Autovation℠ 2007
The AMRA International Symposium

20TH ANNIVERSARY
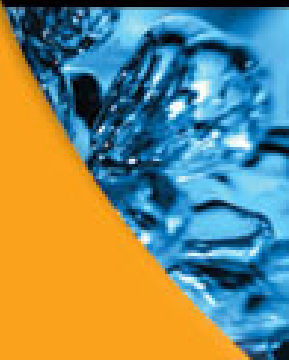
The premier metering resource
for the utility industry

www.amra-intl.org

Agenda

- ➢ **Agenda**
  - ❑ Background
  - ❑ Service-oriented Architecture (SOA) Strategy
  - ❑ Enterprise Integration Concepts
  - ❑ Advanced Metering Infrastructure (AMI) Architectural Principles
  - ❑ AMI Integration Architecture
  - ❑ Enterprise Information Management (EIM) Concepts
  - ❑ EIM for SOA
  - ❑ Summary

Sempra Energy Utilities

➢ **Sempra Energy Utilities**

The Sempra Utilities - San Diego Gas & Electric (SDG&E) and Southern California Gas Co. (SoCalGas)—serve California customers from the state's Central Valley to the Mexican border.

❑ San Diego Gas & Electric

SDG&E serves 3.3 million consumers through 1.4 million electric meters and more than 800,000 natural gas meters. The utility's service area spans 4,200 square miles.

❑ Southern California Gas Co.

The nation's largest natural gas distribution utility, SoCalGas serves 19.5 million people through 5.5 million meters. The company's service territory covers 20,000 square miles.

SDG&E

A Sempra Energy utility®

SOA Strategy

SOA Integration Strategy – This is a comprehensive strategy for defining the future direction on Application Integration addressing the key dimensions: people, process and technology.

➢ **People**
- ❑ Creation of an SOA Integration Competency Center (ICC)
- ❑ Combine the existing integration groups – Enterprise Integration Services

➢ **Process**
- ❑ Engage in projects early in the process – business case
- ❑ Formal project review of integration architecture

➢ **Technology**
- ❑ Process (Messaging) Integration for near real-time integration
- ❑ Data Integration technologies for large data transfers or data aggregation
- ❑ Deploy an Enterprise Messaging Framework (Enterprise Service Bus)

Enterprise Integration Concepts

➢ **Integration Framework**

There are two types of integration that focus on different types of requirements and therefore offer distinct advantages when applied appropriately.

❑ **Process Integration**

Focused on enabling real-time exchange of business information across multiple applications as part of a specific business process. Web Services, along with an Enterprise Messaging Framework (EMF) facilitate this real-time integration in a secured and standards-based manner that yields greater usability and business agility.

❑ **Data Integration**

Focused on the movement of data elements from one data store to another primarily to achieve data consolidation, aggregation, business analytics, and/or reporting.

An Enterprise Approach To Integration

➢ Consider all future integration to leverage one of IT's managed platforms.

➢ When capturing Integration Requirements, consider whether the integration is Process or Data Oriented.

➢ When you think of integration, think Enterprise Integration.

Enterprise Integration

Semantic Integration – Enterprise Data Model

Transactional Systems　　　　**Decision Support Systems**

Web Services Process Integration (Real-time)	**EDI** Data Integration (Batch-Oriented)	**BI Services** BI Integration (ETL-Oriented)

Infrastructure

SDG&E

A Sempra Energy utility®

SOA Integration Support Model

Business Units

IT Applications Dept.
(Customer Care)

IT Application Dept.
(Utility Operations)

IT Applications Dept.
(Shared Services)

Supports

Supports

Supports

Enterprise Integration Services (EIS) Group

Messaging Services
(Process Integration)

Data Services
(Data Integration)

B2B Services
(EDI)

