IBM Energy & Utilities

2009 AMI Conference – AMI / Smart Grid Lessons Learned

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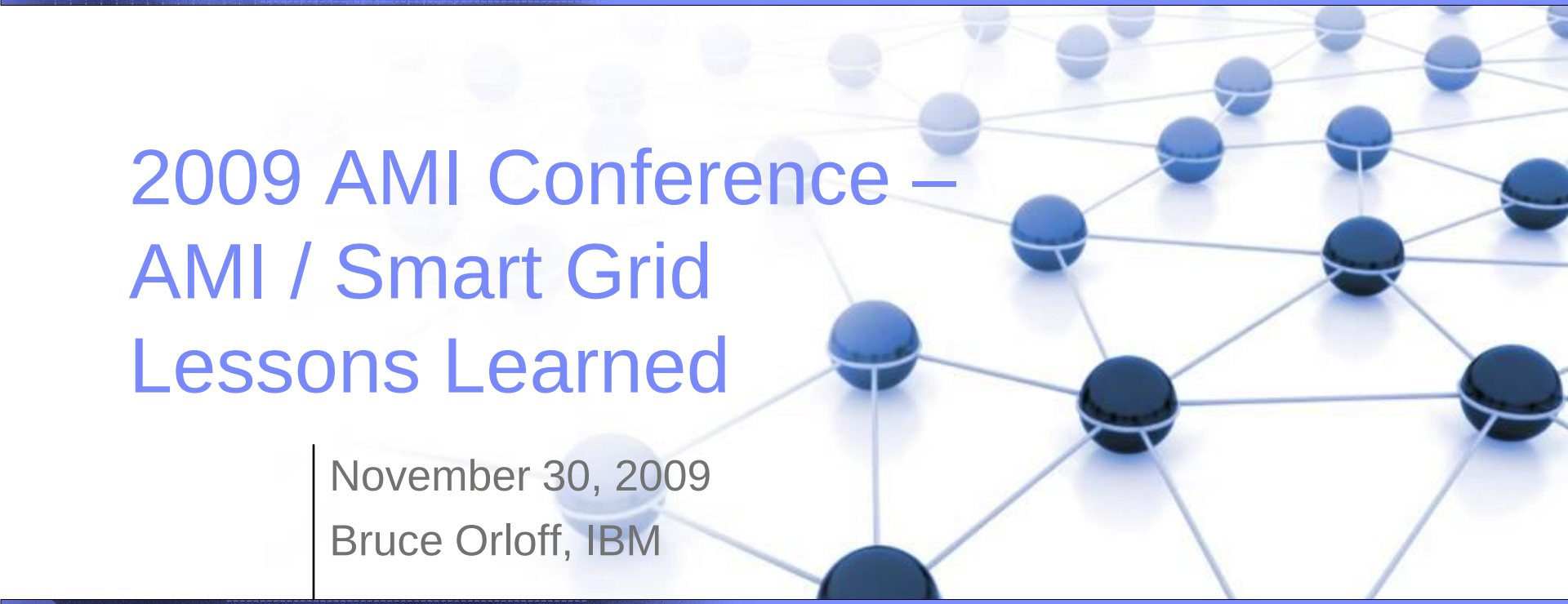


AMI is the Start of Something Bigger

AMI is emerging as the First "Node" on the SmartGrid

Informed

5. Presentation

Customer Web | Customer Mobile Devices | Display Device Interface | Field Employee Mobile Devices | Employee Portal/Dashboard | Paper Bills

Automated

4. Applications & Analytics

WMS | Network Analytics | GIS | Asset Management | OMS | CIS | MDMS

Call Management | Meter Data Collection | Load Control | EMS | DMS

Integrated

3. System Integration Platform

Servers | Storage and Backup | Security Management | System and Network Management | Business Process Management | Messaging & Web Services

Computing Infrastructure | **Systems Management** | **Application & Data Integration**

Connected

2. Integrated Communication Networks

Home Area Network | Neighborhood Network | Access Network | Backhaul Network | Office Network | Extranet

Intelligent

1. Smart, Connected Devices

Smart Appliances | Personal Computers | In-Home displays | Load Control Devices | Electric Vehicles Outlets

Advanced Electric Meters | Advanced Gas Meters | Advanced Water Meters

Switches | Reclosers | Condition Sensors | Voltage Controllers

Ruggedized Laptops | Handheld Data Devices | Cell Phones

Solar Panels | Wind Turbines | CHP | Energy Storage

In-home Devices | **Smart Meters** | **Substation & Grid Devices** | **Mobile Devices** | **Distributed Resources**

AMI/Smart Grid Isn't Just an IT Project

- It's a product life cycle development project . . . (PMO/SI/Strategic Planning)
- It's a regulatory project . . . (business case and funding)
- It's a construction project . . . (meter and network deployment)
- It's a customer-facing conservation project . . . (billing / demand response)
- It's a change management project . . . (organizational change)

