DR INFRASTRUCTURE WORKING GROUP

OBJECTIVE:

To define all the key infrastructure elements, define all the key inter-relationship areas and provide a process to resolve any infrastructure issue or shot comings it time to facilitate the inclusion of Demand Response in MRTU Phase 1 and future upgrades.

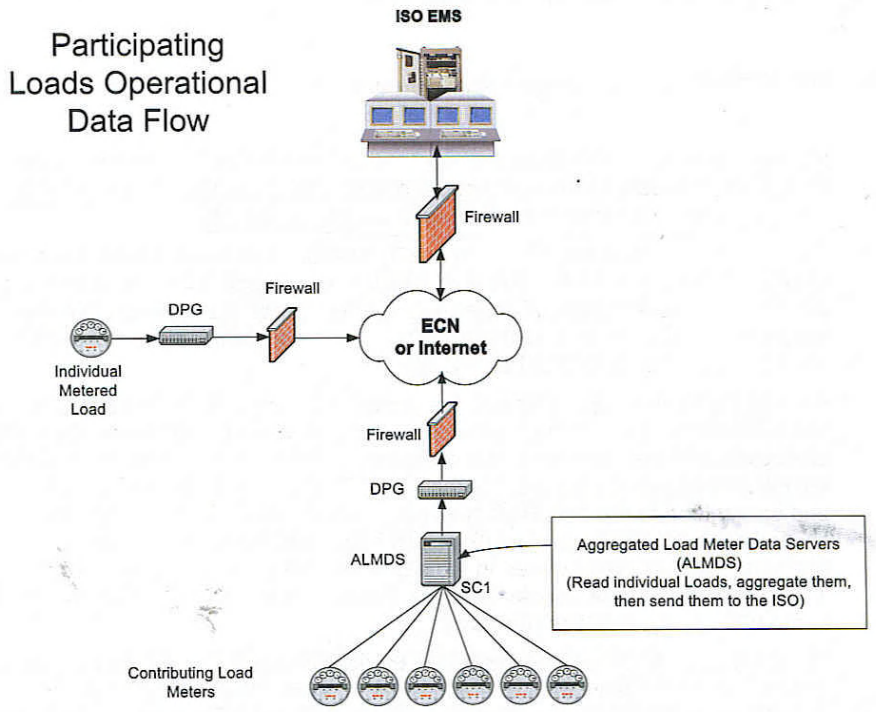
INTRODUCTION

The CAISO is interested in implementing Demand Response (DR) products mixes into their portfolio of products into all three classes of resources: Day-Ahead reductions to load forecasts; Ancillary Services and imbalance energy products; and Emergency products that are used as system conditions degrade on the CAISO Grid. The California Load Serving Entities such as investor owned utilities have developed a portfolio of demand response resources ranging form day-ahead to emergency programs. The DR Infrastructure Working Group is formed to clearly define all the infrastructure elements necessary for the CAISO to call, confirm, verify and reconcile that these DR resources are in fact called properly, respond in the timeframe required, provide the requested level of service and are paid properly for the service they provided. This working group will address the infrastructure required for these DR products and serviced to be Ancillary Service, Day-Ahead, and Emergency Service timeframes.

DEMAND RESPONSE AS AN ANCILLARY SERVICE

DR Programs that provide Ancillary Services are expected to operate within the CAISO existing structure for Participating Load or other established programs. As a participating load, the DR Program will comply with applicable requirements in the CAISO Tariff unless modified specifically by the CAISO to accommodate the characteristics of DR. This working group will identify any area where specific modifications need to be made to the CAISO established programs or tariffs and coordinate these modifications to ensure the proposed MRTU infrastructure can accommodate these modifications. DR Programs that are serving as participating loads may represent a single load meter or employ an aggregating load meter data server (ALMDS) to permit the aggregations of many loads under one third party aggregator manager or one utility DR program to collect appropriate data from distributed participating load components for processing and transmission to the CAISO through a data processing gateway (DPG) that is managed by the appropriate utility and/or CAISO which ever is required.. Specific data collection rates and transfer rates will be defined in the CAISO published technical standard for participating loads. Figure 1 below illustrated the current data flow process for CA ISO Participating Load Programs that will be used by the working group as a starting point for reviewing and assessing the infrastructure requirements for implementing DR.