Supports

Supports

**Infrastructure Engineering &
Operations**

**Network/Telecom Engineering &
Operations**
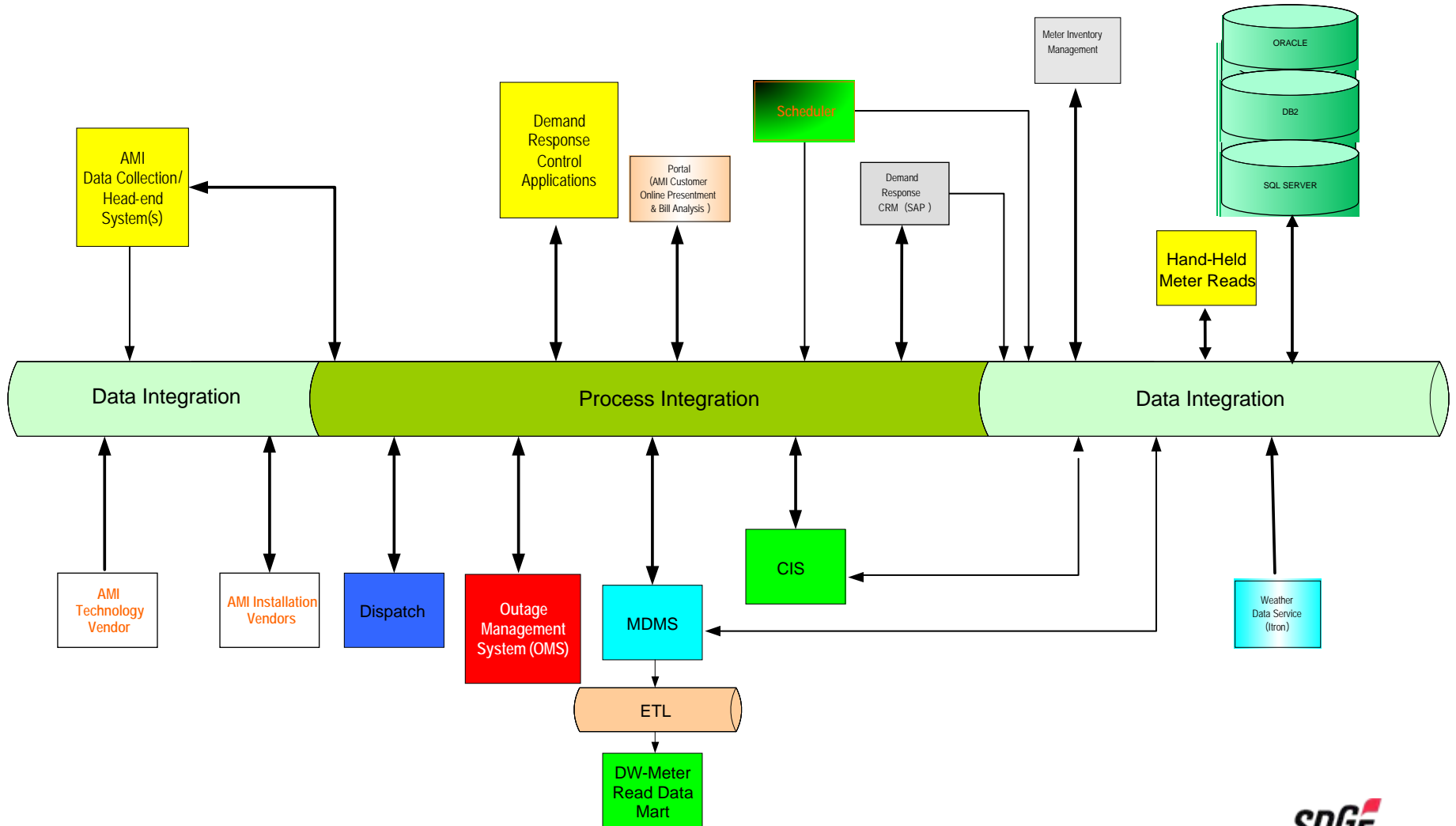
SDG&E

A Sempra Energy utility

AMI Architectural Principles

➢ **Alignment with Business Processes** – All of the architectural deliverables will, in some form, align with the to-be business process definitions.

➢ **Interoperability** - Solutions need to exist and provide interoperability within the context of a larger portfolio of systems and technologies.

