Role of Standard Demand Response Signals for Advanced Automated Aggregation

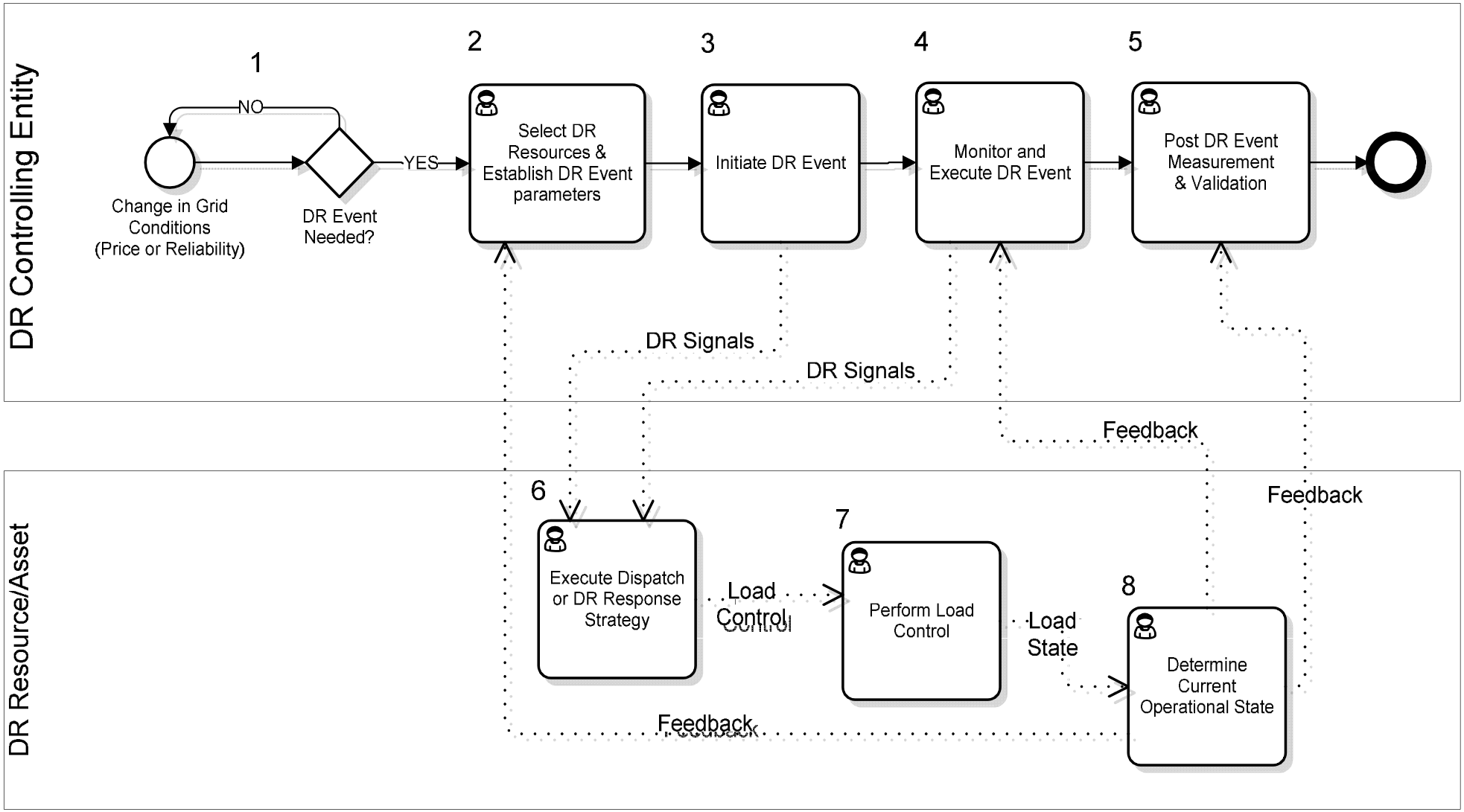
Ed Koch
Akuacom

Sila Kiliccote
Demand Response Research Center

