OpenADR Webinar – From 2.0 to 3.0

November 2023

Agenda

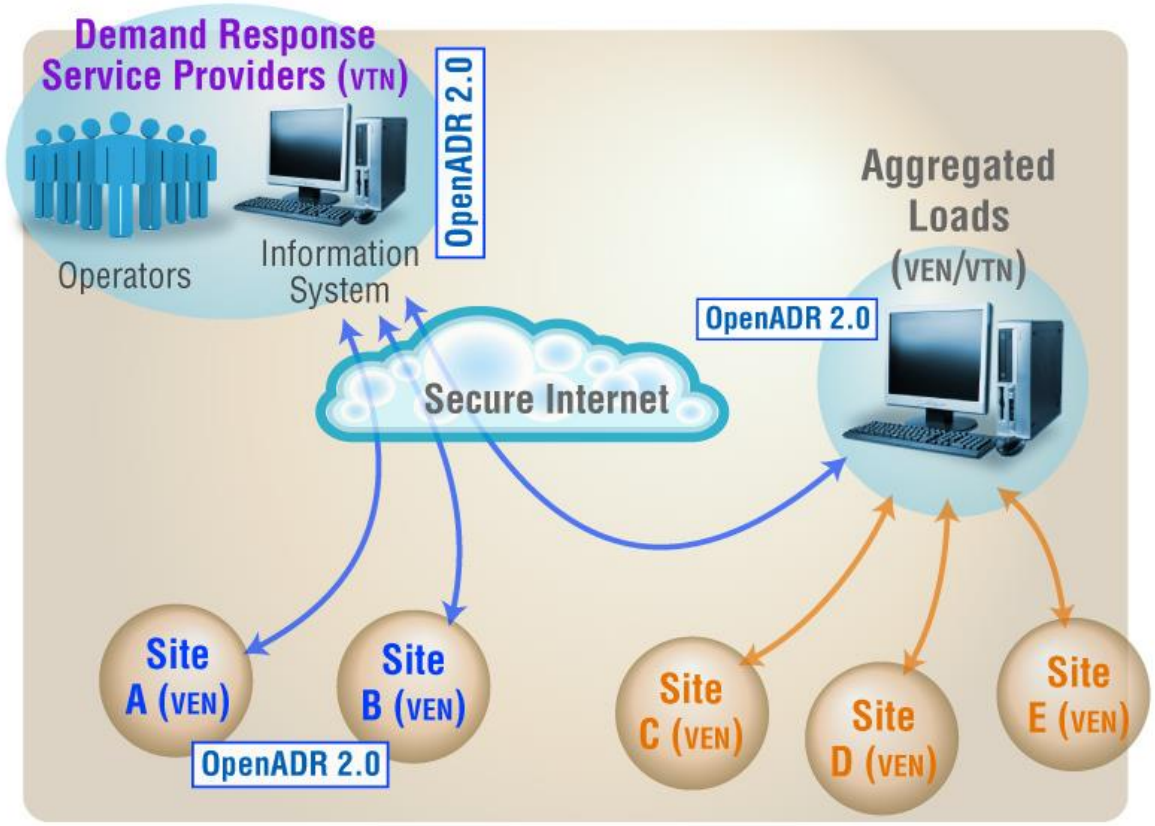
- Housekeeping
- Introduction to OpenADR and the transition to 3.0
- Details of the OpenADR 3.0 Standard
- Demonstration of the new test tool - Codibly
- Preview of Enlit next week
- Q&A