➢ **Information Security** - Consider the security aspects of all solutions in the context of security standards, and potential vulnerabilities of any solution are considered. This includes classifying and managing all data.

➢ **Integration** - All integrations will be managed and leveraged an integration environment.

➢ **System of Record** - An application owner will be assigned to the main information components identified in the data architecture as a mechanism to resolve any conflicts as integrations between applications are deployed.

AMI Application Integration

Integration Architecture

AMI – Head-End Web Services

CIS Web Services

MDMS Web Services

OMS Web Services

Request Credentials

Fine authorization Response

Policy Repository

Messaging Environment

Messaging Bus

Orchestration Engine

XML Appliance (Intermediary PEP)

XML Appliance (End-Point PEP)

XML Validation
Schema Validation
Threat Defense
Authentication
Coarse Authorization
SAML Assertion
Field level encryption

Decryption
Transformation
Encryption
Routing

Decryption
SAML Validation
Authorization
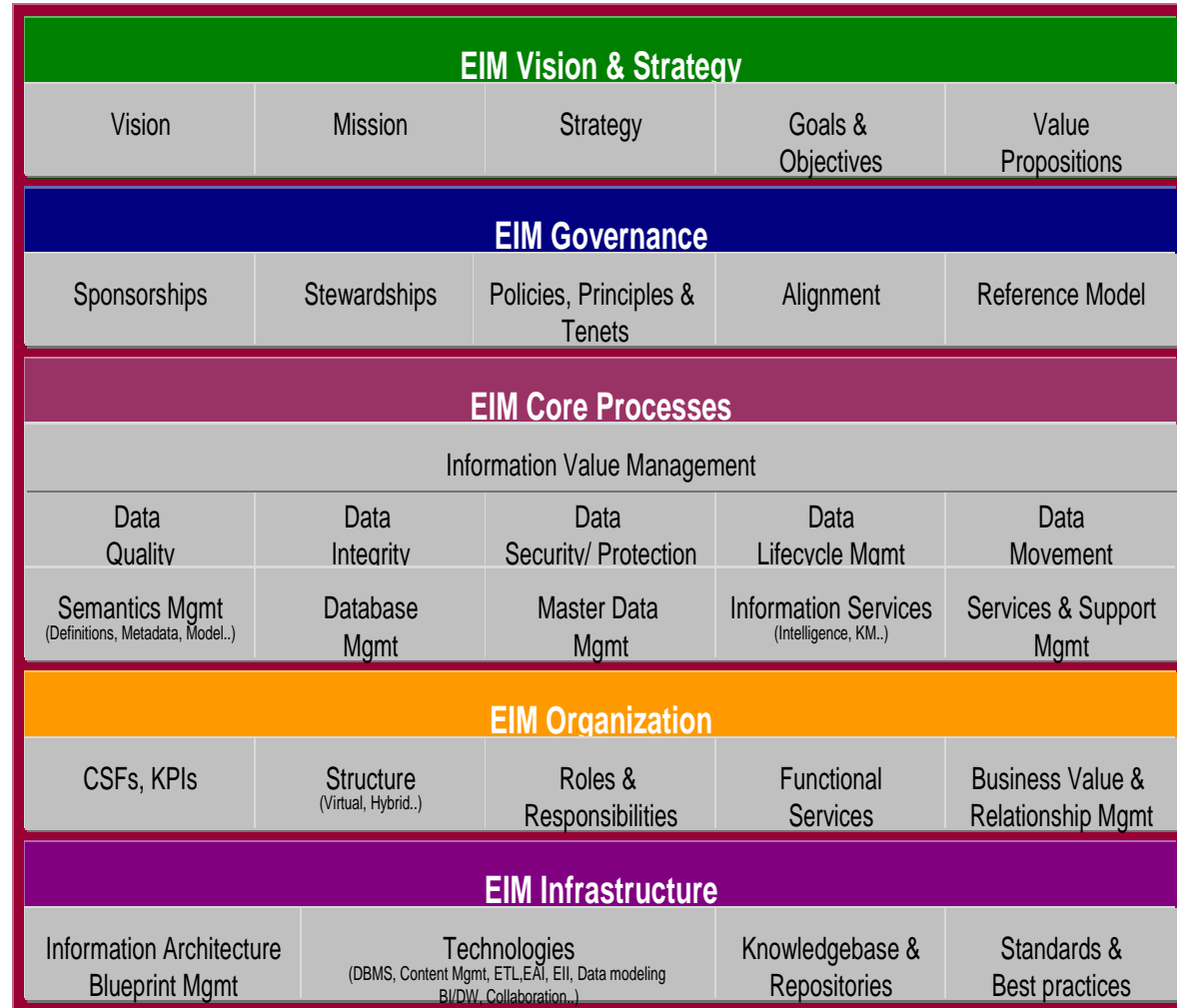
SDGE

