

Transport API C Edition V3.2.x

TRAINING EXAMPLE OVERVIEW



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Chapter 1 Training Examples Suite

1.1 Overview

The Transport API training example suite provides customers with step-by-step training for consumer, interactive provider, and non-interactive provider applications. An example is provided for each application type (consumer, interactive provider, and non-interactive provider), illustrating how to build an application from the ground up. Each example starts at a very basic level and adds functionality with each step. The examples are meant to simulate a classroom environment starting with basic concepts and building on those concepts resulting in a basic functional application.

1.2 Audience

The Transport API training example suite is designed to aid programmers using the Transport API. This manual is written for readers who are members of programming staff involved in the design, coding, and test phases for applications that use the Transport API. The reader should be familiar with the data types, operational characteristics, and user requirements of real-time data delivery networks, and be experienced in developing products using the C programming language in a networked environment.

1.3 Conventions

1.3.1 Typographic

- Functions, arguments, and data structures are shown in **orange, Courier New** font.
- Parameters, filenames, tools, utilities, and directories are shown in **Bold** font.
- Document titles and variable values are shown in *italics*.
- When initially introduced, concepts are shown in ***Bold, Italics***.

1.3.2 Programming

Transport API C Edition Standard conventions were followed.

Chapter 2 Consumer Training Example

2.1 Overview

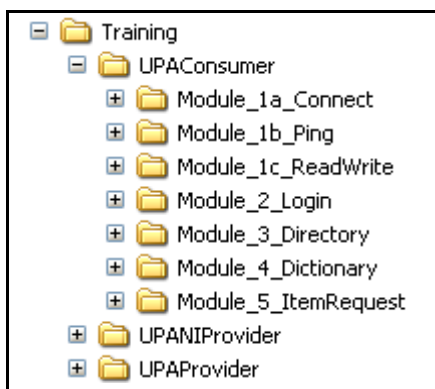
The **Consumer Training** example (also called **UPAConsumer**) provides detailed step-by-step code modules that show how to create a simple, basic OMM consumer application using the Transport API.

The **UPAConsumer** example application:

- Provides an implementation of an OMM consumer application.
- Consists of several modules that show incremental progress of how to build a basic consuming application.
- Is written with simplicity in mind and demonstrates the basic Transport API functionality.

You can use file comparison tools (such as **WinMerge**, etc.) to compare any two consecutive modules. This can help you understand new code added to any specific module. You can also compare each module of the **UPAConsumer** training example code with the same module name (if it exists) from another training application, such as the **UPANIPProvider** training example to find commonality between the applications.

The application is installed in the **TrainingUPAConsumer** folder and has seven available modules as illustrated:



2.2 Consumer Training Module 1a: Establish Network Communication

The first step of any Transport API consumer application is to establish a network connection with its peer component (i.e., another application with which to interact). An OMM consumer typically creates an outbound connection to the well-known hostname and port of a server (i.e., the interactive provider or ADS). The consumer uses the `rsslConnect()` function to initiate the connection and then uses the `rsslInitChannel()` function to complete channel initialization.

2.3 Consumer Training Module 1b: Ping (heartbeat) Management

Ping or heartbeat messages indicate the continued presence of an application. After the consumer's connection is active, ping messages must be exchanged. The negotiated ping timeout is retrieved using the `rsslGetChannelInfo()` function. The connection will be terminated if ping heartbeats are not sent or received within the expected time frame.

2.4 Consumer Training Module 1c: Handling Reads and Writes

When channel initialization is complete, the state of the channel (`RsslChannel.state`) is `RSSL_CH_STATE_ACTIVE`, and applications can send and receive data.

2.5 Consumer Training Module 2: Perform Login Process

Applications authenticate using the Login domain model. An OMM consumer must authenticate with a provider using a login request prior to issuing any other requests or opening any other streams. After receiving a login request, an interactive provider determines whether a user is permissioned to access the system. The interactive provider sends back a Login response, indicating to the consumer whether access is granted.

2.6 Consumer Training Module 3: Obtaining Source Directory

The Source Directory domain model conveys information about all available services in the system. An OMM consumer typically requests a Source Directory to retrieve information about available services and their capabilities. This includes information about supported domain types, the service's state, the quality of service (QoS), and any item group information associated with the service.

