

A National Town Meeting on Demand Response and Smart Grid
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Demand Response Coordinating Committee

Interoperability and Conformance Testing and Certification



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Mission and Value Statements

- Given:
  - The vision of an interoperable Smart Grid is dependent on the use of well defined and industry accepted standards
  - Appropriate processes and controls assure that the systems and devices comprising the Smart Grid conform to the identified standards

- Value:
  - “A comprehensive and robust testing and certification program, developed by trusted industry experts and adopted by all key stakeholders of Smart Grid interoperability will accelerate deployment ready solutions with a level of operational assurance meeting the expectations of both the industry and the public that will be the ultimate beneficiary of these technologies.”

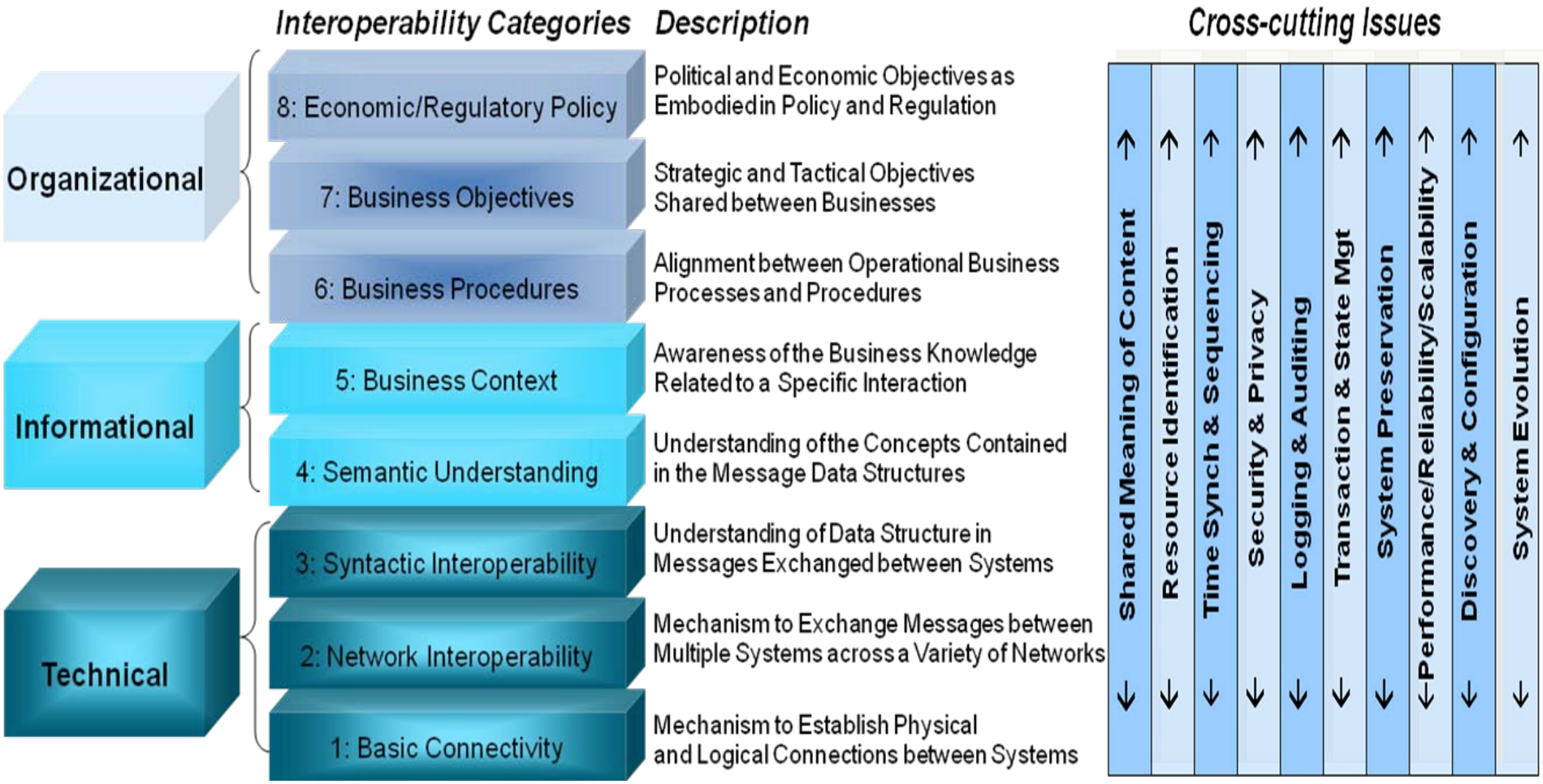
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A Framework for Interoperability and Standards Conformance Includes:

- Qualification criteria for test laboratories and development of test reports
- Qualification criteria for issuing certification documents
- Example processes (Use Cases) and documentation associated with testing and certification activities
  - Matures over time in concert with in-the-field deployments and technology evolution
- Example processes and best practices
  - Provides feedback to standards groups, vendors, legislators and regulators to improve standards and conformance
- Processes to address standards testability gaps and test capability issues
  - Used to identify and communicate the need for additional working groups in support of interoperability standards development, testing and certification.