A Sempra Energy utility®
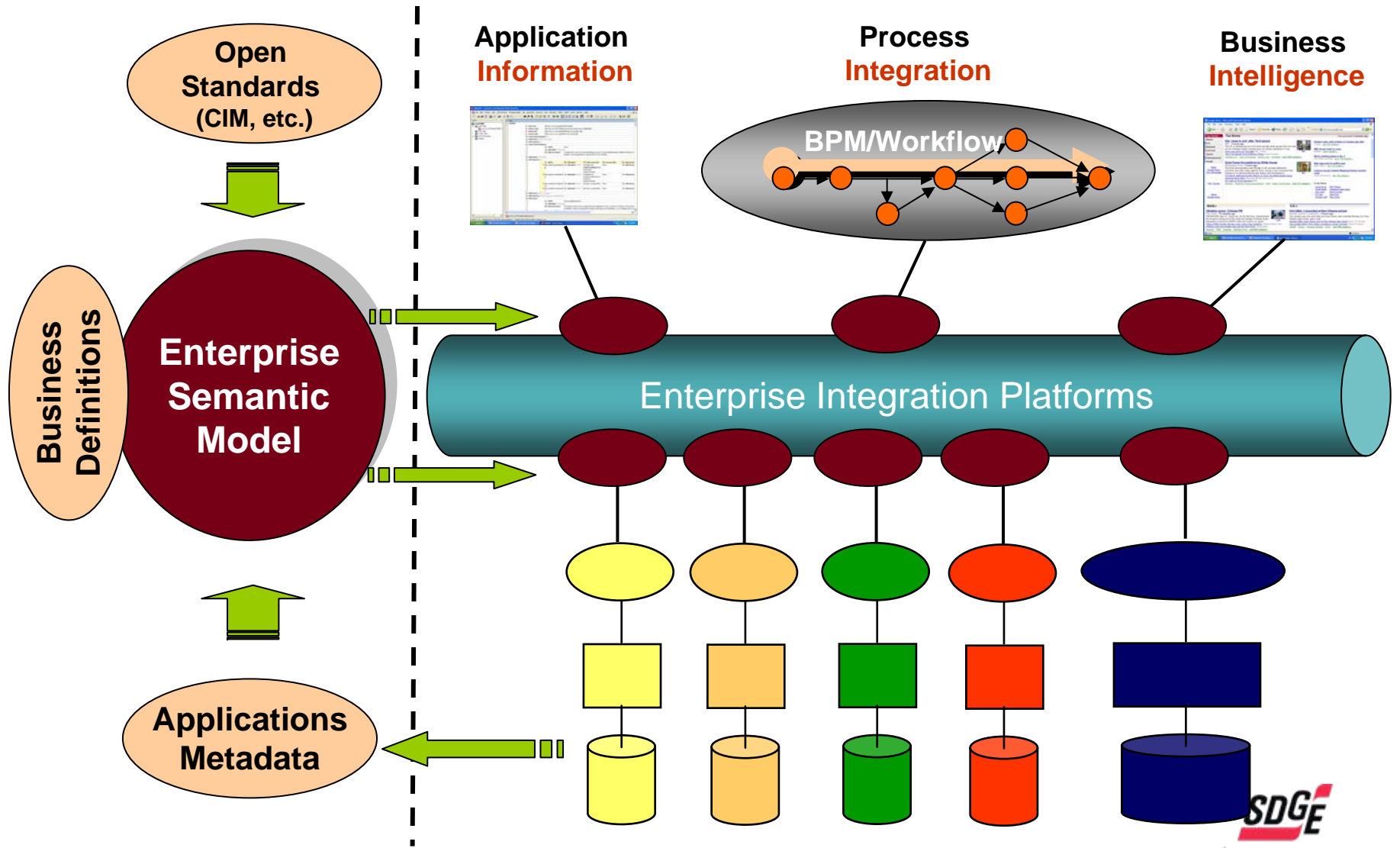
Enterprise Information Management (EIM)

