference

<http://msdn.microsoft.com/en-us/library/dd323269(VS.85).aspx>

Mobile Broadband Schema Reference

<http://msdn.microsoft.com/en-us/library/dd323300(VS.85).aspx>

#### Windows Software Development Kit:

Windows SDK for Windows 7 and .NET Framework 3.5 SP1: BETA:

<http://www.microsoft.com/downloads/details.aspx?displaylang=en&FamilyID=c17ba869-9671-4330-a63e-1fd44e0e2505>

Sample code for using Mobile Broadband API

A sample program that uses the Mobile Broadband API is included in the Windows 7 SDK. The sample is located in the *Windows/v7.0/Samples/NetDs/MB/mbapi* subdirectory of the SDK.