Event Service API for Windows Operating Systems

Programming Guide

November 2003

05-1918-002

Publication Date: November 2003

Document Number: 05-1918-002

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Revision History

This revision history summarizes the changes made in each published version of this document.

Document No.	Publication Date	Description of Revisions
05-1918-002	November 2003	Chapter 4, "Application Development Guidelines": Added note stating that the peripheral hot swap procedure can only be used with CompactPCI* boards. Minor editorial changes.
05-1918-001	November 2002	Initial version of document.

About This Publication

The following topics provide information about this *Event Service API for Windows Operating Systems Programming Guide*:

Purpose

This publication provides guidelines for using the Event Service API to register an application with the Intel® Dialogic® event notification framework in a Windows* programming environment.

This publication is a companion guide to the *Event Service API for Windows Library Reference*, which provides details on the classes, functions, and events in the Event Service library.

Intended Audience

This publication is intended for the following audience:

- Distributors
- System Integrators
- Toolkit Developers
- Independent Software Vendors (ISVs)
- Value Added Resellers (VARs)
- Original Equipment Manufacturers (OEMs)

How to Use This Publication

Refer to this publication after you have installed the hardware and the system software that includes the Event Service library.

This publication assumes that you are familiar with the Windows operating system and the C++ programming language.

The information in this publication is organized as follows:

- Chapter 1, “Product Description” provides an overview of the Event Service API.

- Chapter 2, "Event Handling" describes how to use the Event Service API to register an application with the event notification framework and handle system administration events.
- Chapter 3, "Error Handling" describes the error handling capabilities provided by the Event Service API.
- Chapter 4, "Application Development Guidelines" provides guidelines for using the Event Service API to build highly available applications.
- Chapter 5, "Building Applications" contains information about the required header files and library files included with the Event Service API.

Related Information

Refer to the following documents and Web sites for more information:

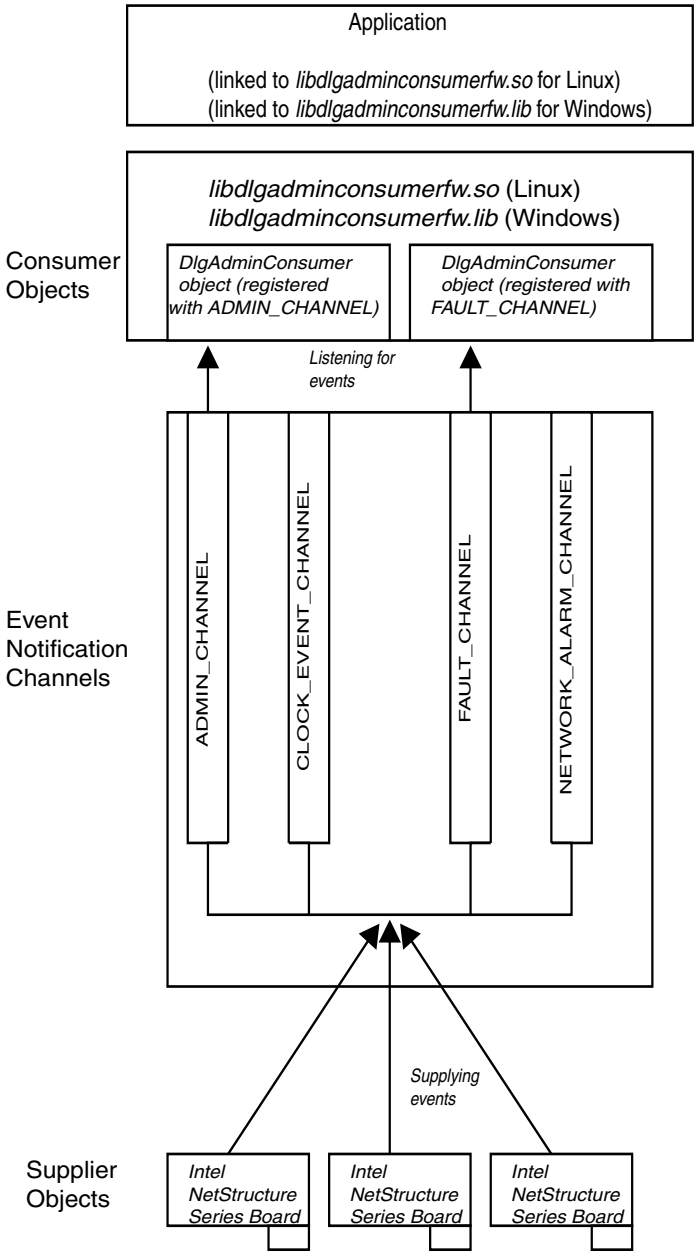
- *Event Service API for Windows Operating Systems Library Reference*
- *Intel Dialogic System Release CompactPCI for Windows Administration Guide* or *Intel Dialogic System Software for PCI Products on Windows Administration Guide*, as appropriate
- *High Availability for Windows Operating System Demo Guide* if using CompactPCI* boards
- *Native Configuration Manager API for Windows Operating Systems Library Reference*
- *Native Configuration Manager API for Windows Operating Systems Programming Guide*
- *http://developer.intel.com/design/telecom/support/* (for technical support)
- *http://www.intel.com/network/csp/* (for product information)

