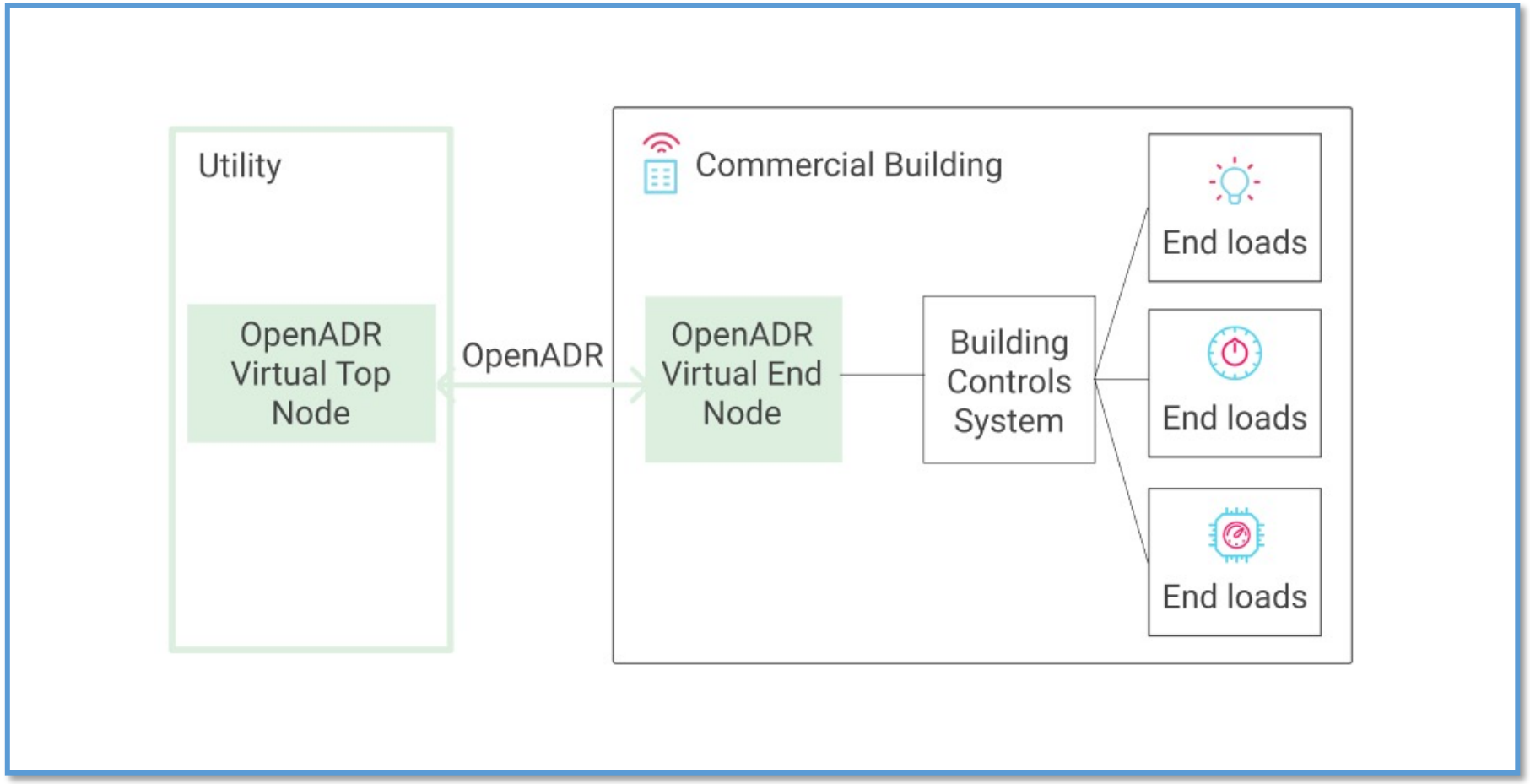
Matt Hale

- Software VEN and VTN provider
- Worked with dozens of OEMs to implement OpenADR and bring load flexibility online
- Prior experience in software, energy efficiency, utility space

