

SAP for Utilities - Beyond Smart Meters

Al Khobar, 31 May 2015

Slawomir Klimowicz, SAP MENA



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Agenda

1 SAP solutions for Smart Metering

A bit of history, solution portfolio, future outlook

2 Beyond software solutions

SAP leading and contributing to programs, projects and associations

To support top performance SAP offers a comprehensive and industry-specific solution portfolio

Energy supply chain optimization

- Fuel supply chain management
- Energy portfolio management
- Corporate sustainability

Operational efficiency for plants and grids

- Project and portfolio management
- Asset operations and maintenance
- Asset network
- Environment, health, and safety

The intelligent grid

- Meter data management and operations
- Grid data processing and analysis
- Demand side management
- Customer education

Customer experience

- Multi-channel marketing
- Sales and customer service for residential customers
- Sales and customer service for commercial and industrial customers
- Bill to cash

Corporate functions > Human resources | Finance | Procurement

Platform and technology > Enterprise technology | Analytics | Mobile | In-memory platform

Market relevancy through extended collaboration

The SAP AMI Eco-System

The AMI@SAP Lighthouse Council



Extended ACCU AMI Workgroup



Exchange of information on technology, market trends and strategies for AMI and Smart Grids

Composition and discussion of architectures and use cases

Definition and prioritization of common software requirements

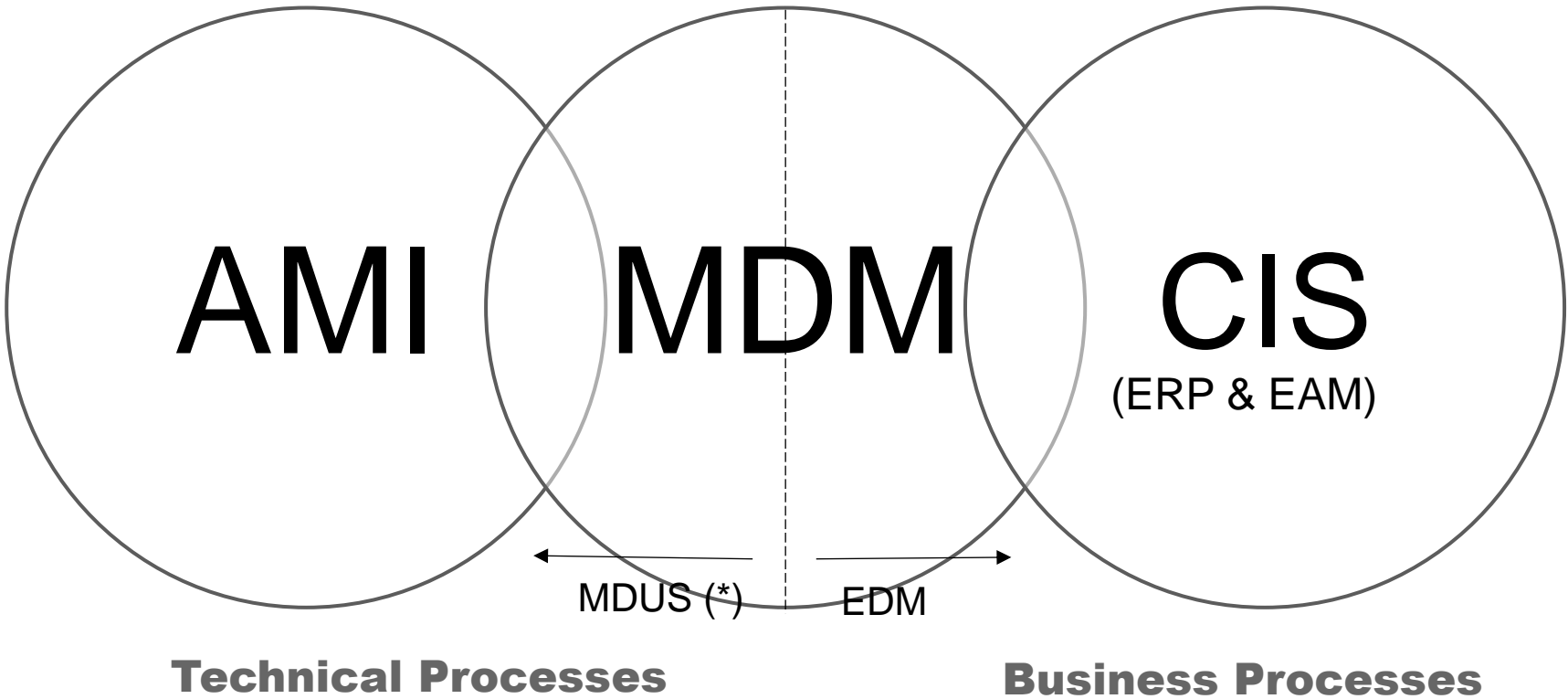
Timely feedback from SAP on new product developments (system demos)

Early customer engagement in the software-development-process (specs, etc.)

Principles to Follow while engaging in AMI

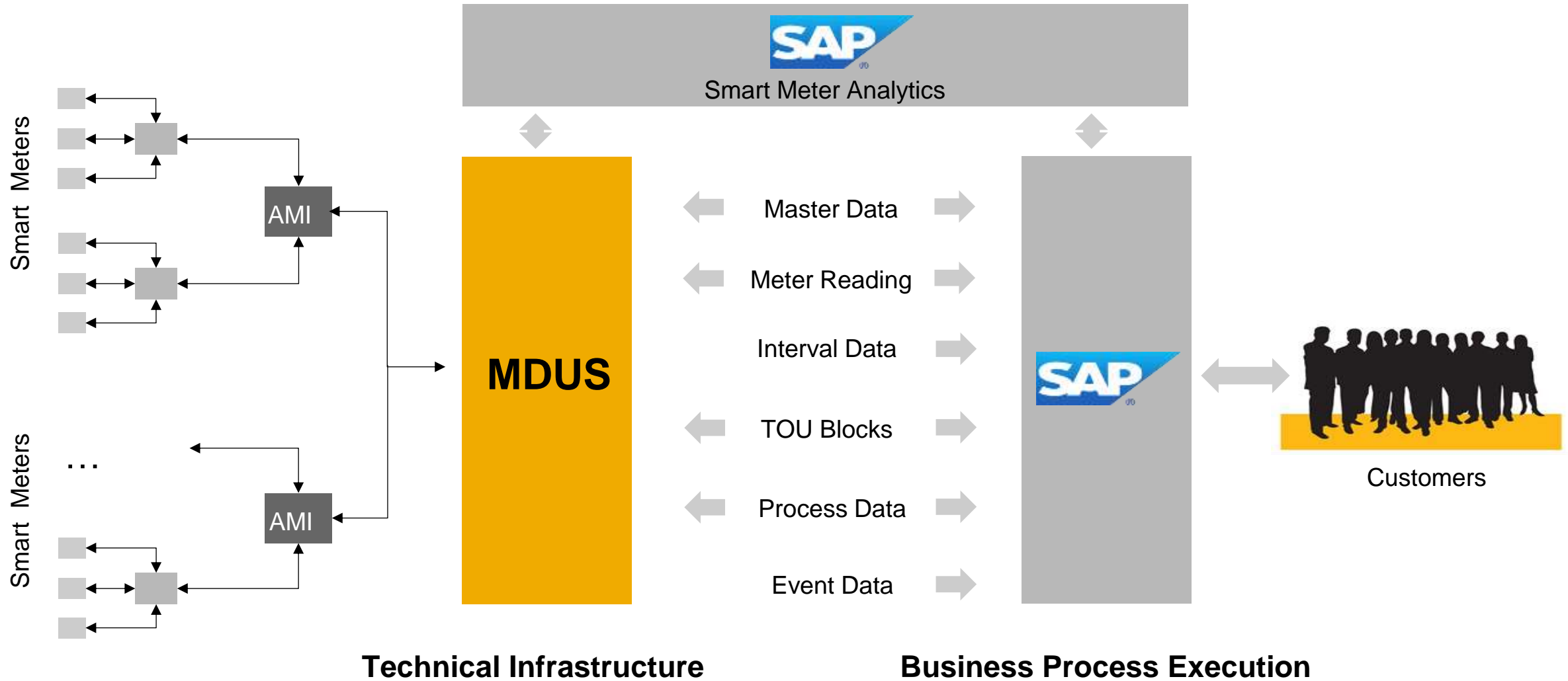
- Simplicity of architecture
- Definition of standards for regulated as well as for deregulated markets
- The Commercial System sets the MDM/MDUS as gateway to the AMI Systems
- Independence of technical AMI environment from Business Process Execution Applications
- Strict differentiation of Meter Reading and Device Management Processes in MDM/MDUS
- Scalability of architecture with respect to high meter volumes
- Applying Enterprise SOA for the integration of MDM/MDUS and Business Applications
- Utilization or (if not available) creation of Industry Standards

