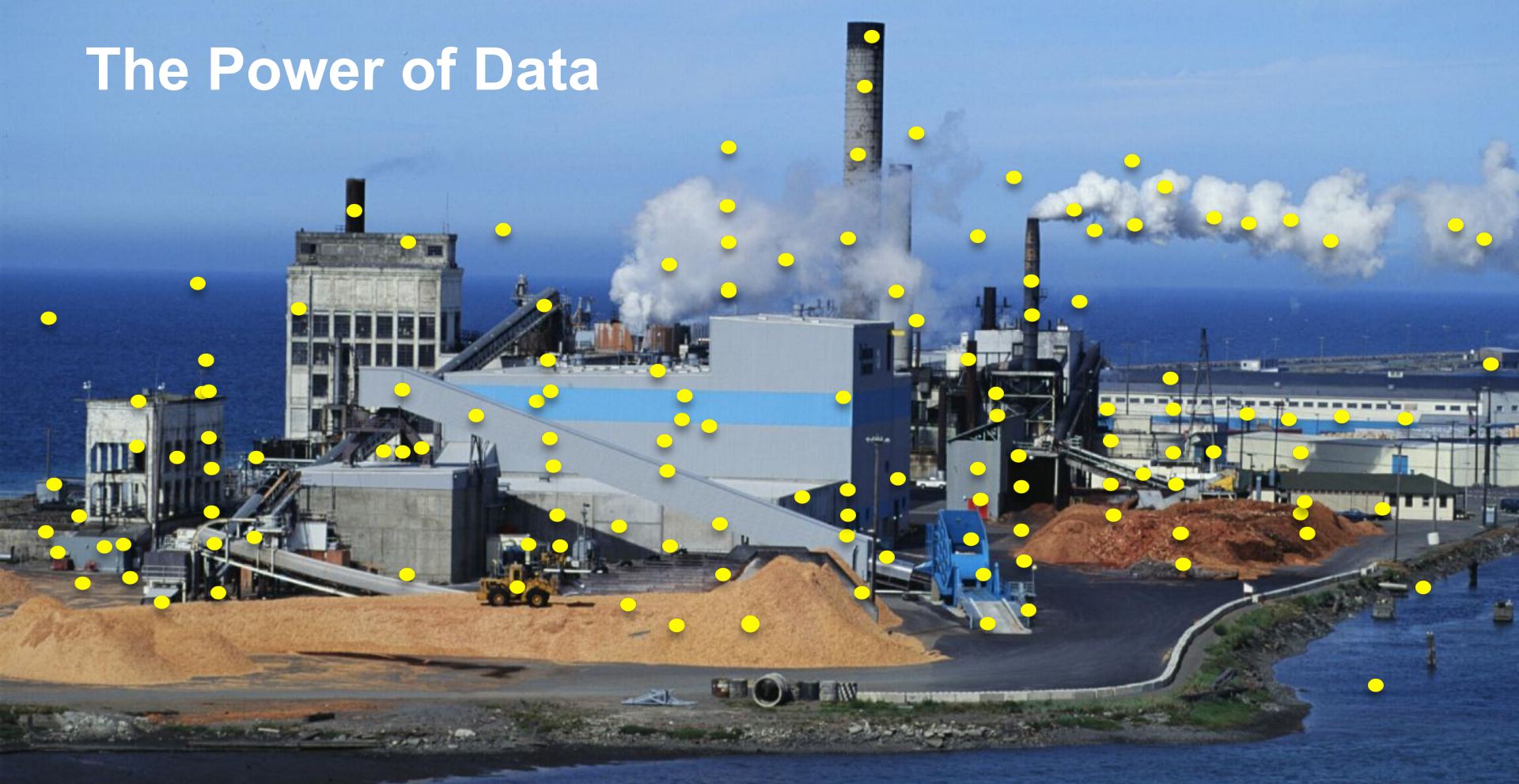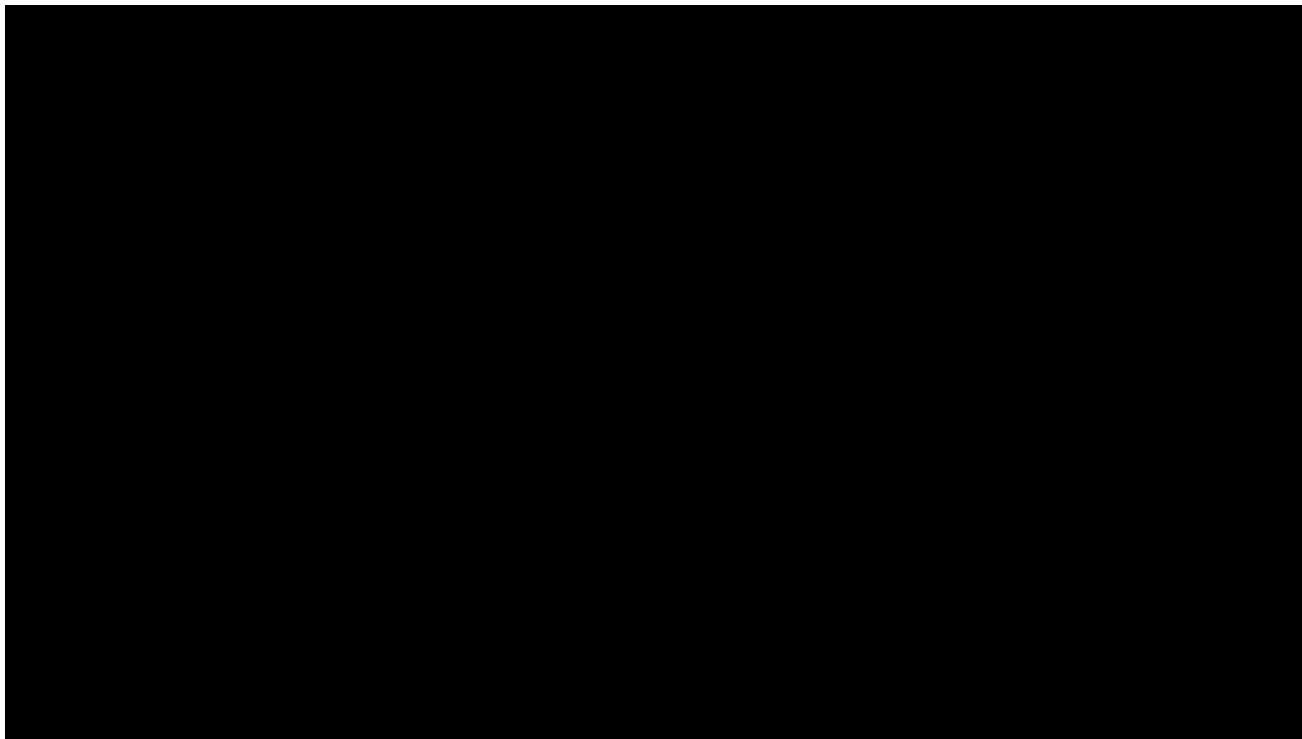# 21st Century Manufacturing Excellence: Securing a Sustainable Future through an Enterprise Architecture

