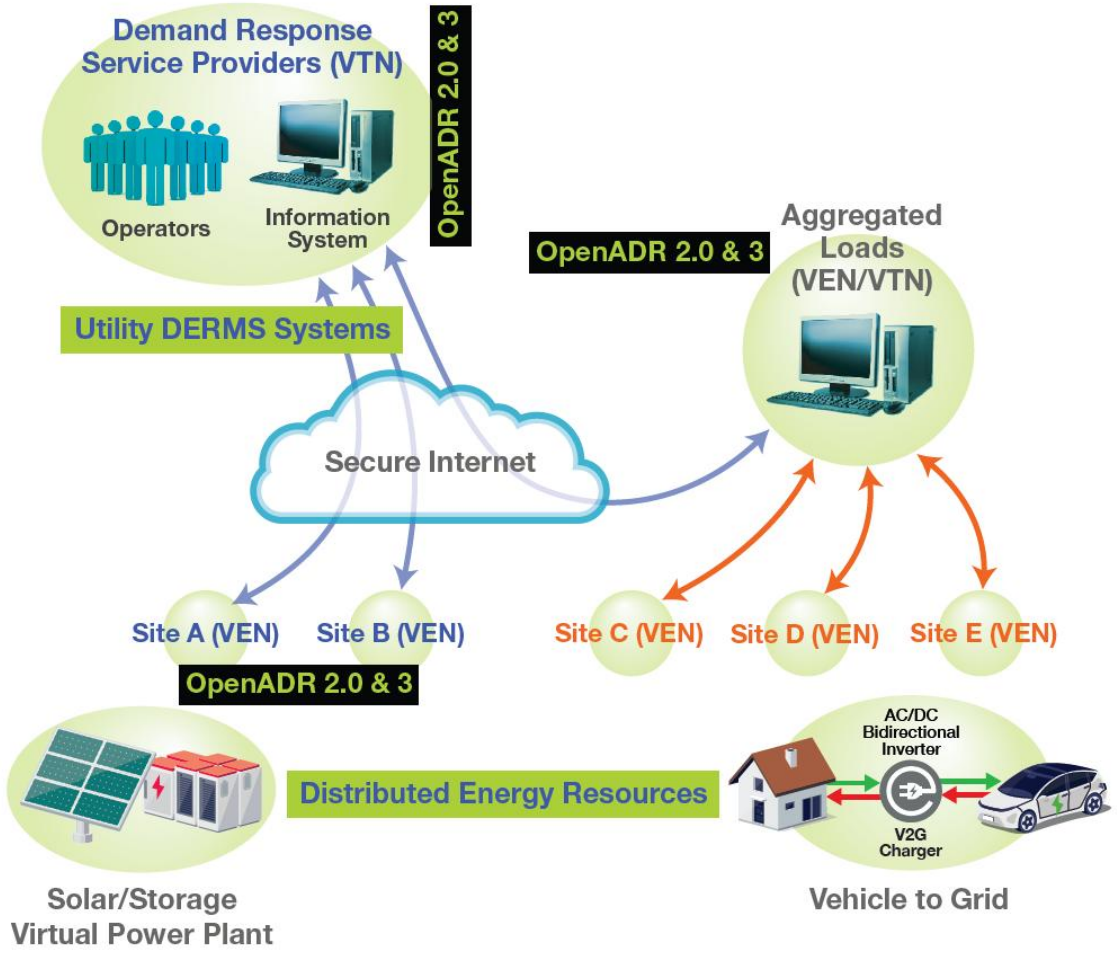
European Flexibility Initiative

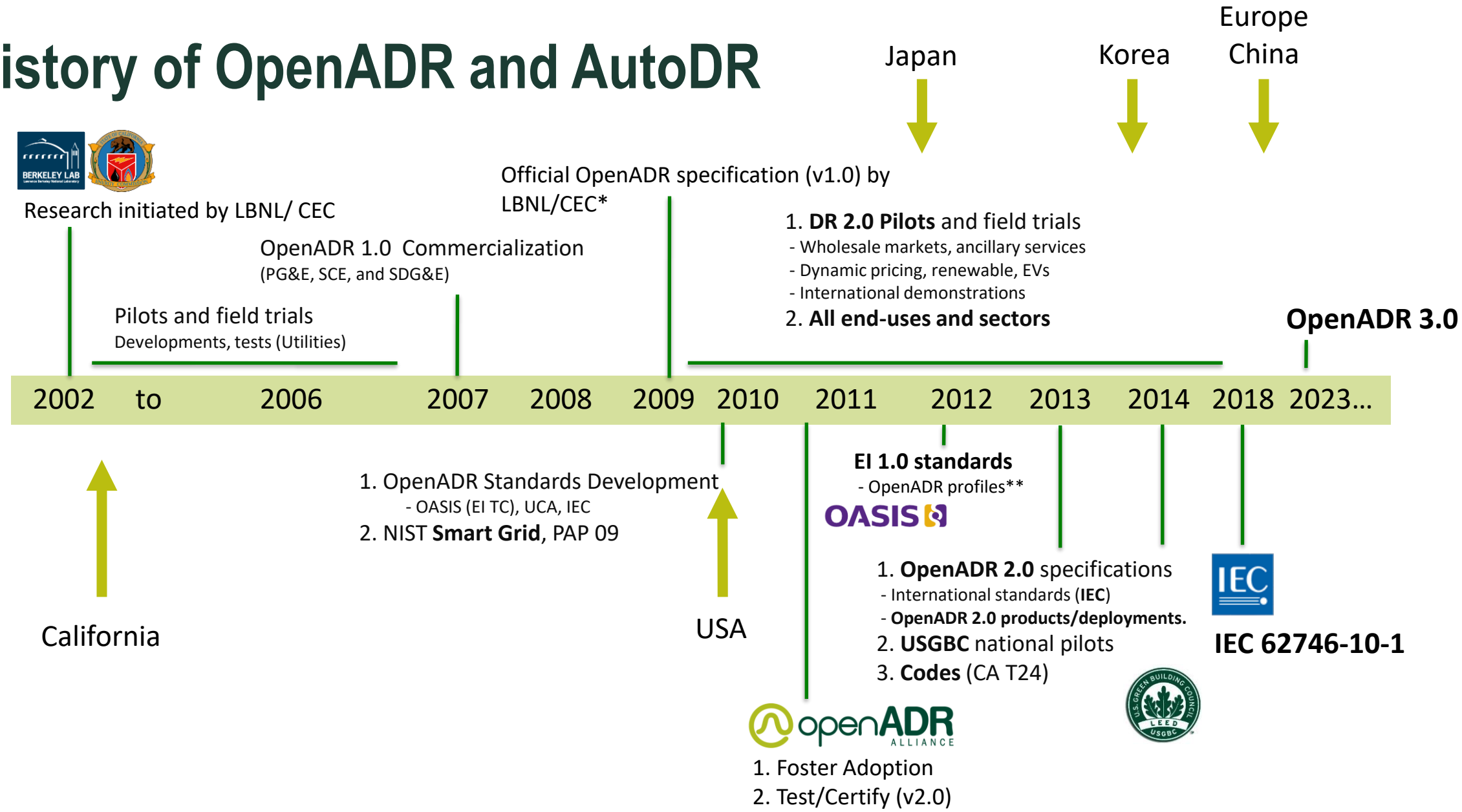
Rolf Bienert, OpenADR Alliance

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. License and royalty free.