The SAP Approach to AMI Projects

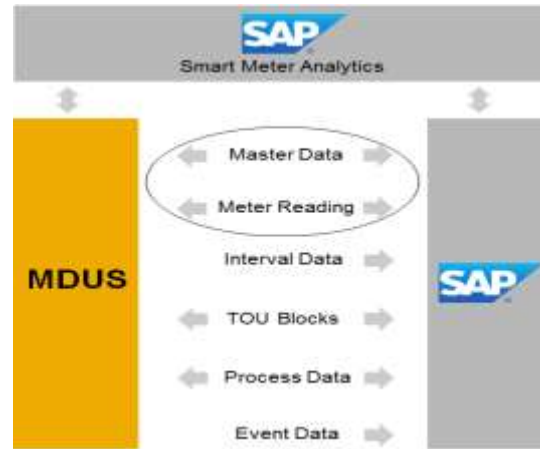


(*) Leveraging Partnerships

System architecture – Regulated market



System architecture – Meter readings/Master data



Device Management

- Enhancement Device Category and Device
- Enhancement Installation/Change of Meters
- Automatic Master Data Exchange to MDUS
- Enhancement BW Content, BOR Objects etc.
- Regional structure and Grid: Assignment of AMI Systems

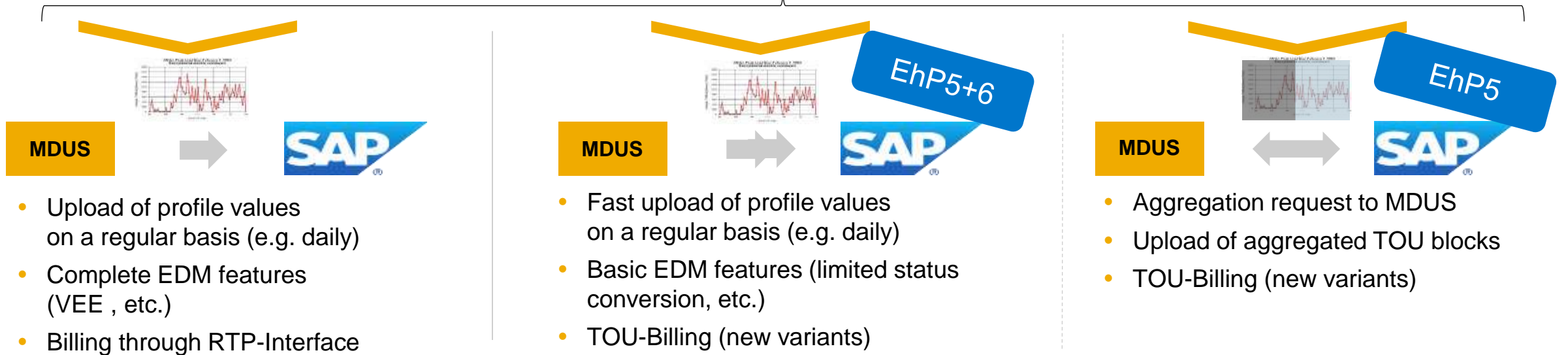
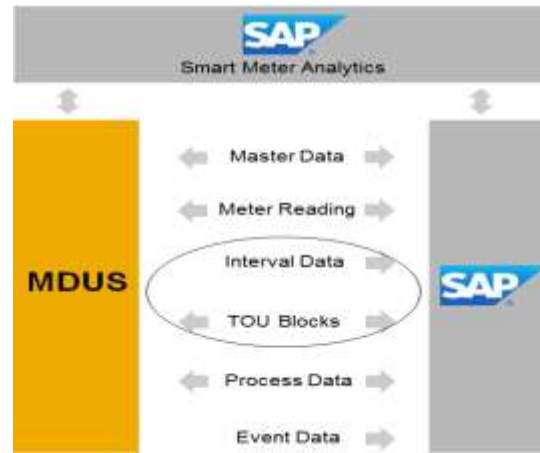
EhP4

Meter Reading

- Enhancement Meter Reading Order
- Flexible Sending of Meter Reading Requests (PI)
- Receiving of Meter Readings (triggered by SAP/AMI)
- On-Demand Meter Reading
- Enhancement Monitoring of Meter Reading Results
- Cancellation of Meter Reading Requests
- Adjustment of all Entry-Screens for Meter Readings

EhP4

System architecture – Handling of interval data/TOU blocks



- Upload of profile values on a regular basis (e.g. daily)
- Complete EDM features (VEE , etc.)
- Billing through RTP-Interface

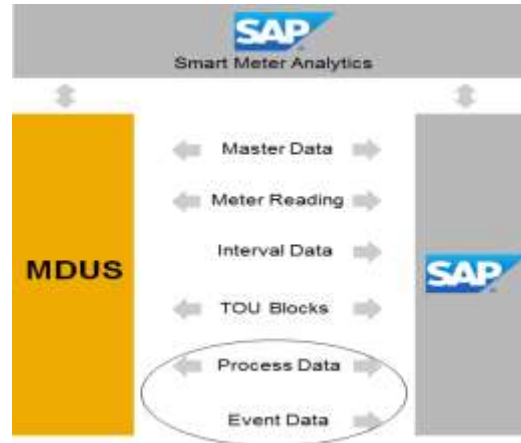
- Fast upload of profile values on a regular basis (e.g. daily)
- Basic EDM features (limited status conversion, etc.)
- TOU-Billing (new variants)

- Aggregation request to MDUS
- Upload of aggregated TOU blocks
- TOU-Billing (new variants)

