



Open Source OpenADR 2.0 Project

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The Electric Power Research Institute

Independent

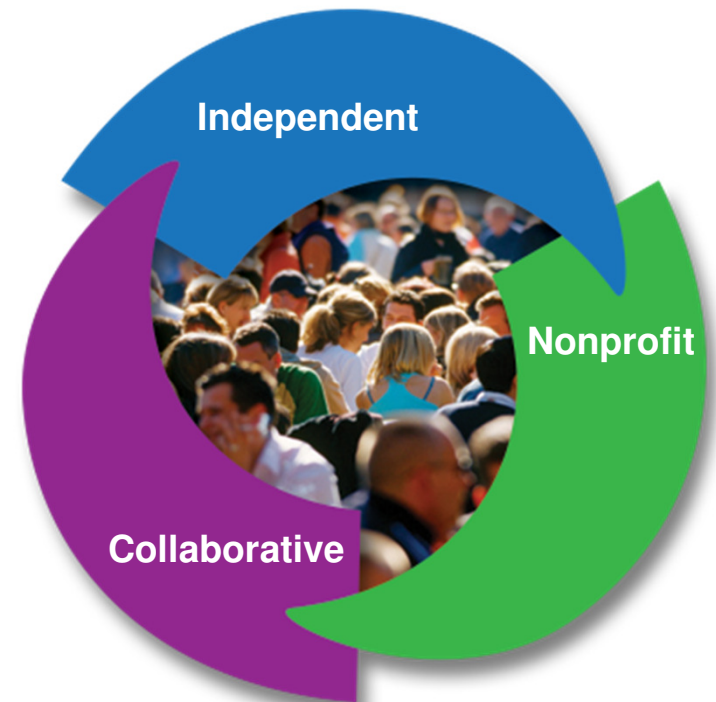
Objective, scientifically based results address reliability, efficiency, affordability, health, safety and the environment

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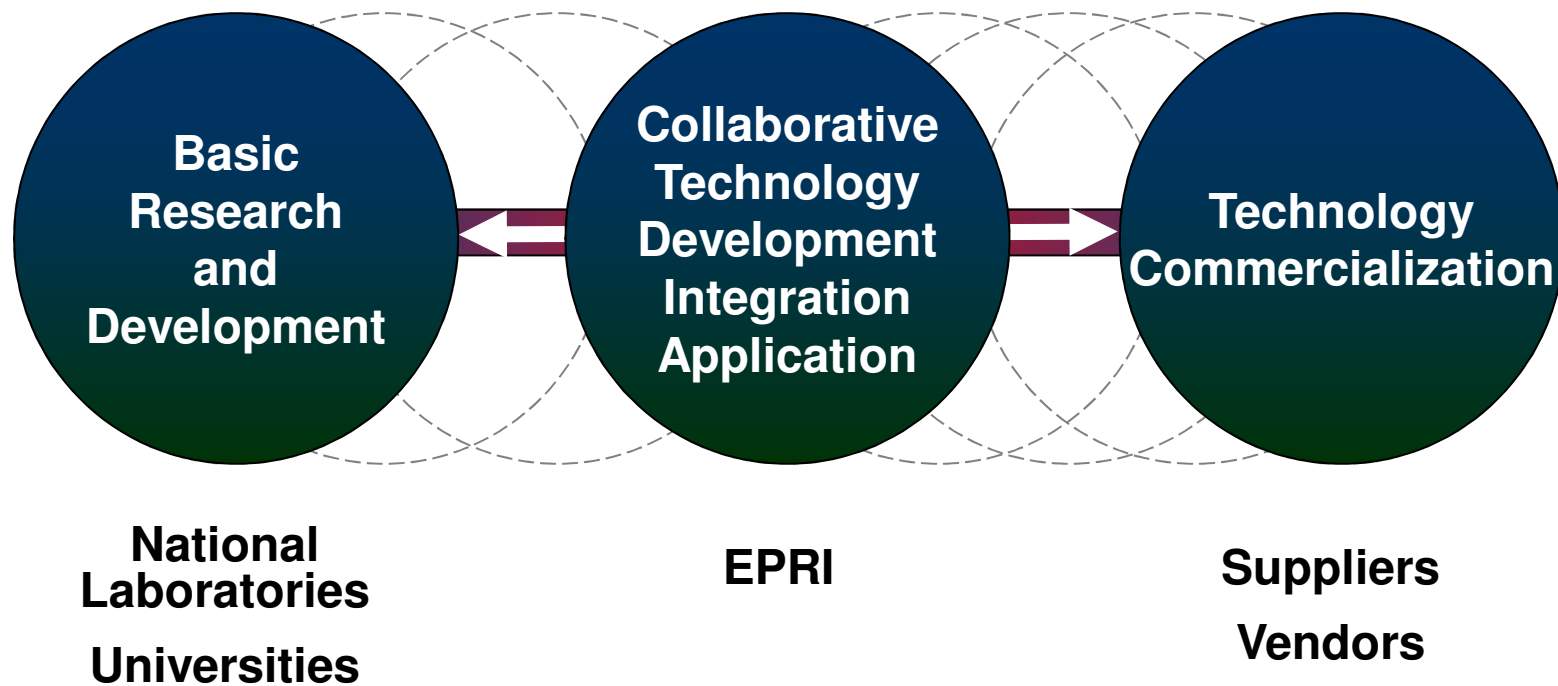
Bring together scientists, engineers, academic researchers, industry experts