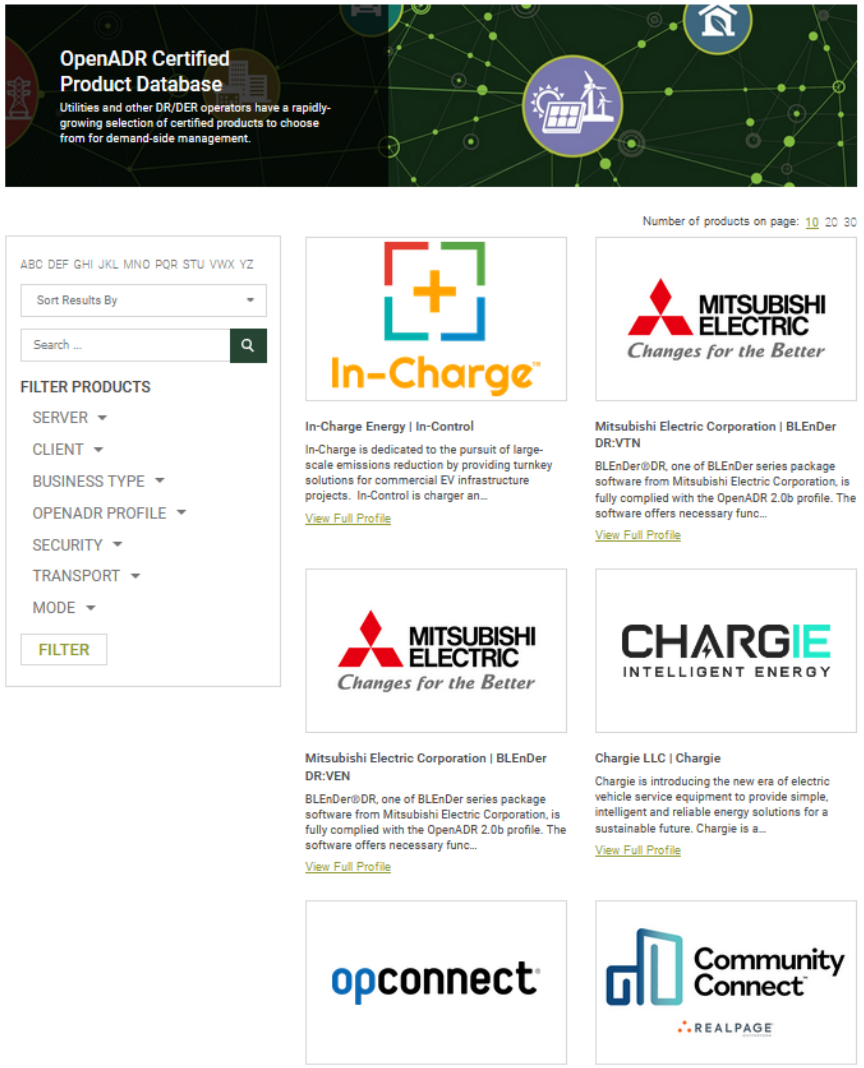
History of OpenADR and AutoDR



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

Where are we today?



The OpenADR Alliance is a non-profit member organization. We do not manufacture products.

- Three completed specifications
  - >13 years for 2.0a
  - >12 years for 2.0b
  - >1 year OpenADR 3
- 10 test houses validated
- Over 335 certified systems
  - OpenADR 3 starting
- Over 220 member companies
- Certification (openadr.org)
- OpenADR – Product Database

In Use Today

- 50% of customers in the US are connected to utilities that have at least one OpenADR-based program
- Japan relies on OpenADR since before 2018 – more or less harmonized usage
- South Korea, China, Taiwan use OpenADR
- New Zealand's biggest utility uses OpenADR, more projects coming
- Europe
  - Sweden, E.On
  - Netherlands defining Grid Aware Charging, Flex
  - UK – Two areas: DESNZ defining end to end connectivity, Energy Networks Association defining Flex Market communications
  - Other countries evaluating