Commercial & Industrial Customers

Residential Customers

System architecture – Process and event data



EhP5

Disconnection/Reconnection

- Integration in Dunning Process
- Notification Process
- Scheduling of Disc./Rec. Orders
- Mass Activity for Sending Disc./Rec. Orders
- Cancellation of Disc./Rec.
- Monitoring of Disc./Rec. Orders

EhP5

Sending of Text Messages

- Sending of text messages from CRM or ERP (free editable text or templates)
- Integration in dunning process
- Report to send out messages
- Automatically check each message before sending (e.g. offensive language)
- Prevent message sending in a short notice

EhP5

Event Management

- Receiving and prioritization of event data from the MDUS-System
- Triggering of follow-up activities based on utility-specific rules
- Monitoring of event processing

Strategic solutions – Participation by invitation

Qualified Business Solutions (QBS)

MDUS



Selection Criteria

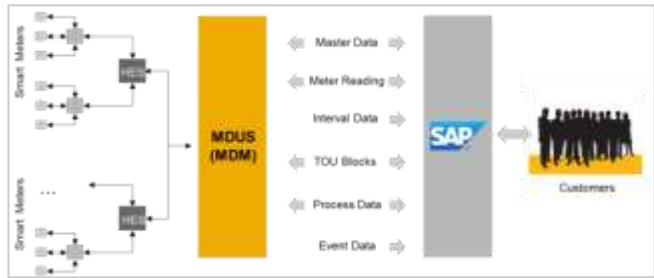
- Specific business or technology focus (“White Space”)
- Alignment with SAP product & technology roadmap
- Limited overlap with the SAP solution
- Highly differentiated and integrated solution
- Proven track record and customer references
- Company maturity and financial viability
- Global engagement

Relationship Benefits

- Solution Certification
- Technical Enablement
- Marketing Enablement
- Echo Hub Storefront
- Online Marketing Campaigns
- Solution Endorsement by SAP
- Joint Marketing campaigns



The Intelligent Grid: The SAP experience



2007
Concept
 Customer Groups
 (Lighthouse Council & ACCU
 AMI Working Group)
 Architecture

2008
AMI Foundation
 Master Data Sync
 Meter Reading
 CRM Enhancements

2010
Processes
 Enhanced Billing
 Disconnection /
 Reconnection
 Event Handling
 Etc.

2011
Deregulation
 Mass processing &
 infrastructure
 SOA enablement for
 sending and receiving
 SAP EDM profiles

2013
**Continuous
 Innovation**
 Conditional Billing
 Others
 (Activation Handling, Device
 Management, etc.)

2014
Project Feedback
 Register Group,
 Time Stamp, etc.



> 70

SAP AMI Integration for Utilities

SAP AMI Integration for Utilities

Business Suite 7

- **Meter Reading**
 - Support of regular and on-demand reading
 - Monitoring
 - Status Administration
- **Device Management**
 - Exchange of Master Data
 - Business Warehouse Content
 - Integration to all Data Objects (e.g. Grid)
- **Customer Service**
 - Disconnection / Reconnection (also ERP)
 - AMI Capabilities for Product Value Help
 - Device Information in the Interaction Center
- **Broad Number of Enterprise Services**

Business Suite 7 Innovation 2010

- **Joint Energy Data Management (MDUS Integration)**
 - Tight integration of MDUS with SAP for Utilities
 - Transfer aggregation rules dynamically to the MDUS
 - Support of the various billing scenarios
- **Monitoring**
- **Disconnection / Reconnection**
 - Scheduling, Monitoring of entire Process
 - Support of Approval and Reversal Process
- **Device Management**
 - On-Demand Request for AMI-Meter/Device status
 - Master Data Exchange

Business Suite 7 Innovation 2010

- **Sending of Text Messages to the Meter**
 - Possibility to send text message from CRM or ERP to specific meter
- **Event Management**
 - Receiving and prioritization of event data from the MDUS-System
 - Triggering of follow-up activities based on utility-specific rules
 - Monitoring of event processing
- **P2P Communication for all enterprise services**
- **Miscellaneous:**
 - Performance Improvements
 - Support Meter Mass Rollout

Business Suite 7 Innovation 2011

- **Market Communication**
 - Mass processing and infrastructure adjustments
 - SOA enablement for sending and receiving of profiles stored in SAP EDM
- **Bulk-Services**
 - Asynchronous services for profile import
- **Enhancement of TOU-Billing-Features**
 - Simulation
- **Demand Side Mgmt.**
 - Program support
 - Monitoring & Reporting

...and what customers have told us

Continuous innovation / Country-specific enhancements

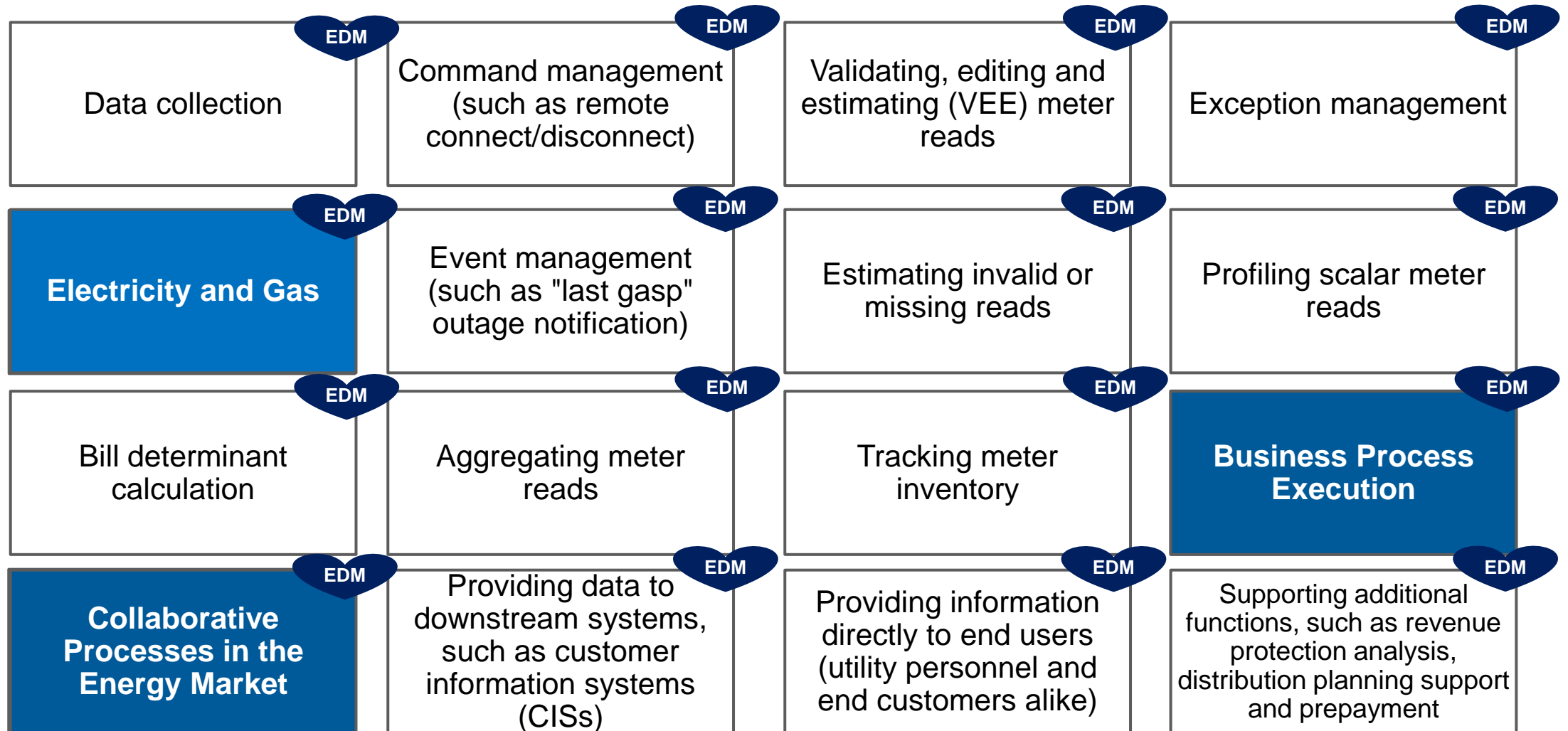
Partnering concept

Mass deployments of smart meters

Operational reporting / analytics

Simplicity / flexibility of architecture

Key Features of an MDM System (Gartner Based)