2.7 Consumer Training Module 4: Load or Download Dictionary

Consumer applications often require a dictionary for encoding or decoding specific pieces of information. This dictionary typically defines type and formatting information. Content that uses the `RsslFieldList` type requires the use of a field dictionary (usually the Thomson Reuters `RDMFieldDictionary`, although it could also be a user-defined or user-modified field dictionary).

A consumer application can choose whether to load necessary dictionary information from a local file or download the information from an available provider.

2.8 Consumer Training Module 5: Issue Item Requests

After the consumer application successfully logs in and obtains Source Directory and Dictionary information, it can request additional content. When issuing the request, the consuming application specifies the `serviceId` of the desired service along with a `streamId`. Requests can be sent for any domain using the formats defined in that domain model specification. In this simple example, we show how to make a Market Price level I data Item request to obtain the data from a provider.

Chapter 3 Interactive Provider Training Example

3.1 Overview

The **Interactive Provider Training** example (also called **UPAProvider**) provides detailed step-by-step code modules on how to create an OMM Interactive Provider application.

The **UPAProvider** example application:

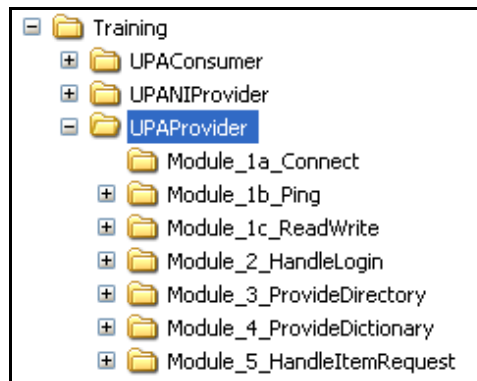
- Provides an implementation of an OMM Interactive Provider application.
- Is written with simplicity in mind and demonstrates the basic functionality of the Transport API.
- Consists of several modules that show incremental progress showing how to build the Transport API Interactive Provider application.

You can use file comparison tools (such as **WinMerge**, etc.) to compare any two consecutive modules. This can help you understand any new code added to any specific module.

You can also compare each module of the Interactive Provider Training example code with the same module name (if it exists) of another training application (such as the **Transport API NIPProvider Training** example) to find commonality between the applications.

Content is encoded and decoded using the Transport API Message Package and the Transport API Data Package.

The application is installed in the **Training\UPAProvider** folder and has seven available modules:



3.2 Interactive Provider Training Module 1a: Establish Network Communication

The first step of any Transport API interactive provider application is to establish a listening socket on a well-known port so that consumer applications can easily connect. The provider uses the `rsnlBind()` function to open the port and listen for incoming connection attempts.

Whenever an OMM consumer application attempts to connect, the provider uses the `rsnlAccept()` function to begin the connection initialization process.

For this simple training application, the interactive provider only supports a single client.

3.3 Interactive Provider Training Module 1b: Ping (heartbeat) Management

Ping or heartbeat messages indicate the continued presence of an application. After establishing a connection, ping messages must be exchanged. The negotiated ping timeout is retrieved using the `rsslGetChannelInfo()` function. If ping heartbeats are not sent or received within the expected time frame, the connection is terminated.

3.4 Interactive Provider Training Module 1c: Handling Reads and Writes

When channel initialization is complete, the state of the channel (`RsslChannel.state`) is `RSSL_CH_STATE_ACTIVE` and applications can send and receive data

3.5 Interactive Provider Training Module 2: Perform Login Process

Applications authenticate using the Login domain model. An OMM Interactive Provider must handle the consumer's Login request messages and supply appropriate responses. After receiving a Login request, the interactive provider must perform authentication and permissioning.

3.6 Interactive Provider Training Module 3: Providing Source Directory

An OMM provider provides source directory information specifying available services and their capabilities. This includes information about supported domain types, the service's state, the quality of service (QoS), and any item group information associated with the service.

3.7 Interactive Provider Training Module 4: Providing Dictionary

Applications often require the use of a dictionary for encoding or decoding specific pieces of information. This dictionary typically defines type and formatting information. Content that uses the `RsslFieldList` type requires the use of a field dictionary (usually the Thomson Reuters `RDMFieldDictionary`, though it could also be a user-defined or user-modified field dictionary).

Providers may optionally provide dictionary information to consumers.