What is EIM?

➢ A shared commitment between business and IT to invest and manage data/information as assets.

➢ Establishment of a governance body and processes to execute the commitment.

➢ Establishment of core competencies (resources and technologies) of EIM.

➢ Affecting the outcomes of major programs by adopting EIM guiding principles and implementing EIM recommendations incrementally.

EIM Vision & Strategy				
Vision	Mission	Strategy	Goals & Objectives	Value Propositions

EIM Governance				
Sponsorships	Stewardships	Policies, Principles & Tenets	Alignment	Reference Model

EIM Core Processes				
Information Value Management				
Data Quality	Data Integrity	Data Security/ Protection	Data Lifecycle Mgmt	Data Movement
Semantics Mgmt (Definitions, Metadata, Model..)	Database Mgmt	Master Data Mgmt	Information Services (Intelligence, KM..)	Services & Support Mgmt

EIM Organization				
CSFs, KPIs	Structure (Virtual, Hybrid..)	Roles & Responsibilities	Functional Services	Business Value & Relationship Mgmt

EIM Infrastructure			
Information Architecture Blueprint Mgmt	Technologies (DBMS, Content Mgmt, ETL,EAI, EII, Data modeling BI/DW, Collaboration..)	Knowledgebase & Repositories	Standards & Best practices

SDG&E

A Sempra Energy utility

Impact of EIM to Enterprise Integration

Open
Standards
(CIM, etc.)

Business
Definitions

Enterprise
Semantic
Model

Applications
Metadata

Application
Information

Process
Integration

BPM/Workflow

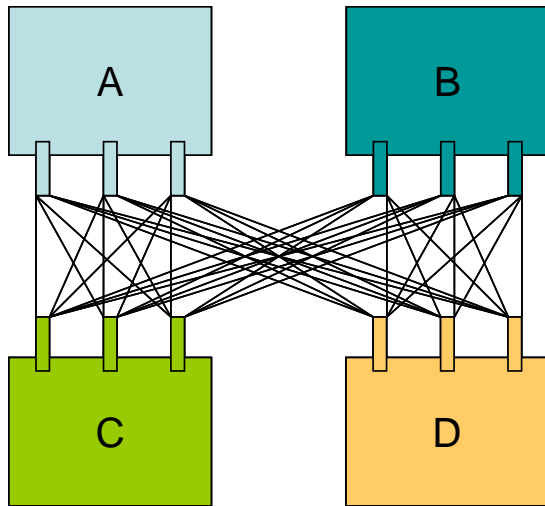Business
Intelligence

Enterprise Integration Platforms

SDG&E

A Sempra Energy utility®
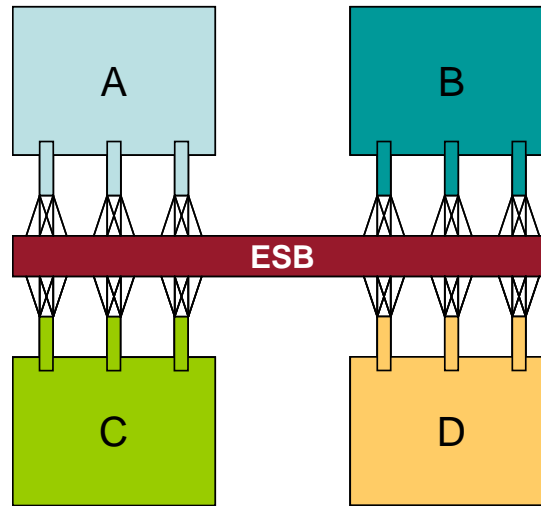
ESB + ESM = Complete SOA