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Our Role...

Help Move Technologies to the Commercialization Stage...



“Technology Accelerator!”

OpenADR and Ancillary Services Demonstration (4-Year Demo)

Objectives and Scope

- Advance Standards for DR-provided Ancillary Services (Fast DR) through Utility Demonstrations
- Address Research Questions
 - Quality of Service, Reliability, Security, Privacy, Scalability, etc.
- Develop Utility DR Technology Roadmaps



Value

- Increase Adoption and Innovation of Products
- Understand Utility Migration Strategies
- Characterize Load Classes for Ancillary Services

Advance Standards for Automated DR & Ancillary Services

Auto DR Demo Participants



Company
American Electric Power (AEP)
California Independent System Operator (CAISO)
Électricité de France (EDF)
Electricity Supply Board (ESB)
Kansas City Power & Light (KCP&L)
New York Independent System Operator (NYISO)
Southern Company
Tokyo Electric Power Company (TEPCO)


Hosting of Demonstrations



- Research what OpenADR can do (capabilities)
- Explore what applications can be enabled
- Evaluate responsiveness of types of loads
- Evaluate architectures that preserve existing (legacy) DR systems
- Evaluate certified products in utility host-site demos
- Feed information to standards bodies to help with identified gaps

EPRI Open Source OpenADR 2.0b Implementations

- VTN: <http://sourceforge.net/projects/openadr2vtn/>
- VEN: <http://sourceforge.net/projects/openadr2bven-pull/>


**EPRI OpenADR 2.0 Virtual Top Node**

This application is an implementation of a virtual top node (VTN) as defined in the OpenADR Alliance's ...
117 weekly downloads

This application is an implementation of a virtual top node (VTN) as defined in the OpenADR Alliance's OpenADR 2.0 Profile Specification B Profile, updated July 1, 2013. OpenADR defines a machine-to-machine interface and includes the information model, transport and security mechanisms, and the manner in which data is exchanged between two end points. OpenADR 2.0 defines what and how information ... [Read more.](#)

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**EPRI OpenADR 2.0b Virtual End Node**

This application is an implementation of a virtual end node (VEN) as defined in the OpenADR Alliance's ...
82 weekly downloads

This application is an implementation of a virtual end node (VEN) as defined in the OpenADR Alliance's OpenADR 2.0 Profile B Specification (HTTP pull), updated July 1, 2013. OpenADR defines a machine-to-machine interface and includes the information model, transport and security mechanisms, and the manner in which data is exchanged between two end points. OpenADR 2.0 defines what and how ... [Read more.](#)

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The EPRI OpenADR VTN User Interface

- The Admin Menu consists of the following options: *Accounts, VENs, Resource Types, Market Contexts, Groups, Events, Units, Schedules, VTN Parameters, and Test Case Prompts.*
- Non-admin users have limited access to the system. Their User Menu consists of five links: *Account Settings, VENs, Create Test Event, Dashboard, and Download VEN.*