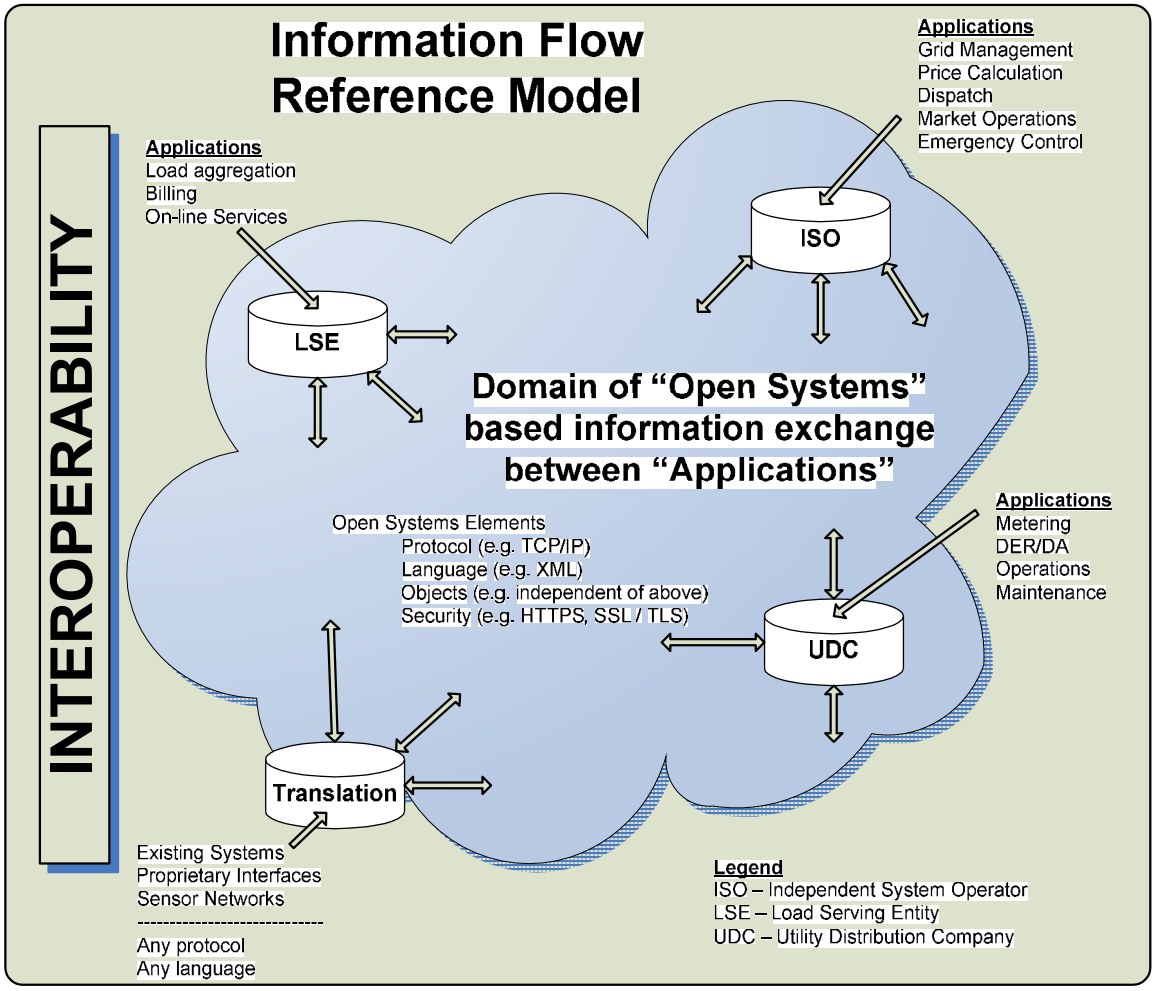
Figure 1. CAISO Participating Load Operational Data Flow