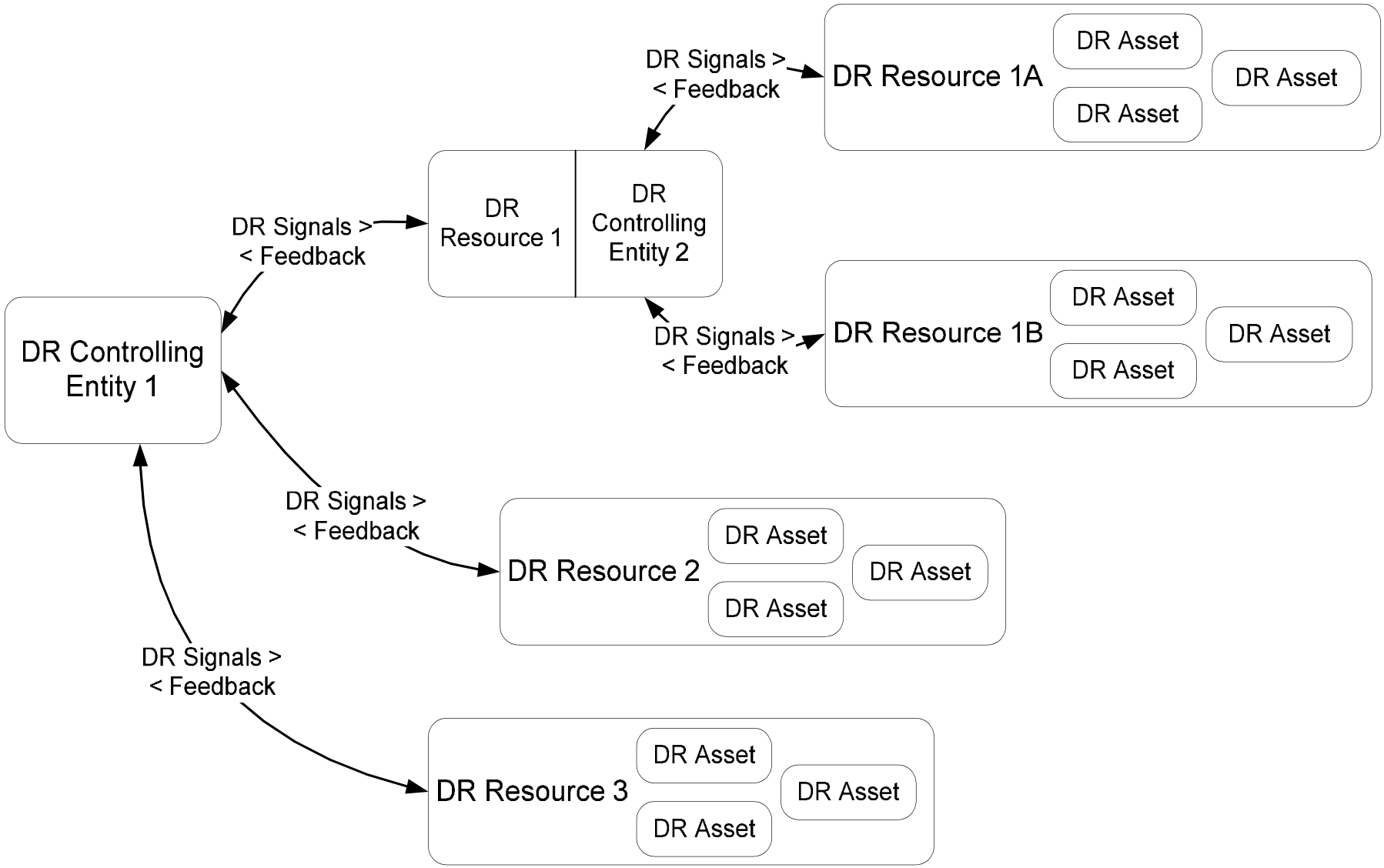
Agenda

- Introduce DR process and actors
- Define what is meant by Aggregation
- Discuss benefits of aggregation
- Role of standards to support aggregation
- Conclusions