SAP Approach to the AMI Projects

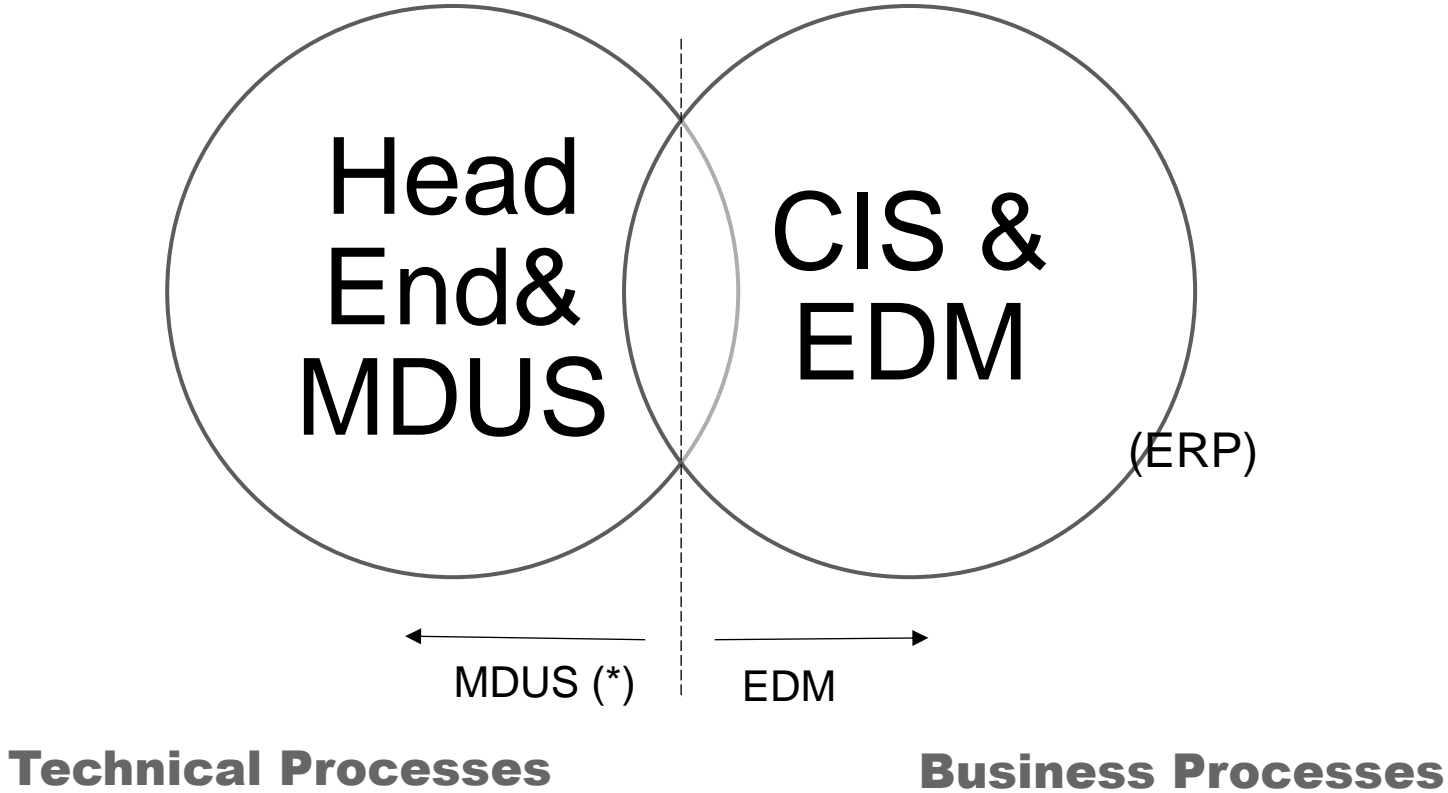
Traditional Approach

- MDM perceived as a system with a very strong technical focus
- Support to multiple AMI protocols and strong in interoperability.
- Handling large data volumes at low TCO.
- MDM would not focus on Business Process Execution (MDUS concept)
- MDUS Certification and partnerships secured end to end interoperability.

Alternative Approach

- Customers are asking for TCO reduction and simplification of system architecture / landscape
- SAP HANA offers real time capabilities and Critical insights on data w/o need for replication
- SAP EDM handles large volumes of data with low TCO (already productive customers)
- MDM implementations have limited capabilities to take care of business process execution aspects (e.g. market communication)
- Customers ask SAP to offer end to end solutions given the it's extensive solution capabilities
- Multiple AMI protocols are already being on a project basis effort.
- MDUS protocol is a key enabler of AMI integration simplifying the integration work. A standard easily adopted by multiple AMI players.

The Alternative SAP Approach to AMI Projects



(*) Leveraging Partnerships

The New Partner Model

Strategic solutions – Participation by invitation

Qualified Business Solutions (QBS)

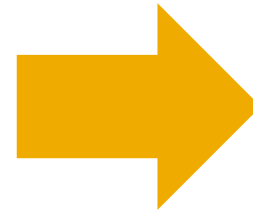


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SAP Enterprise Service Bundle Certification:

- Enterprise services (ES) bundles group enterprise services according to an end-to-end business scenario
- SAP certifies the implementation of one or more use cases outlined within the AMI ES Bundle
- Validation /certification of partner's ability to consume AMI ES via SAP PI
- Process to be completed within a limited time frame
- Access to shared and exclusive-use hosted test systems
- No restriction / limitation to any partners
- Link to ES Bundle Certification page:

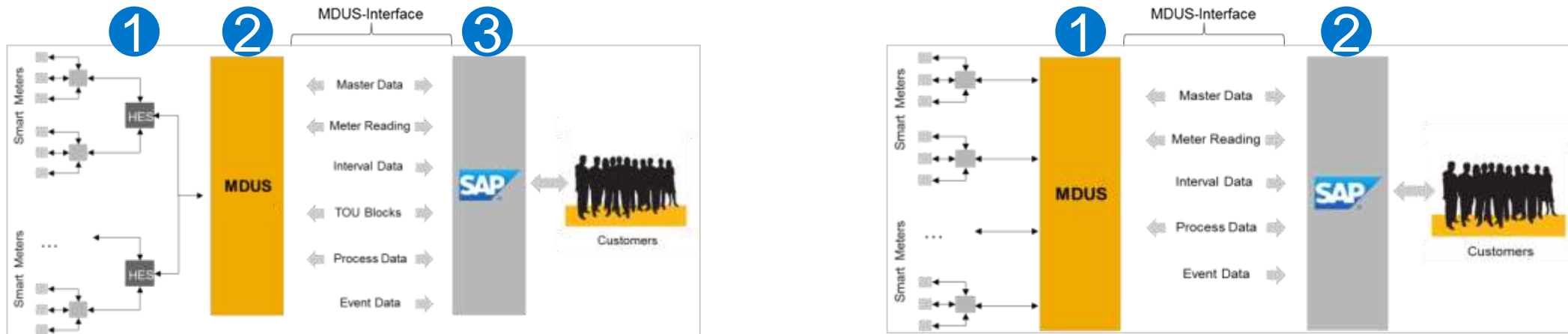
- Supported to foster co-innovation and product development
- More flexible, less cost-intensive and time-consuming collaboration agreement

SAP® Certified
Integration via Enterprise Services

OR

SAP® Certified
Integration with Applications on SAP HANA®

Simplicity / flexibility of architecture



- Customers ask for simplification and cost reduction: license, implementation and maintenance → two-tier architecture
- Processes do not need a three-tier architecture and act sometimes obstructive; some processes need the data in the SAP-system anyway
- Significant overlap between solution providers
- SAP AMI Integration for Utilities solution and new SAP ES Bundle Certification supports different architectures and multiple vendors (no changes to the MDUS-interfaces)
- Customers are already deploying SAP Energy Data Management as the central meter data repository (AGL, etc.)
- SAP Consulting by this time offers a *reduced* system architecture in certain tenders due to customer requirements

➔ SAP Business Assessment for individual customer landscape / architecture

SAP AMI Integration for Utilities - Roadmap

AMI 1.0

ECC 6.0 EHP4/ CRM 7.0

- Meter Reading
- Device Management
- Customer Service
- Broad Number of Enterprise Services



AMI 2.0

ECC 6.0 EHP5/ CRM 7.0 EHP 1

- TOU Aggregation
- AMI Monitoring
- Disconnection / Reconnection
- Device Mgmt
- Sending of Text Messages
- Event Mgmt
- P2P Comm. for all enterprise services
- Performance Improvements
- Smart Meter Rollout



AMI 3.0

ECC 6.0 EHP6/ CRM 7.0 EHP 2

- Market Communication
- Bulk-Services
- Enhancement of TOU-Billing-Features
- Demand Side Mgmt.

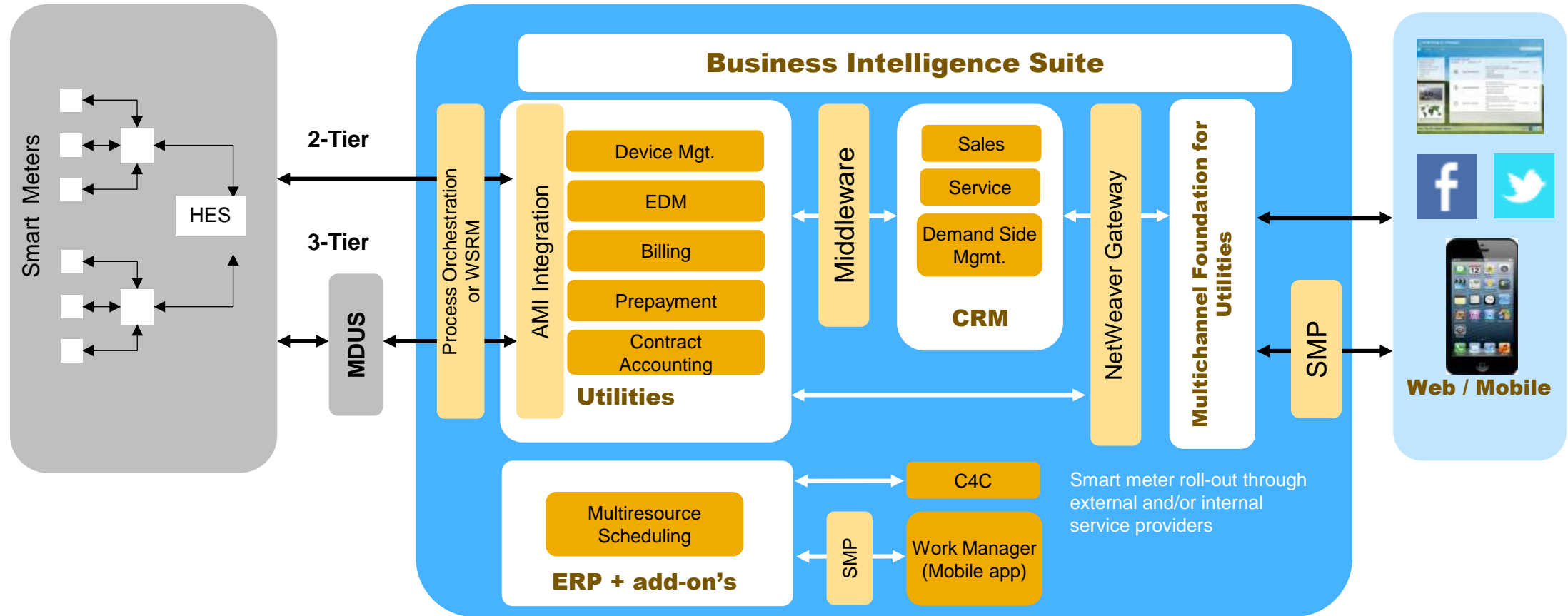


AMI 4.0

ECC 6.0 EHP7/ CRM 7.0 EHP 3

- Device Mgmt (flexible handling of remote capabilities) *
 - Meter Reading (Push of meter readings to the MDUS) *
 - Provision of VEE relevant information to the MDUS *
 - New billing concept: Conditional Billing (CPP, PTR tariffs)
- * Functionality will be also provided on ECC 6.0 EHP6 / EHP5

Smart Metering / Smart Grids architecture by SAP



Non-SAP
SAP
Either

HES: Head-End System
MDUS: Meter Data Unification and Synchronization
WSRM: Web Services Reliable Messaging
EDM: Energy Data Management
SMP: SAP Mobility Platform
C4C: SAP Cloud for Customer

Customer's experience

Lessons learnt led to a market driven rollout policy reforms ...

6

- ✓ Rollout of smart meters is commercially driven rather than mandated or regulated
- ✓ Ensures that the meter specifications are based on the smart metering services that customers want
- ✓ Provides the flexibility for retailers & 3rd parties to develop new products and services to customers.

...focused on empowering customers to make choices

> Digital Metering Overview
> Stephanie Bashir
> April 2015



Active Stream Breaking New Ground

10

Active Stream is on the cutting edge of technology – to provide the best customer experience at the lowest cost.



- Implement SAP Energy Data Management (EDM) integrated with smart meters (SAP's new "2-tier AMI architecture").
- 100% cloud based solution at AGL –access (RemoteApp), email (Office 365) and systems (Storm, SAP, Brave) are cloud based.
- Host enterprise systems on Microsoft Australia Azure cloud platform.
- Implement high availability SAP on Azure (using SISO/SQL 2012 solution).