Housekeeping

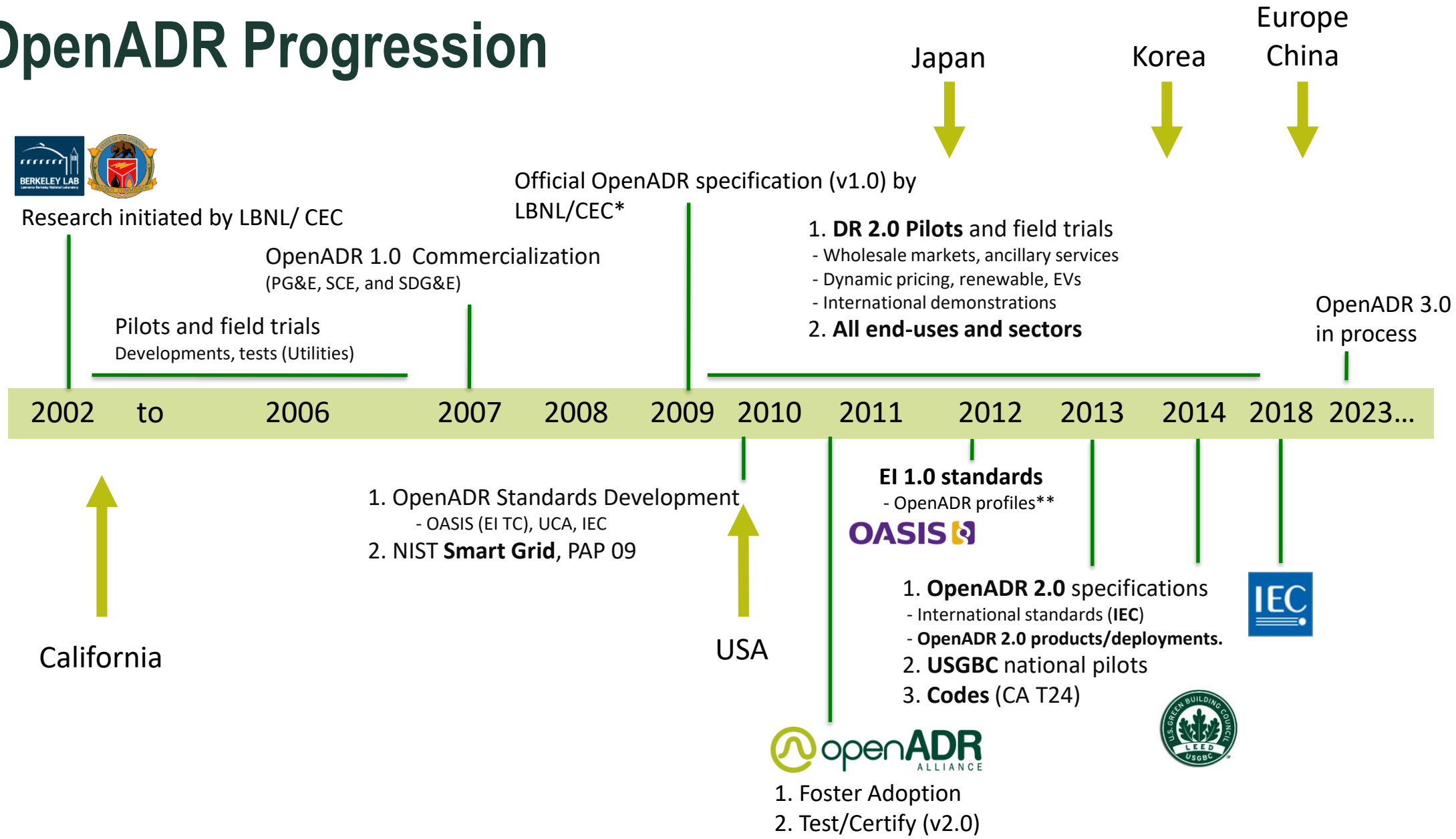
- The webinar is being recorded
- Slides and Recording will be made available on https://www.openadr.org/webinar-series
- All attendees are in listen only mode
- To ask questions, please enter them in the Questions tab of the Webinar Tool
  - We will field as many questions as possible at the end of the presentations

OpenADR in a Nutshell

OpenADR (also IEC 62746-10-1) provides a non-proprietary, open standardized Demand Response (DR) & Distributed Energy Resources (DER) interface that allows DR service providers to communicate DR, DER, and TE (Transactive Energy) signals directly to existing customers using a common language and existing communications such as the Internet.