Presented by **Lance Fountain**, Manager, Global Primary Metals, Manufacturing Solutions, Alcoa
Andrew Fanara, Chief Sustainability Strategist, OSIsoft

The Power of Data

Alcoa's Keys to Sustainability

Leadership, Scorecards, Roadmaps, Compensation, Transparency & DATA

"One of the things we saw when we went after our CO2 goals, is we used technology to give the people on the shop floor better data and faster data so they could make real-time changes to the processes. This gave us lower energy costs, lower carbon footprint and typically, a higher output."

Kevin Anton
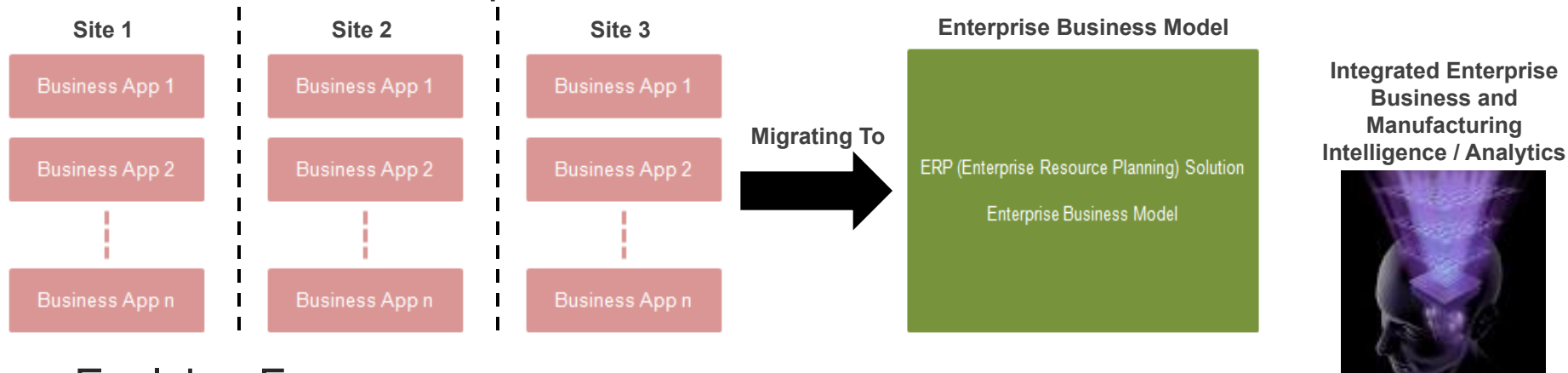
Chief Sustainability Officer and Alcoa Vice President
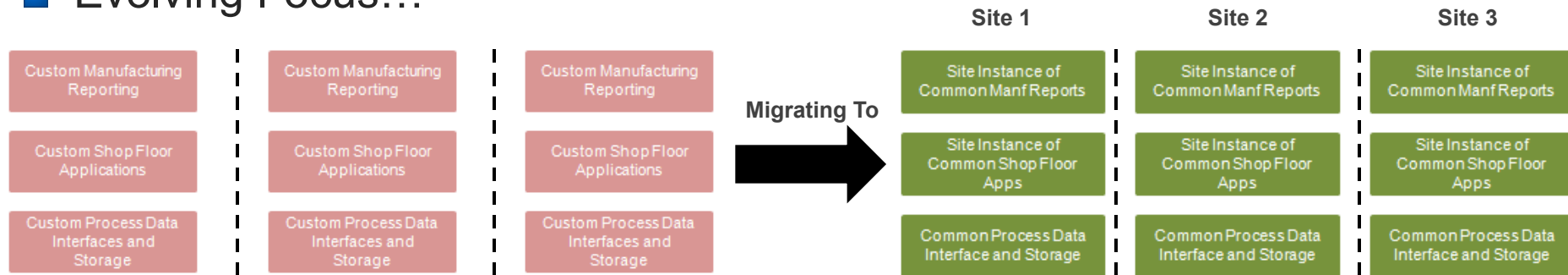
21st Century Manufacturing Excellence

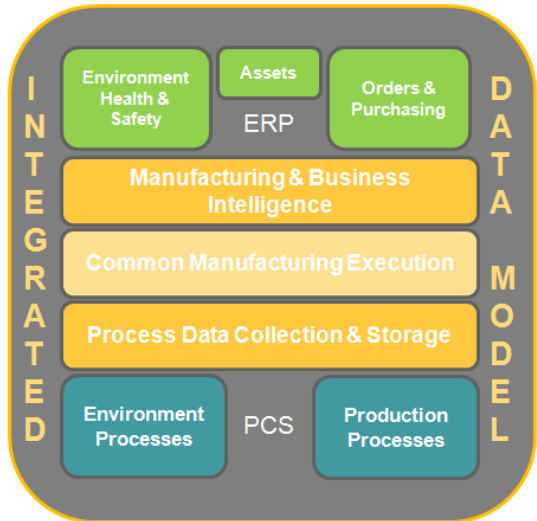**Securing a Sustainable Future through an Enterprise Architecture**

April 16th, 2013

ALCOA

Initial Focus of Enterprise Architecture

Site 1	Site 2	Site 3
Business App 1	Business App 1	Business App 1
Business App 2	Business App 2	Business App 2
Business App n	Business App n	Business App n

Migrating To →

Enterprise Business Model

ERP (Enterprise Resource Planning) Solution

Enterprise Business Model

Integrated Enterprise Business and Manufacturing Intelligence / Analytics

Evolving Focus…

Custom Manufacturing Reporting	Custom Manufacturing Reporting	Custom Manufacturing Reporting
Custom Shop Floor Applications	Custom Shop Floor Applications	Custom Shop Floor Applications
Custom Process Data Interfaces and Storage	Custom Process Data Interfaces and Storage	Custom Process Data Interfaces and Storage

Migrating To →

| Site 1	Site 2	Site 3
Site Instance of Common Manf Reports	Site Instance of Common Manf Reports	Site Instance of Common Manf Reports
Site Instance of Common Shop Floor Apps	Site Instance of Common Shop Floor Apps	Site Instance of Common Shop Floor Apps
Common Process Data Interface and Storage	Common Process Data Interface and Storage	Common Process Data Interface and Storage