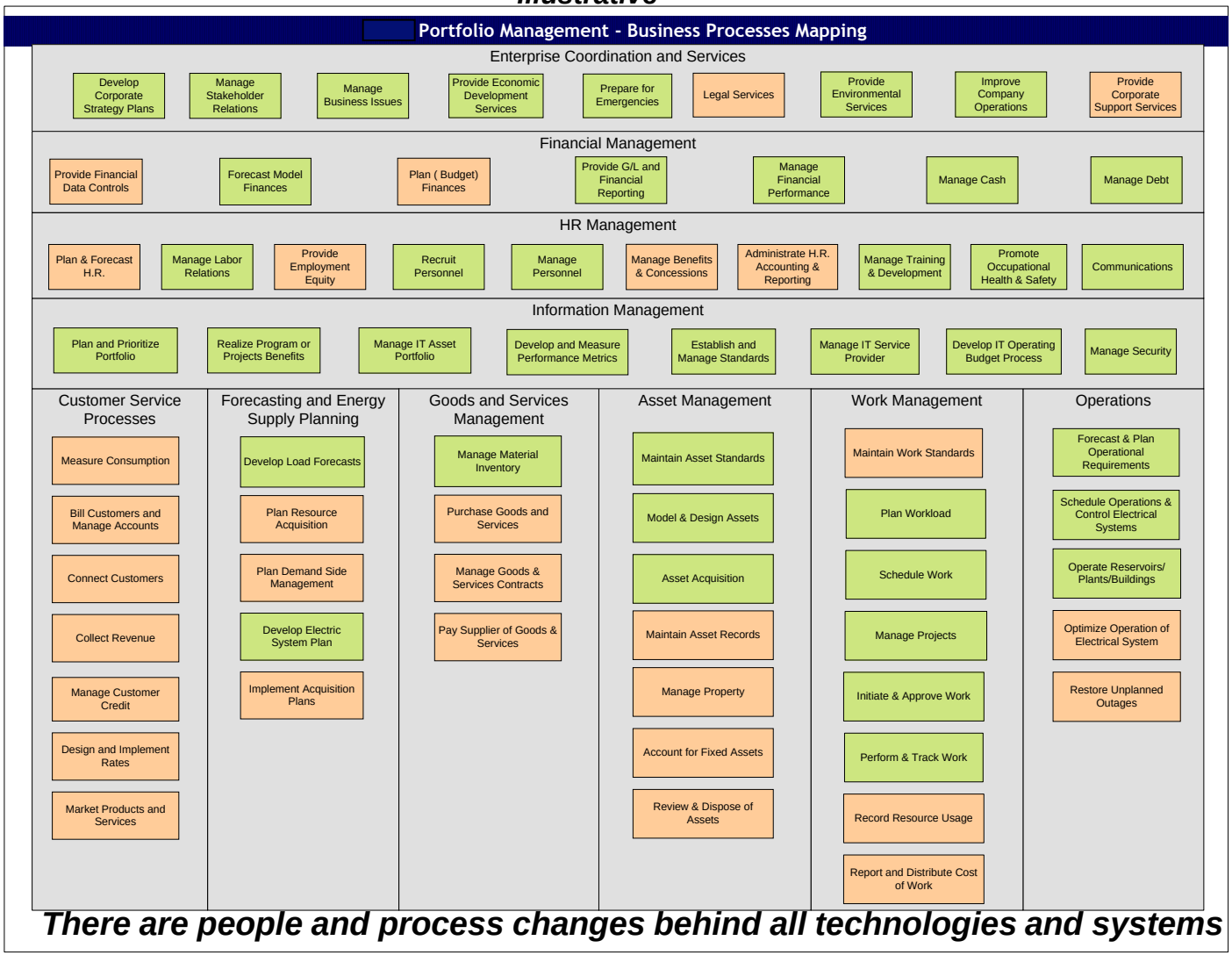
It's complex

It's expensive

It's transformational

Smart Grid Introduces Change Across the Organization

- Illustrative -



There are people and process changes behind all technologies and systems

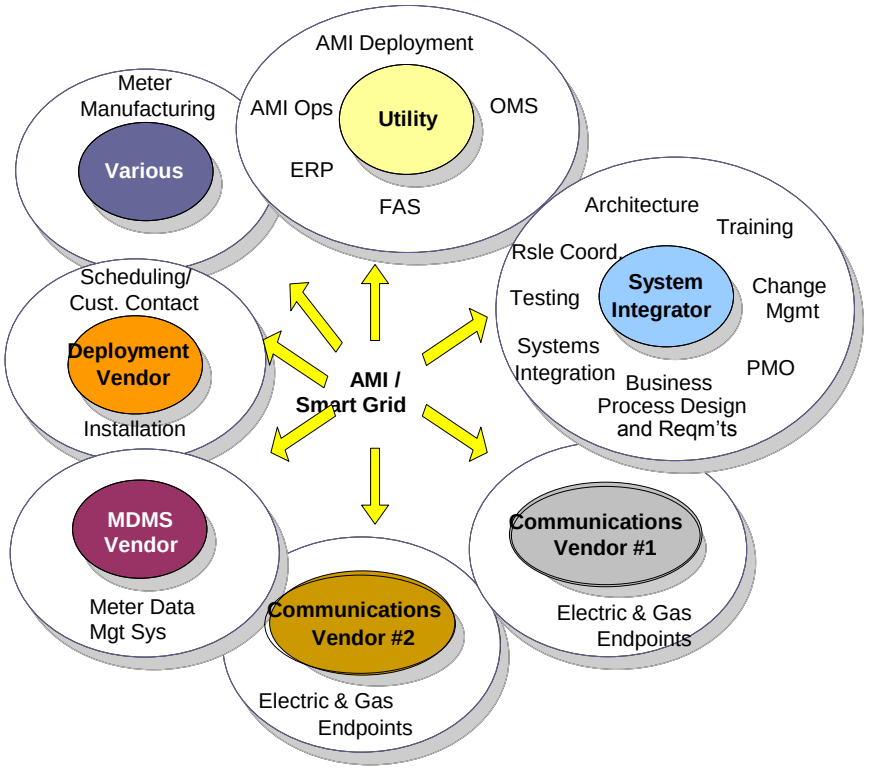
AMI Doesn't Happen Overnight

- Starts with Strategy and Business Case, regulatory approvals, etc
- Then the challenge of picking the "right" technology
- Good planning and testing is essential – Its worth the investment in time and money
- Consider Field test as part of RFP selection process
- Test preparation and data set-up takes an enormous amount of time – more than anyone expects.
- Getting meters deployed without the back office in place will likely impact the business case. The money's in the meters – the benefits are in the back office
- Once you launch full scale deployment turning back is costly - Do it right. Be quick, but don't hurry
- Also, there are 10-20 other utilities out there doing something related to AMI at the same time you are – Don't forget the concept of supply and demand

AMI/Smart Grid Requires Risk and Vendor Management

- Risk sharing versus shifting
- Mitigate risk via shared performance commitments, incentives, and holdbacks
- Don't underestimate complexities of contracts and their interrelations
- consider logical pieces of work and balance trade-offs between "all risks".
- Demand cooperation amongst vendors by clarifying roles, and setting expectations early and contractually
- Define metrics/SLAs for quality review
- On-going focus on vendor management will be required to manage and coordinate – multiple products, on multiple platforms, on different release schedules, etc
- Don't assume that vendor product lifecycles can be made to fit into AMI schedule

- Illustrative-



Importance of the Design Authority

- Responsible for end to end viability of the Smart Grid Application initiatives
  - Scope includes all aspects from the meter/sensor to the back office
  - Security, performance and operability are key focus areas
- Enforce requirements for structured architecture deliverables including:
  - Vision and Goals documentation
  - Requirements Traceability and Verification Matrix (RTVM)
  - Non Functional Requirements documentation
  - Performance validation test structure and milestones
    Architecture Decisions documentation
- Design Authority has demonstrated value in Complex Systems Integration projects
  - Now a best practice that is looked for in IBM delivery excellence reviews

Integration Strategy
Why does it matter?