OpenADR Progression



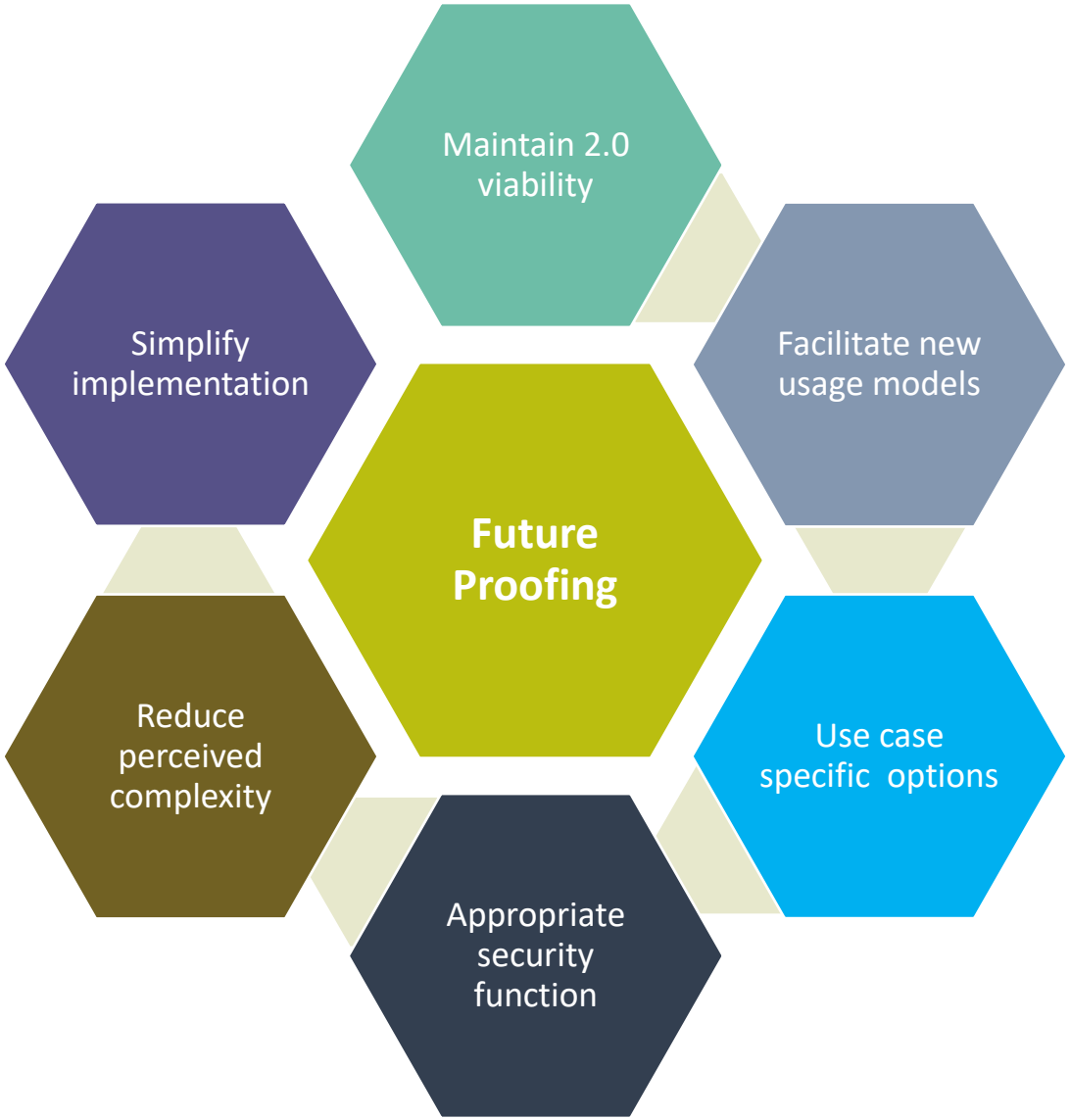
openADR ALLIANCE

* OpenADR v1.0: http://openadr.lbl.gov/
** OASIS EI 1.0 standards: http://www.oasis-open.org/committees/download.php/45425/energyinterop-v1.0-cs01.zip
*** Publication: http://drrc.lbl.gov/sites/drrc.lbl.gov/files/LBNL-5273E.pdf

Why a new OpenADR version?

- 2.0b is nearly a decade old (and the ideas were designed well before that – although still valid)
- 2.0b is widely used globally - no existing implementations need to change anything
- 3.0 will not make 2.0 obsolete
- 2+ years of discussions around improvements, updates, new tech
- 3.0 is built on modern IT technologies and principles
  - REST model for API
  - Clear separation of VTN as server of data from Business Logic that determines that data
- 2.0b oriented to VENs in cloud entities
  - An increasing number of VENs will be in individual flexible loads and other in-building devices
  - These VENs will implement a small subset of OpenADR capabilities
  - Implementation burden should be minimized - 3.0 does this

What we wanted



So, what's different?