> Digital Metering Overview
> Stephanie Bashir
> April 2015



The Implementation of Smart Metering starts with the Business Assessment

Business Strategy + Process Architecture

- Creation of business model
- Review of the past growth
- Business model simulation
- Evaluation of the business strategy
- Define process and IT requirements
- Adjust process model
- Development and evaluation of IT scenarios

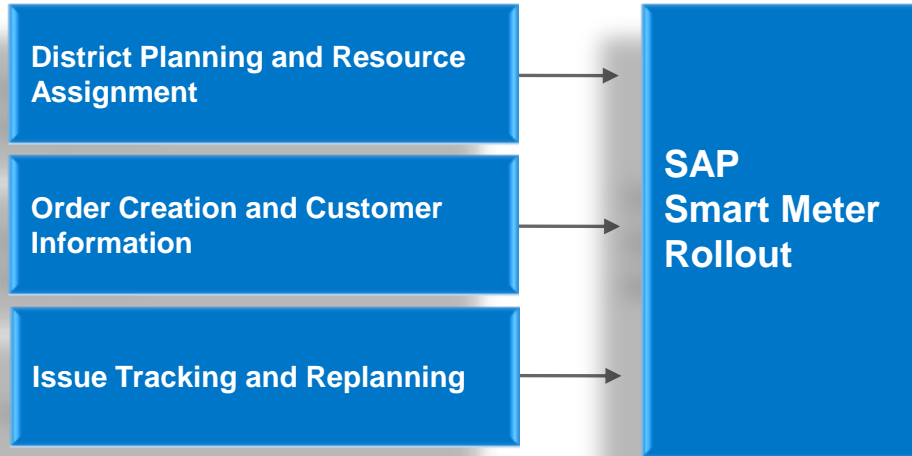
Business Assessment Smart Metering

> IT Strategy + BPM > Implementation

- Define requirements
- Provide and appraise solution options
- Roadmap
- Test critical processes and IT performance
- Translate strategy concepts into IT concepts
- Implementation of processes and IT scenarios
- Go live

SAP Smart Meter Roll Out

SAP Solution



- Provide **all relevant information** in a unified environment
- Provide **sophisticated planning tools** and workflows to reduce resource effort and improve planning reliability
- Allow complex planning activities in **GIS** environment







SAP Differentiators

Integration: Seamlessly integrate all relevant data and processes across functional boundaries on a single platform

The right information: Flexible toolset for execution and verification of smart meter mass rollout

Always up-to-date: Real-time data availability in online and offline scenarios

Smart meter rollout – a holistic view

	Preparation 	Rough planning 	Fine planning 	Job-/ order-submission 	Job- / order-execution 	Confirmation of job / order 
SAP for Utilities	Data analysis	Data analysis Planning and purchase of devices	Data source and order generation	Mobile-workforce interface		Confirmation of device information
SAP Smart Meter Roll-Out by Prologa		Def. of planning scenario Selection of devices Generation of job plans for order generation				
SAP MRS		Definition of responsibilities and capacities per area	Planning of orders and scheduling Resource allocation Route optimization	Status-update and conflict-handling	Monitoring, status	Monitoring, status
SAP Controlling						Reporting, costs and resources
SAP Work Manager Mobile				Job- / order-submission	Execution of jobs / orders and status	Confirmation of activities and status information
SAP AMI		Device attributes and data synchronization				Data synchronization

SAP Cloud for Customer (C4C)

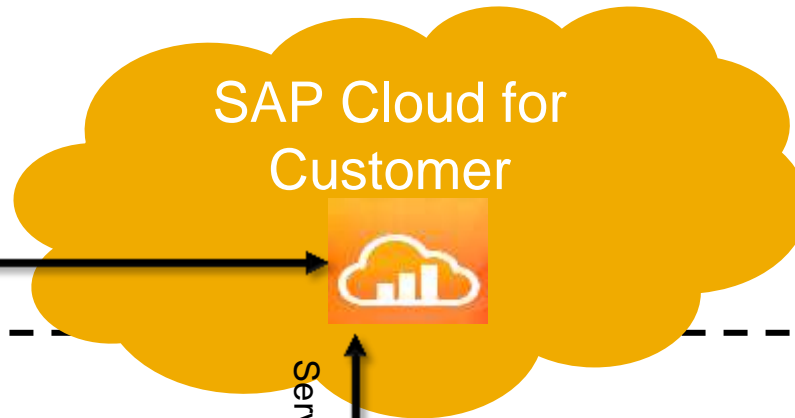
Smart meter roll-out through internal and external service providers

External service employees (w/o SAP ERP)



- Overview of tickets
- Employee details
- Ticket information (e.g. customer data)

Service Orders



Ext. Provider
Utility Company

- Optimization of employees (internal & external)
- Analysis (e.g. work duration)
- Assignment details (internal & external)
- Travel information
- Transfer of service orders:
 - Internally: Work Manager Mobile
 - externally: C4C