3.8 Interactive Provider Training Module 5: Item Requests

Interactive providers must be able to accept item requests from a consumer and provide an appropriate response. In this simple example, we show how to handle a Market Price level I data Item request and send a response.

Chapter 4 Non-Interactive Provider Training Example

4.1 Overview

The **Non-Interactive Provider Training** example (also called **UPANIPProvider**) provides detailed step-by-step code modules that show how to create an OMM non-interactive provider application.

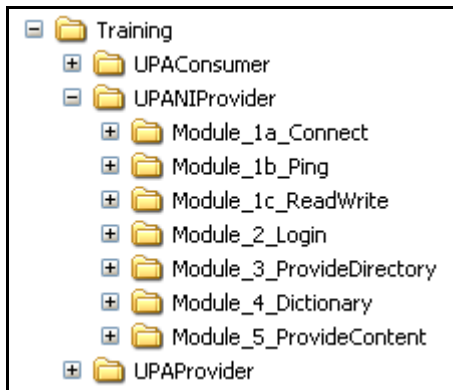
The **UPANIPProvider** example application:

- Provides an implementation of an OMM Non-Interactive Provider application.
- Consists of several modules that show incremental progress showing how to build the Transport API Non-Interactive Provider application.
- Is written with simplicity in mind and demonstrates the basic functionality of the Transport API.
- Is written such that you can use file comparison tools (such as **WinMerge**, etc.) to compare any two consecutive modules. This can help you understand any new code added to a specific module.

You can also compare each module of the Non-Interactive Provider Training example code with the same module name (if one exists) of another training application (e.g., the Transport API Interactive Provider Training example) to find commonality between the Transport API Interactive Provider Training and Transport API Non-Interactive Provider Training applications, if you wish.

Content is encoded and decoded using the Transport API Message Package and the Transport API Data Package.

The application is installed in the **TrainingUPANIPProvider** folder and has seven available modules:



4.2 Non-Interactive Provider Training Module 1a: Establish Network Communication

The first step of any Transport API Non-Interactive Provider application is to establish network communication with an ADH server. To do so, the OMM Non-Interactive Provider creates an outbound connection to the well-known hostname and port of an ADH. The Non-Interactive provider uses the **rsslConnect()** function to initiate the connection process and uses the **rsslInitChannel()** function to complete channel initialization.

4.3 Non-Interactive Provider Training Module 1b: Ping (heartbeat) Management

Ping or heartbeat messages indicate the continued presence of an application. After establishing a connection, ping messages must be exchanged. The negotiated ping timeout is retrieved using the `rsslGetChannelInfo()` function. If ping heartbeats are not sent or received within the expected time frame, the connection will be terminated.

4.4 Non-Interactive Provider Training Module 1c: Handling Reads and Writes

When channel initialization is complete, the state of the channel (`RsslChannel.state`) is `RSSL_CH_STATE_ACTIVE` and it is possible for an application to send or receive data.

4.5 Non-Interactive Provider Training Module 2: Perform Login Process

Applications authenticate using the Login domain model. An OMM Non-Interactive Provider must authenticate with the ADH using a Login request prior to providing any content. After receiving a Login request, an ADH determines whether a user is permitted to access the system. The ADH sends a Login response back to the Non-Interactive Provider indicating whether access is granted.

4.6 Non-Interactive Provider Training Module 3: Providing Source Directory

The Source Directory domain model conveys information about all available services in the system and the OMM Non-Interactive Provider application must provide Source Directory information specifying all available services that it provides.

This includes information about supported domain types, the service's state, the quality of service (QoS), and any item group information associated with the service.

4.7 Non-Interactive Provider Training Module 4: Loading Dictionary

Some data requires the use of a dictionary for encoding or decoding specific pieces of information. This dictionary typically defines type and formatting information. Content that uses the `RsslFieldList` type requires the use of a field dictionary (usually the Thomson Reuters `RDMFieldDictionary`, though it could also be a user-defined or modified field dictionary).

The OMM Non-Interactive Provider will use dictionaries that are available locally in a file.

4.8 Non-Interactive Provider Training Module 5: Providing Content

After providing a Source Directory, the OMM Non-Interactive Provider application can begin pushing content to the ADH. In this simple example, we show functions for sending one Market Price domain Item refresh, update, and close status message(s) to an ADH.

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