

Impact of Scalable Performance on DR Communication Architecture

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Driving to Grid 2020

Outline

- Why do we care?
- Requirements
- Architecture
- Recommendations

Why Do We Care?

- Many different DR programs from slow to fast
- Many different customers with different needs and a wide range of energy consuming systems
- Minimize the system costs and complexity of supporting all the above
- Bottom Line: Service Providers are looking for solutions that provide the biggest bang for the buck

Form Follows Function

- System Architecture Follows System Requirements
- Requirements
 - Functional: What?
 - Quality of Service: Constraints on the system
- Architecture
 - Many layers/views
 - Communication Architecture is one view
- QoS has large impact on communication architectures

Communication QoS Reqs.

- Business QoS
 - Service Provider Economics – FERC 14
 - High Customer Diversity
 - Grid Reliability – Stable closed loop stability
 - Supportability – Change over time
- Technical QoS
 - Security
 - Scalability
 - Performance

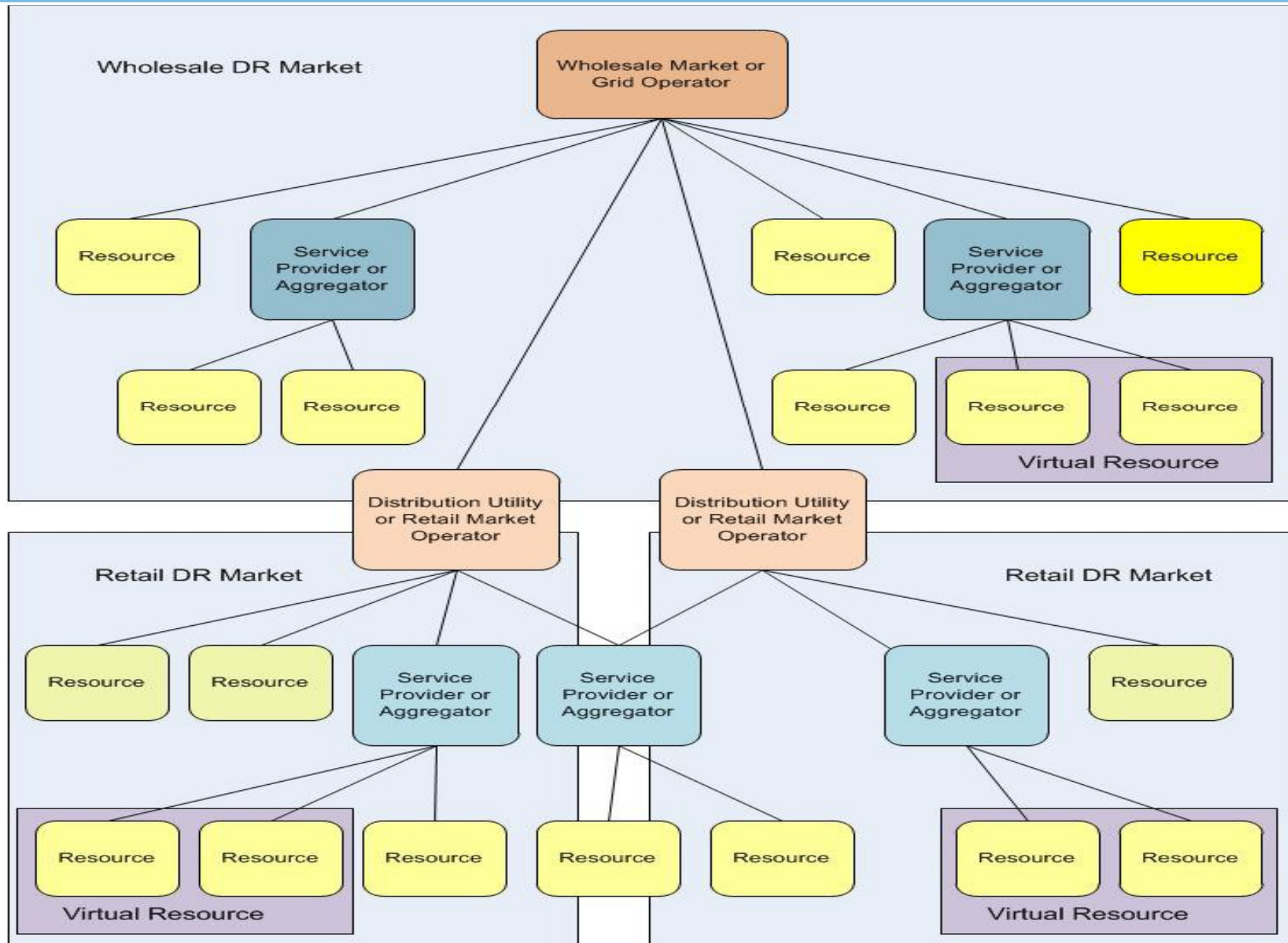


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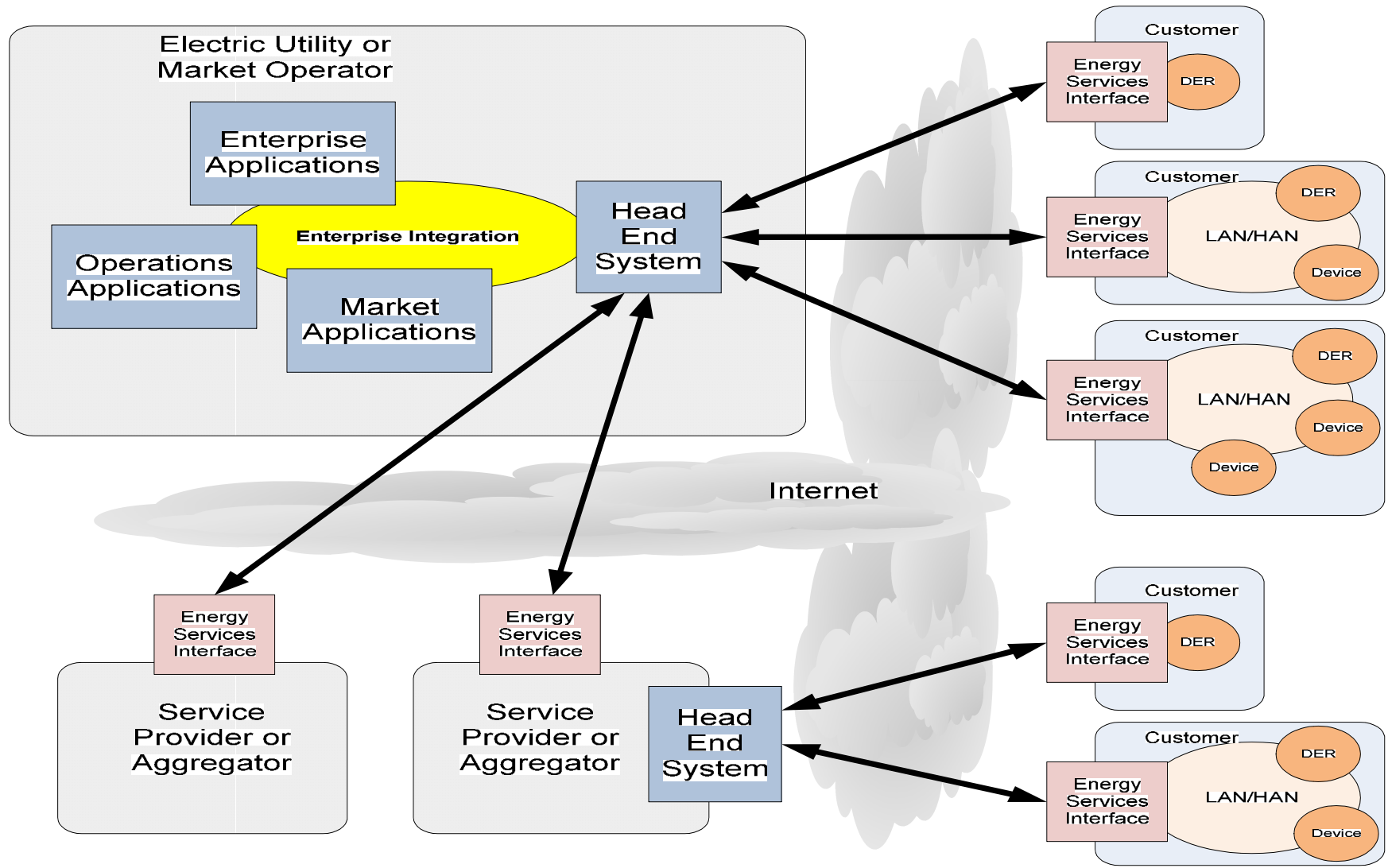
Architectural Considerations