AS-IS

- Point to point
- Complete coupled and ripple effect of change
- Duplication of data and logic, no control of data quality and consistency
- Costly to maintain and change
- Can't enable business process integration

With ESB

ESB

- Interoperability through Web Services technology
- Managed integration
- Reuse of connectivity of systems to ESB
- Reuse of application level services
- Enable business process integration

With ESB+ESM

ESB + ESM
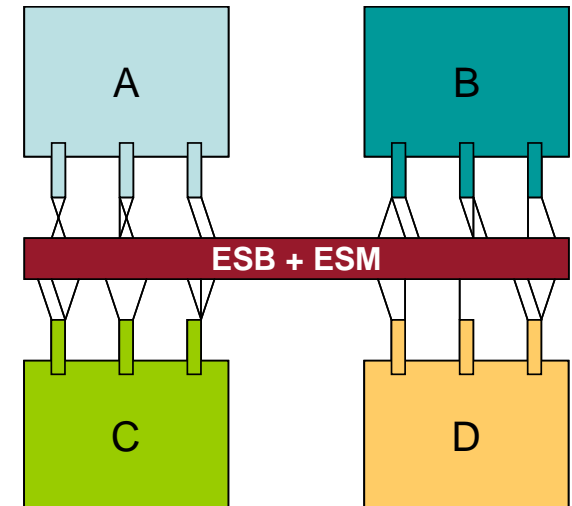
- Interoperability through common semantics
- Complete decouple of systems
- Reuse of services, leads to less number of interfaces
- Reduce total cost of ownership
- Improve data quality and consistency
- Enable higher level business services (information, intelligence, process, etc.)
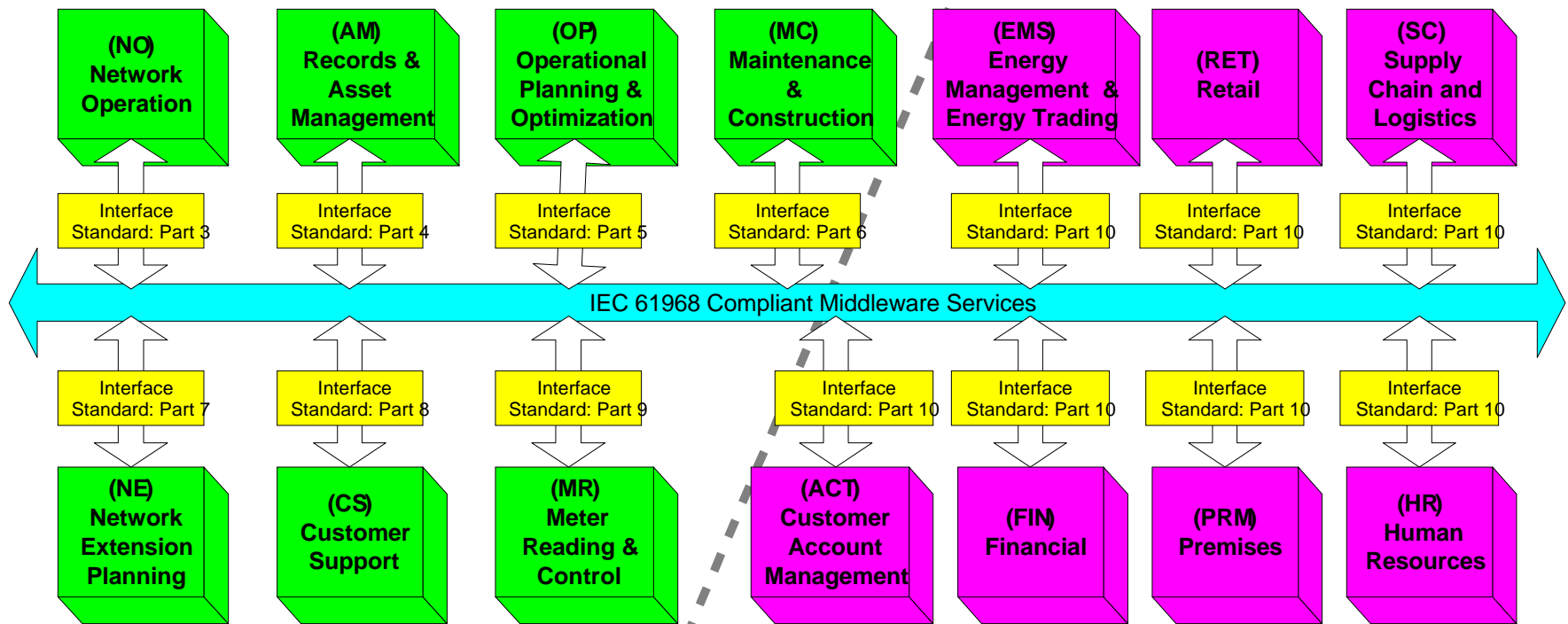
A Sempra Energy utility®