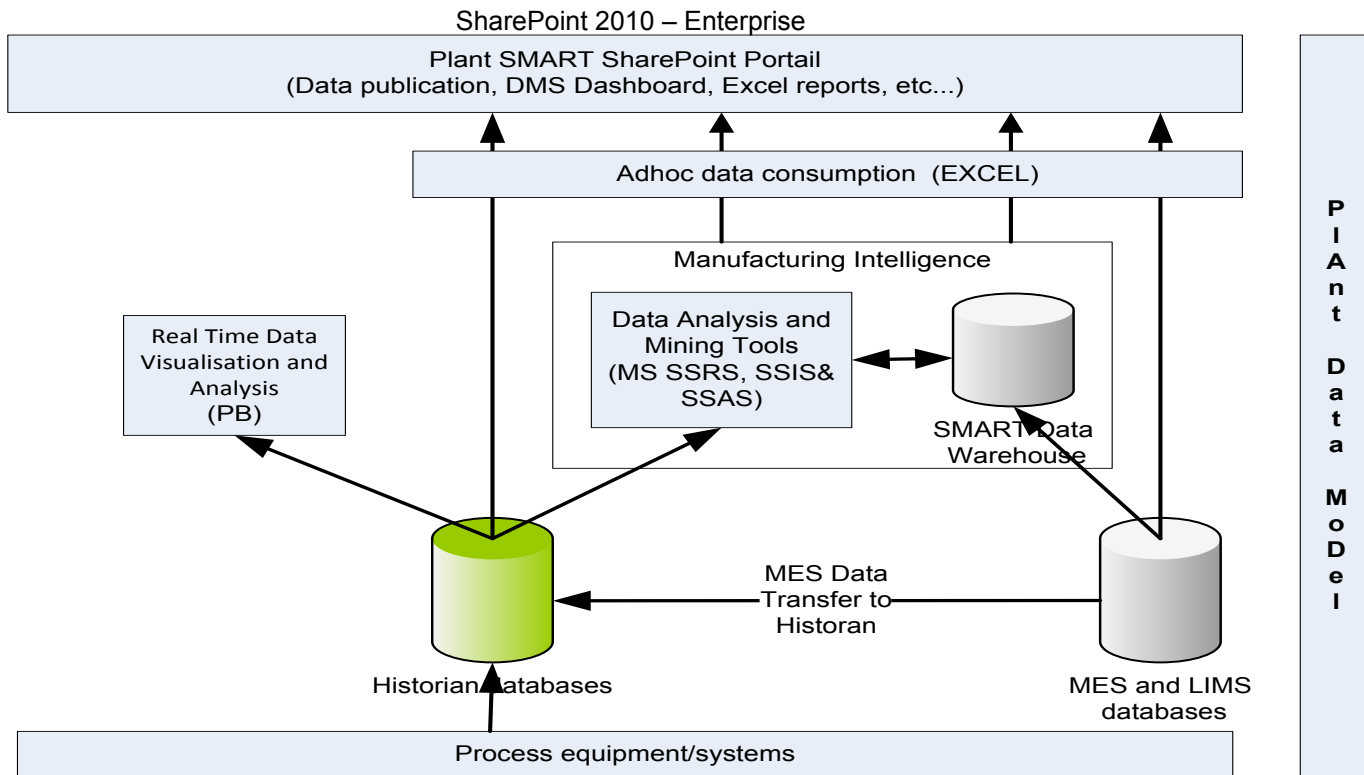- Develop an Overall Enterprise Architecture Model that Delivers All Required Technical Capabilities

- Align Business Leadership with the Benefits of Leveraging Information into the Business Operating System