- Demand Response
- Security
- Scalability
- Performance

Hierarchical DR Network



Typical System Network



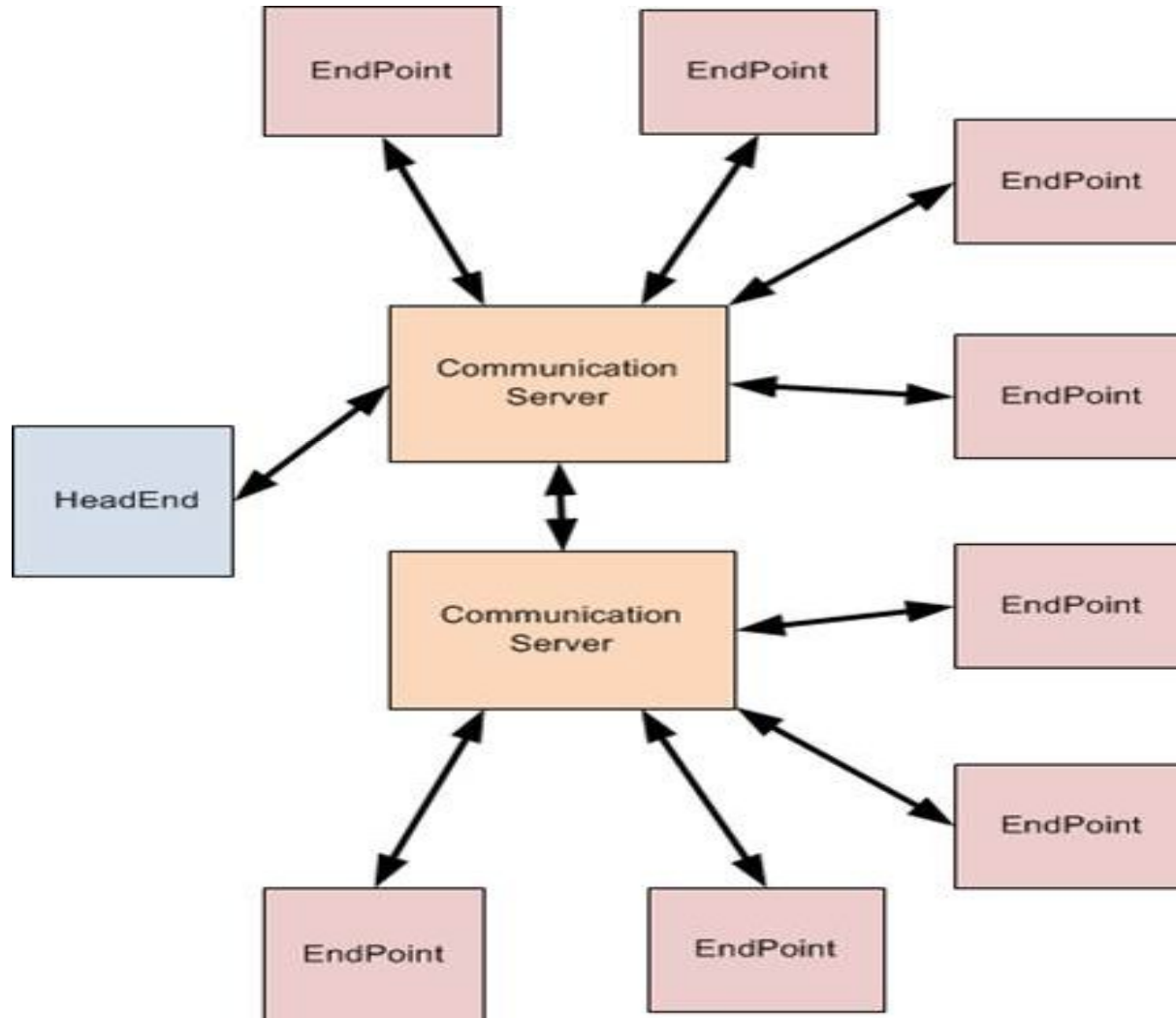
Security

- Authentication
- Authorization
- Confidentiality
- Integrity and
- Non-repudiation
- But...
- Firewalls are still needed and
- Inbound Ports are usually closed

Scalability

- Scale-up
 - Buy Bigger Hardware
- Scale-out
 - Add More Boxes
- Distributed Systems that use Scale-out
 - Big Data NOSQL databases
 - High Performance Parallel computing
 - Email, Instant Messaging
- Divide and Conquer: Federation
 - Cloud-based

Scaling using Federation





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Performance

- Through-put (Messages/Sec)
- Latency (Sec)
 - Can PULL or PUSH
 - PUSH provides lowest latency

Recommendations

- Well-established and supported, open, near real-time communication infrastructures already exist that meet the requirements outlined
 - Extensible XML Messaging Protocol (XMPP) using in instant messaging (e.g. Google, Facebook)
- But ...

Recommendations (cont.)

- Next-generation real-time Internet communications standard that leverages IPV6 for wide range of critical cloud-based apps
 - congestion-resistance
 - very low latency and high throughput
 - high scalability
 - connection rerouting and
 - connection failover



Thanks!