



## CHAPTER 17

# OpenADR Client Service

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This chapter provides an overview of the OpenADR client service and the DRAS architecture, and describes how to configure the OpenADR client service on the Mediator. It includes the following sections:

- [About Open Automated Demand Response, page 17-1](#)
- [DRAS Architecture, page 17-1](#)
- [About DR Event Information, page 17-2](#)
- [Configuring the OpenADR Client Service, page 17-3](#)
- [Viewing DR Event Information, page 17-4](#)
- [Handling Response Schedules, page 17-5](#)

## About Open Automated Demand Response

A *Demand Response* (DR) program involves the dynamic management of energy usage through cooperation between power consumers, their electric utility, and the electric system operator (or the independent system operator - ISO). It is an element of the *Smart Grid* that is used to optimize electric supply and demand. When the electric grid is nearing capacity, for example, when a large number of air conditioners are operating on a warm day, the ISO notifies the electric utility and power consumers of the situation, which may require electric load reduction or shifting by the power consumers.

The *Open Automated Demand Response* (OpenADR) standard is used to define the communication methods that enable ISOs and electric utilities to continuously send signals to power consumers using open network protocols. These utility-generated DR signals indicate the presence or scheduling of a DR event, which can be *automatically* translated into load sheds or shifts.

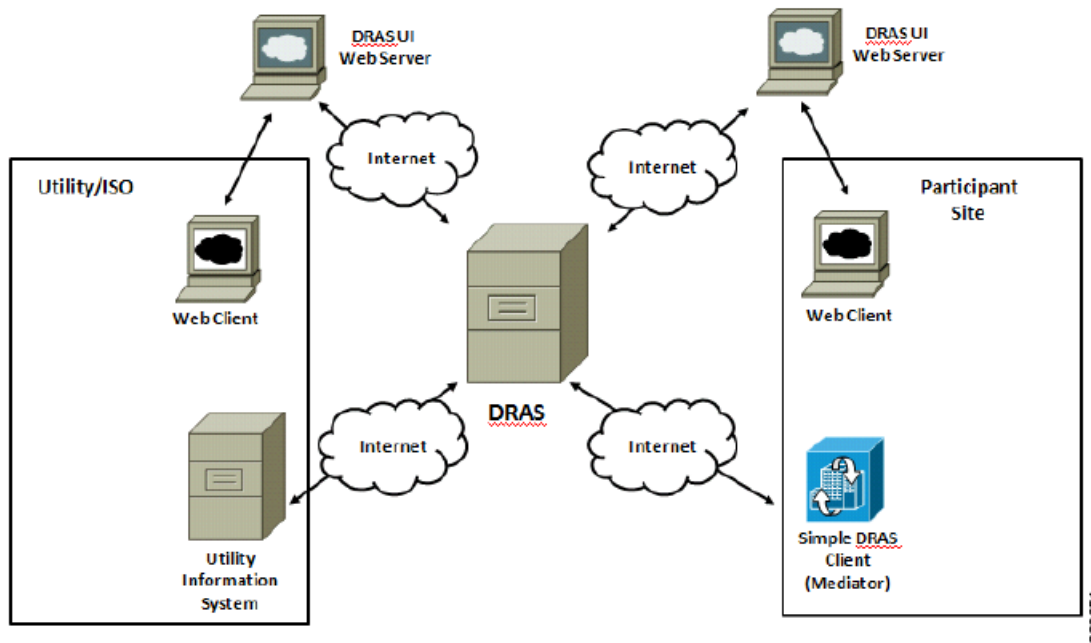
For more information on OpenADR, refer to the Open Automated Demand Response Communications documentation.

## DRAS Architecture

[Figure 17-1](#) outlines a generic Demand Response Automation Server (DRAS) architecture.

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Figure 17-1 DRAS Architecture



A generic DRAS architecture consists of the following components:

- DRAS—Facilitates communication between the entities that produce and distribute electricity (utilities and ISOs) and the entities that manage the consumption of electricity (facilities). The Akuacom DRAS is used as the primary DRAS, which presents a web service to DRAS clients.
- Simple DRAS client—Interfaces between the DRAS on the utility/ISO side and other systems on the participant side. The DRAS client typically exists on the participant side. When the OpenADR service is configured as a network service on the Cisco Network Building Mediator (Mediator), it acts as a simple DRAS client that communicates with the DRAS using the PULL mode of interaction. In the PULL mode, the DRAS client periodically polls the DRAS for DR event information at configurable intervals of time.
- Utility/ISO interface—This is the interface that utilities and ISOs use to set up, manage, and monitor a DR program.
- Participant interface—This is the interface that participants of the DR program use to convey electricity demand requests to the DRAS.

For more information on the DRAS architecture, refer to the Open Automated Demand Response Communications documentation.

## About DR Event Information

The simple DRAS client periodically polls the DRAS for DR event information. This information is returned from the DRAS in the form of an XML document. In this XML document, the *EventState* entity is of significance because it is a representation of the state that the DRAS client is in with respect to a particular DR event. The *EventState* entity contains the following variables that describe a specific DR event to the DRAS client:

- EventStatus—Depicts the current temporal state of a DR event and can take on the following values:
  - NONE (1)—There is no event pending.