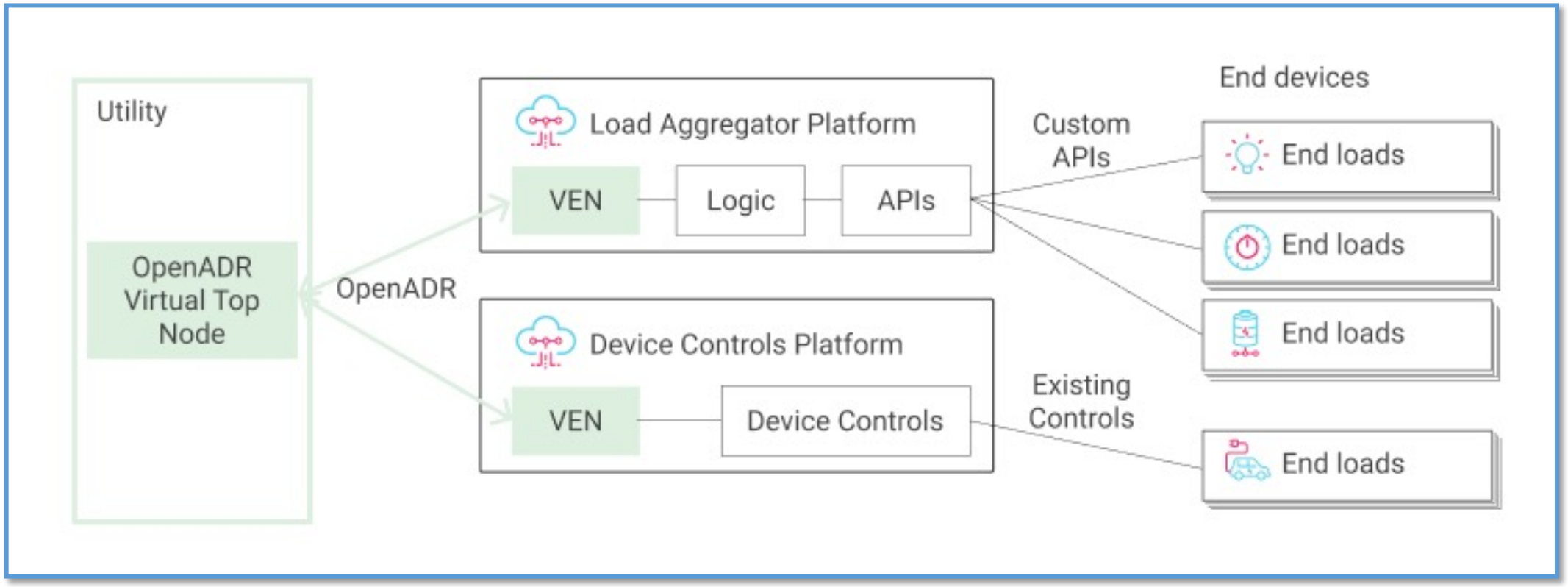
What do we mean by cloud VENs?

Traditional OpenADR Architecture



GridFabric
A CLEANSPARK COMPANY

Cloud VEN OpenADR Architecture



GridFabric
A CLEANSPARK COMPANY

Cloud VENs are now a common implementation model for OEMs

- Good fit with IoT devices
- Good fit for smaller form factor, more numerous device types (e.g. residential)
- Simpler implementation and maintenance than on-device
- Allowed by regulations