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GWAC Stack – Levels of Interoperability



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Key Actors

- Standards Organizations
- Testing Authorities
- Test Labs
- Hardware and Software Vendors
- Purchasers and Users of Smart Grid Products and Services
- Federal, State, and Local Government, Regulatory Agencies and Legislatures

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SGIP TCC Work Plan

- Prioritized set of standards to develop guidelines for
- The level of depth and types of testing required for each
- Best common practices across all standards
  - Test program success metrics
  - “Golden” test tools – scripts, references, common equipment
- Best common practices within standards categories
- Specific artifacts necessary for a framework
- High level work flow description
- Examples

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Standards Readiness for Test

- Category 1 – High interest / High Impact / FERC relevant
  - Basic testing elements and test authorities in place
  - Requires formal structure
  - E.g. IEC 61850, IEEE 18115 DNP3, ANSI C12, ***IEEE C37.118 (PMU)***
- Category 2 – Consortia developed, high interest
  - Strong certification program in place
  - Needs accountability and consistency
  - E.g. ZigBee, HomePlug, BACNet
- Category 3 – Complex / Enterprise Integration
  - Key testing elements identified
  - Needs certification context defined – what is implied by certified
    - Complexity requires application and context specific profiles
  - E.g. IEC 60870-6 (ICCP), MultiSpeak, IEC 61978/61970 (CIM)

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Standards Readiness for Test

- Category 4 – General interest, Informal
  - Existing self declared testing programs
  - Need independent review and oversight
  - E.g. ANSI/CEA 709 (LONWorks),OGC GML
- Category 5 – Under development
  - Standards in development, few if any testing elements
  - Opportunity to inject framework in process now
  - E.g. ITU G.hn, other NIST roadmap standards

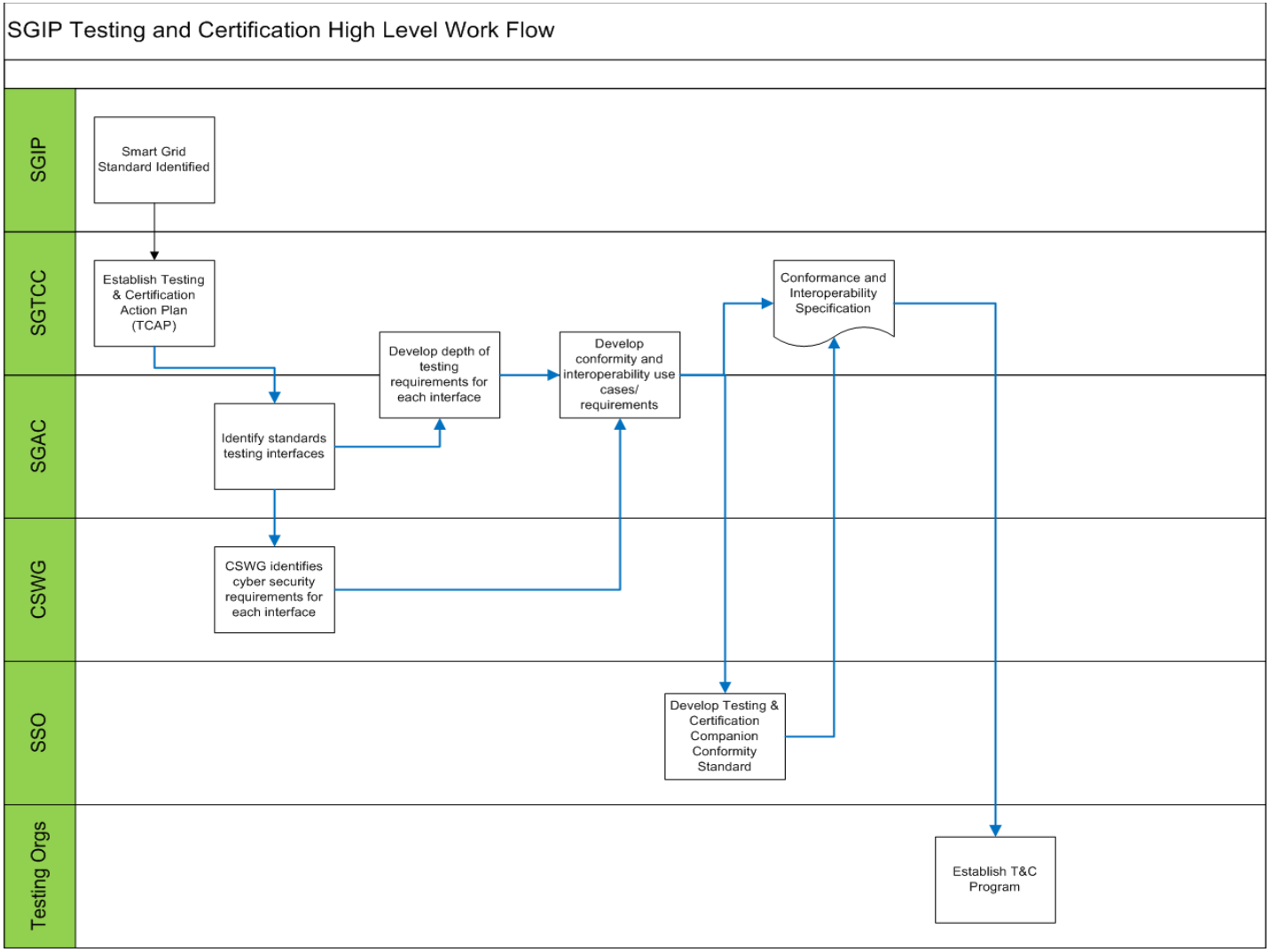
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Specific Framework Artifacts

- Testing architecture
- Thoroughness of testing
- Test process sufficiency assurance
- Test gap identification and mitigation
- Lab qualification processes
- Inter-standard dependency management
- Best practices
- Product testing guide for specific environments

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New Standard T&C Work Flow



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Conclusion

- To achieve the benefits promised by a smarter grid empowered by standards, strong interoperability and conformance testing (ICT) processes are required
- An ICT framework must take into account smart grid application evolution and technology change
- An ICT framework must me widely accepted and implemented to be effective
- Some existing standards testing programs can be augmented quickly to adhere to a basic ICT framework and serve as an example for others to follow and facilitate improving the framework rapidly

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