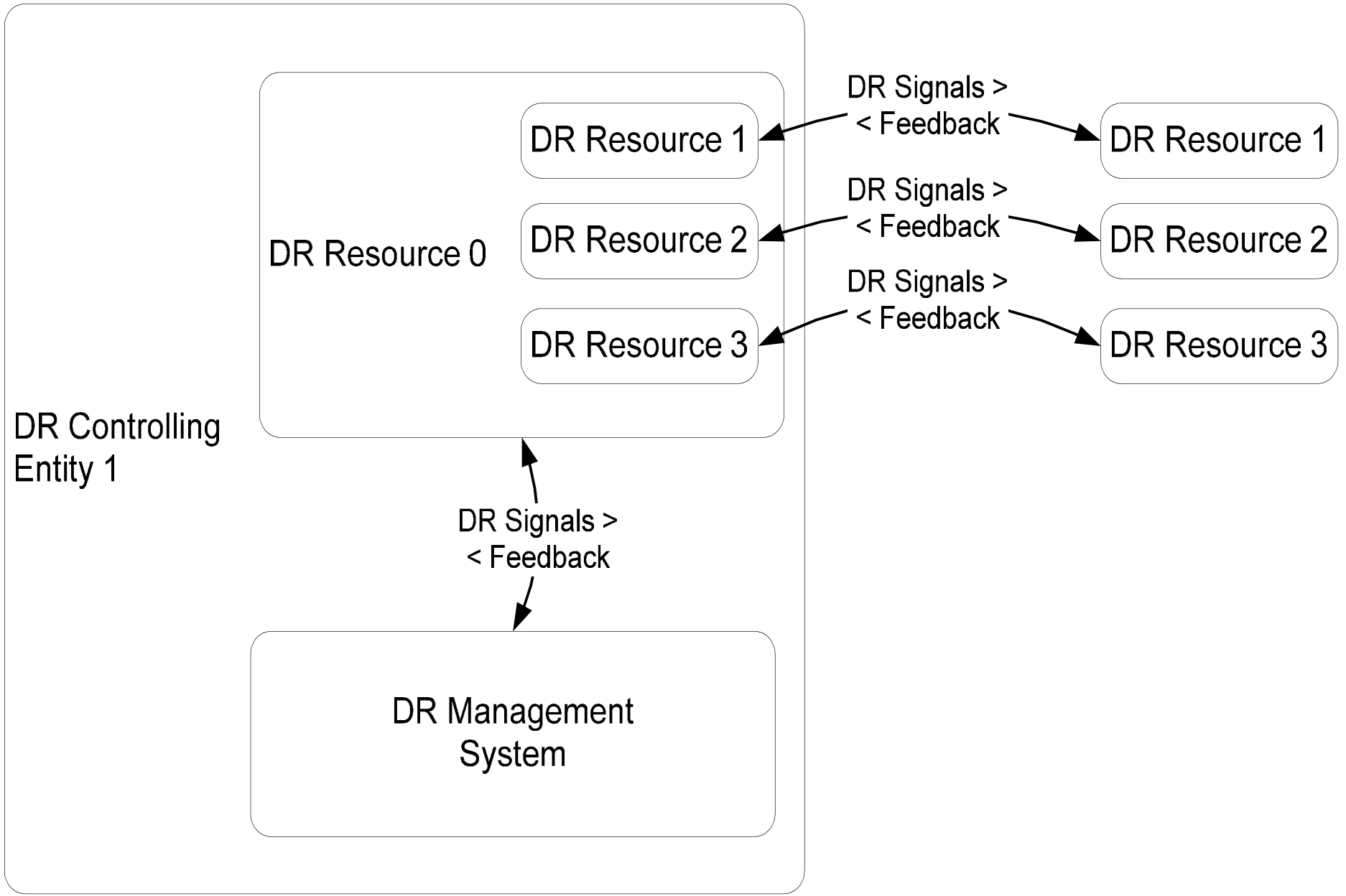
Simplified DR Process



DR Actor Relationships



Ad Hoc Aggregation



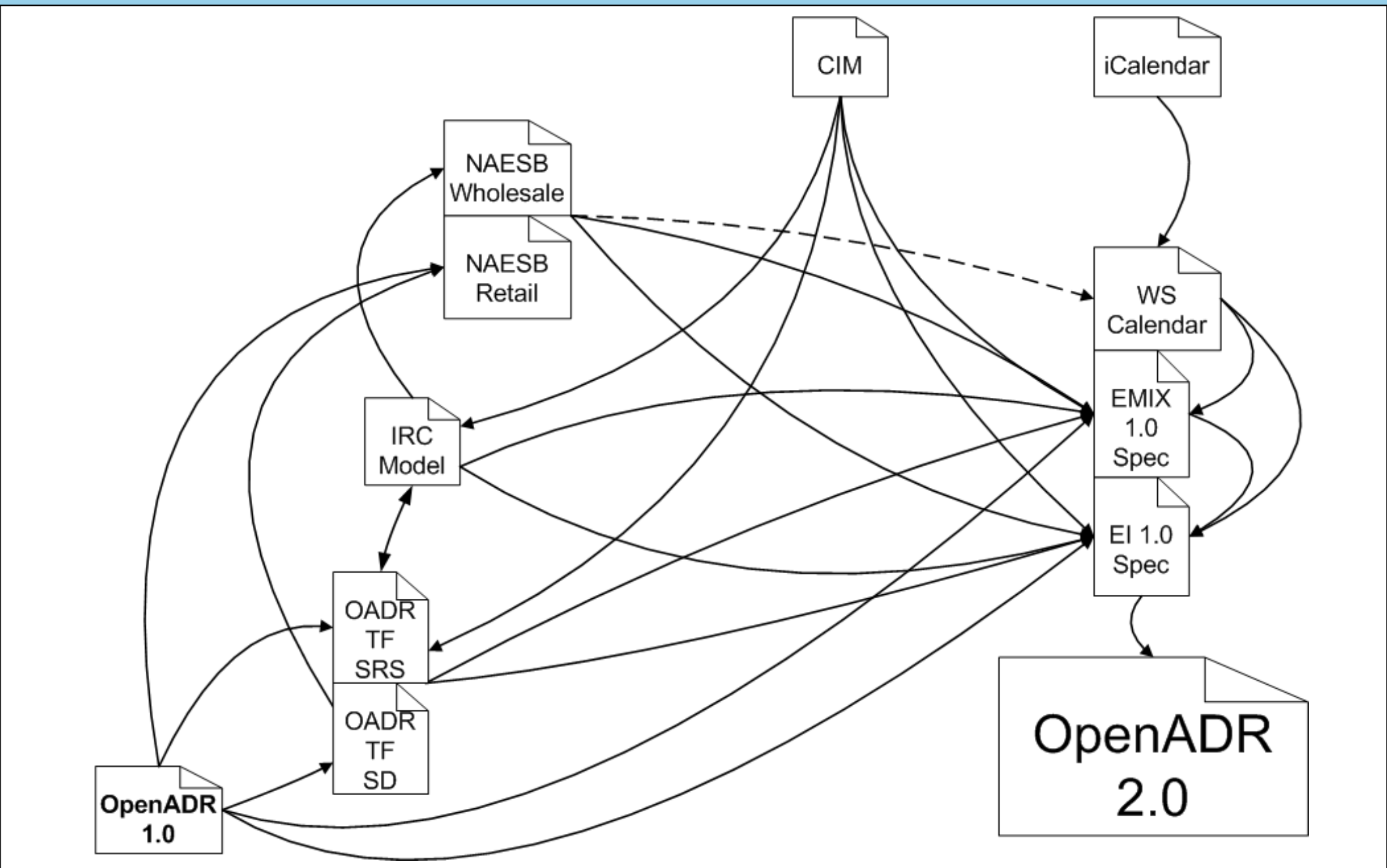
Benefits of Aggregation

- Increase size of DR Resources
- Increase reliability
- Reduce uncertainty
- Reduce complexity
- More accurate load shaping
- More flexible load profiles

