



2018

**Transactive
Energy
Systems**

CONFERENCE & WORKSHOP

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Energy Services Interface (ESI) Vision

*A super-natural fit for TE
and interoperability*

Steve Widergren
Principal Engineer
Pacific Northwest National Laboratory

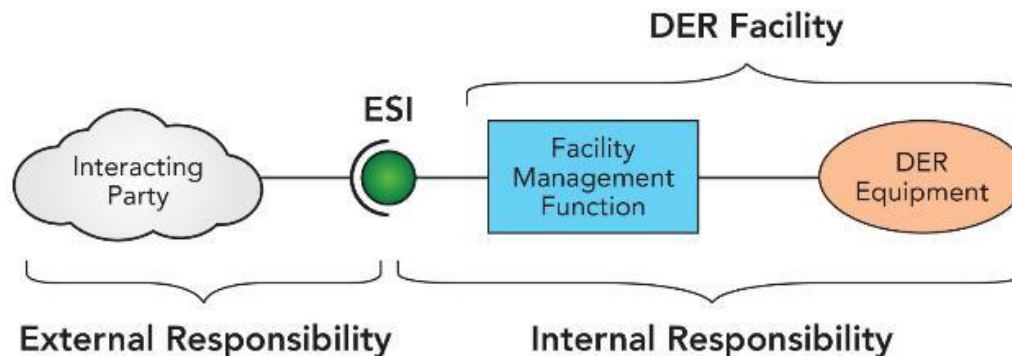


PNNL-SA-135328



Energy Services Interface: A Vision for DER Integration

"An ESI is a bi-directional, *service-oriented*, logical interface that supports the secure communication of information between entities inside and entities outside of a customer boundary to facilitate various energy interactions between electrical loads, storage, and generation within customer facilities and external entities."*

