SAP MII
Manufacturing Integration and Intelligence
Positioning within the Business Suite Portfolio

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SSM Manufacturing
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Agenda

- SAP MII Brief Overview
  - Capabilities
  - Architecture
  - Integration Landscape
- MII and Process Integration
- MII and Business Objects
- MII and Enterprise Portals
- Summary
SAP MII is a service-based composition environment that leverages unique services for rapid development of Manufacturing Integration and Intelligence applications across all industries served.

**Data Services**
- Real-time integration of data with plant floor systems, applications and legacy systems.

**Visualization Services**
- Extensible presentation layer presented via web pages. Family of configurable UI objects provide manufacturing views in role based dashboards or via wireless PDAs.

**Business Logic Services**
- Flow based logic engine, enables data aggregation and transformation of disparate data. Transactions can be triggered or scheduled. Calculations, business rules, and alerts are easily developed and executed.
SAP Manufacturing Platform Delivers Information and Process Integration

Manufacturing Integration & Intelligence
- Business Logic Services
  - Visualization
  - Quality Engine
  - KPIs / Metrics / Alerts

Data Services

Global Coordination
- PLAN
- MAKE
- DELIVER

ERP
- SCM
- PLM

Supplier Processes
- Contract Manufacturer

Distributor/Customers
- LOB
- Devices

Simplified Execution
- DCS / PLC via OPC
- MES
- LIMS/ Inspection / Equipment Testing
- Plant DB
- Environmental Building Management
- Plant Data Collection
- Wireless Integration
- SCADA / HMI
- Plant Historian
SAP MII – Core Functions/Services

- **Data Services**
  - Bi-directional data access
  - Metadata browsing
  - XML-based data abstraction
  - Connectors to external systems

- **Business Logic Services**
  - Logic
  - Integration services
  - Notification services
  - Calculation and data transformation
  - Content creation

- **Visualization Services**
  - Charts, grids, tickers, UI controls
  - Dashboard components

- **Analytic Services**
  - SPC/SQC (Six Sigma) analyses
  - Statistical and other mathematical analyses

- **Web Services**
  - All services exposed as web services
  - Includes user-defined composite services

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SAP NetWeaver – Web AS

Manufacturing Integration & Intelligence

Business Logic Services

Visualization

Quality Engine

KPIs / Metrics / Alerts

Data Services

Composition Environment
SAP MII extracts data from SAP ERP and provides real-time visibility and distribution to Plant Floor Systems of:

- Planned Orders
- Bills of Material
- Production & Process Orders
- Material Inventory Levels
- Inspection Lots Data
- Master Recipes
- Material Details
- Batch Details
- Resources & Functional Locations
- Maintenance Work Order & Notification details
- Material & Order Costs

SAP MII’s ability to perform transaction execution into SAP also enables automated, plant-level creation of:

- Production Confirmations
- Process Messages
- Material Receipts
- Material Consumptions
- Material Transfers
- Inspection results recording
- Quality Notifications
- Batch Characteristic recording
- Work Orders & results recording
- Maintenance Notifications

Manufacturing Integration & Intelligence

- Visualization
- Quality Engine
- KPIs / Metrics / Alerts

Data Services

Global Coordination

Simplified Execution

ERP

SCM

PLM

PLAN
MAKE
DELIVER

SCADA / HMI

Plant Historian

Plant Data Collection

Plant DB

Environmental Building Management

MES

LIMS/ Inspection / Equipment Testing

DCS / PLC via OPC

Wireless Integration

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SAP MII in a Multi-Plant Context

- Corporate
- Central SAP BI
- SAP Business Suite SAP NetWeaver®
- SAP MII
- SAP MII
- SAP MII
- SAP MII
- SAP MII
Typical SAP MII Application Areas

Adaptive Manufacturing

Manufacturing Operations
SAP Manufacturing (mySAP ERP)

Manufacturing Synchronization
- Data Integration
- Work Process Management
- UI Simplification

Performance Management
- Dashboards
- Scorecards
- Analytics

Manufacturing Integration
Manufacturing Intelligence
SAP’s pre-packaged integration templates
Accelerated Time-to-business value

Integrated business process platform reduces integration cost throughout integration life cycle

- Duration reduction by 20%
- Duration reduction by 25%
- Reduction of Integration effort by 30%
- Reduction of Deployment per service by 1 day
- Only possible with ESR/SR

"Now we can provision new web services in a technologically independent way – and reduce our development and integration effort by two-thirds through re-use of enterprise services."

Gerald Elder
Project Manager, Swiss Post

*Based on Swiss Post presentation in SAPPHIRE, Berlin 2008*
The current categories for the building block transactions are:

- Materials Data
- Material Movements
- Batches
- Production Orders
- Process Orders
- Plant Maintenance Notifications
- Plant Maintenance Work Orders
- Quality
- Planned Orders
- Repetitive Manufacturing
- IDOCs

The collection of MII transactions will be continuously evolve with all content posted and maintained on SDN.
SAP Partner Landscape for Batch Manufacturing

Manufacturing Enterprise Processes

SAP Business Suite (SCM, PP, PP-PI, IM/WM, QM...)

