

DER Communications Requirements Framework

Walt Johnson
EPRI

Angie Eide
Hawaiian Electric

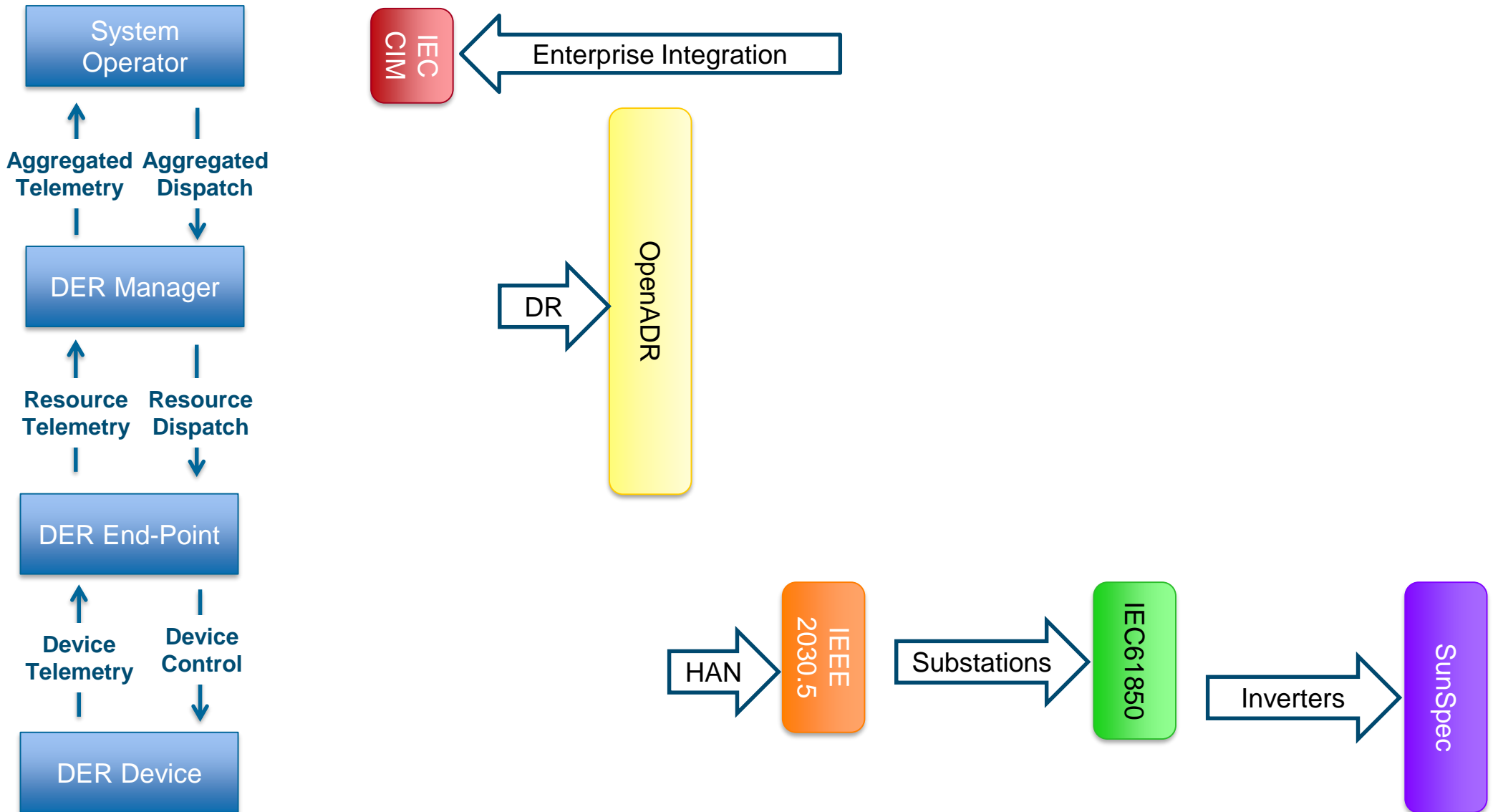
DER Protocol Workshop
April 18, 2017



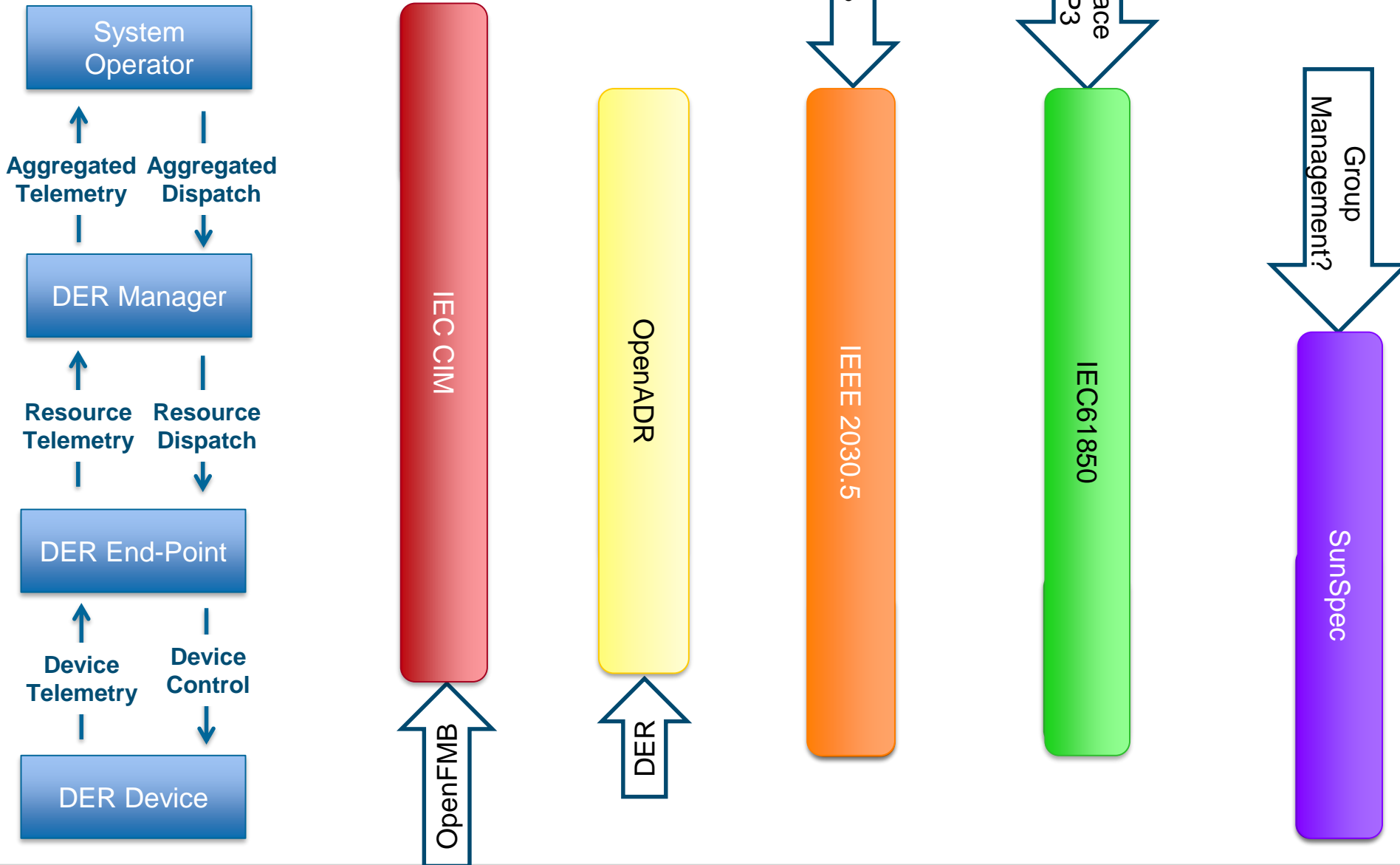
Approach

- The Evolving DER Protocol Situation
- The Challenge for a Utility
- Requirements Principles
- Framework Development Process
 - Collect Use Cases
 - Extract Actors, Processes, Scenarios, Interactions, etc.
 - Determine Scope
 - Actors (Participants)
 - Processes (Timeline)
 - Interactions
 - Map Coverage of Protocols to Required Interactions
 - Identify Other Assumptions/Requirements
 - Document

In the Beginning...