The Alcoa GPM 'SMART Manufacturing' Solution
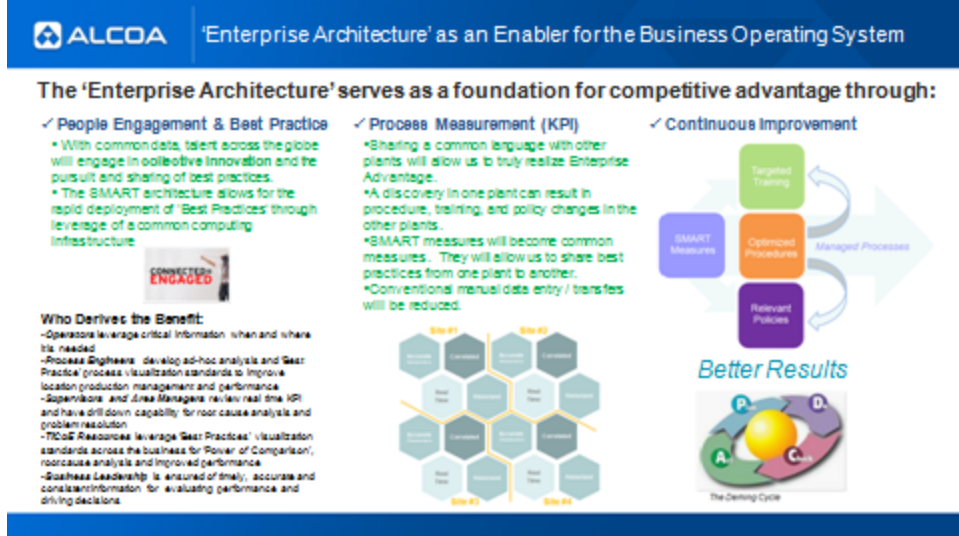
Infrastructure Architecture – Leveraging the CMI Model
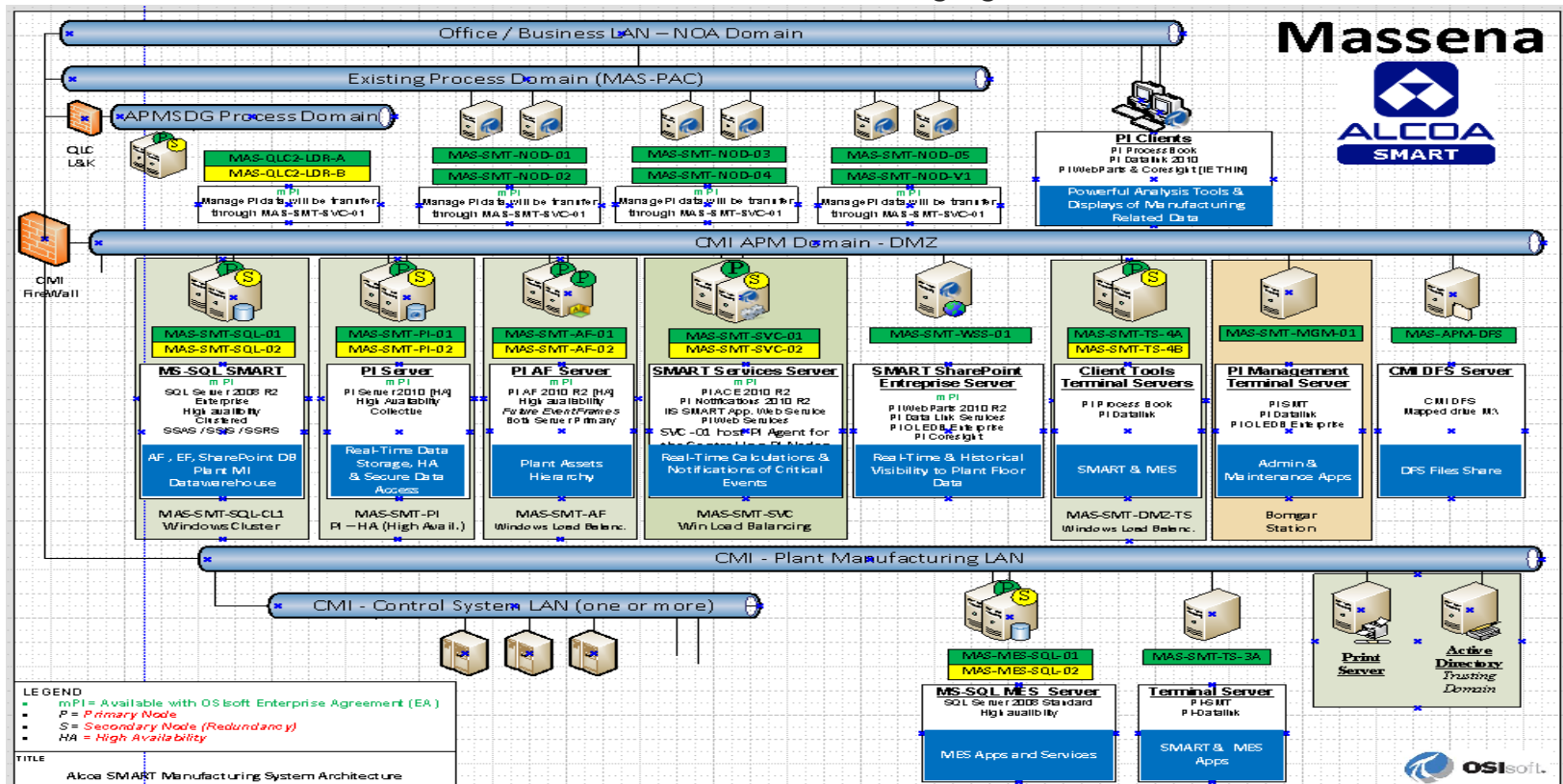
The Data and Visualization Toolset

