



Open Source OpenADR 2.0 Project

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The Electric Power Research Institute

Independent

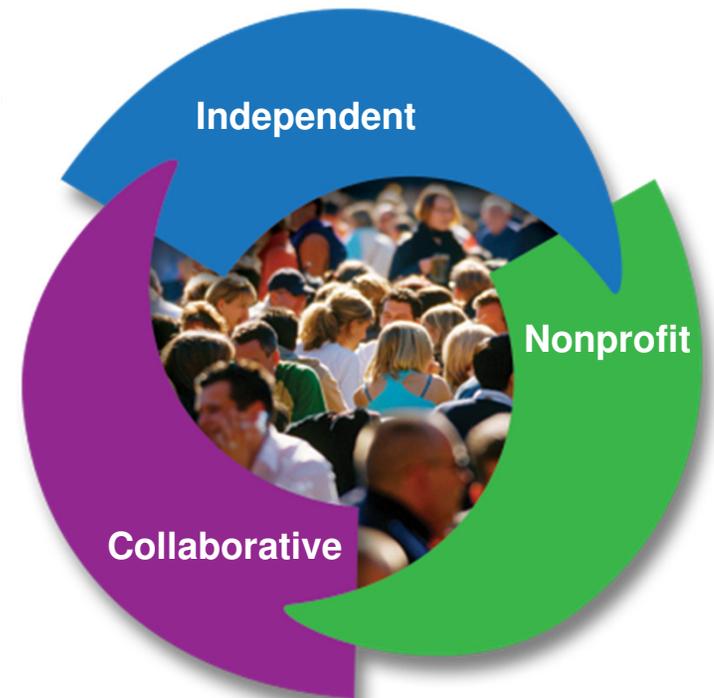
Objective, scientifically based results address reliability, efficiency, affordability, health, safety and the environment

Nonprofit

Chartered to serve the public benefit

Collaborative

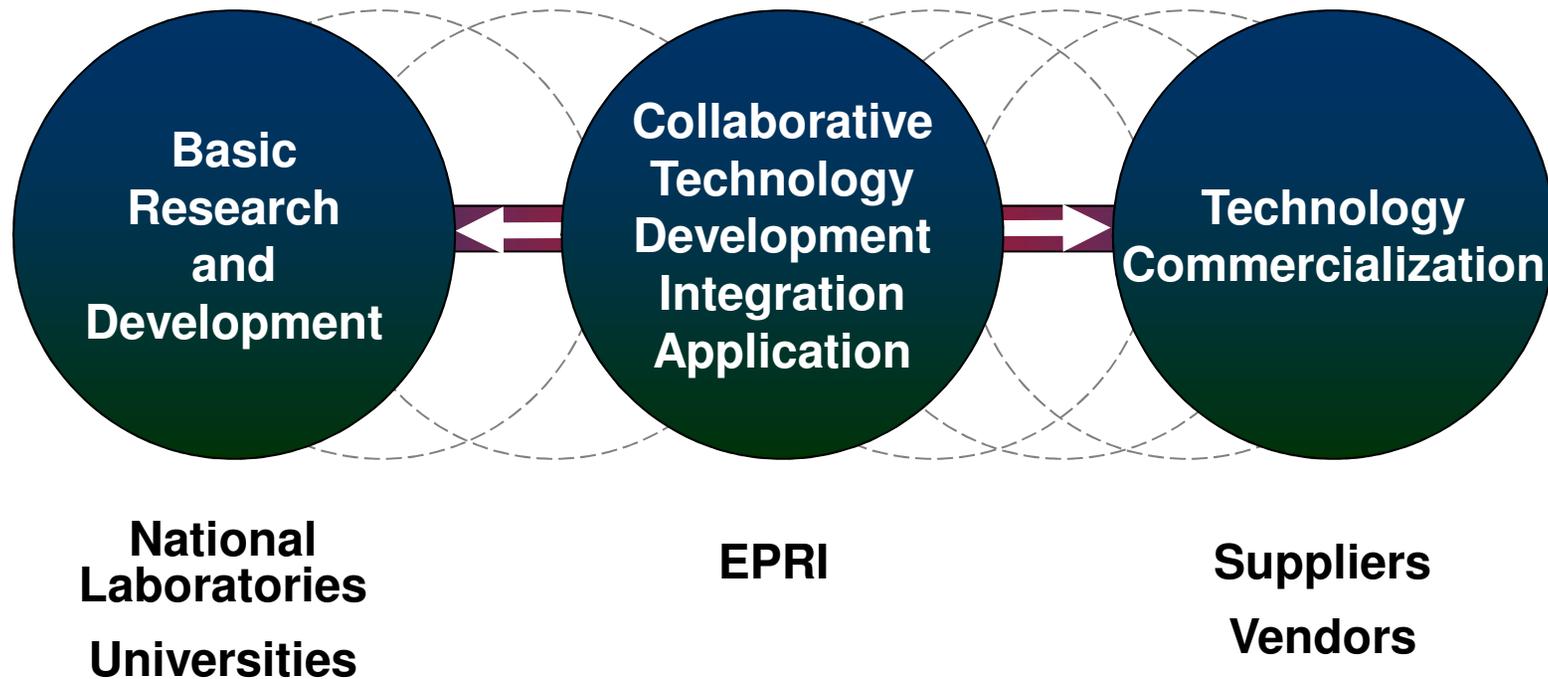
Bring together scientists, engineers, academic researchers, industry experts



