



Research Opportunity Notice

System Integration

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Research Perspective

- ◆ **Focus is on Demand Response (DR)**

- ◆ **Other System Integration Initiatives**
 - **CEIDS** (Consortium for Electric Infrastructure to Support a Digital Society) - EPRI and Electricity Innovations Institute (E2I)
(Overall architecture for the entire enterprise)

 - ◆ **GridWise** – DOE/PNNL
(Structure for distributed generation)



Utility Business and Engineering Systems

- ◆ **Many computing hardware platforms**
- ◆ **Many different operating systems**
- ◆ **Different mainframes / client-server / web-based systems**
- ◆ **Different databases**
- ◆ **Many component technologies**

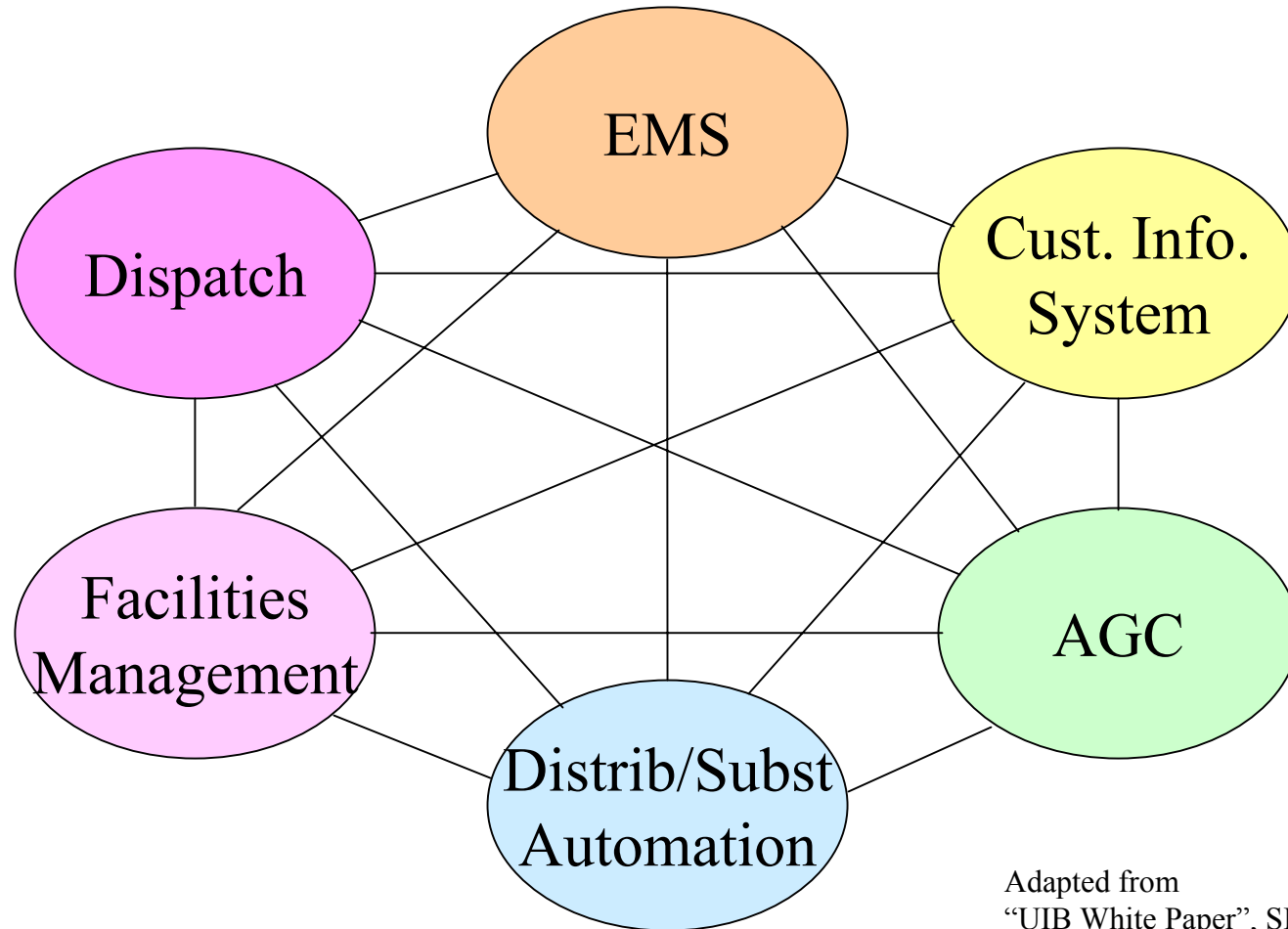
CORBA (Common Object Request Broker Architecture - Open)

