



Potential areas where IMM methods and tools may be applied now to help reveal valuable areas that deserve attention and justification to decision-makers

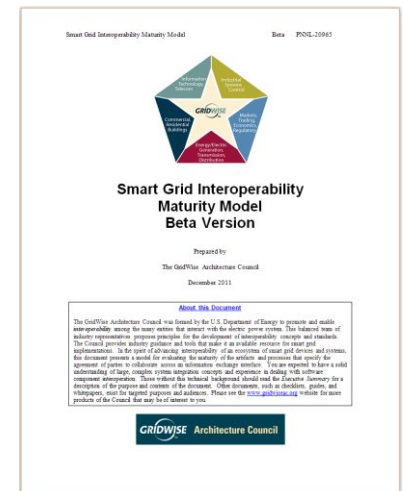
IMM Workshop

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Agenda and Objectives

- Discuss potential applications for the IMM and briefly discuss use cases, completed field trials, and emerging trends where IMM may be useful.
- Focus on a single area for more in-depth discussion based on group participation and interest.
- Identify and discuss an area where the group feels there is a benefit to employing the IMM.

- IMM Use cases*
 - Energy Market Operations
 - Retail Service Provider/Vendor Technology Community
 - A Multi-Player, Smart Grid Research Project ✓
 - An Enterprise Smart Grid Application ✓
- Synchrophasors
- OT/IT convergence

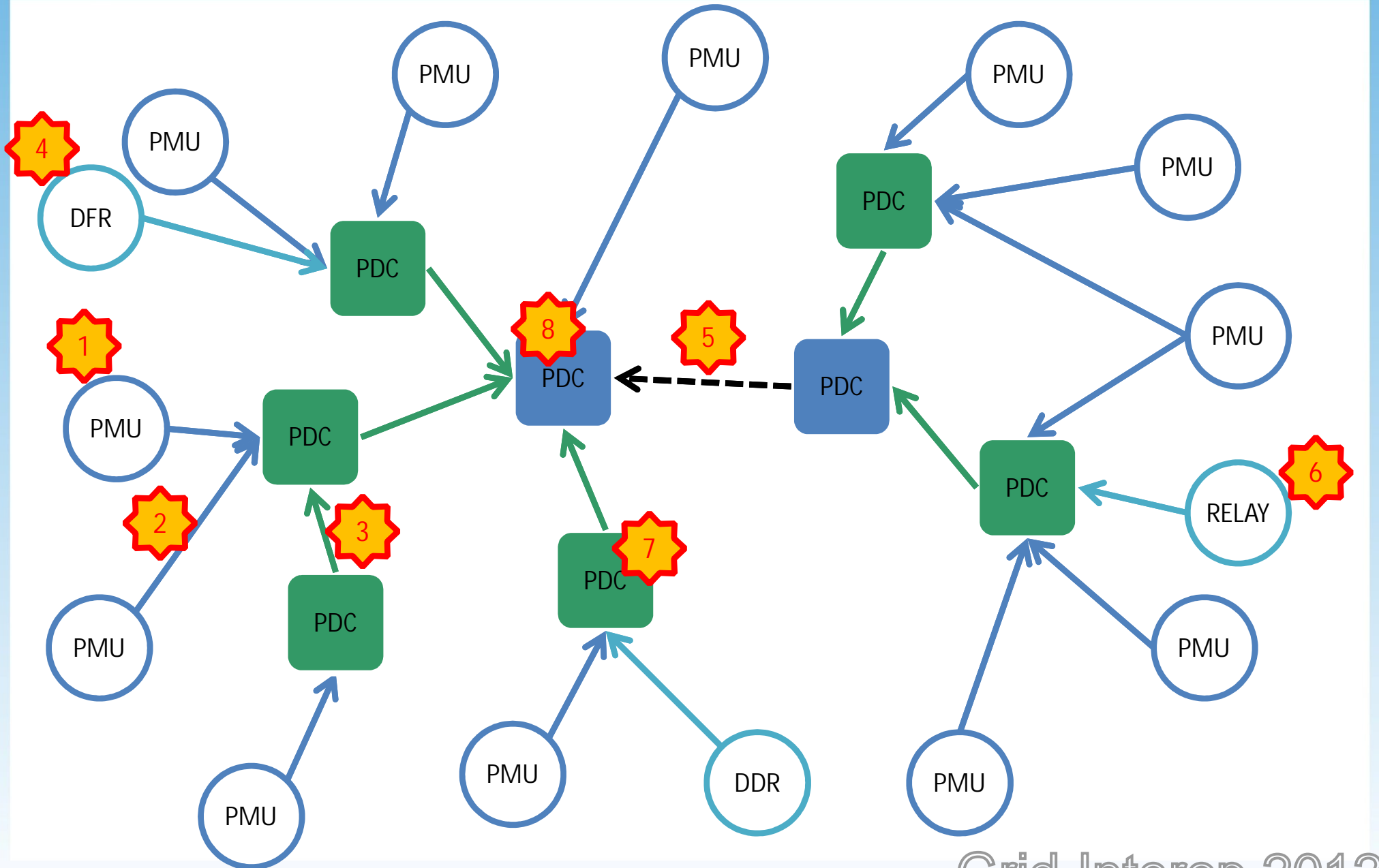


*Please see the www.gridwiseac.org website for more information.

Potential Interoperability Issues

1. PMU configuration
2. Use of standards (C37.118)
3. Intra PDC communication (different vendors)
4. Use of additional modules to extend DFR functionality
5. Phasor gateway communications
6. Dual function devices and reconfiguration issues
7. Scalability and data visualization
8. Regional data concentration (naming standards etc.)

