California Demand Response Business Network (DRBizNet)

Architecture Requirements

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Sources for Requirements

- Existing DR programs
- DRBizNet tasks 1-4
- DRBizNet Proposal
- Demand Response Programs Report, 3rd Edition
- IECSA Technical Report
- "*Building an infrastructure for demand response*", Ali Vojdnai, Power Economics, Volume 5, Issue 9, October 2001

Requirement Groupings

- Functional requirements
- Technical requirements
- Industry requirements
- Business requirements

Functional Requirements

There are *many different flavors* of DR programs (curtailable load, demand bidding/buy back, direct load control, interuptable load, real time pricing) , therefore the architecture should support:

- Wide variety of programs and related tariffs
- Frameworks for each distinct type of program (e.g. dispatchable load versus real-time pricing)
- Reality of heterogeneous program frameworks (there will be no one universal program framework)
- Ability for program participants and service providers to perform different processes & roles within different programs

Functional Requirements

There are many Flavors of DR programs
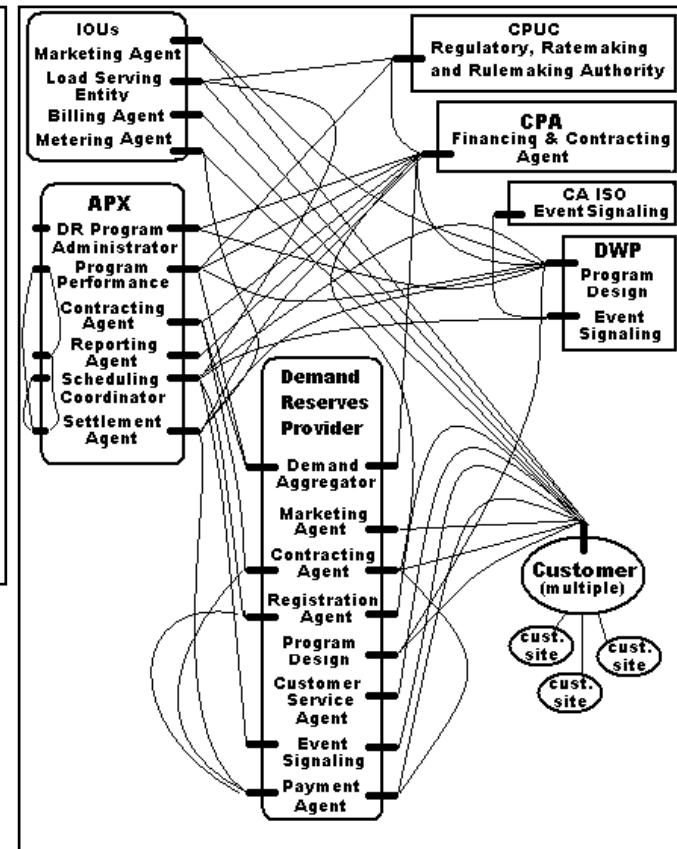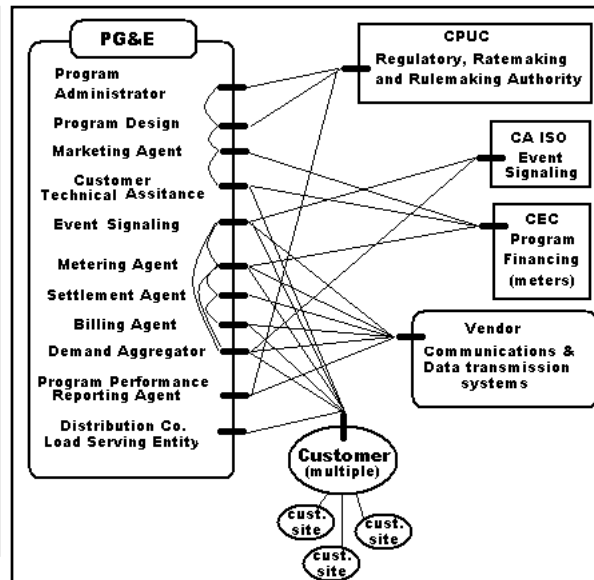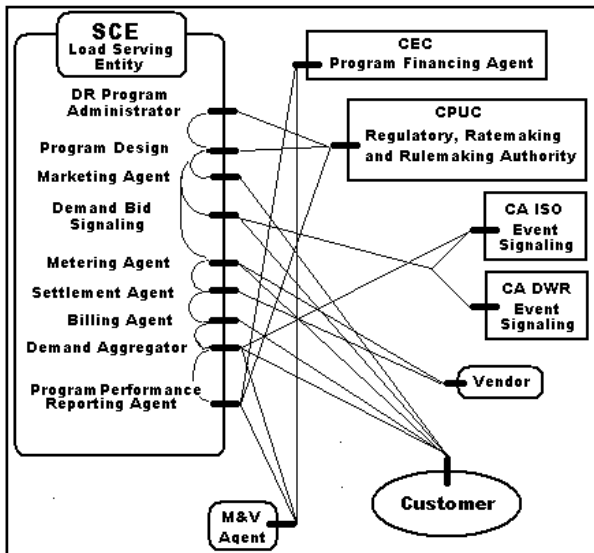
Functional Requirements