- In order to succeed with an AMI / MDMS program a utility must have a technique to share information between disparate applications and the infrastructure to allow those applications to communicate in a flexible, robust way
  - Ability to easily broaden the audience of applications that consume events published by another application
  - Effectively transition from one initiative to the next through message transformation and routing

- In our experience there are critical components in an Enterprise Architecture (EA) that contribute significantly to the success of AMI / MDMS programs
  - One of them is the strategy and approach to integration

Integration Strategy
Why does it matter?

- Without a strategy no individual project will tackle the need for a common way to express information or implement the required shared infrastructure
  - Always fall outside an individual initiative's scope
  - Semantic mismatches will be identified and solved on an interface by interface basis
- No single vendor can provide a suite of integrated products that satisfies any one utilities' smart grid vision
- Vendor risk mitigation
  - Proprietary integration techniques can "lock in" one vendor's products and "lock out" the ability to make changes
  - The ability to adapt to significant failures in vendor performance is enhanced by well designed integration
    - Vendor failure to perform or deliver planned or promised product or features
    - Vendor failure to meet non functional requirements such as performance

Integration Strategy
Why does it matter?

- Mitigate impact of external change on an ongoing basis
  - Merger / acquisition driven changes to vendors' products
  - Failure of vendor's company
  - Emergence of new industry leaders and products
  - Development of new social policy initiatives
  - Retail market and smart grid regulations

- The inventory of point to point integrations is an impediment to change
  - Replacement of a non or under performing software asset can be blocked by the magnitude of the impact on existing systems

Integration Strategy
Where do I start?

“Think big. Start small. Scale rapidly.”

– OR –

You can’t solve the entire Smart Grid integration architecture at once.

- Build on the experience of other utilities to develop an integration strategy, architecture and information model
- Begin realization of the architecture and model with one project
- Use the education and experience on the early Smart Grid initiatives to drive further elaboration of the architecture and information model

Thank-you

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