The ‘Entities’ of OpenADR

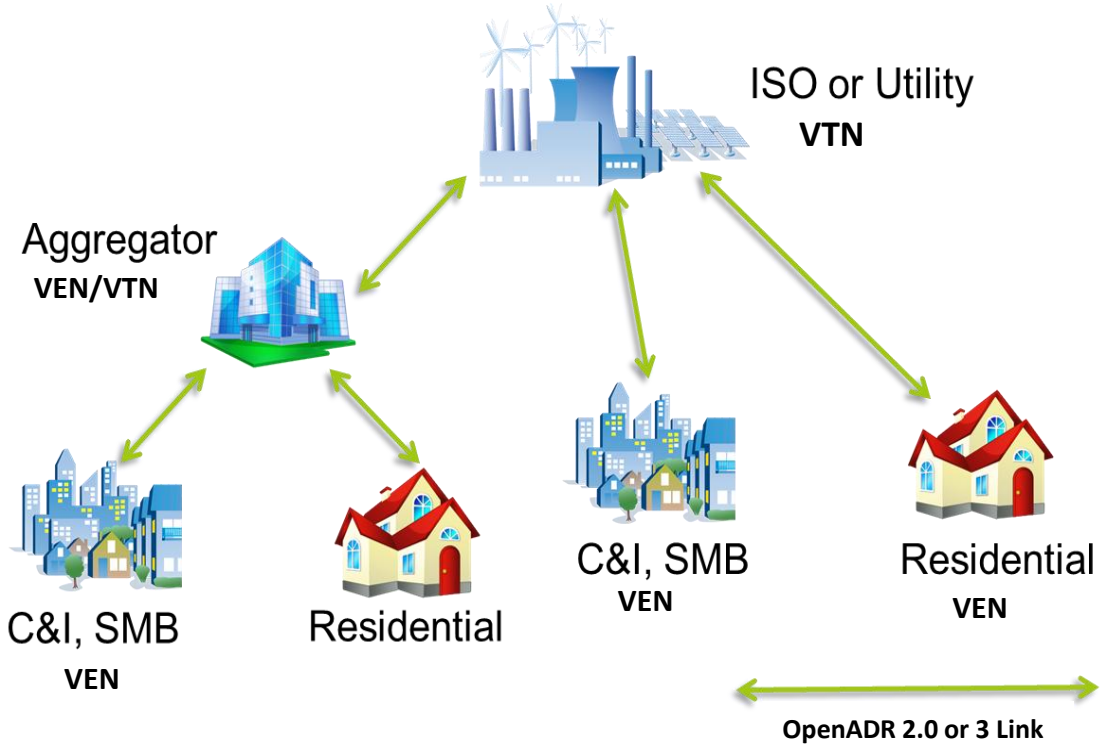
OpenADR is a message exchange protocol with two primary actors aka ‘entities’

Virtual Top Nodes (VTN)

- Manages Resources
- Creates/Transmit events
- Request Reports

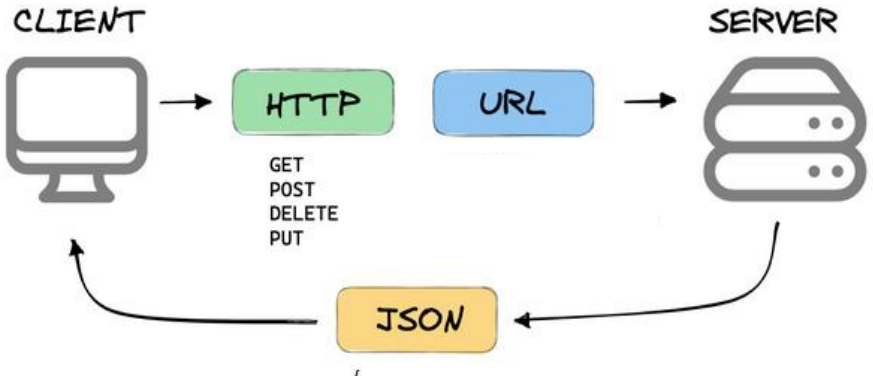
Virtual End Nodes (VEN)

- Receive events and respond to them
- Generate reports
- Control demand side resources