Together... Shaping the Future of Electricity

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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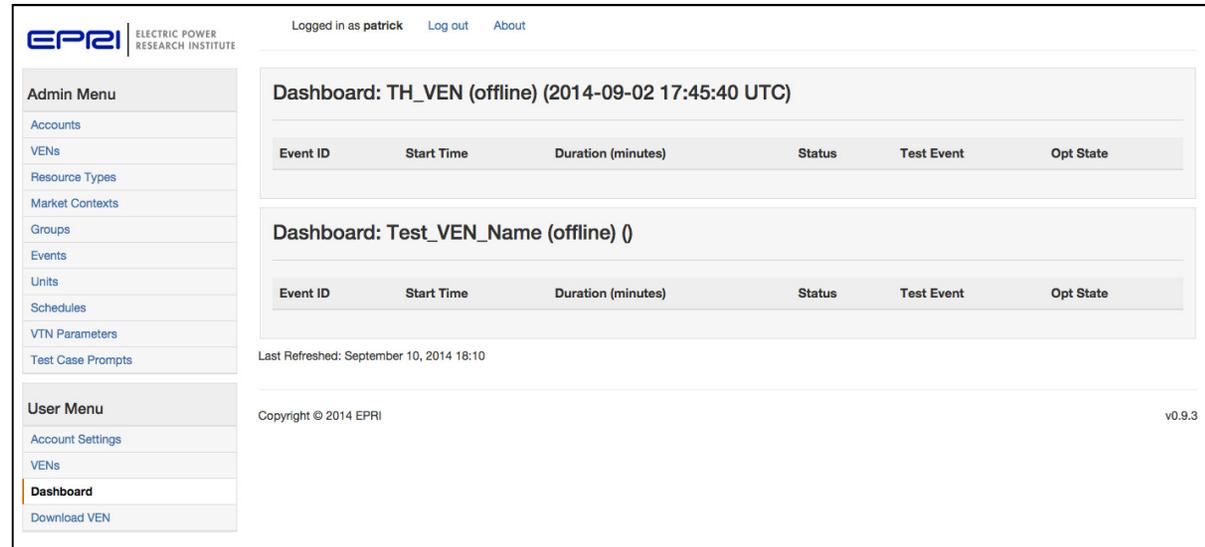
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The EPRI OpenADR VTN User Interface

- 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, it shows the EPRI logo and the text "ELECTRIC POWER RESEARCH INSTITUTE". The user is logged in as "patrick" and can click "Log out" or "About".

The interface is divided into two main sections: the Admin Menu and the 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, Dashboard, and Download VEN.

The main content area shows two dashboards. The first dashboard is titled "Dashboard: TH_VEN (offline) (2014-09-02 17:45:40 UTC)" and contains a table with the following columns: Event ID, Start Time, Duration (minutes), Status, Test Event, and Opt State. The second dashboard is titled "Dashboard: Test_VEN_Name (offline) ()" and contains a similar table. Below the dashboards, it indicates "Last Refreshed: September 10, 2014 18:10" and "Copyright © 2014 EPRI". The version number "v0.9.3" is visible in the bottom right corner.

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 user interface. The top section is the 'Settings' panel, which includes fields for 'Default Opt' (radio buttons for Opt In, Opt Out, Manual), 'Server' (URL, Client Certificate, Client Cert Password), 'Credentials' (VEN Name, Password), and 'Log' (Auto Scroll Log, Clear Log, Start Polling). Below this is the 'Log/Communication History' section, featuring a table with columns for Date, Response Time, Request Type, Response Code, and Request XML. The table lists several log entries with their respective details. At the bottom of the interface is the 'Status' bar, which shows 'Idle', '200: OK', 'Server time: 12/6/2013 11:31:46 AM', 'Version: 0.0.5.0', and 'VEN IS Registered'.

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 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