Service Orders



Work Manager Mobile for internal employees

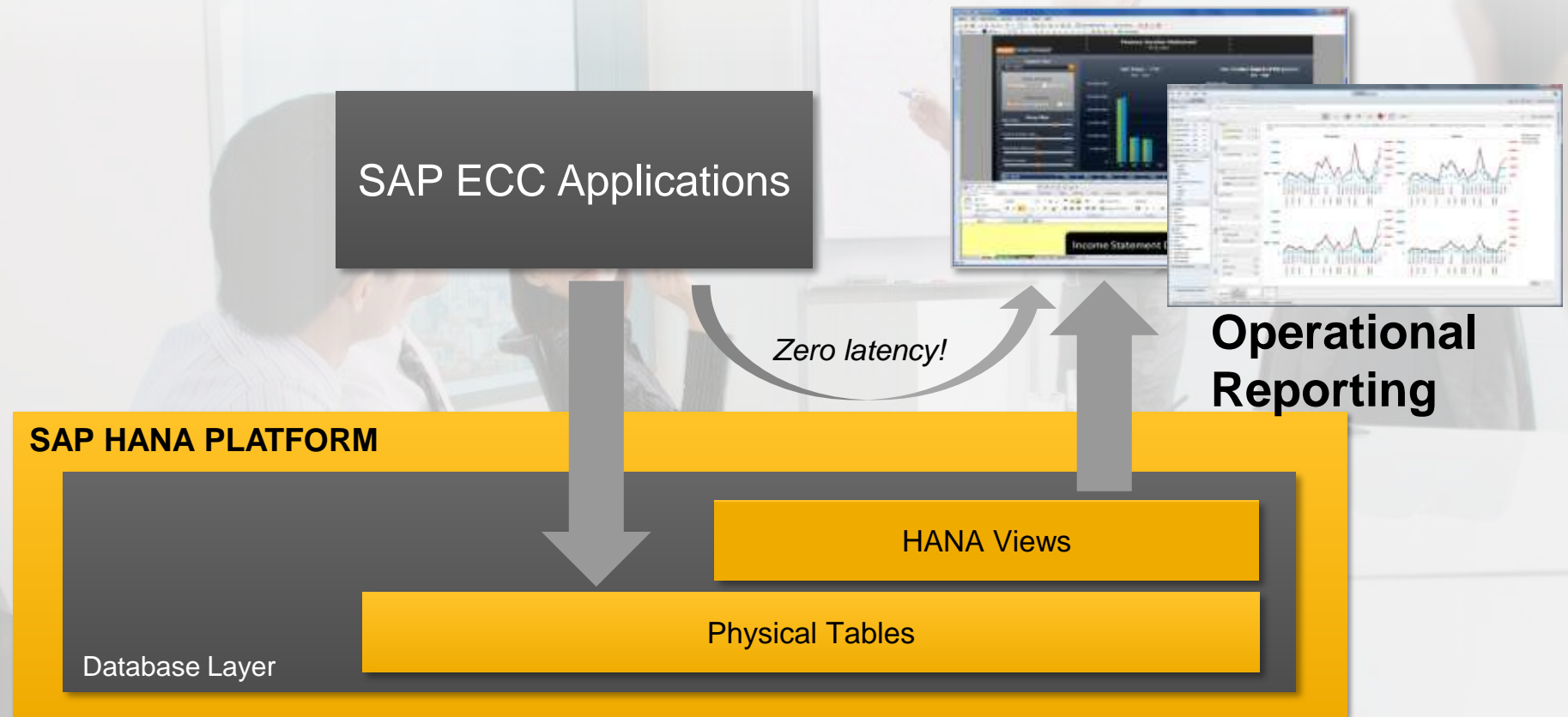


Service Orders

System demo

SAP HANA Live architecture

Foundation for new class of applications



Atomic data set for detailed drill-down information



Operational data available instantaneously



Pre-defined models across entire suite

SAP Hana Live for Utilities, edition for SAP ERP



Target Roles

- ▶ Business Users
- ▶ Divisional Managers

Analysis Report Areas

- ▶ Device Management
- ▶ Meter Reading
- ▶ Billing
- ▶ Invoicing

Business Questions

- ▶ What is the status of the device roll-out and device inspection process?
 - ▶ How many and what type of devices are installed?
 - ▶ How many, which and when devices are due for a periodic replacement – and where?
- ▶ What is the status of the meter reading process with regard to consistency and completeness?
 - ▶ How many plausible/implausible meter reading results exist?
 - ▶ Is the meter reading order creation process complete? How many meter reading orders are missing?
 - ▶ How many meter readings are scheduled to be read?
- ▶ What is the status of the billing process with regard to consistency and completeness?
 - ▶ Are the billing orders complete? How many billing orders are missing?
 - ▶ How many billing documents have been outsourced during billing?
 - ▶ How many billing documents were reversed?
 - ▶ How many contracts are blocked for billing?
 - ▶ How many contracts have been scheduled for billing?
- ▶ And many more...

Key Metrics

- ▶ Device Management
 - ▶ Devices
 - ▶ Device info records
 - ▶ Periodic Replacement
- ▶ Meter Reading:
 - ▶ Meter reading orders
 - ▶ Plausible meter reading results
 - ▶ Implausible meter reading results
 - ▶ Meter reading documents
 - ▶ Missing meter reading orders
 - ▶ Scheduled meter readings
- ▶ Billing:
 - ▶ Contracts scheduled for billing
 - ▶ Billing documents
 - ▶ Reversed billing documents
 - ▶ Outsourced billing documents
 - ▶ Missing billing orders
 - ▶ Billable billing orders
 - ▶ Non-billable billing orders
 - ▶ Contracts blocked for billing
- ▶ Invoicing:

Dimensions

- ▶ SAP Client
- ▶ Contract
- ▶ Installation
- ▶ Equipment
- ▶ Device category
- ▶ Year of construction
- ▶ Register
- ▶ Meter reading date/time/status
- ▶ Meter reading type/category
- ▶ Meter reading unit
- ▶ Portion
- ▶ Scheduled billing date
- ▶ And many more...

Demo

Agenda

1 SAP solutions for Smart Metering

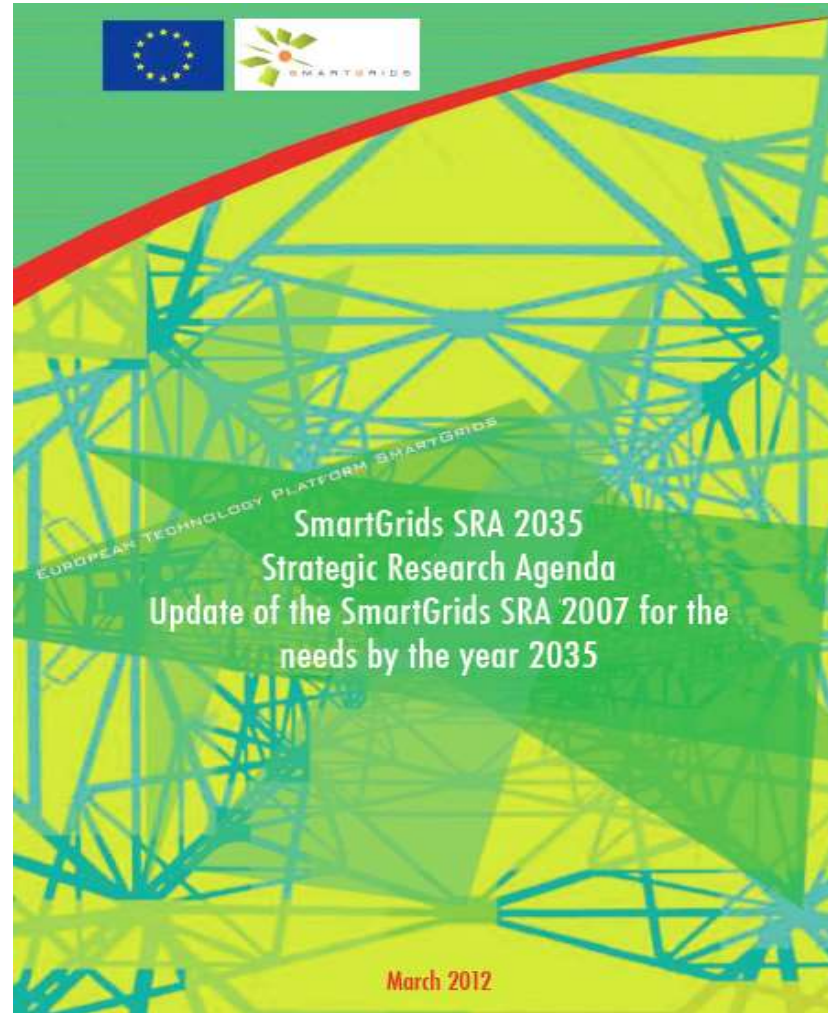
A bit of history, solution portfolio, future outlook

2 **Beyond software solutions**

SAP leading and contributing to programs, projects and associations

Beyond software development

EU SmartGrids horizons 2020 and 2035



ESMIG: Working groups' Studies and reports – SAP Chairing

KEY MESSAGE

- Support of EU standardization mandates (e.g. M441 & M490)
- Support of standards, interoperability and privacy by design (TF SmartGrids, EG2)
- Support of the 3rd Energy package (EBSII uses cases, “Empower” report)



Standardisation, Interoperability, Interchangeability and Innovation

Date: 11.07.2011
Reference: Sec 11-07
Version: Final 2.6
Author: ESMIG Secretariat

Innovative Use Cases, Architecture and opportunities for the future European Smart Metering Business Systems

Version 2.0 - October 2011

European Business Systems Integration and Interoperability (EBSII) working group

PART I

Innovative Use Cases, Architecture and opportunities for the future European Smart Metering Business Systems

Version 3.0 - October 2012

European Business Systems Integration and Interoperability (EBSII) working group

PART I

EBSII working group is chaired by SAP

Executive summary

In order to ease the roll-out of Smart Meters in Europe, ESMIG supports strongly the initiatives that are aimed to improve the interoperability of components in Advanced Metering Infrastructures. The organisation adopted a definition of open standards (originating from the European Commission) where the products of its members should comply to. These standards should support the competitive development of applications from various sources, creating business models for most industry stakeholders, including individual citizens. They should embrace the engagement of these stakeholders with the entire Smart Grid concept. It is ESMIG's objective to provide a full end-to-end working solution between technical Metering Systems and Business Systems in a multi-vendor environment. ESMIG is committed to reduce total cost of deployment of Smart Metering by providing both standards and best practices for implementation.