The Basics in 2.0 XML code, SOAP web services, based on complex web structures	→	**The Basics in 3.0** JSON, REST API, simple code written to fit the purpose
The Exchange Model Specific exchange patterns for all products (business logic)	→	**The Exchange Model** VTN is resource server posting the info. Exchange in separate bus. logic
The Certification All functions required, single certification level	→	**The Certification** Small number of certification feature sets, some very simple
What's the same? Basic functions – Event, Report Cyber Security	→	**What's the same? (kind of)** Event, Report but more flexible, Cyber Security but more appropriate

Some snippets

Price Communication Example

Metadata

```
"program": {
 "ID": "73536392",
 "createdDateTime": "2020-01-08T18:52:50",
 "programID": 'ResHDPL5",
 "retailerName": "Pacific Gas and Electric",
 "retailerID": "PGE",
 "programName": "Residential Highly Dynamic Price Location 5",
 "country": "US",
 "principalSubdivision": "CA",
 "timeZoneOffset": 8,
 "activePeriod": {
      "start": "2023-01-01T09:30:47Z",
      "duration": "PT4H" },
 "programDescription": "http://www.pge.com/tariffs/ResHDPL5",
 "bindingEvents": False,
 "payloadTable": [
    {"payloadType": "PRICE",  "units": "KWH",  "currency": "USD"},
    {"payloadType": "GHG",  "units": "GHG"}
 ]
}
```

Dynamic Data

```
"event" : {
 "ID": 73536392,
 "createdDateTime": "2020-01-08T18:52:50",
 "programID": 'ResHDPL5",
 "intervalPeriod": {
   "start": "2023-01-01T09:00:00Z",
   "duration": "PT1H" ,
 },
 "payloadDescriptors": [
   {"payloadType": "PRICE", "units": "KWH", "currency": "USD"}
 ],
 "intervals": [
   { "ID": 123456789, "payloads": [ {"payloadType": "PRICE",  "values": [15.1] } ] },
   { "ID": 123456790, "payloads": [ {"payloadType": "PRICE",  "values": [18.4] } ] },
   { "ID": 123456791, "payloads": [ {"payloadType": "PRICE",  "values": [21.1] } ] },
   { "ID": 123456792, "payloads": [ {"payloadType": "PRICE",  "values": [19.8] } ] }
 ]
}
```

To include GHG, payloadDescriptors adds:

```
   {"payloadType": "GHG",  "units": "GHG"}
```

and each interval looks like:

```
   { "ID": 123456789, "payloads": [ {"payloadType": "PRICE",  "values": [15.1] },  {"payloadType":
"GHG",  "values": "383"}] },
```