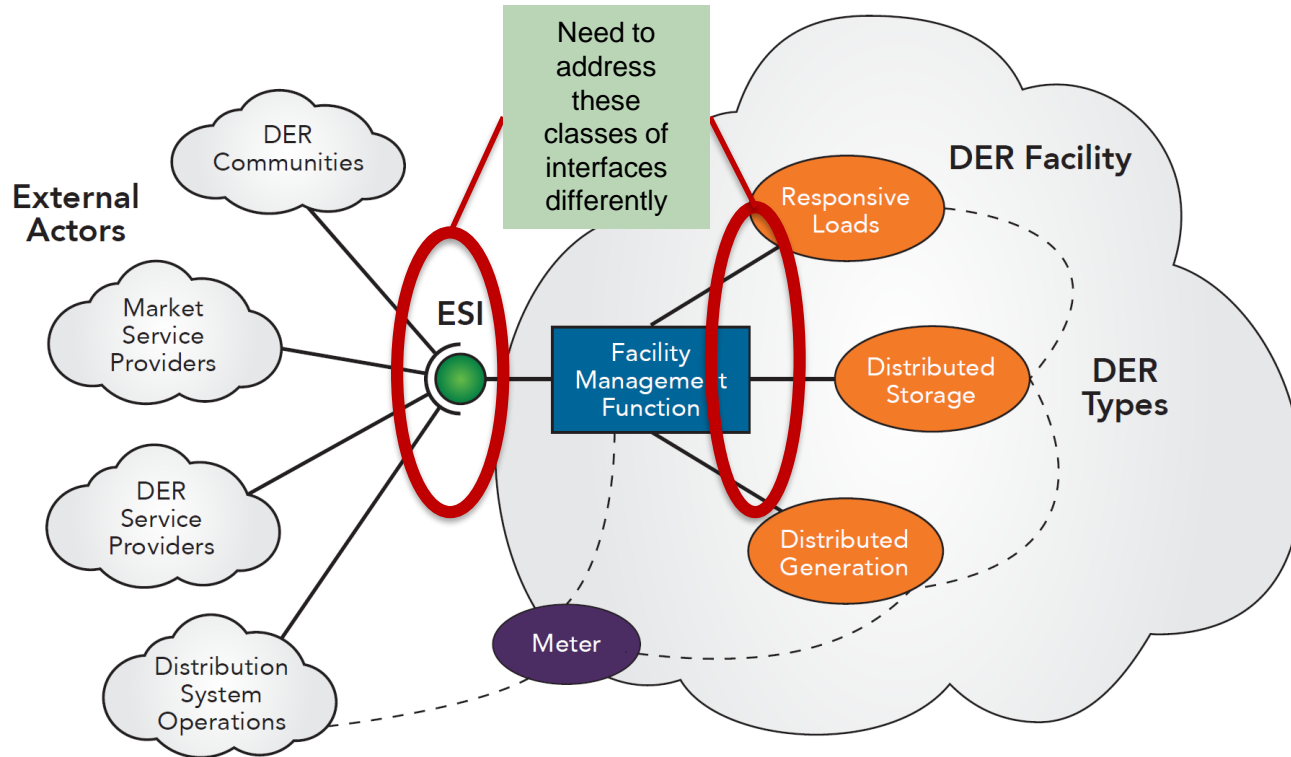


The ESI concept supports an agent-based approach to system design and operation

* Hardin et al: http://www.gridwiseac.org/pdfs/forum_papers11/hardin_paper_gi11.pdf . Note, the words “service-oriented” are added to the definition here.



ESI Vision: A General DER Facility Conceptual Model

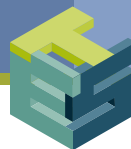


ESI = Energy Services Interface

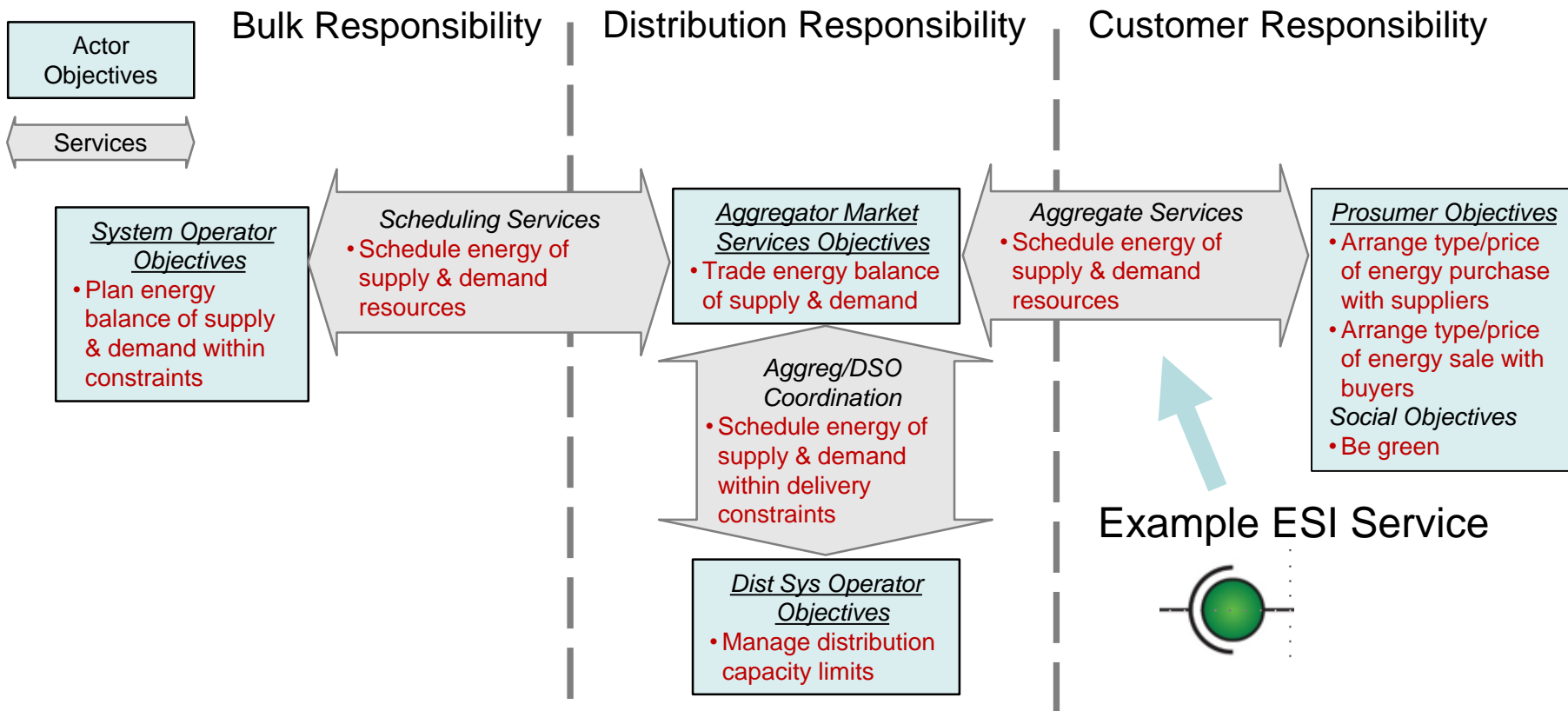
The sets of arrows and dotted lines represent areas of focus for discussing interoperability issues