Scope



Inter-Dependence

The advances in electrical and electronic technologies enable the flexible electrical architecture and associated functions, but they are only achievable with the advanced communication and information technologies to supervise them.

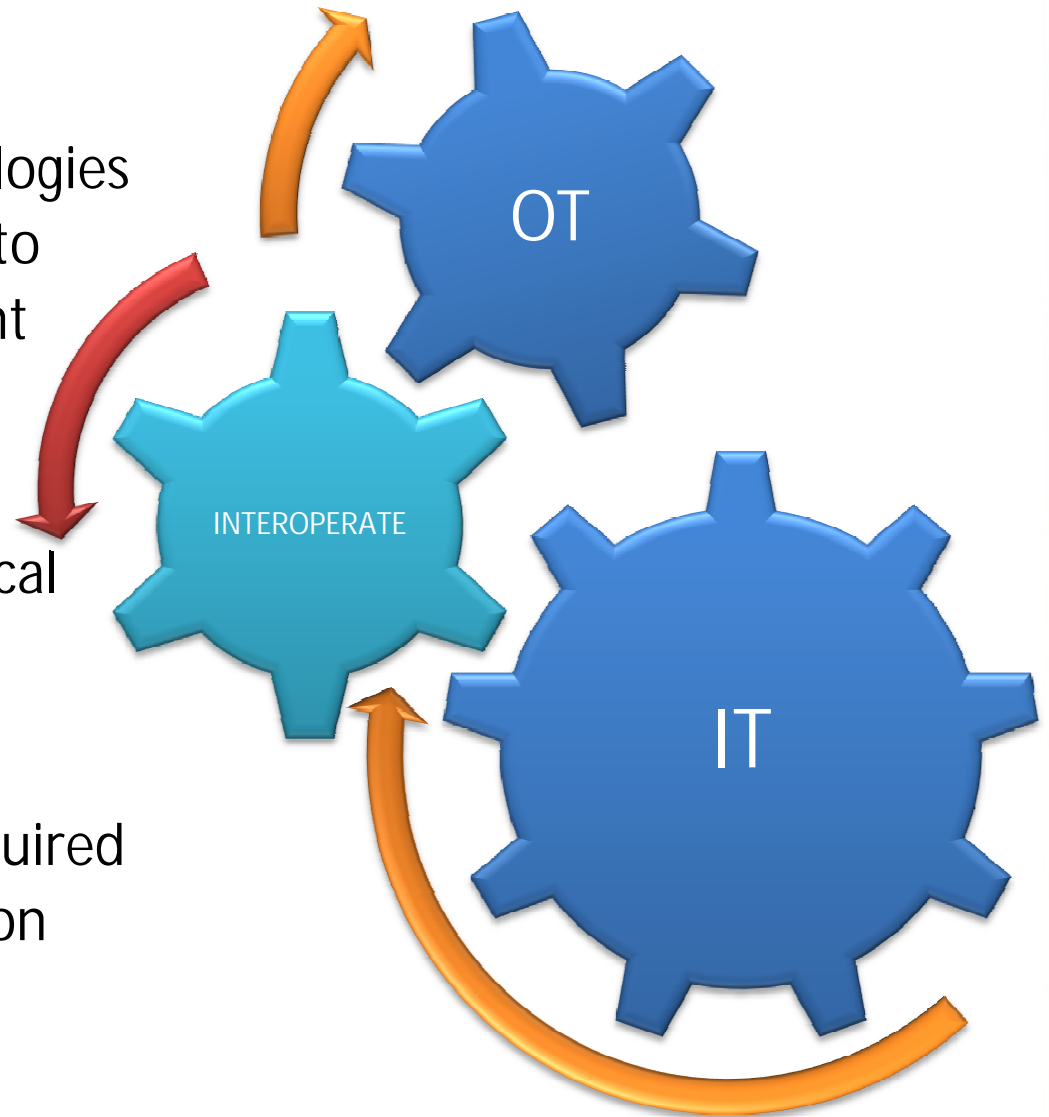
FLEXIBLE ELECTRICAL
ARCHITECTURE

OPEN COMMUNICATIONS
ARCHITECTURE

Architecture and enabling technologies are impotent to make any difference without corresponding changes to the distribution system.

Information and Operation

- IT
 - Tools, processes, methodologies and associated equipment to collect, process, and present information.
 - Manage & monitor
 - Do not control mission critical systems
- OT
 - Mission critical systems required to maintain system operation and reliability
 - Control & monitor
 - Can touch the grid





Driving to Grid 2020

Pros and Cons for Support Functions

BUSINESS CRITICAL

MISSION SUPPORTING

MISSION CRITICAL



IT SYSTEMS SUPPORT LEVELS

CORPORATE

BUSINESS UNIT

Benefits

- Application of corporate- or industry-wide standards
- Improved consistency in service quality levels
- Employment of an enterprise-wide perspective
- Lower total ownership costs
- Avoidance of duplication of resources/ efforts

Benefits

- More rapid response levels
- Greater focus on specific business priorities
- Improvement to compliance to more complex and unit-specific specifications and regulations
- Maintenance of specialized skills



Support Activities

- Program management
- Supplier/vendor relations
- Acceptance testing
- Data content management
- User documentation and training
- Layered application support and interfaces

Regardless of the support level, the underlying activities are similar

IT/OT Convergence

- What do you see as the low hanging fruit and biggest challenges in terms of the intersection, and therefore interoperability, between IT systems and OT systems?
- SEI Ultra-Large Scale Systems book - states that computer science and related engineering fields are not well equipped to address the interaction of technology with people, even in single, unconnected systems yet alone vast socio-technical ecosystems.
- In fact, a problem encountered in genetic programming, especially in designing analog circuits, is that accidental functionalities are unexpectedly exploited.
- Technical and Cognitive issues (across the interface)