DCOM (Distributed Component Object Model – Microsoft)

EJB (Enterprise JavaBeans – Sun Microsystems)



Islands of Information



Adapted from
"UIB White Paper", SISCO, 1999.



Drawbacks

- ◆ **Duplicate entries for the same data in multiple databases**
- ◆ **Each duplicate data entry may not be synchronized**
- ◆ **Data from one system requires entry by hand onto another system**
- ◆ **Non-critical data are rarely updated**
- ◆ **Locked into legacy proprietary systems**
- ◆ **Difficult to introduce new systems/applications**



Utility System Integration Related Initiatives

- ◆ **Utility Communications Architecture (UCA)**
- ◆ **Inter-Control Center Communications Protocol (ICCP)**
- ◆ **Control Center API (CCAPI)**
- ◆ **Common Information Model (CIM)**
- ◆ **Utility Integration Bus (UIB)**
- ◆ **Integrated Energy and Communications System Architecture (IECSA)**



Objectives

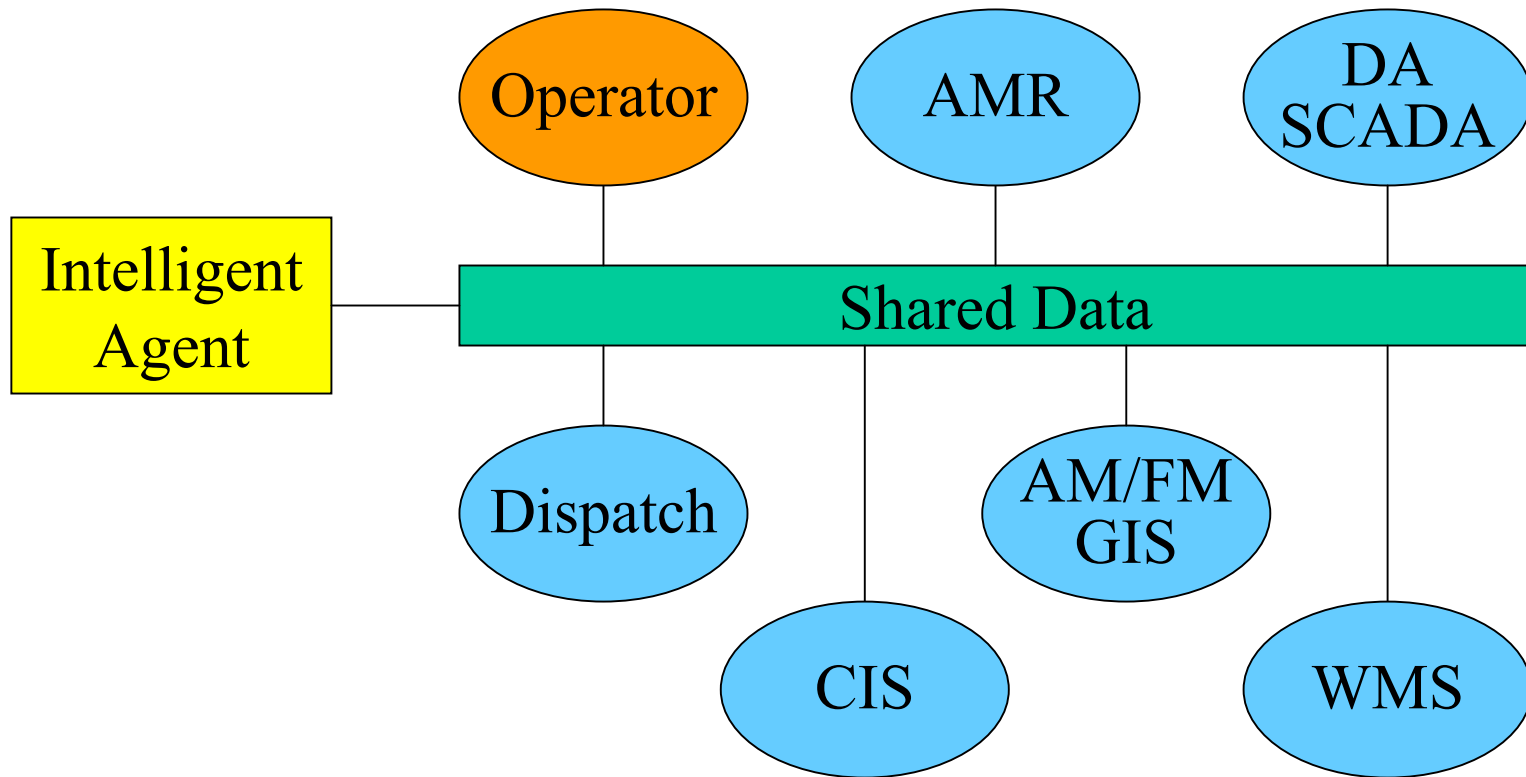
Develop System Integration Enabling Technologies in Support of DR