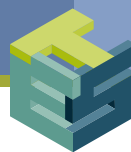
GMLC 1.2.2 Interoperability Strategic Vision whitepaper

<https://gridmod.labworks.org/project-highlights/strategic-vision-grid-interoperability-published>

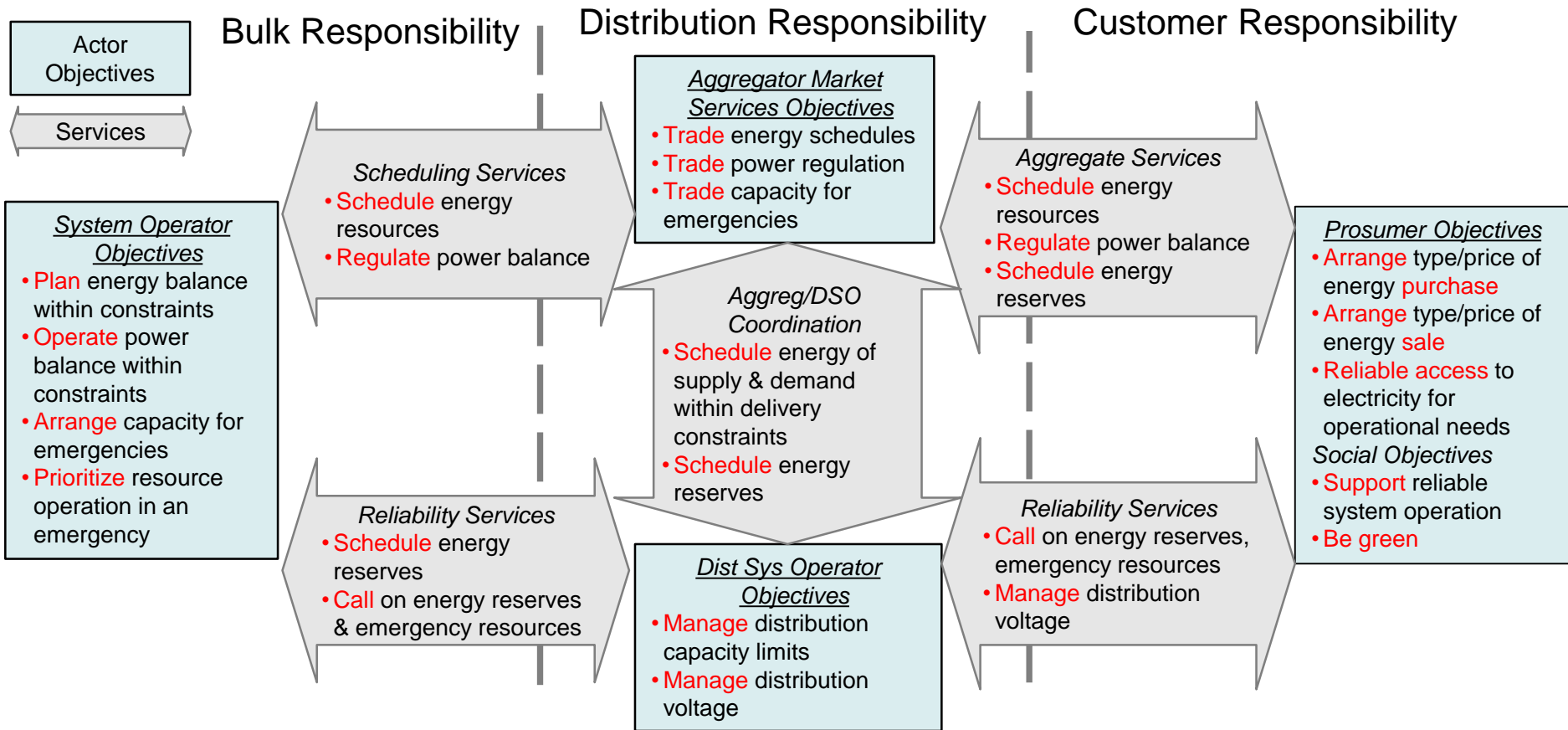


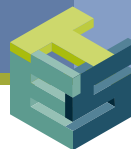
Separating Actor Objectives and Service Interactions: An Energy Scheduling Example