In the Future?



**The Result: DER
communications
is a confusing
and overlapping mix
of services, standards,
and protocols**

transactive
energy

SunSpec

IEEE 61850-7-420

Orange
Button

Common
Information
Model

UL 1741-SA

IEEE1815.1

web
services

Modbus

SEP 2

TCP/IP

CIM

RESTful API

ASHRAE
201

CSIP

oSDX

OpenADR

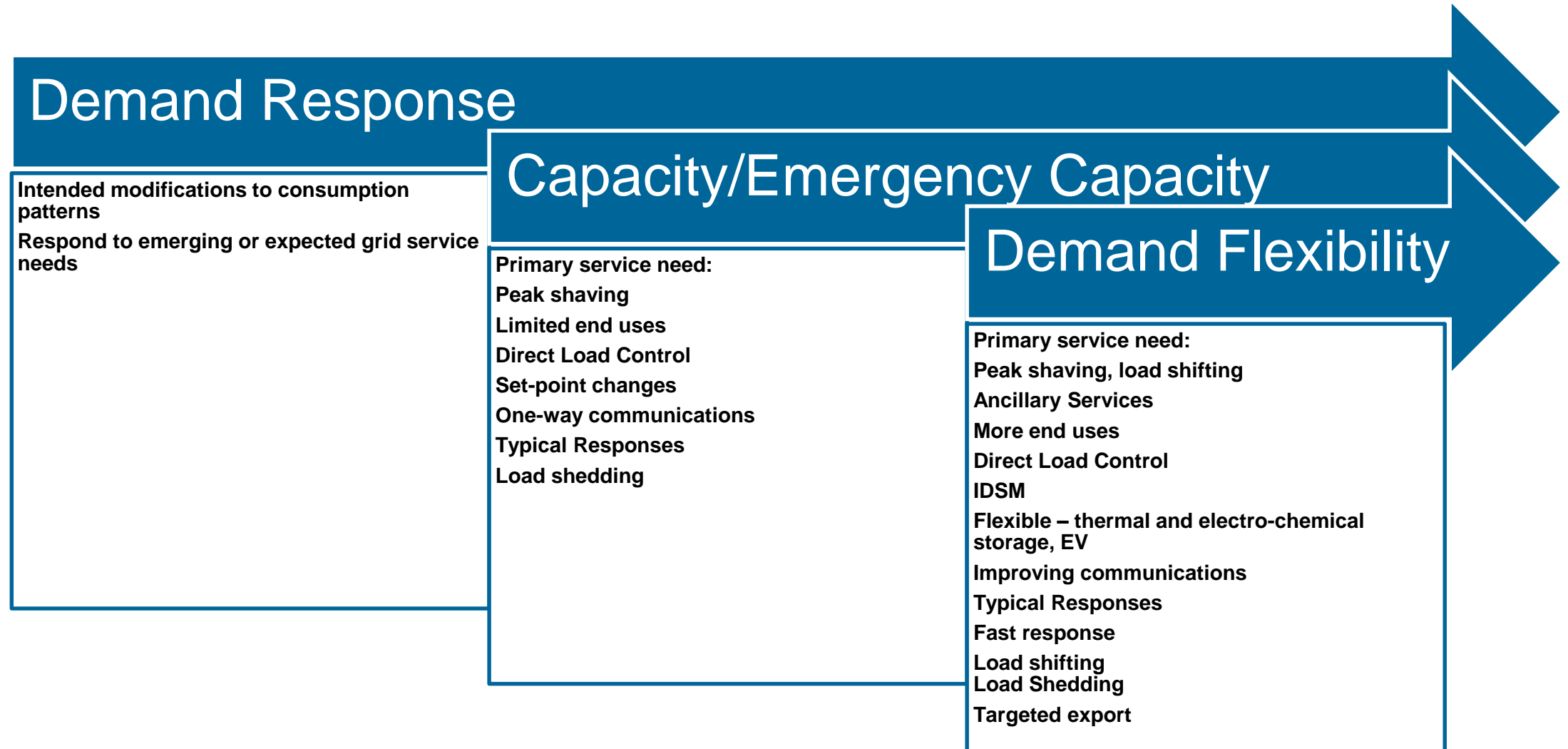
DNP3

IEEE 2030.5

What's a Utility to Do?