Product Description 1

This chapter provides a description of the Event Service API and the event notification framework.

The Event Service API provides an interface for registering your application with the Intel® Dialogic® event notification framework. The event notification framework is the subsystem for sending asynchronous system administration events to applications. The framework is implemented using supplier objects, consumer objects, and event notification channels as shown in Figure 1:

Figure 1. Event Notification Framework



Intel Dialogic system software components, such as device drivers and firmware, are the supplier objects. They generate events that are broadcast to consumer objects via the event notification channels. The DlgAdminConsumer class allows you to instantiate consumer objects and register them to receive events from one of the event notification channels. The CEventHandlerAdaptor class allows you to instantiate user-defined event handler objects that are invoked when consumer objects receive events.

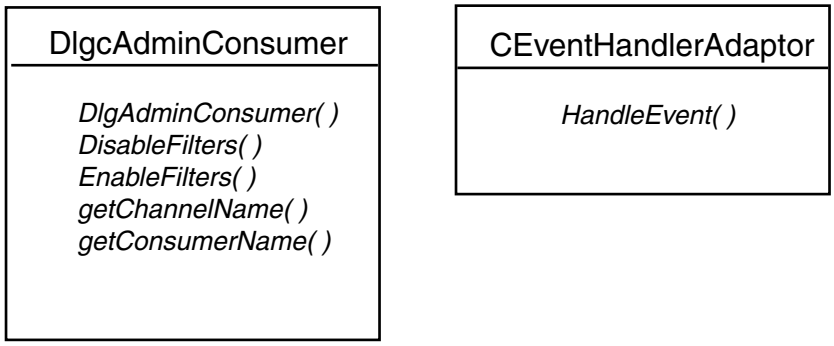
The framework contains the following event notification channels, each of which carries specific types of events:

- ADMIN_CHANNEL
- CLOCK_EVENT_CHANNEL
- FAULT_CHANNEL
- NETWORK_ALARM_CHANNEL

Note: Each DlgAdminConsumer object can only monitor one event notification channel for incoming events.

The Event Service API contains two C++ classes. A DlgAdminConsumer class for instantiating event consumer objects and a CEventHandlerAdaptor virtual class for implementing event handler objects. The two Event Service API classes, along with their member functions, are shown in Figure 2:

Figure 2. Event Service API Classes



Event Handling 2

This chapter provides information about receiving and handling asynchronous events that are transmitted via the event notification framework.