- ◆ **Technologies need to support:**
 - The concept of measured once, used many times
 - Sharing of stored data within all systems
 - Legacy systems and pathways to future systems
 - Common methods of sending/receiving data
 - Automated initiation of new and innovative utility business processes



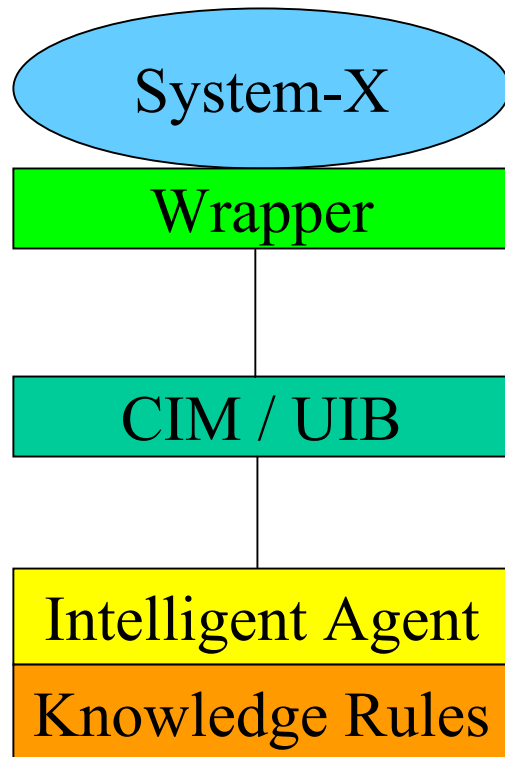
Example

Automatic Outage Detection Repair Dispatch





Candidate Technologies



- ◆ **Additions and/or enhancements to the CIM and UIB**
- ◆ **Software wrappers or applications interfaces**
- ◆ **Intelligent Agents**
- ◆ **Knowledge rules (ontologies)**



Summary

The purpose of this RON is to solicit proposals.

- ◆ **For R&D tasks that will develop enabling technologies for system integration in support of DR.**
- ◆ **NOT to produce a product**
- ◆ **R&D (relative to DR) must not duplicate CEIDS and GridWise efforts, but may be complimentary**
- ◆ **Multi-phase proposals – initial phase < \$250K.**
- ◆ **Initial phase defines milestone for funding approval for remaining phases**