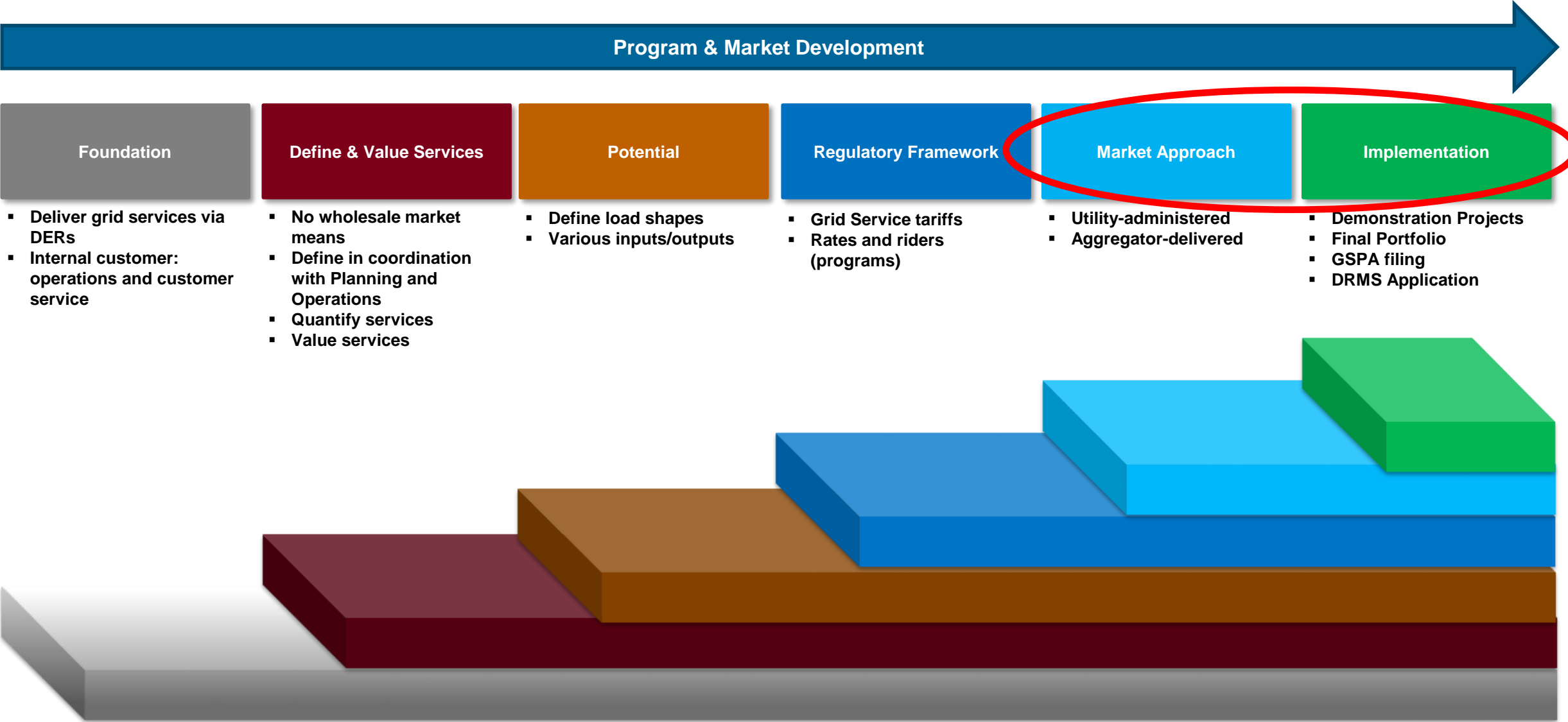
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Hawaiian Electric

Demand Response Transformed: Demand Flexibility



DR has transitioned from strictly peak load reductions to a more flexible and dynamic resource

Distributed Grid Service Delivery Process



What are We Actually Doing?

- Specifying Program Parameters and Processes
- Defining Use Cases
 - Information Exchanges
- Identifying Security Requirements
- Identifying Protocols/Standards

How?