OpenADR 3

- Created in addition, instead of changing the existing 2.0 standards
  - Maintain interop, 2.0 remains in place
- REST API for simpler implementation, MQTT
- JSON; more practical security approach
- Easier to implement in end products if envisioned (rarer use case)
- Maintains concepts of OpenADR (inform & motivate) but simplifies and increases flexibility
  - E.g., could be resource server in building gateway
- Reference is GitHub



OpenADR 3 – Version 3.0.1 to 3.1.0

- Notifications via message queues
  - 3.0.1 supports webhook notifications
    - work well for VENs that can expose a callback server to the Internet, i.e. cloud hosted VENs,aggregators, B2B
    - In-the-home VENs and IoT environments often cannot accept incoming Internet traffic due to firewalls or other networking components
- Notifications provide another mechanism for VENs to receive notification of the change of state of objects on the VTN
  - We have chosen MQTT as a specific ‘binding’ and as the implementation in the RI
  - VTNs may choose other messaging infrastructure

OpenADR 3 – Version 3.0.1 to 3.1.0 (2)

- Object Privacy
  - VEN, resource, subscription and report objects
    - A VEN may only read objects it has created
    - On object creation VTN associates properties of the requestor's token with the object
    - On read requests, VTN inspects requestor's token and only returns objects with the proper association
  - Program and event objects
    - BL may 'assign' targets to a VEN client by creating or modify a ven or resource object with targets. Note above that VEN and resource objects are always associated with exactly one VEN client
    - On read requests to programs and events, VTN inspects 'assigned' targets and only returns objects with matching targets, or none
  - BL can read all objects

OpenADR 3 – Version 3.0.1 to 3.1.0 (3)

- Other changes include
  - Targets are lists of strings, not lists of valueMap objects
  - Program object simplified to remove properties that can be expressed in a generic attributes property
  - Make /resources a top-level collection to avoid potentially large VEN responses
  - Augment report timing controls
  - Compact representation of series data such as multiple PRICEs
  - ‘Active’ query param for /events to filter for current and future events
  - Add <>/auth/server endpoint to allow discovery of authentication service
  - Add enumeration schemes to aid type checking in implementations
  - Provide Definition and User Guide in markdown and pdf formats
  - Refactor addressable objects to separate object definition with metadata and requests
  - Additional definition of TLS requirement
  - And more minor tweaks.

Interaction with other Standards

- OpenADR prefers to “inform & motivate”
- Therefore, it is well suited to integrate with other downstream standards like S2, EEBUS, Matter, OCPP, BACnet, IEEE 2030.5, Sunspec, and others
- Upstream typically an implementation with utility controls – CIM Harmonization
- No direct translation needed
- Use of information elements to make decision locally

What's next for the specification?

- We have a collection of feature requests
- Need to settle on next release date
- Start editing team up again to work through the comments
  - Plan is a 3.1.1 release. No plans for major release unless necessary for region/country

- Editing team starting soon!
- In process now: Creating page for application (implementation) conventions

Some lessons learned

- USA
  - Large country, large customer base, generally high energy consumption
  - But… state by state energy regulations
  - Perceived & real differences
  - No harmonization of programs – in fact, little communication (changing a little now – mostly because of industry)
  - The results:
    - different implementations even when using the same standard
    - Confusion for manufacturers
    - No good “database” for programs for utilities to draw from

Some lessons learned (2)

- Japan
  - Build harmonized program outline using OpenADR
  - Clearer requirements
  - Less vendor drift
  - Working off the “same template”

  - Not all perfect and nuances exist. But a good start.

Let’s get to it

Why are we here?

- European countries had a bit slower start to engage with customer equipment
- But… now increased momentum
- Good time to try to harmonize baseline requirements
  - What are the utility and regulatory objectives?
  - What is the “ask” from customer?
  - How can we make this worth while for the customer?
  - And… how can it work?

So let’s see what we can do!

Thank you!

Contact:
Rolf Bienert
Managing & Technical Director OpenADR Alliance
rolf@openadr.org

Education Programs
Don Dulchinos
don@openadr.org

Marketing
Shannon Mayette
shannon@openadr.org