Programs are ***constantly evolving*** and therefore the architecture should support:

- Evolution of programs through flexibility
- Means for all participants to easily establish and change trading relationships and enroll and participate in a variety of programs
- Frequent regulatory, market and program rule changes
- Selling of load response resources using a number of retail demand response products from a number of DR providers
- Flexible, rule-based notifications to program participants
- Dynamically change the behavior of systems and devices in the network in a coordinated fashion

Functional Requirements (cont.)

Programs must offer a *"level playing field"* which requires that the architecture support:

- Both large and small participants in a fair and equitable manner, including support for aggregators

- Means to manage markets with adequate safeguards

- Market information to participants so they are better positioned to negotiate and manage risks

- Real-time and historical information access for market monitoring, settlements, billing

Functional Requirements (cont.)

DR involves doing things in real time, so the architecture must accommodate

- real-time operational and markets signal and operations

DR deals with mission critical processes, requiring the architecture support

- flexible and secure operations, B2B communication and integration

Technical Requirements

Programs should provide *ten times the capabilities at one tenth the cost (10 by 10),* which will require

- a paradigm shift from static and siloed system architectures and implementation approaches

Programs must be technically **robust**;

- **Scalable**
- **Reliable**
- **Secure**

Technical Requirements (cont)

Programs must support a ***host of other technical requirements***, which include support:

- Ability to readily integrate with existing and future systems and infrastructures

- Multiple communication transports between service providers and participants

- More than one program simultaneously

- Leverage information and business capabilities provided by current and next generation meter technologies

Industry Requirements

The architecture must support the following industry requirements:

- Leverage of existing physical infrastructure (meters, networks, etc.)
- Leverage of existing technology standards
- Utilization of existing business standards
- Ability to integrate with existing technical infrastructures
- Ability to leverage emerging products and technologies
- Simple to deploy, manage and maintain
- Provides for efficient, low cost customer service and education

Business Requirements

The architecture must support the following business requirements:

- Minimize total cost of ownership (TCO)
- Simple and economical operations
- DRBizNet implementation must be economically sustainable as a business independent of external funding
- Be able to rapidly introduce new programs and change existing programs to meet market and regulatory needs

Requirements Summary

- Requirements will evolve, so by definition many are unknown, which will require extreme flexibility

- Must accommodate heterogeneous programs to provide the means to effectively reduce market fragmentation

- Must support a wide variety of players

- Must accommodate new, low cost as well as existing legacy technologies and products

- Participation and operation must be simple and economical

Implications of Requirements

- Need an extremely **flexible architecture** and information model that can support multiple frameworks and multiple programs within each framework, supporting a very large number of participants

- Need **real-time, rule and role-based** distributed information **infrastructure** which uses flexible message structures and business directory services

- Must **leverage open** and/or commodity **technologies**

- Must leverage the **internet** and web technologies

- Must be design to accommodate and exploit **distributed processing** and intelligent/adaptable 'end' devices

Guiding Principles

- Program categories require their own customized architecture frameworks
- All frameworks should inherit from a core conceptual framework
- Frameworks need to include profiles, standards, tariffs, instrument types and distributable business rules
- Processing must be distributed but leverage common directory and integration services
- Should allow for extreme evolution and change
- Leverage standards and open technologies
- Processing needs to be tightly coupled, but loosely integrated
- Use a service oriented architecture, which includes common business network management, integration and directory services