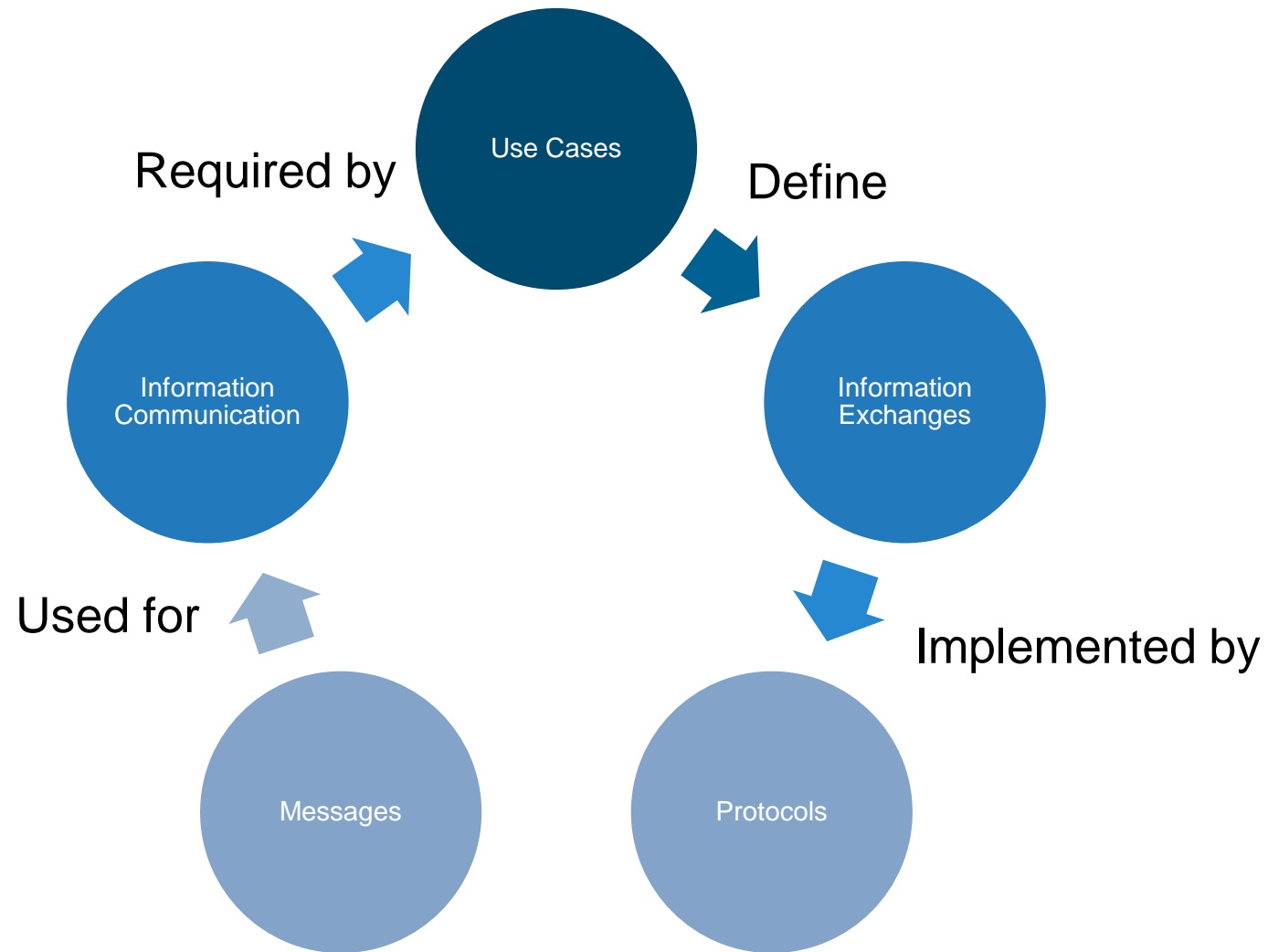
- Demonstrations and other Pilot Efforts
- Relying on Trusted Partners
- Peers
- Workshop Particularly Timely

Framing the Requirements

Principles for Requirements

- **Focused:** Information operations that result in protocol messages between entities
- **Leveled:** Expressed at approximately the same level of detail
- **Orthogonal:** Ideally, independent of each other, without overlap
- **Vetted:** Vetted by the utility community and used as the basis for a protocol specification
- **Documented:** Well-documented, preferably by an SDO

