Mobile Broadband Stack Changes for Windows 7

July 29, 2009

Abstract

Windows® 7 mobile broadband drivers use the new features introduced by Network Driver Interface Specification (NDIS) 6.20. Because of this, broadband devices integrate differently with Windows 7 than they did with Windows Vista® and Windows XP, when they appeared to the operating system Ethernet or dial up networking/modem devices. This paper discusses important changes in the mobile broadband drivers for Windows 7.

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://go.microsoft.com/fwlink/?LinkId=160125>.

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# Introduction

Windows Vista® and earlier versions of Windows had no specific medium type for mobile broadband networks. On these systems, mobile broadband miniport drivers exposed their medium as 802.3 (Ethernet) or integrated with Windows as a modem. The Windows® 7 operating system defines a new driver model for mobile broadband devices. This driver model uses the new functionality defined by Network Driver Interface Specification (NDIS) 6.20 and defines a standard mechanism for mobile broadband devices to integrate with Windows. All mobile broadband drivers in Windows 7 must follow this driver model. Windows 7 also has a new logo program for mobile broadband devices that ensures that all drivers for Windows 7 comply with the driver model.

This document discusses important changes in mobile broadband drivers for Windows 7 compared to Ethernet-based drivers for mobile broadband devices. Applications like firewall, antivirus, VPN clients, and other applications that use NDIS lightweight filter (LWF) drivers, NDIS intermediate (IM) drivers, or Windows Filtering Platform (WFP) for filtering, analyzing, or injecting the network packets at the MAC layer might be affected by these changes.

# INF File Changes

The following table contains important INF file changes to mobile broadband miniport drivers and compares mobile broadband miniport drivers for Window  7 to Ethernet-emulating mobile broadband drivers used with earlier versions of the operating system.

NDIS IM or NDIS LWF drivers use these values to bind and attach to the underlying network device.

|  |  |  |
| --- | --- | --- |
| Value | Mobile broadband driver (Windows 7) | Ethernet driver (prior to Windows 7) |
| **UpperRange** | For IPv4 : “Flpp4”  For IPv6 : “Flpp6” | “ndis5” |
| **LowerRange** | “Ppip” | “ethernet” |
| **IfType** | For GSM based device : IF\_TYPE\_WWANPP (243)  For CDMA based device IF\_TYPE\_WWANPP2 (244) | IF\_TYPE\_ETHERNET\_CSMACD (6) |
| **MediaType** | NdisMediumWirelessWan (9) | NdisMedium802\_3 |
| **PhysicalMediaType** | NdisPhysicalMediumWirelessWan (8) | Refer to MSDN documentation for possible values for Ethernet drivers |

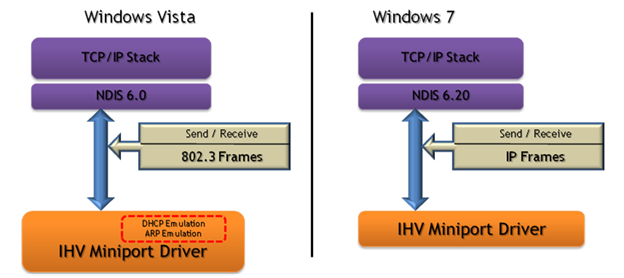
# RAW IP Frame Processing

Windows 7 defines a new media type: **NdisMediumWirelessWan**. For this media type, NDIS sends raw IP frames directly to the miniport driver and expects raw IP frames to be returned from the miniport driver. Raw IP frames are the same as Ethernet frames except that the raw IP frame starts with an IP header. It does not contain an Ethernet header in the beginning.

The following figure explains the Ethernet frame and the corresponding raw IP frame for mobile broadband devices.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Ethernet Frame | |  |  |  |  | | --- | --- | --- | --- | | **Ethernet Header** | **IP Header** | **TCP/UDP Header** | **Application data** | |
| Raw IP Frame | |  |  |  | | --- | --- | --- | | **IP Header** | **TCP/UDP**  **Header** | **Application data** | |

The following figure explains the difference in how the mobile broadband miniport driver sends and receives data with NDIS in Windows 7, as compared to Windows Vista–based network drivers.

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# Impact on Applications

Applications that use NDIS LWF, NDIS IM, or WFP, and that rely on network media type or interpret the data passed to and from the network adapter, may be affected because of the changes mentioned previously.

NDIS does not recommend using NDIS 4.0–NDIS 5.x*–*based IM filter drivers for Windows Vista or later operating systems. NDIS provides a translation layer to support these drivers in Windows Vista and Windows 7, but the NDIS translation layer does not support the use of NDIS 6.20 features with earlier NDIS IM drivers. Therefore, applications using the NDIS 4.0–NDIS 5.*x* IM filter drivers will not work with NDIS 6.20–based mobile broadband drivers. Applications that work with mobile broadband drivers should move to NDIS LWF or WFP.

Similarly NDIS 5.*x*–based NDIS IM MUX drivers also will not work as mobile broadband drivers. Applications using NDIS5.*x*–based NDIS IM MUX drivers can either move to NDIS 6.0 MUX or they can move to NDIS LWF or WFP.

The impact on applications using WFP, NDIS LWF, or NDIS 6.*x* IM MUX drivers can be divided into following two categories:

* **Binding to mobile broadband device**

Because WFP-based solutions do not need to bind specifically to a network medium, this section applies only to applications using NDIS LWF or NDIS6.*x* IM MUX drivers.

LowerRange and MediaTypespecified in the network miniport driver’s INF file are important changes for an NDIS LWF driver. To bind to Windows 7 mobile broadband driver, the filter driver should add “ppip” in the FilterMediaTypessection of the filter driver’s INF file. It should also accept miniport drivers with NdisMediumWirelessWan in their FilterAttach function.

For NDIS 6.*x* IM MUX drivers the protocol edge of the driver should specify “flpp4” or “flpp6” in the LowerRange in the driver’s INF file to be able to bind to the mobile broadband driver.

* **Network packet parsing**

This section is applicable to solutions based on NDIS6.*x* IM MUX, NDIS LWF, or WFP that parse network packets passed between NDIS and the network driver.

If the application parses network frames passed between NDIS and the miniport driver, then the parsing function should be changed to expect raw IP frames for mobile broadband adapters.

# Resources

For any query related to integrating your application for Windows 7 mobile broadband network adapters, send an e-mail message to [Win7mb@microsoft.com](mailto:Win7mb@microsoft.com).

Guidelines for Testing Network Packet Monitoring and Filtering Applications with Mobile Broadband

<http://go.microsoft.com/fwlink/?LinkId=160124>

Windows Driver Kit documentation "MB Raw IP Packet Processing Support"

<http://msdn.microsoft.com/en-us/library/dd445729.aspx>

Repository of mobile broadband driver model, API, and other related documentation

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

Windows Filtering Platform (WFP)

http://msdn.microsoft.com/en-us/library/aa366510(VS.85).aspx)

NDIS 6.0 Backward Compatibility

<http://msdn.microsoft.com/en-us/library/ms795568.aspx>