The screenshot displays the EPRI OpenADR VTN User Interface. At the top, the EPRI logo and 'ELECTRIC POWER RESEARCH INSTITUTE' are visible. The user is logged in as 'patrick' with links for 'Log out' and 'About'. The interface is divided into two main sections: 'Admin Menu' and 'User Menu'. The 'Admin Menu' includes links for Accounts, VENs, Resource Types, Market Contexts, Groups, Events, Units, Schedules, VTN Parameters, and Test Case Prompts. The 'User Menu' includes links for Account Settings, VENs, and a highlighted 'Dashboard' link. The 'Dashboard' section shows two tables: 'Dashboard: TH_VEN (offline) (2014-09-02 17:45:40 UTC)' and 'Dashboard: Test_VEN_Name (offline) ()'. Both tables have columns for Event ID, Start Time, Duration (minutes), Status, Test Event, and Opt State. The 'Last Refreshed' timestamp is September 10, 2014 18:10. The footer shows 'Copyright © 2014 EPRI' and 'v0.9.3'.

More information about the EPRI OpenADR software is available in *Automated Demand Response and Ancillary Services Demonstration Project Update: Volume One* (Product ID 3002002782) and *OpenADR Technical Workshop DVD – 6.19.2013* (Product ID 3002001822).

The EPRI OpenADR VEN User Interface

1. Settings: This section has the following controls and actions: *Default Opt, URL, Client Certificate & Password, SSL/TLS, VEN Name, Password, Poll Interval, and Auto Scroll Log.*

3. OpenADR Services: This area has tabs that show the status and state of the four OpenADR services: Events, Reporting, Opt, and Registration.

The screenshot displays the OADR VEN2b application window. The 'Settings' tab is active, showing fields for Default Opt (Opt In), URL (https://openadr.nebland.com/OpenADR2/Simple/2.0b), Client Certificate (ven.pfx), Client Cert Password, Use SSL/TLS (checked), VEN Name (Test_VEN_Name), Password, Poll Interval (10), and Auto Scroll Log (checked). The 'Log' tab is also visible, showing a table of events with columns: Date, Response Time, Request Type, Response Code, and Response. The 'OpenADR Services' tab is active, showing a table of events with columns: ID, Start Time, Duration, Status, Market, Signal, and Current. The 'Status' bar at the bottom shows: Idle | 200: OK | Server time: 12/6/2013 11:31:46 AM | Version: 0.0.5.0 | VEN IS Registered.

Date	Response Time	Request Type	Response Code	Response
12/5/2013 5:52:39 PM	0.1880108	oadrPoll	200	oadrRe...
12/5/2013 5:52:49 PM	0.2700155	oadrPoll	200	oadrRe...
12/6/2013 11:31:49 AM	1.2360707	oadrQueryRegistrat...	200	oadrCre...
12/6/2013 11:31:49 AM	0.4130236	oadrCreatePartyRe...	200	oadrCre...
12/6/2013 11:31:49 AM	0.3630207	oadrRegisterReport	200	oadrRe...
12/6/2013 11:31:49 AM	0.1080062	oadrRequestEvent	200	oadrDist...
12/6/2013 11:31:50 AM	0.2540146	oadrPoll	200	oadrRe...

ID	Start Time	Duration	Status	Market	Signal	Current
7d99315...	11/10/2013 ...	PT15M	complet...	http://...	level	normal

Event Details

Event Descriptor: Active Period, Event Signals, Targets

Event ID: []

Modification Number: []

Priority: []

Market Context: []

Created Date/Time: []

Event Status: []

Test Event: []

Request XML

2. Log/communication history

4. Status

2. Log/Communication History: All OpenADR messages exchanged between the VEN and VTN are captured in the log list view. Selecting a message in the list view causes the associated request and reply messages to display in the request and reply XML areas.

4. Status: The status bar, located at the bottom of the VEN's user's interface, displays information regarding the current state of VEN polling, the last message status, the VEN version, and the OpenADR registration state.

Features and Capabilities

- Demonstrate each of the four services (EiEvent, EiReport, EiRegisterParty, and EiOpt)
 - Reference Implementation
- View request and response XML messages (VEN)
- Create events on a schedule

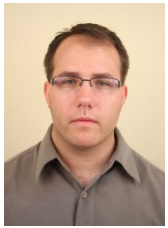
Coming Soon

- C++ library
 - Implements OpenADR 2.0b VEN pull
 - Generates compliant messages for all 4 services
 - Manages HTTP/s connection with curl and `openssl` libraries
 - Can be used to create a compliant VEN
 - Intended for embedded applications
- Certified versions of the VTN and desktop VEN software

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Thank You