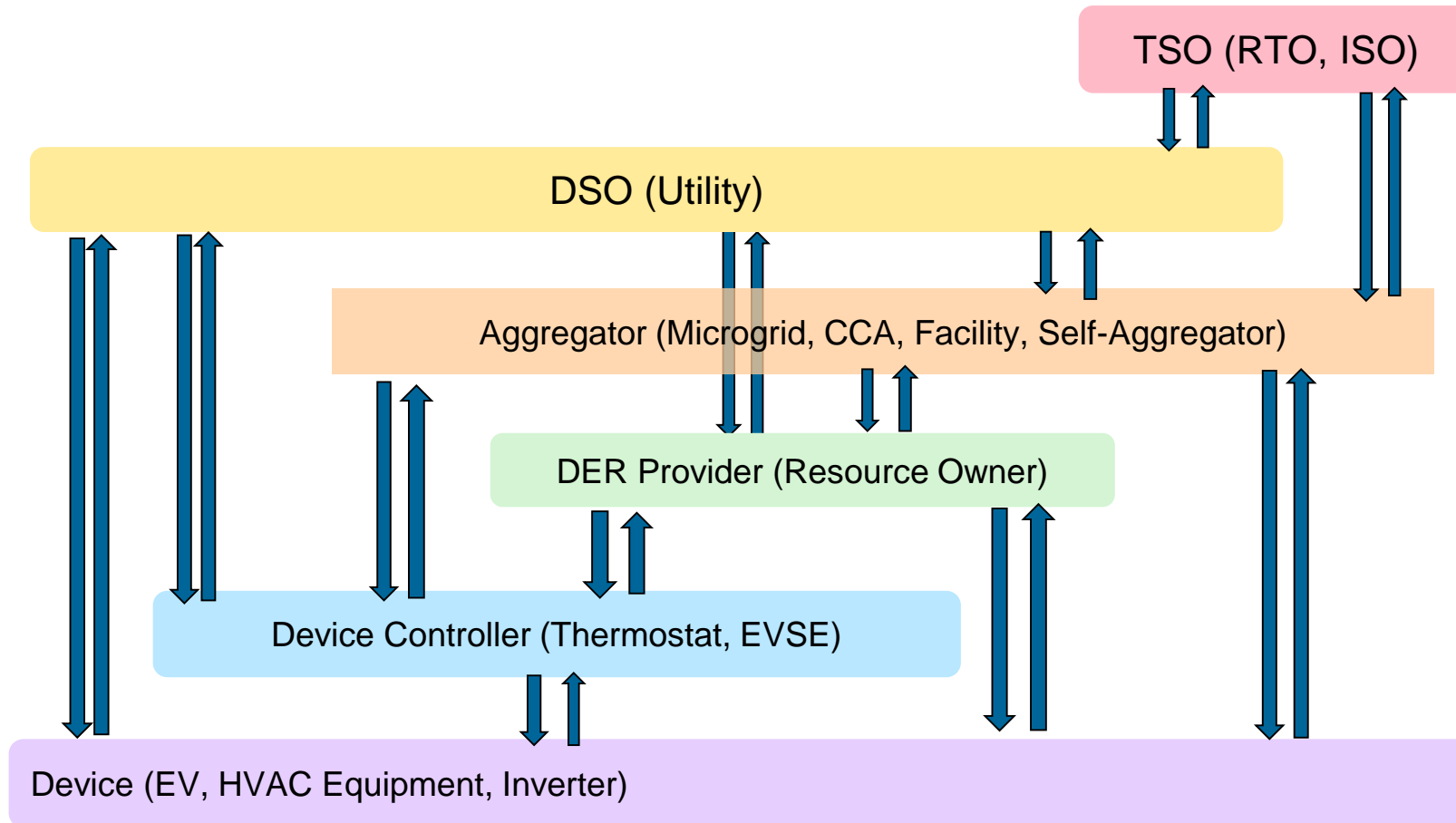
The Role of Use Cases



Key Elements of a Use Case

- Actors
- Scenarios
- Process/Actions
- Others
 - Constraints
 - Relationships
 - Interactions
 - ...