The same example in 2.0B

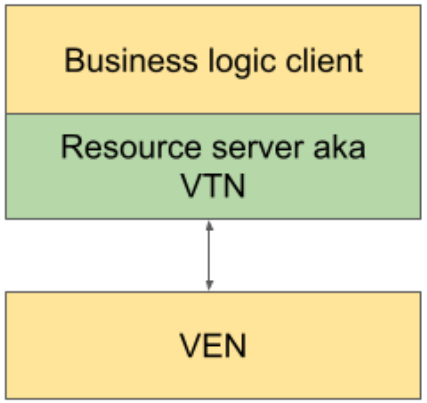
Price Communication Example

```
<oadr:oadrPayload>
  <oadr:oadrSignedObject>
    <oadr:oadrDistributeEvent ei:schemaVersion="2.0b">
      <pyld:requestID>OadrDisReq091214_043740_513</pyld:requestID>
      <ei:vtnID>TH_VTN</ei:vtnID>
      <oadr:oadrEvent>
        <ei:eiEvent>
          <ei:eventDescriptor>
            <ei:eventID>Event091214_043741_028_0</ei:eventID>
            <ei:modificationNumber>0</ei:modificationNumber>
            <ei:priority>0</ei:priority>
            <ei:eiMarketContext>
              <emix:marketContext>http://MarketContext1</emix:marketContext>
            </ei:eiMarketContext>
            <ei:createdDateTime>2023-05-09T12:37:40Z</ei:createdDateTime>
            <ei:eventStatus>far</ei:eventStatus>
          </ei:eventDescriptor>
          <ei:eiActivePeriod>
            <xcal:properties>
              <xcal:dtstart>
                <xcal:date-time>2023-05-09T13:00:00Z</xcal:date-time>
              </xcal:dtstart>
              <xcal:duration>
                <xcal:duration>PT4H</xcal:duration>
              </xcal:duration>
              <ei:x-eiNotification>
                <xcal:duration>PT24H</xcal:duration>
              </ei:x-eiNotification>
            </xcal:properties>
            <xcal:components/>
          </ei:eiActivePeriod>
          <ei:eiEventSignals>
            <ei:eiEventSignal>
              <strm:intervals>
                <ei:interval>
                  <xcal:duration>
                    <xcal:duration>PT1H</xcal:duration>
                  </xcal:duration>
                  <xcal:uid>
                    <xcal:text>0</xcal:text>
                  </xcal:uid>
                  <ei:signalPayload>
                    <ei:payloadFloat>
                      <ei:value>15.1</ei:value>
                    </ei:payloadFloat>
                  </ei:signalPayload>
                </ei:interval>
                <ei:interval>
                  <xcal:duration>
                    <xcal:duration>PT1H</xcal:duration>
                  </xcal:duration>
                  <xcal:uid>
                    <xcal:text>0</xcal:text>
                  </xcal:uid>
                  <ei:signalPayload>
                    <ei:payloadFloat>
                      <ei:value>18.4</ei:value>
                    </ei:payloadFloat>
                  </ei:signalPayload>
                </ei:interval>
                <ei:interval>
                  <xcal:duration>
                    <xcal:duration>PT1H</xcal:duration>
                  </xcal:duration>
                  <xcal:uid>
                    <xcal:text>0</xcal:text>
                  </xcal:uid>
                  <ei:signalPayload>
                    <ei:payloadFloat>
                      <ei:value>21.1</ei:value>
                    </ei:payloadFloat>
                  </ei:signalPayload>
                </ei:interval>
                <ei:interval>
                  <xcal:duration>
                    <xcal:duration>PT1H</xcal:duration>
                  </xcal:duration>
                  <xcal:uid>
                    <xcal:text>0</xcal:text>
                  </xcal:uid>
                  <ei:signalPayload>
                    <ei:payloadFloat>
                      <ei:value>19.8</ei:value>
                    </ei:payloadFloat>
                  </ei:signalPayload>
                </ei:interval>
              </strm:intervals>
              <ei:signalName>ELECTRICITY_PRICE</ei:signalName>
              <ei:signalType>price</ei:signalType>
              <ei:signalID>SIG_02</ei:signalID>
              <oadr:currencyPerKWh>
                <oadr:itemDescription>currencyPerKWh</oadr:itemDescription>
                <oadr:itemUnits>USD</oadr:itemUnits>
                <scale:siScaleCode>none</scale:siScaleCode>
              </oadr:currencyPerKWh>
            </ei:eiEventSignal>
          </ei:eiEventSignals>
          <ei:eiTarget>
            <ei:venID>venID_1234</ei:venID>
          </ei:eiTarget>
        </ei:eiEvent>
        <oadr:oadrResponseRequired>always</oadr:oadrResponseRequired>
      </oadr:oadrEvent>
    </oadr:oadrDistributeEvent>
  </oadr:oadrSignedObject>
</oadr:oadrPayload>
```