For your application to receive events from the event notification framework you must follow these steps:

1. Define and implement a class that is derived from the CEventHandlerAdaptor class.
2. Provide an implementation of the **CEventHandlerAdaptor::HandleEvent( )** function.
3. Define an array of filters for use by the DlgAdminConsumer object using DlgEventService::AdminConsumer::FilterCallbackAssoc. Each DlgAdminConsumer object references an array of filters. The elements in the array determine the following:
   - the event handler that is associated with the DlgAdminConsumer object. The implementation of the **CEventHandlerAdaptor::HandleEvent( )** function is called when one of the events that is included in the array is received.
   - the client data that is returned to the application after the associated event handler object has been invoked.
   - the events that are allowed to pass to the DlgAdminConsumer object. If an event does not have an element in the filter array, the event is discarded and the DlgAdminConsumer object will not receive it.
   - whether the event filter is enabled or disabled.
4. Use the **DlgAdminConsumer::DlgAdminConsumer( )** function to instantiate a consumer object. A pointer to the array initialized in step 3 is used as a parameter for the function.
5. Call the **DlgAdminConsumer::StartListening( )** function so that the consumer object can begin monitoring its associated event notification channel for events. When the **DlgAdminConsumer::StartListening( )** function is called, the consumer object creates and runs in its own thread, allowing it to monitor its associated event notification channel without blocking the main application thread.

When a DlgAdminConsumer object receives an event through its associated event notification channel, it compares the event's msgId field to its filter array. If a matching filter is found, the associated event handler object is invoked.

Note: When a DlgAdminConsumer object receives more than one event that is associated with the same event handler object, the DlgAdminConsumer object must return from the **CEventHandlerAdaptor::HandleEvent( )** function before it can process the next event.

Error Handling 3

This chapter explains the error handling capabilities of the Event Service API.

Many of the Event Service API functions return error codes to indicate that a given function call has failed. The following list explains the error codes returned by the Event Service API functions:

DlgAdminConsumer::DlgAdminConsumer( )
This function is a class constructor. It does not have a return value.

DlgAdminConsumer::getChannelName( )
Returns NULL for a failure.

DlgAdminConsumer::getConsumerName( )
Returns NULL for a failure.

DlgAdminConsumer::StartListening( )
Returns Boolean value of False for failure.

Application Development Guidelines 4

This chapter provides information about using various Intel® Dialogic® libraries, including the Event Service library, to develop applications that support peripheral hot swap.

Note: Peripheral hot swap can only be performed using CompactPCI* boards.

The board replacement could be driven by an application (for example, if the statistics are showing a degradation of service) or could be driven by an operator (for example, periodic hardware maintenance).

The following procedure provides information about developing applications that support Basic Hot Swap of peripheral hardware:

1. Register your application to receive events from the event notification framework according to the procedure outlined in Chapter 2, "Event Handling".
2. When a CP/SP fault, CT Bus clocking fault or network alarm event is transmitted via the event notification framework, the event's payload contains the AUID of the board that generated the event.
3. Once the application has a board's AUID, use the **SRLGetVirtualBoardsOnPhysicalBoard( )** and **SRLGetSubDevicesOnVirtualBoard( )** functions to retrieve the list of virtual devices ("dxxx", "dti" etc.) on a board. This allows the application to cross-reference physical boards with virtual devices. For more information about these functions and the difference between physical and virtual boards, refer to the *Standard Runtime Library API for Linux and Windows Operating Systems Library Reference*.

   Note: As a general high availability/peripheral hot swap application rule, you should design your application to accommodate the dynamic insertion/removal of virtual devices. Do not include permanent references to virtual device names within your application, instead, depend on the Standard Runtime Library (SRL) device mapper functions to get virtual device names.
4. The Standard Runtime Library functions can be used to determine the virtual devices on the board with the specified AUID. The virtual devices can be closed using the **dx_close( )**, **dt_close( )**, etc.
5. When all virtual devices on a board have been closed, you can either use the DCM's **Device > Stop Device** option or call the **NCM_StopBoard( )** function to stop the board. When a board has been successfully stopped, a DLGC_EVT_BLADE_STOPPED event is generated on the ADMIN_CHANNEL.
6. Use the DCM's **Device > Remove/Uninstall** Device option to remove the board's configuration information from the DCM database. When the **Remove/Uninstall** option is selected from the DCM, a DLGC_EVT_BLADE_ABOUT_TO_REMOVE event is generated on the ADMIN_CHANNEL.
7. Physically remove the board from the chassis.