Actors and Interactions



Protocol A



Protocol B



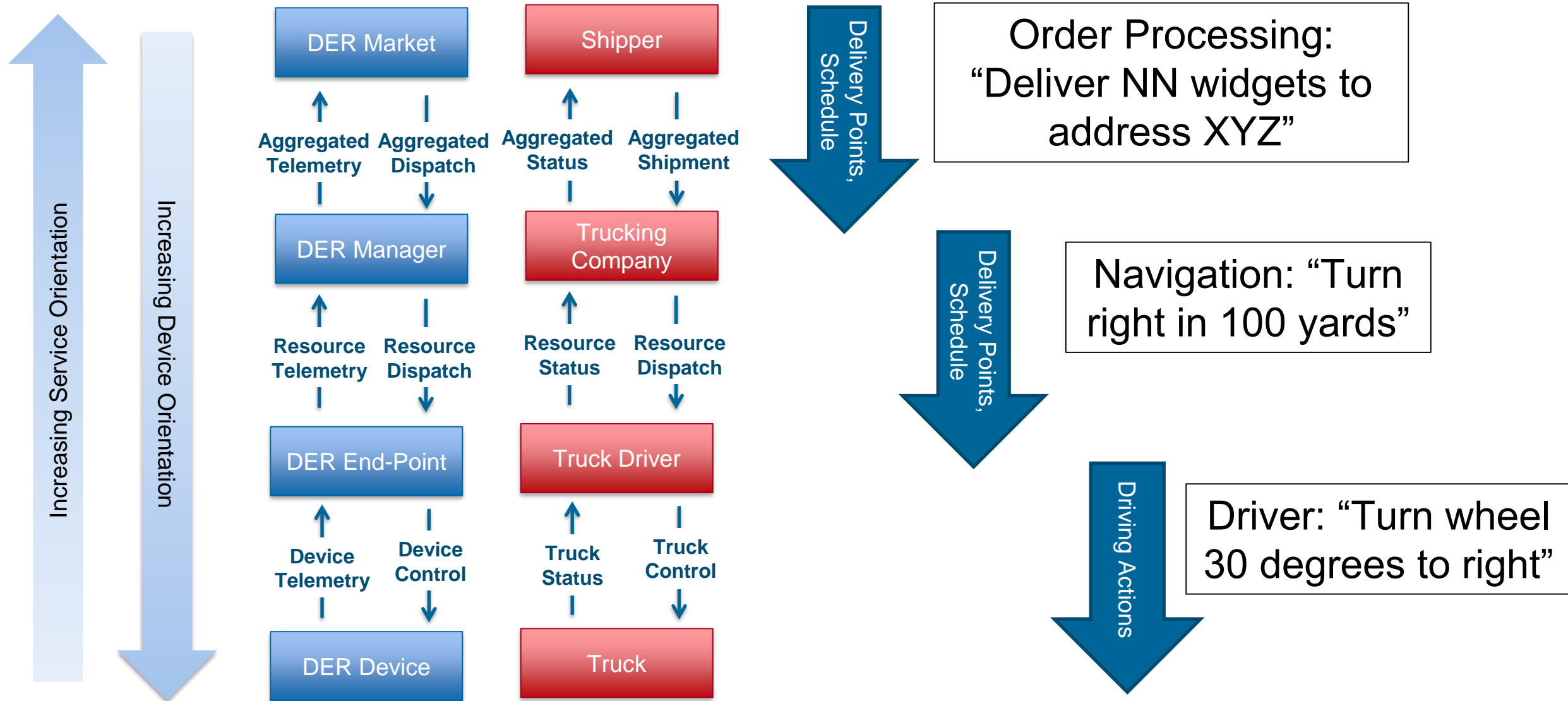
Protocol C



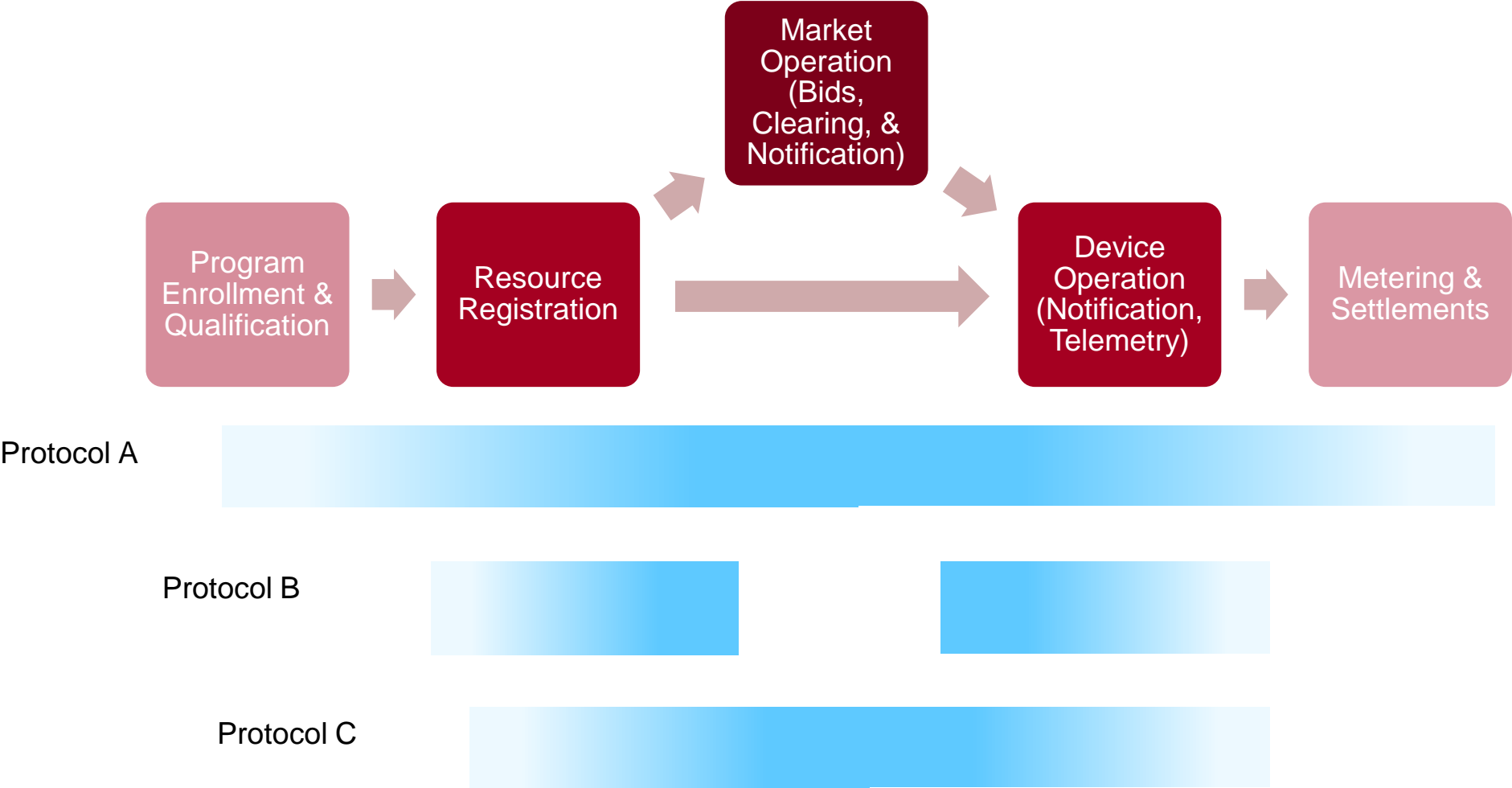
Protocol D



An Analogy: Freight Shipment



Process Steps (Timeline)



Framework Scope Decisions

- The included exchanges are conceptual and generic
 - They do not address detailed message structures or information content
- All exchanges are viewed from the viewpoint of the VEN
 - Often this is the Device or Device Controller (for device-oriented messages)
 - It could be the Resource or an Aggregator (for service or state-oriented messages)
- Messages that are delivered and acted upon in real time are treated separately from the same information delivered in advance of the response periods
- Program enrollment is out of scope
 - But registration of DER for participation in programs is in scope
- Financial settlement (whether for service or resulting from TE) is out of scope
 - But communication of after-the-fact metering data is in scope
- Includes most commonly encountered exchanges
 - Also includes a few rarer ones (to engage conversation)



Together...Shaping the Future of Electricity