The Data Model Concept
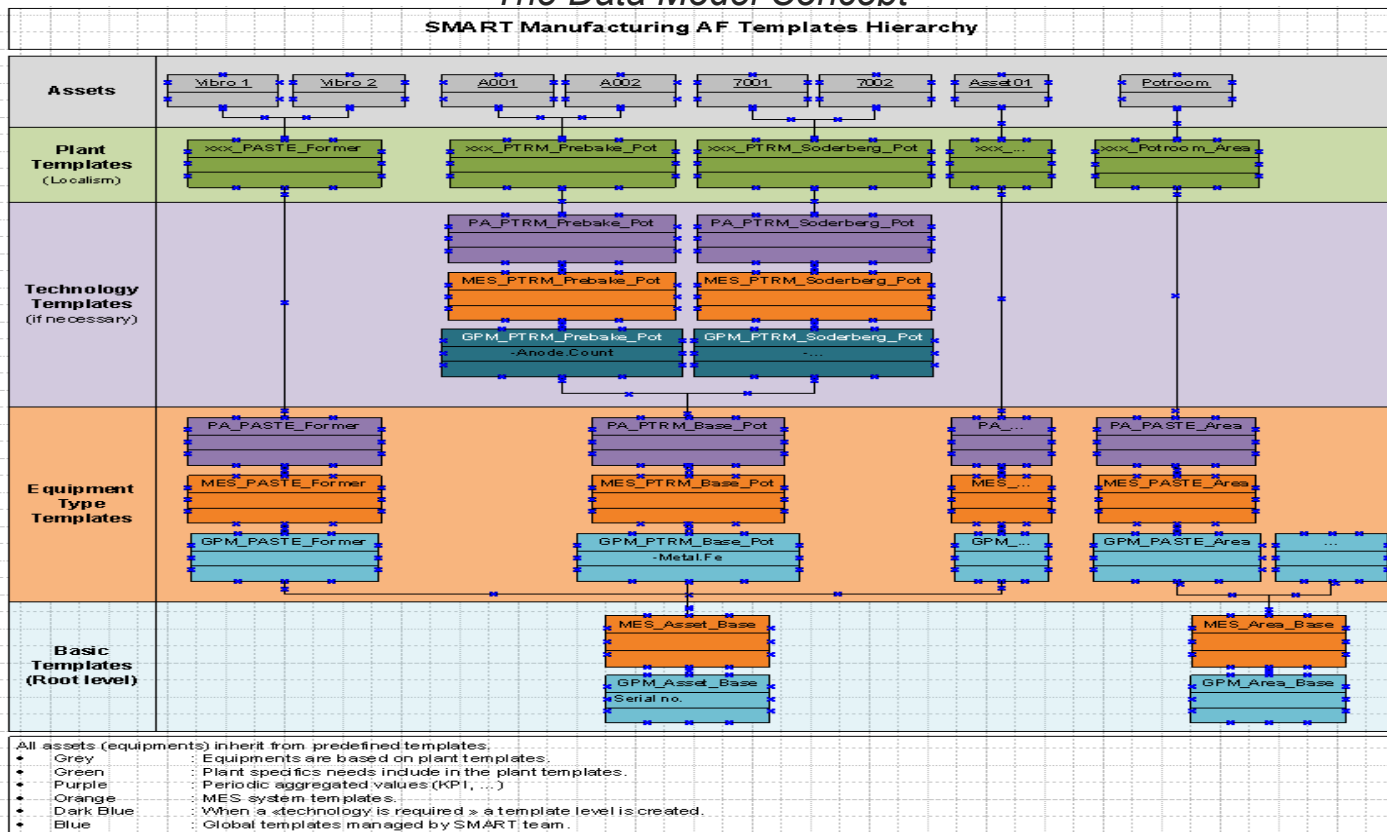
Extending the Common Data Model