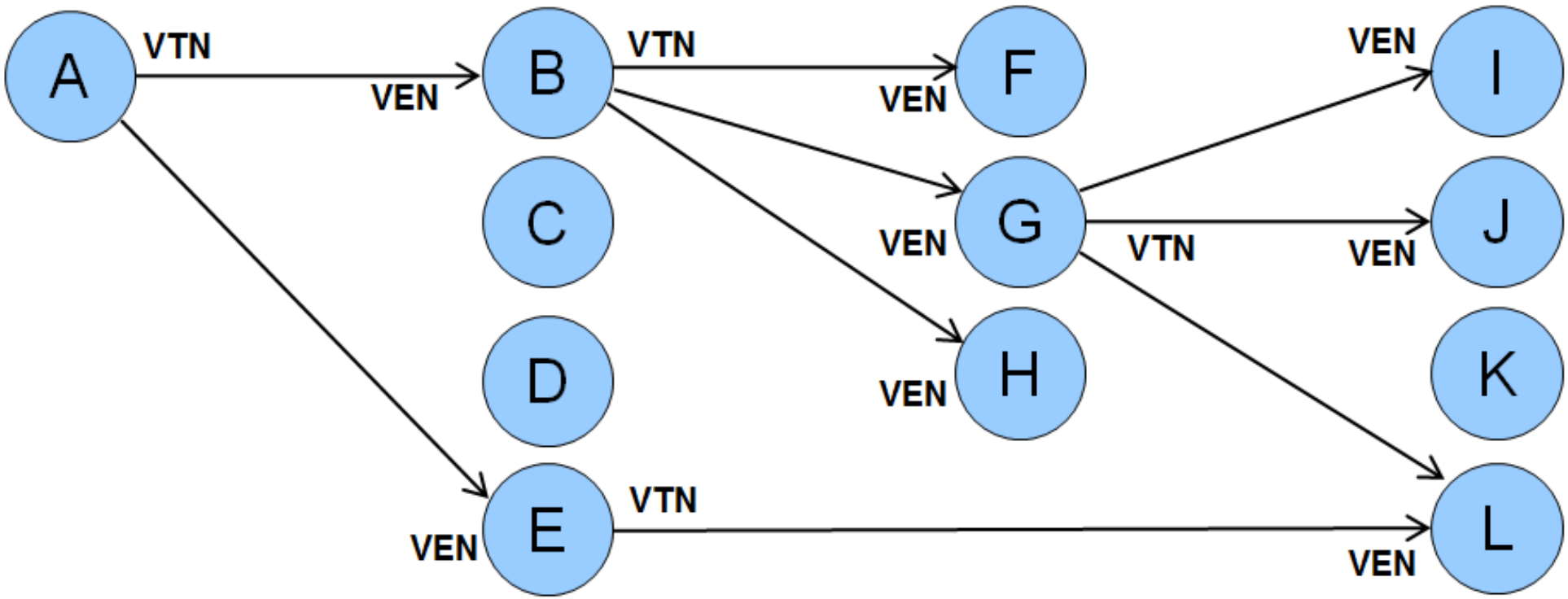
Role of Standards in Aggregation

- Lower the cost of aggregation as DR Resources and Assets will have embedded capabilities to respond to standard signals.
- Allow individual DR Resources to be easily moved between different intermediaries and avoid stranding assets.
- Allow individual DR Resources to be easily used in a number of different aggregation schemes including the notion of ad hoc aggregation groups.
- Support multiple levels of aggregation.
- Allow DR events to be initiated and propagated from top to bottom with common semantics.
- Allow DR Controlling entities to specify objectives that can be easily utilized and propagated to the DR Resources at the lower levels of the aggregation hierarchy.