EIM/SOA Value Propositions

➢ Enables business to take ownership, responsibility and accountability for the improvement of data quality and information accuracy and consistency.

➢ Enables business to establish single version of truth for data over time.

➢ Improves business process and operational efficiency and effectiveness.

➢ Provides a strategy and technique to mitigate the risks as well as maximize the value of implementing commercial packaged applications.

➢ Reduces the number and effort of integration over time.

➢ Enables the control of unnecessary data duplication and proliferation.

➢ Enables a more flexible and scalable process integration.

➢ Improves the data quality, integrity, consistency, availability, and accessibility over time.

➢ Maximizes the return on investment of SOA related technologies.

➢ Establishes a critical component of the Enterprise Architecture.

Leverage IEC CIM & 61968 for AMI SOA

Distribution Management Business Functions

Business Functions External To Distribution Management

| (NO) Network Operation | (AM) Records & Asset Management | (OP) Operational Planning & Optimization | (MC) Maintenance & Construction | (EMS) Energy Management & Energy Trading | (RET) Retail | (SC) Supply Chain and Logistics |

| Interface Standard: Part 3 | Interface Standard: Part 4 | Interface Standard: Part 5 | Interface Standard: Part 6 | Interface Standard: Part 10 | Interface Standard: Part 10 | Interface Standard: Part 10 |

IEC 61968 Compliant Middleware Services

| Interface Standard: Part 7 | Interface Standard: Part 8 | Interface Standard: Part 9 | Interface Standard: Part 10 | Interface Standard: Part 10 | Interface Standard: Part 10 | Interface Standard: Part 10 |

| (NE) Network Extension Planning | (CS) Customer Support | (MR) Meter Reading & Control | (ACT) Customer Account Management | (FIN) Financial | (PRM) Premises | (HR) Human Resources |

Electric Distribution Network Planning, Constructing, Maintaining, and Operating

Generation and Transmission Management, Enterprise Resource Planning, Supply Chain, and General Corporate Services

SDGE

A **Sempra Energy** utility®

Where We Are……

➢ **AMI (Smart Meter) program is in full swing.**

➢ **Enterprise Integration Services (EIS) group formally established to work with Smart Meter program in SOA implementation.**

➢ **Establishing repeatable SOA methodology, architecture and design for refinement and future reuse.**

➢ **Leveraging EIM concepts and using IEC CIM & 61968 standards to ensure a complete SOA solution for AMI.**

➢ **Establishing EIM strategy, roadmap, and business case for Sempra Energy utilities.**

Q/A

Questions and Comments are Welcome.

- *For more information, please contact:*

- *Enrique Villalobos: evillalobos@semprautilities.com*
  - *Joe Zhou: jzhou@xtensible.net*

SDG_E

A Sempra Energy utility®