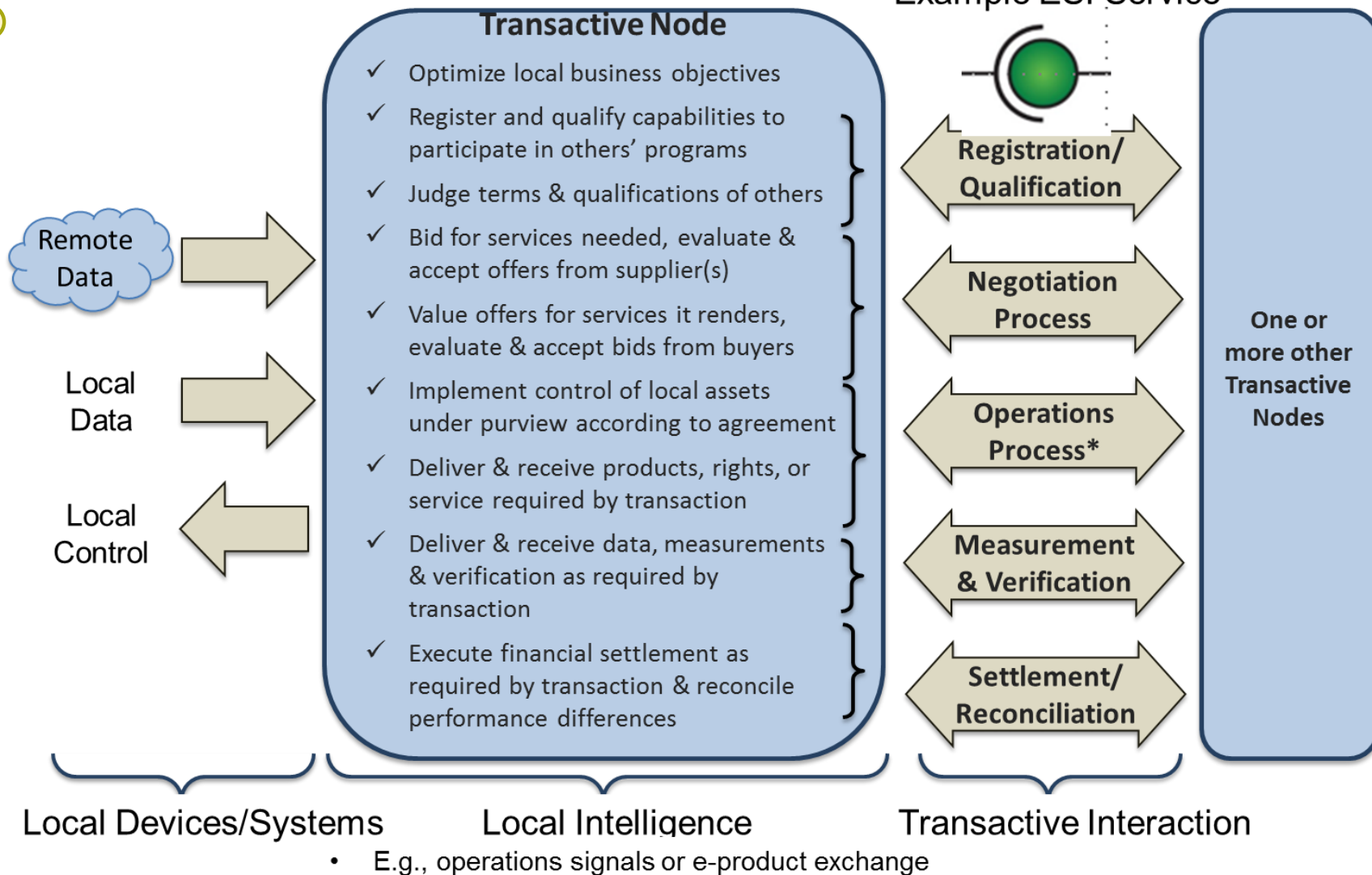


Imaging an Service-oriented Vision for DER Coordination





Transactional Interaction Model





● A Strategy to Improve Interoperability

Convergence of Roadmaps for DER Interoperability