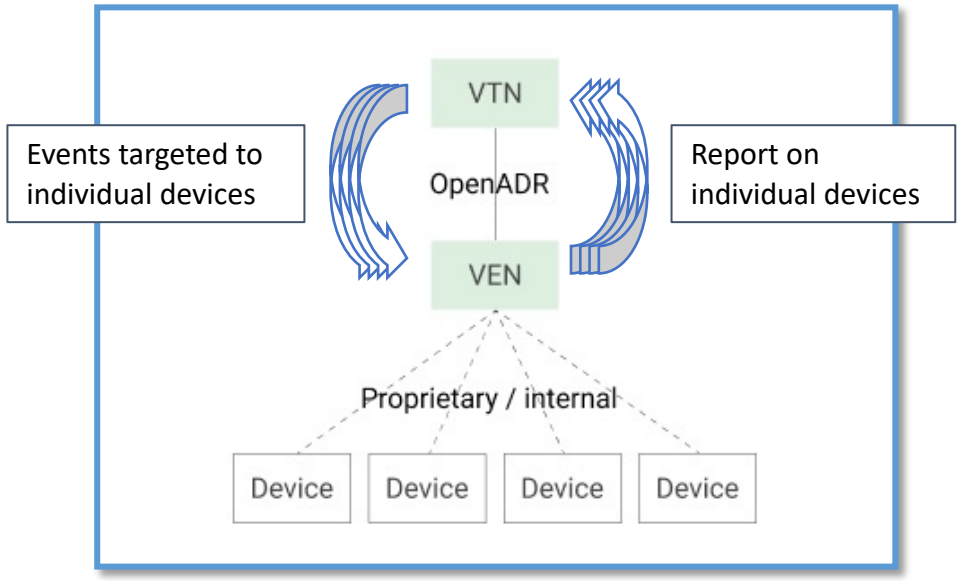
Cloud VENs have not been “formalized”

Less formalized => less interoperability

For discussion

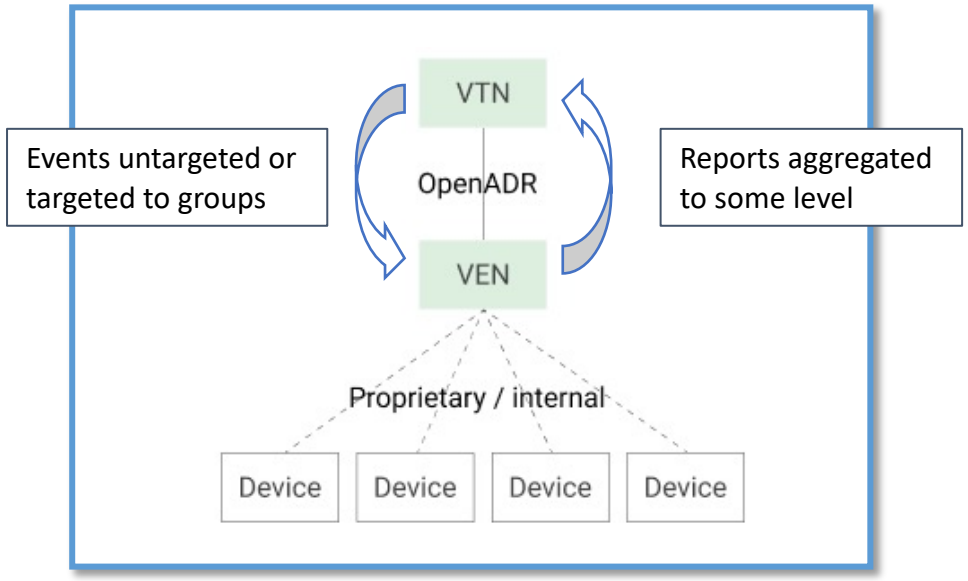
Cloud VEN as a proxy vs as an aggregator

Proxy



Targeting, grouping, etc resides with VTN operator

True Aggregator



Push sophistication to Aggregator or OEM

GridFabric
A CLEANSPARK COMPANY

For discussion

Many unique use cases for reporting causing practitioners implementation headaches

- Examples include
  - Resource / device enrollment
  - Offline device report
  - Group definitions
  - Future resource capacity and availability
  - Only report on a changing subset of resources each time (i.e. online devices only)
- Reporting is flexible enough to handle most cases, but custom use cases = expensive integration

For discussion

The joys of resourceId

- Ambiguity of resourceId – is it serial #, meter #, device Id, etc.
- Easily confused with rId
- Often incorporates metadata, e.g. ven1-evcharger13
- Some VENs ignore targeting
- groupId and partyId not observed

For discussion

Summary

- OpenADR is flexible and can fit many requirements
- Flexibility at the cost of interoperability – custom requirements require custom integration
- Pain observed when:
  - Large amounts of data flow necessary
  - Programs have custom / novel requirements
  - VENs have differing capabilities