to the Enterprise
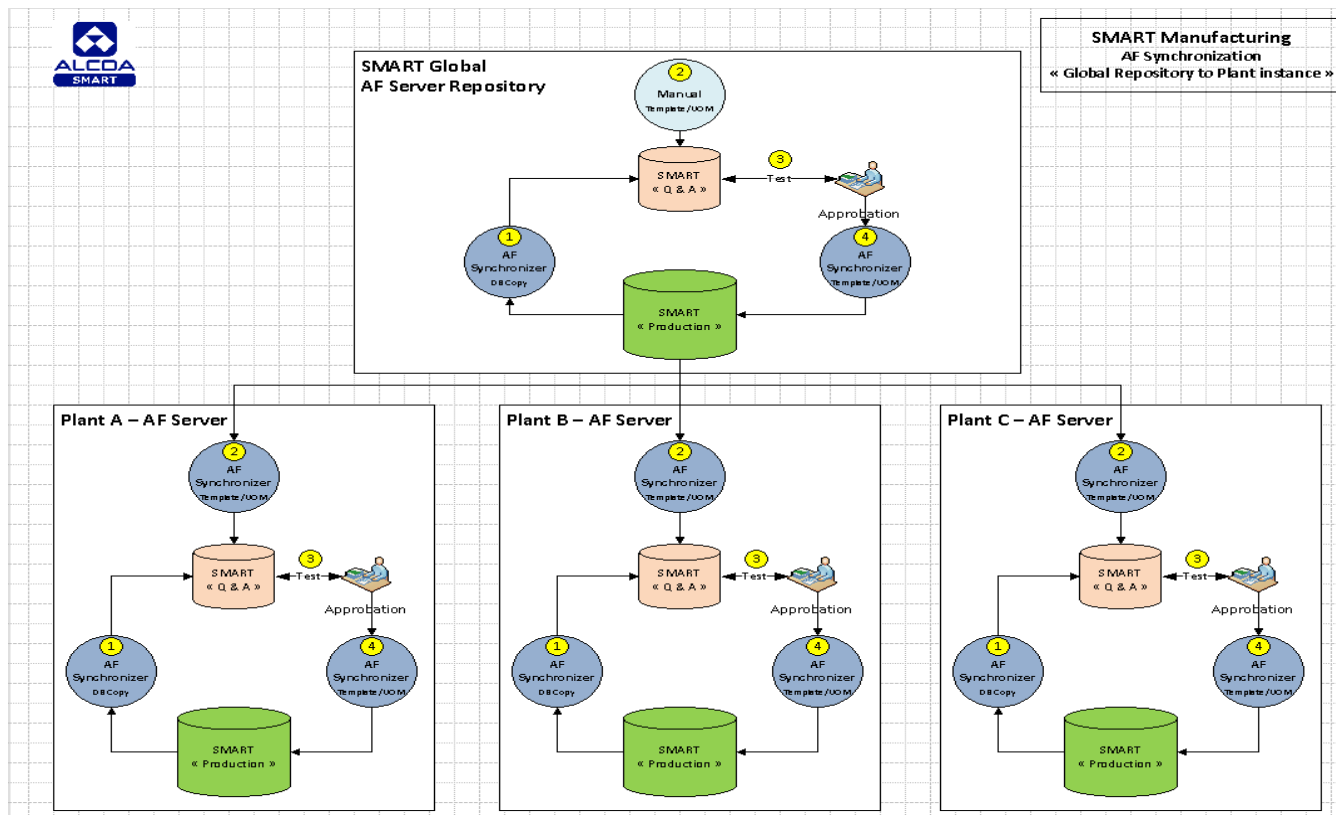
Manufacturing Application Portfolio

