Smart Grid Conceptual Architecture Framework
Linking national goals, industry use cases, requirements and implementations

Eric Simmon
Smart Grid Task Force
NIST

Doug Houseman
Enernex

National Institute of Standards and Technology
Technology Administration, U.S. Department of Commerce
Background

• National Institute of Standards and Technology (NIST)
  “Primary responsibility to coordinate development of a framework that includes protocols and model standards for information management to achieve interoperability of Smart Grid devices and systems…”

[2007 EISA Title XIII, Section 1305]

• Smart Grid Interoperable Panel (SGIP)
  • Will support NIST in fulfilling its responsibilities under the 2007 Energy Independence and Security Act.
SGIP Mission

• The mission of the SGIP is to provide a framework for coordination of all SG stakeholders to accelerate standards harmonization and development.

• The SGIP does not write standards, but instead develops and reviews use cases, identifies requirements, and proposes action plans for standards development and harmonization.

• Consensus building process
Smart Grid Interoperability Panel and Governing Board

One Organization, One Vote

Priority Action Plans

Use Cases

Requirements

Standards Descriptions

Conceptual Model

Products (IKB)

SGIP Plenary

SGTCC

SGAC

CSWG

Permanent Working Groups

Domain Expert Working Groups

H2G

TnD

B2G

I2G

PEV2G

BnP

SGIP Administrator

Smart Grid Identified Standards

Standards (Smart Grid)

Prioritization

One Organization, One Vote

SGIP Standing Committee Members (2)

At large Members (3)

Ex Officio (non-voting) Members

NIST Oversight

Stakeholder Category Members (22)

Smart Grid Interoperability Panel and Governing Board

SGIPGB

SGIP Administrator

NIST Oversight

One Organization, One Vote

Priority Action Plans

Use Cases

Requirements

Standards Descriptions

Conceptual Model

Products (IKB)
SGIP Smart Grid Architecture Committee

• Development and management of the Smart Grid Conceptual Model and Use Cases
• Overall
• Resource for the SGIP, GB, NIST, and working groups

• Organization
  • 30 members, confirmed by SGIP
  • Selected from recommendations from nominations teams
  • Selection criteria, members, and chair
  • Chairs confirmed by SGIPGB
  • SGAC Chair: Ron Ambrosio, IBM
Conceptual Architecture

• What it does
  • Provides traceability from legislated goals to conceptual business services
  • Provides a common vocabulary and building blocks for discussion
  • Provides a basis for understanding what standards are needed

• What it does not:
  • Require a specific technology or process
  • Specify implemented services to be delivered
  • Dictate any organization or services split
Assumptions

- **Inputs**
  - NIST Conceptual Model is the basis for the framework
  - Goals derived from national legislation (9500 pages)
  - Use cases (655) and requirements (20 documents) are initially assumed valid
    - Intelligrid, SCE, NIST updates, CSWG
    - New use cases and requirements accepted
  - CSWG materials on requirements will be used for the security requirements

- **Process**
  - ToGAF is the underlying method
  - Small team will do the “heavy lifting”
  - Outputs will be publically available
Conceptual Architecture Timeline

- **Goals Workshop**
  - Aug

- **Requirements Workshop**
  - Sept

- **Business Services Workshops**
  - Oct
  - IT
  - Nov

- **Interaction Workshop**
  - Jan
  - Feb

- **Harmonization Meetings**
  - Q2/3 2011

**Whitepaper on each architecture reviewed**
Goal Decomposition
Services

25-60 Services per domain

Conceptual Model

Manage Grid Operations

Manager

Schedule
Control

Topology
Forecast
Availability
Initial Feedback

- Market Domain
  - New use cases
- Customer Domain
  - Customer
- Service Provider Domain
  - All areas
- Overall business management
- Many incomplete use cases
Next Steps

- Harmonize
  - Publish a strawman for wider inputs
  - Meet with other organizations developing architecture models to align
    - ITU, IETF, Zigbee expressed interested

- Interoperability
  - Create a set of conceptual information services that run between the domains and the business services to describe the requirements for interoperability
Further Information

• SGIP Twiki
  [http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/SGIP](http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/SGIP)

• Doug Houseman
  [doug@enernex.com](mailto:doug@enernex.com)

• Eric Simmon
  [eric.simmon@nist.gov](mailto:eric.simmon@nist.gov)