Complying to open standards is a basic condition, however not sufficient to reach interoperability. International standards leave room for further "configuration" so they can be used in various architectures that can be found in EU member states. This document explains what additional measures have to be taken such as the selection of technologies, fixing of optional features and definition of functional behaviour of data exchange between the AMI components. An ESMIG approach is proposed to position standards in a pyramid with unified standard data models in the top and various alternative technologies (such as RF and PLC technology standards) at the bottom.

When EU member states create standard specifications there are European rules and regulations to take in account. Open standards defined by the European Standards Organisations (ESO's) should be the basis but on national level, these standards should be completed with additional definitions to fill the gaps and reach real interoperability. ESMIG already supports the ESO's with creating the international standards and definition of Use Cases to identify functional behaviour of data exchange. ESMIG can also support regional or national initiatives to translate these international definitions to local solutions for interoperability.

17 Smart Metering Use Cases in focus at ESMIG

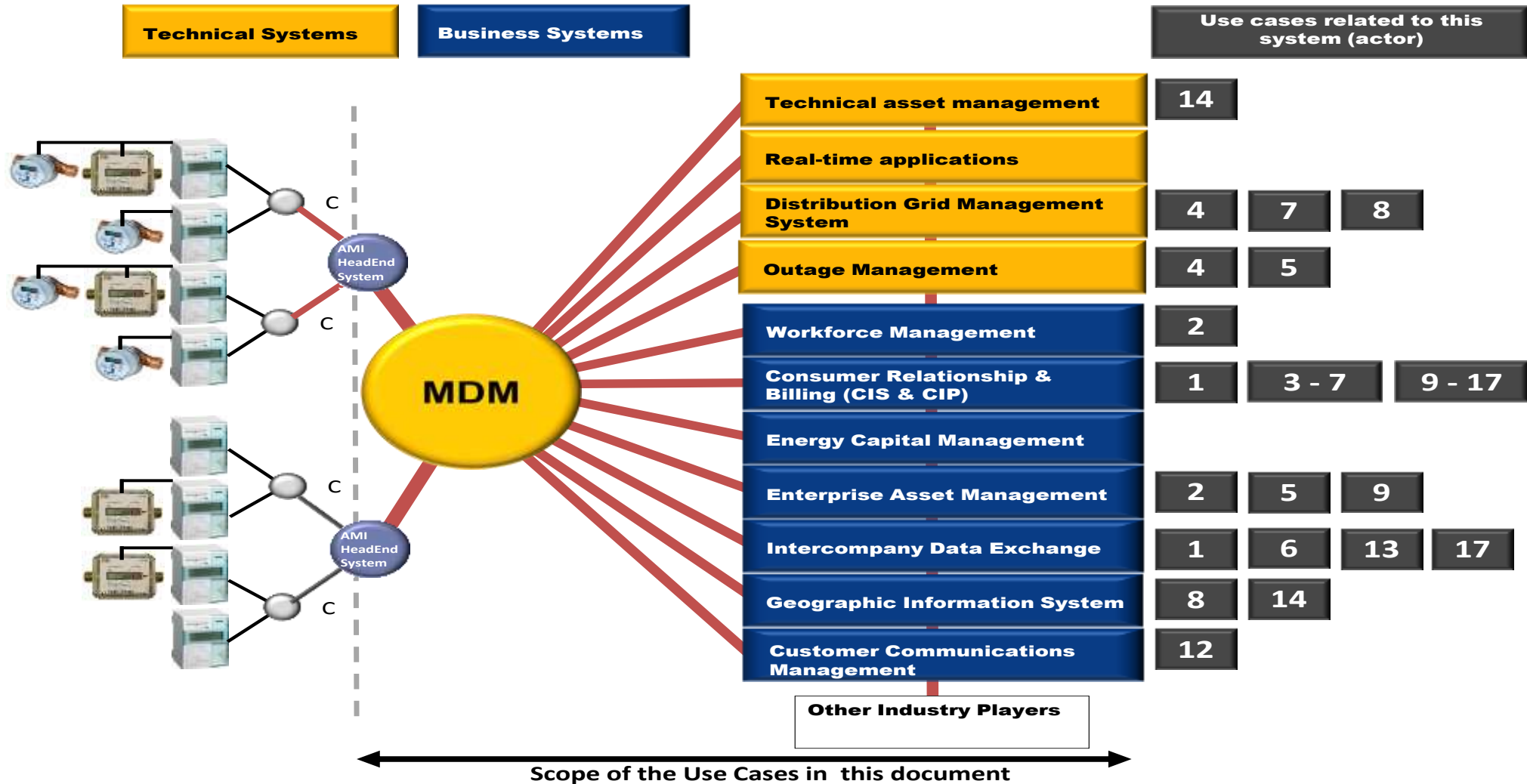
ESMIG-EBSII Use Cases

1	Obtain Meter Reading Data
2	Install, Configure and Maintain the Metering System
3	Support Prepayment Functionality
4	Manage Power Quality Data
5	Manage Outage Data
6	Facilitate Demand Response Actions
7	Facilitate DER for Network Operation
8	Manage the Network using Metering System Data
9	Manage Interference to Metering System
10	Manage Tariff Settings on the Metering System
11	Enable and Disable the Metering System
12	Interact with Devices at the Premise
13	Manage Efficiency Measures at the Premise using Metering System metering system data Data
14	Display Messages
15	Consumer Move-in/move-out
16	Supplier Change
17	Demand Side Management

ebIX UseCases-ID

1
2 - 3 - 4 - 5 - 6 - 7
1 - 7
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1 - 7
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3 - 5 - 6 - 7
4 - 5 - 6 - 7
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ESMIG - European Smart Metering Industry Group Architecture



Active Collaborator with the Utilities Industry European Initiatives



Initiatives

Participants

ETP Smart Grids: Energy Retailers
Perspective on Deployment of Smart
Grids in Europe (07/2010)



*ETP Smart Grids Demand and Metering
and Retail Group chaired by SAP*



European Electricity Grid Initiative (EEGI)
white paper (Top 7 TSO & Top 7 DSO)



Member of Executive Committee

ESMIG – EBSII working group on MDM/
ERP System Interoperability (09/10)



*European Smart Industry Group – WG
EBSII chaired by SAP*





Thank You!