■ Recognize the criticality of 'Change Management' within the Business Operating System

- Clearly Define Roles and Responsibilities


Project Resourcing
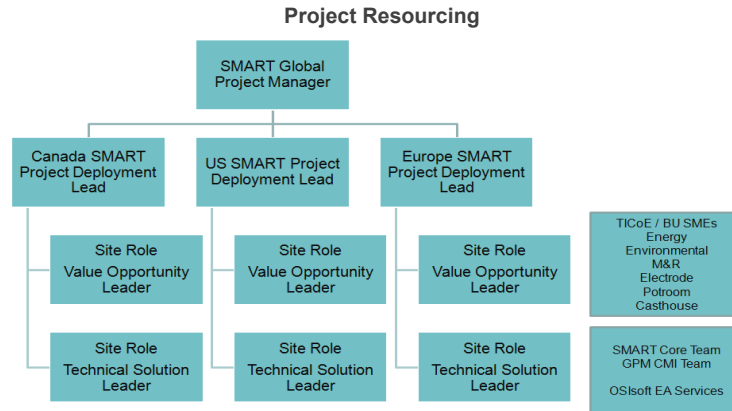
- Identify Value as the Key Deliverable – Not the Technology
- Identify People as the Critical Component to Delivering Results

The 'Enterprise Architecture' serves as a foundation for competitive advantage through:

✓ People Engagement & Best Practice

- With common data, talent across the globe will engage in **collective innovation** and the pursuit and sharing of best practices.
- The SMART architecture allows for the rapid deployment of 'Best Practices' through leverage of a common computing infrastructure
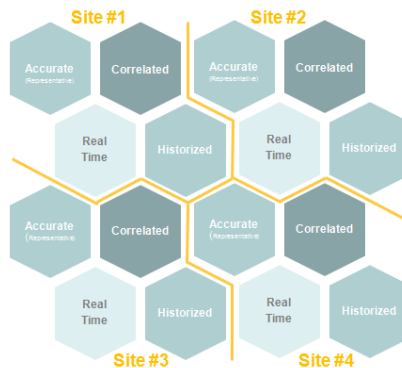
CONNECTED = ENGAGED
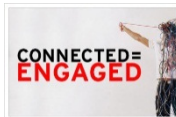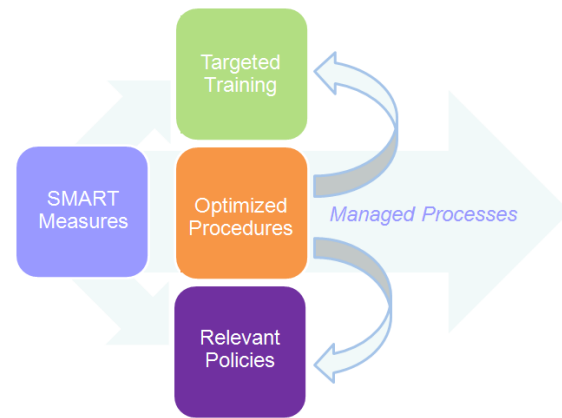
Who Derives the Benefit:
- *Operators* leverage critical information when and where it is needed
- *Process Engineers* develop ad-hoc analysis and 'Best Practice' process visualization standards to improve location production management and performance
- *Supervisors and Area Managers* review real time KPI and have drill down capability for root cause analysis and problem resolution
- *TICoE Resources* leverage 'Best Practices' visualization standards across the business for 'Power of Comparison', root cause analysis and improved performance
- *Business Leadership* is ensured of timely, accurate and consistent information for evaluating performance and driving decisions

✓ Process Measurement (KPI)

- Sharing a common language with other plants will allow us to truly realize Enterprise Advantage.
- A discovery in one plant can result in procedure, training, and policy changes in the other plants.
- SMART measures will become common measures. They will allow us to share best practices from one plant to another.
- Conventional manual data entry / transfers will be reduced.

Site #1 — Site #2 — Site #3 — Site #4
Accurate (Representative), Correlated, Real Time, Historized

✓ Continuous Improvement

Targeted Training, SMART Measures, Optimized Procedures, Relevant Policies — *Managed Processes*

Better Results

The Deming Cycle (Plan, Do, Check, Act)

After Project Deployment

Primary Roles:
- Value Identification
- Value Opportunity Progress Tracking
- DI Creation
- Value Reporting / Dashboard

Primary Roles:
- Maintain / Upgrade Infrastructure
- Maintain Data Model
- Deploy / Maintain Identified Best Practices

ALCOA GPM SMART USERS GROUP

| Site Role Value Opportunity Leader | Site Role Value Opportunity Leader | Site Role Value Opportunity Leader | TICoE / BU SMEs Energy Environmental M&R Electrode Potroom Casthouse |
| Site Role Technical Solution Leader | Site Role Technical Solution Leader | Site Role Technical Solution Leader | SMART Core Team GPM CMI Team OSIsoft EA Services |