It is anticipated that when DR is used for Ancillary Services that the data collection and reporting requirements will be more detailed and stringent that for the Day Ahead and Emergency DR Products. Using DR as a CA ISO Ancillary Service requires a capable and responsive data communications protocol system that will work for the CAISO, the utilities, the DR Aggregators (when used) and the large customers (such as DWR). Under MRTU, it is anticipated that the CA ISO will use web service architecture as the framework to meet the dispatching, confirmation and controlling of the DR Ancillary Service resources. Use of an open architecture communication protocols such as XMPP that allow the automated dispatching and responding to CA ISO and Utility calls for this DR service has been identified by current operators as a desired infrastructure improvement. In addition to this protocol, the use of web service notification and confirmation or a consistently formatted email message services are also recommended for consideration. Recommendations on infrastructure protocols are areas this working group is expected to review, discuss, coordinate and resolve.

In addition to CA ISO Ancillary Services products, the Day-Ahead and Emergency DR Products are expected to be use by the CAISO. As an initial starting point for discussion, the infrastructure diagram in Figure 2 was previously developed by interested parties and presented at several DR technical meetings as a recommend methodology for addressing DR infrastructure issues that need to be addressed and resolved.

Figure 2. DR Interoperability Concept Diagram



The following are some of the key characteristics of any proposed DR infrastructure:

1. Shareability - Common resources offer economies of scale, minimize duplicative efforts, and if appropriately organized encourage the introduction of competing innovative solutions.
2. Ubiquity - All potential users can readily take advantage of the infrastructure and what it provides.
3. Integrity - The infrastructure operates at such a high level of manageability and reliability that it is often noticeable only when it ceases to function effectively.
4. Ease of use - There are logical and consistent (preferably intuitive) rules and procedures for the infrastructure's use.
5. Cost effectiveness - The value provided must be consistent with cost or the infrastructure simply will not be built or sustained.
6. Standards - The basic elements of the infrastructure and the ways in which they interrelate are clearly defined and stable over time.

7. Openness - The public infrastructure is available to all people on a nondiscriminatory basis.
8. Secure - The infrastructure must be protected against unauthorized access, interference from normal operation, and facilitate implementing information privacy policy

In addition to these characteristics, the DR Infrastructure should follow these principles and goals:

1. Provide a set of interfaces, transactions and services to support current and envisioned demand response functions.
2. Serve all constituents.
3. Promote the principles of free enterprise.
4. Protect the rights of users and stakeholders.
5. Promote interoperability and open standards.

One possible approach for the DR Infrastructure Working Group to take is to work to coordinate a DR Infrastructure Reference Design. Establishing a reference design provides the following benefits:

1. Establishes a common starting point for implementing open information exchange for a DR infrastructure whose characteristics include:
    a. Scalability
    b. Interoperability
    c. Facilitating Innovation (cheaper, better, faster)
    d. Maintaining Compatibility (existing and proprietary systems)
2. Guarantees regulatory bodies the ability to develop tariffs, programs and other currently unknown initiatives
3. Protects the integrity of California's power delivery system

If the working group determines that a Reference Design is appropriate, the following components of the reference design will be defined by the working group:

1. Actors - the entities that need to exchange information (e.g., CAISO, LSE's, and UDC's)
2. Applications - the functions that need to be performed by the actors
3. Protocol - the underlying communication methods used to move bits and bytes
4. Language - a common language to facilitate information exchange
5. Objects - high-level definitions of objects that are independent of protocol and language
6. Translation - services that provide a way to allow information exchange with external systems
7. Security - overarching methods to ensure confidentiality, integrity, and availability

The DR Infrastructure Working Group will meet and discuss the above and other issues as necessary to fully define and coordinate the infrastructure issues necessary to fully incorporate DR into the MRTU implementation.