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- FAR (2)—An event is pending far into the future.
- NEAR (3)—An event is pending soon.
- ACTIVE (4)—An event is currently in progress.

In general, the EventStatus variable transitions from NONE to FAR to NEAR to ACTIVE.

- OperationModeValue—Depicts the operational state of the facility and can take on the following values:
  - NORMAL operation (1)
  - MODERATE shed or shift (2)
  - HIGH shed or shift (3)

The OperationMode variable takes on values according to a schedule during the event that is defined by the participant or the utility or ISO.
- CurrentTime—Signifies the time till the ACTIVE state of the event is reached.
- OperationModeSchedule(ResponseSchedule)—Defines how a participant responds to DR events. It is an ordered list of rules that are valid within a specific time slot of the ACTIVE period of the DR event. These rules determine how the OperationMode variable transitions during the time slot. For more information on how the Mediator handles response schedules, see the “[Handling Response Schedules](#)” section on page 17-5.

## Configuring the OpenADR Client Service

This section describes how to configure the OpenADR client service on the Mediator and includes the following topics:

- [Prerequisites, page 17-3](#)
- [Configuring the OpenADR Client, page 17-3](#)

### Prerequisites

Before configuring the OpenADR client service on the Mediator, ensure that the Mediator network has access to the public DRAS network, so that it can obtain the necessary DR event information from the DRAS. If the Mediator network is protected by a firewall, ensure that access to the DRAS network is open using the default HTTPS port number 8443.

### Configuring the OpenADR Client

To configure the OpenADR client service on the Mediator, perform the following steps:

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- Step 1** Start configTOOL and connect to the Mediator (see the “[Accessing Mediators Using configTOOL](#)” section on page 4-11).  
The configTOOL window appears.
  - Step 2** In the node tree pane, expand the node tree, then choose **services > network**.
  - Step 3** Right-click the **network** node, and choose **Add** from the drop-down list.  
The Available Devices dialog box appears listing the protocols supported by the Mediator.

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- Step 4** In the Available Devices dialog box, choose **Open ADR Protocol Service (OpenADR)** from the list, and then click **OK**.
- A new child node, OpenADR, appears under the network node in the node tree pane.
- Step 5** In the node tree pane, right-click the **OpenADR** node, and choose **Add** from the drop-down list.
- The Available Devices dialog box appears.
- Step 6** In the Available Devices dialog box, choose **OpenADR Simple Client (OpenADR\_Client)** from the list, and then click **OK**.
- A new child node, OpenADR\_Client, appears under the OpenADR node in the node tree pane.
- The OpenADR\_Client tab displays the default name, description, and the configurable parameters of the OpenADR\_Client child node.
- Step 7** In the Serverip text box, enter the IP address of the DRAS.
- Step 8** In the User Name text box, enter the user name of the participant account. The electric utility creates the participant account and provides this information.
- Step 9** In the Password text box, enter the password of the participant account. The electric utility creates the participant account and provides this information.
- Step 10** In the Port Number text box, retain the port number as 8443, which is the default port for HTTPS.
- Step 11** In the File Path text box, retain the default path, which is the location of the EventState file in the DRAS.
- Step 12** In the Poll Period text box, enter the polling frequency, in seconds, with which the simple DRAS client polls the DRAS.
- Step 13** Save the configuration.
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## Viewing DR Event Information

You can view the DR event information that the simple DRAS client polls from the DRAS.

To view the DR event information, perform the following steps:

- Step 1** Launch an Internet browser (for example, Internet Explorer) and browse to the Mediator web client home page. To do so, enter the IP address of the Mediator in the Address bar of the browser and log in when prompted.
- The Mediator web client home page appears in the Internet browser window.
- Step 2** Click **Nodes**.
- The Mediator web client Node page appears.
- Step 3** Choose **services > network > OpenADR > OpenADR\_Client**.
- The Mediator web client Node page displays the variables of the EventState entity and their corresponding values. For more information on the variables and the significance of their values, see the [“Viewing DR Event Information” section on page 17-4](#).
- This information can now be used to create control logic that can reduce the energy usage of a facility.
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## Handling Response Schedules

The following scenario outlines how the Mediator (acting as a simple DRAS client) handles the response schedule:

1. A DR event notification is issued by the DRAS 300 seconds (5 minutes) before the ACTIVE state of the DR event.
  2. The Mediator polls the DRAS sometime between the FAR and NEAR state of the DR event.
  3. In the Node Browser, the services > network > OpenADR > OpenADR\_Client > OperationModeSchedule > ModeSlot node provides the Mediator with information on how the OperationMode variable changes during the ACTIVE period of the DR event.
  4. If the ModeSlot values are 0 and 300, and the OperationMode values are MODERATE and HIGH, the Mediator schedules a procedure to update the OperationMode at the relevant time.
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