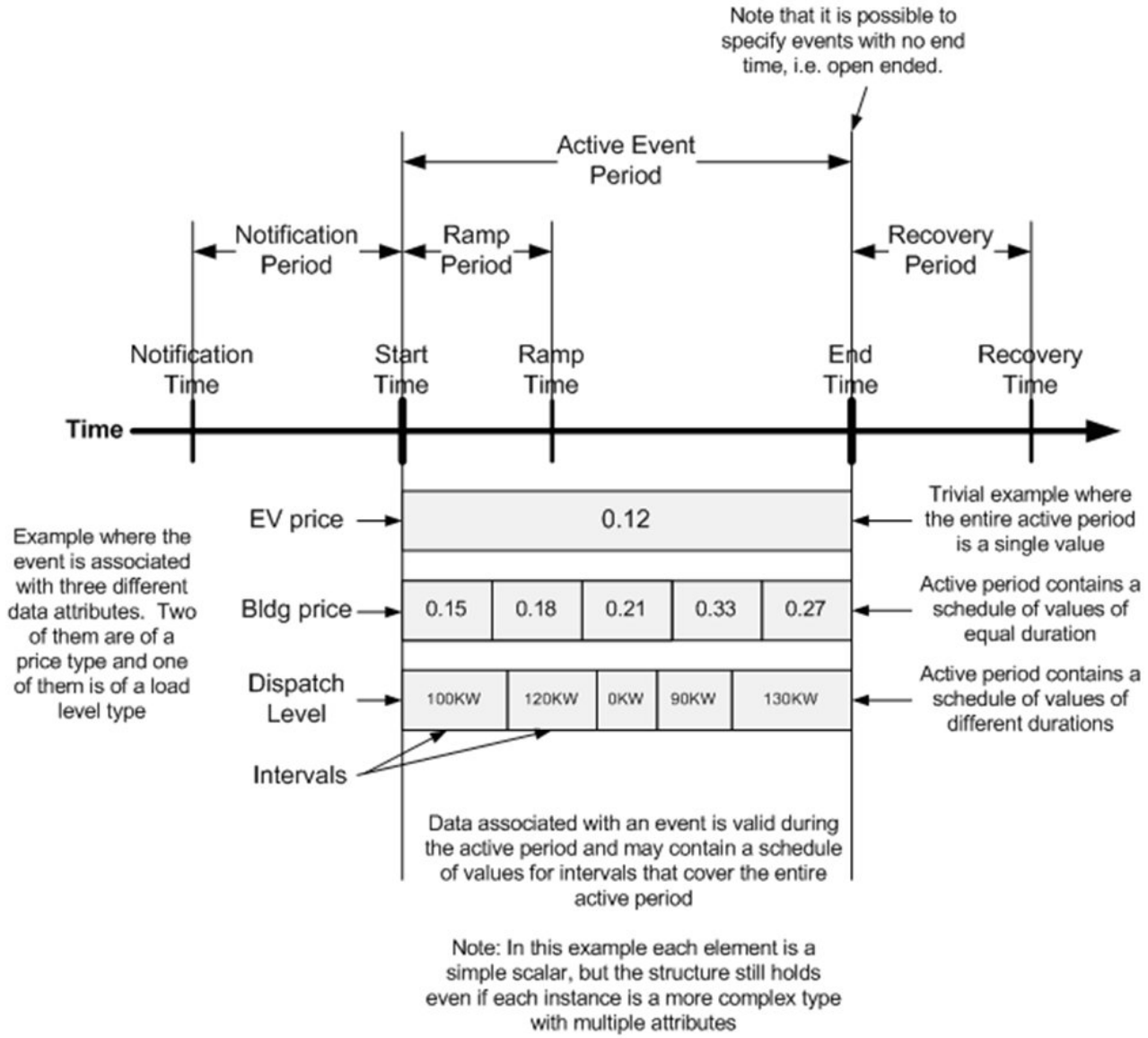
OpenADR Standards Lineage



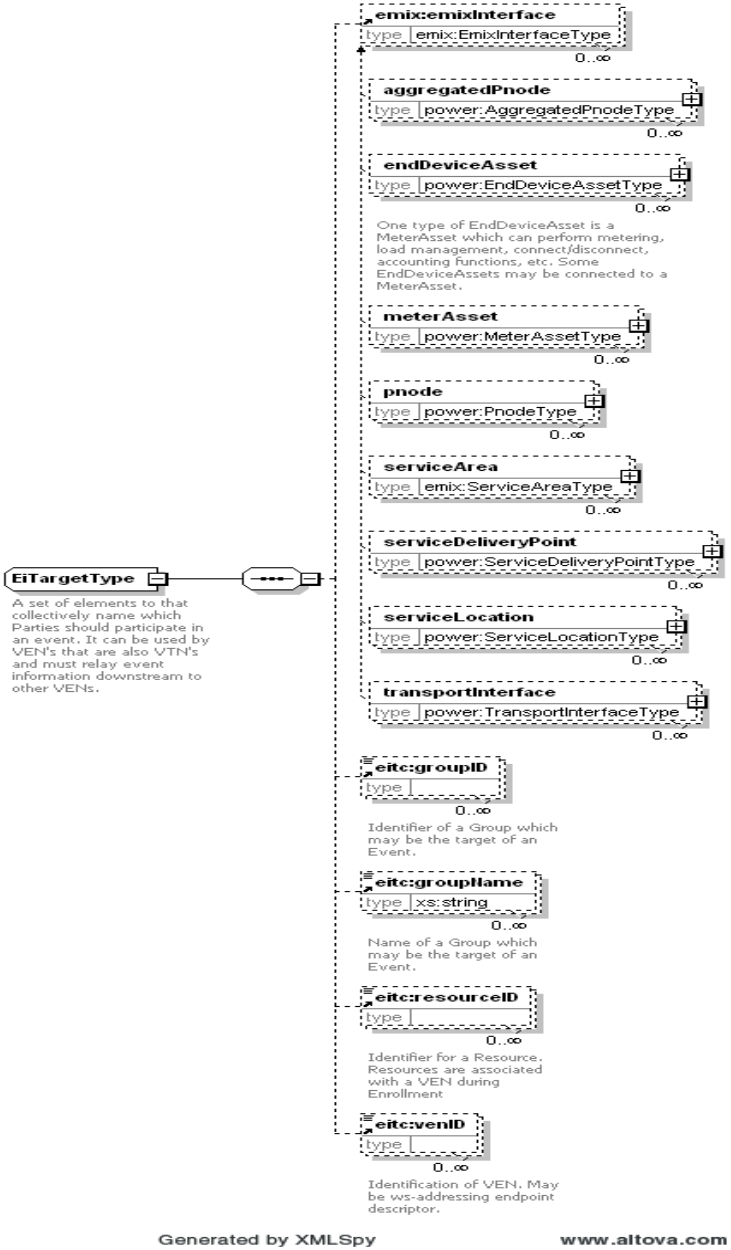
Virtual Nodes in OASIS EI



DR Event Model



Target Attributes in OpenADR



Active Areas of Research

- Dynamic creation of ad hoc aggregation groups to satisfy objectives.
- DR strategies to optimize aggregate behavior along many different dimensions:
  - Reliability of response
  - Better predictability
  - Accuracy of dispatch following
  - Duration and magnitude of response

Conclusions

- Emerging standards such as OpenADR support the notion of aggregation as one of its core concepts.
- Use of standards such as OpenADR by the DR resources allows them to participate in a wider range of programs that may require aggregation and helps to avoid stranded assets.
- Use of standards such as OpenADR allow the same DR resources to be used in different aggregation groups that may be created in an ad hoc fashion.