8. Insert a new board into the chassis and configure it according to the procedures in the appropriate configuration guide. When the Intel Dialogic Plug and Play* subsystem detects the inserted board, a DLGC_EVT_BLADE_DETECTED event is generated on the ADMIN_CHANNEL.
9. Use the DCM's **Device > Start Device** option or invoke the **NCM_StartBoard( )** function to start the board.
10. When a board has been successfully started, a DLGC_EVT_BLADE_STARTED event is transmitted on the event notification framework's ADMIN_CHANNEL. Use the AUID from the event's payload, along with the Standard Runtime Library functions and the virtual device functions (**dx_open( )**, **dt_open( )**, etc.) to determine the virtual devices that are on the newly inserted board and open the board's virtual devices.

    Note: If the board fails to start, a DLGC_EVT_BLADE_START_FAILED event will be transmitted on the ADMIN_CHANNEL.
11. Once a board's virtual devices are open, the board can be used by your application.

Refer to the *Native Configuration Manager API for Windows Operating Systems Library Reference* and the *Native Configuration Manager API for Windows Operating Systems Programming Guide* for complete information about the functions in the NCM API.

Refer to the *High Availability for Windows Operating System Demo Guide* for information on executing the high availability demo programs included with the Intel Dialogic System Software.

For complete information about configuring Intel® NetStructure™ boards, refer to the *Intel NetStructure Products on DM3 Architecture for CompactPCI on Windows Configuration Guide*, the *Intel DM3 Architecture PCI Products on Windows Configuration Guide* or the *Intel NetStructure IPT Series on Windows Configuration Guide*, as appropriate.

Building Applications 5

This chapter provides general information for building applications that use the Event Service library. The following topics are included:

5.1 Compiling and Linking

An application that uses the Event Service library must include references to the Event Service API header files and must link to the appropriate library files. This information is provided in the following topics:

- Include Files
- Required Libraries
- Variables for Compiling and Linking

5.1.1 Include Files

The following header files are required by applications that receive and process events from the event notification framework:

dlgadminconsumer.h
defines the DlgAdminConsumer class

dlgadminmsg.h
defines the CEventHandlerAdaptor class

dlgcevents.h
header file that includes references to all event-specific header files

dlgeventproxydef.h
defines the generic data structure for events

Note: You are not required to include the *dlgctypes.h* file in your application. However, if the file is included in your application, you will receive numerous warnings when the application is compiled. The warnings are Standard Template Library-related warnings and can be ignored.

5.1.2 Required Libraries

The following event service library file must be liked to applications that receive and process events from the event notification framework:

libdlgadminconsumerfw.lib
library file that contains the event consumer objects

5.1.3 Variables for Compiling and Linking

In System Release 6.0, the following variables have been introduced to provide a standardized way of referencing the directories that contain header files and shared objects:

INTEL_DIALOGIC_INC
: Variable that points to the directory where header files are stored.

INTEL_DIALOGIC_LIB
: Variable that points to the directory where library files are stored.

These variables are automatically set at login and should be used in compiling and linking commands. The following is an example of a compiling and linking command that uses these variables:

```
cc -I${INTEL_DIALOGIC_INC} -o myapp myapp.c -L${INTEL_DIALOGIC_LIB} -lgc
```

Note: It is strongly recommended that developers begin using these variables when compiling and linking applications, since they will be required in future releases. The name of the variables will remain constant, but the values may change in future releases.

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