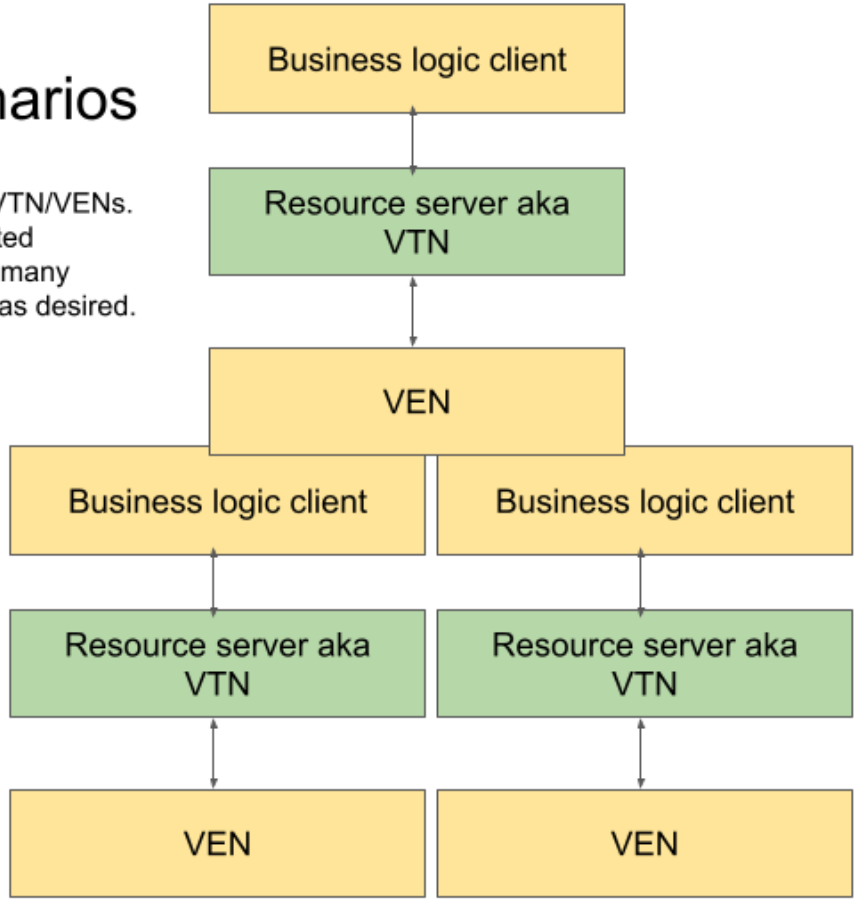
Some snippets (2)

OA 3.0 Implementation scenarios

Below is an implementation in which the the business logic and VTN are hosted by the same system and do not have communication between them (or use proprietary communication. This usage is equally valid.



Right is a stack of VTN/VENs. This can be replicated indefinitely, with as many layers or branches as desired.



OADR3 resources

Specification documents

Definitions: Normative requirements

User Guide: Informative examples

oadr3 yaml: Normative API specification

available to members on openadr.org

GitHub repositories

openapi: yaml specification

test tool: client app for local and online testing and certification

VTN Reference Implementation

available to members on request

OADR3 Specification Documents 1/3

Definitions:

- Describes objects and endpoints found in openapi yaml
- Describes revision and extensibility framework
- Defines standard strings as enumerations
- Defines security model
  - OAuth2 client credential flow
  - Client (VEN) is provided clientID/secret as credentials
  - At runtime, credentials are traded for short-lived API access tokens
  - Token used by VTN to enforce access controls

OADR3 Specification Documents 2/3

User Guide:

- Design objectives
- User Stories
- Scenarios
- General Usage
- Feature Examples
- Use Cases
  - load shed
  - continuous pricing
  - inverter control
  - more…

OADR3 Specification Documents 3/3

oadr3 yaml:

- openAPI specification (aka swaggerdoc)
  - human and machine readable format for comprehensive REST API definition
  - tooling support for client and server generation, testing, online documentation

endpoints:

- <baseUrl>/programs
- <baseUrl>/programs/{id}
- <baseUrl>/events
- <baseUrl>/events/{id}
- <baseUrl>/reports
- <baseUrl>/reports/{id}
- <baseUrl>/subscriptions
- <baseUrl>/subscriptions/{id}
- <baseUrl>/vens
- <baseUrl>/vens/{id}
- <baseUrl>/vens/{id}/resources
- <baseUrl>/vens/{id}/resources/{id}

primary objects:

- program
- event
- report
- subscription
- ven
- resource

Test Tool Demo

- Demonstration of the new test tool - Codibly

Enlit Europe
28-30 November 2023 | Paris, France

OpenADR Alliance
Stand: 7.2.J55

- **Alliance Member Companies Exhibiting at RE+**
  - AMPECO (stand no: 7.3.C40-06)
  - Driivz (stand no: 7.3.E33)
  - Fuji Electric (stand no: 7.3.B44)
  - Honeywell (stand no: 7.2.C170)
  - Kaluza (stand no: 7.2.C150)
  - Panasonic (stand no: 7.2.F10 and 7.3.MR6)
  - Siemens (Siemens AG –7.2.D70; Siemens Energy – 7.3.C70)
  - Trilliant (stand no: 7.2.A140 and 7.3.MR9)
  - SmartEn – Demand-side Flexibility Zone
- **Outreach Focus**
  - SmartEn member companies
  - Utilities – RTE, Enel, etc. Also “DSO’s for Europe Entity
- **P.R. Focus**
  - Launch of OpenADR 3.0
  - On-site video interviews with members
  - Social media

Thank you!

Q&A