Manufacturing Operations

SAP MII
“SMART, Best Practice MES Solution”

Intelligence Integration Innovation
Batch Manufacturing Templates
SAP Plant Connectivity (PCo)
SAP NetWeaver Composition Environment

Partner Scheduling & EAM Systems

Partner MES Systems
“Comprehensive MES Solution”

Shop Floor Systems

Inspection/Equipment Testing LIMS Plant Historian HMI PLC SCADA / DCS Weigh Scales
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SAP NetWeaver PI 7.1- Available Now
Single integrated product for comprehensive business SOA

- Single middleware product for A2A, B2B integration across the business network
- High performance and secure end-to-end transactions supporting latest SOA standards
- Pre-integrated repository and registry for centralized service provisioning and governance
- Pre-packaged integration templates significantly reduce integration project TCO
PI versus MII functionality

What do you get from PI?
- EAI Platform
- Enterprise Messaging
  - Centralized configuration, tracing, monitoring, and maintenance of messages across sites and between systems
- Guaranteed Delivery and Store Forward
- Enterprise Service Repository
- Stateful Workflow
- BPM Tools
- Business Activity Monitoring (BAM) functionality
- Asynchronous Communication

What do you get from MII?
- Composition Environment, including GUI tools specifically designed for plant use cases, to develop applications for manufacturing
- Manufacturing Systems Connectivity
- EAI enabler for the plant
- Enterprise message client to PI with local queues
- Easy to use tools to take data from plant systems and populate message templates for message consumption by enterprise applications
- Largely synchronous communication
- Rich analytic capabilities
- Lean, graphical service composition environment
- Service enablement of the shop floor
- Simple data aggregation and transformation tools
Top Reasons to use each product

When you should use PI

- You wish to use Process Integration as the SOA backbone in your Enterprise
- To Establish ES Repository as the central SOA repository in customer landscapes
- To Leverage support of additional WS standards such as UDDI, WS-BPEL and tasks, WS-RM across the enterprise landscape
- Enable high-volume and mission-critical integration scenarios between business applications
- Benefit from new functionality, such as principal propagation, XML validation, and BAM capabilities

When you should use MII

- You have a heterogeneous set of plant data stores that you want to organize and analyze
- You want to get consistent manufacturing operations reporting across sites
- You need to drill down into plant data stores and across different data stores for manufacturing intelligence applications
- You wish to connect proprietary plant applications to ERP data and work processes – through standard, out of the box connectors and tools

Products are complimentary – when both are available in the same landscape, use each for its strengths
How do MII and PI work together?

**SAP PI focus**
- A2A and B2B connector framework to integrate all kind of backend systems and applications
- Business process engine to support stateful, long running business logic
- Pure integration functionality; no flexible, manufacturing-focused UI engine to integrate people with processes

**SAP PI** is the SAP solution for enterprise application integration. **SAP MII supplements** SAP PI in decentralized and synchronous **Manufacturing** environments

**SAP PI and SAP MII** will be - from an architectural point of view - two different systems, whose functionality are deployed in a complementary way
- SAP PI as central instance in data processing service center
- SAP MII as separate deployment instance, often at the manufacturing site, with PI client capabilities, including local queues to withstand network and system outages
Plant to Enterprise Integration using MII and PI – Logical View

- **Process Integration Server** used for Enterprise Messaging
- **Use the PI stack included as part of NetWeaver CE for message queuing and quality of service**
- **MII used at the plant to communicate to proprietary manufacturing automation system data stores, and transform and contextualize the raw data so that it can communicate with ERP transactional systems**
Communication Scenarios for Plant to Enterprise Integration

MII Integration to ERP

- **Scenario 1 – Direct:**
  MII can communicate directly to ERP through BAPIs, RFCs, and IDOCS

- **Scenario 2 – Thru PI:**
  MII can communicate through a PI or XI Server (or other enterprise middleware)

- **Scenario 3 – ESOA:**
  MII can communicate through SAP ESA Services for Manufacturing

Note: Scenarios are not mutually exclusive. They may be combined in any way depending on the needs of the application.
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Product Directions for BI Solutions
SAP BusinessObjects BI Solutions

Dashboards, Visualization
- Web App Designer
- Xcelsius

Enterprise Reporting
- Report Designer
- Crystal Reports
- Web Intelligence

Ad-hoc Query & Reporting
- Pioneer (OLAP Analysis)
- Predictive

Advanced Analysis
- SAP NetWeaver BI and BIA
- BusinessObjects Enterprise

And Much More...
- Polestar
- BI Widgets
- Mobile BI
- Web Services

Enterprise Data Warehousing & BI Platform
- SAP NetWeaver BI and BIA
- BusinessObjects Enterprise
Manufacturing Analytics: Closed Loop Between Strategy and Execution

**Executive Level**
- Executive reporting defines plant Productivity targets

**Plant Level**
- Plant reporting defines line targets

**Line Level**
- Line level data rolls up to summary for plant level reporting

SAP Business Objects

SAP MII Intelligence

Plant level data rolls up to summary for executive and Cross-site reporting
Production Analytics – MII with Xcelsius
## SAP MII / Business Objects Evolution

<table>
<thead>
<tr>
<th>SAP MII Version</th>
<th>Released</th>
<th>Description</th>
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| SAP MII 12.1   | Q4/2008  | ■ Existing: Basic connectivity to Business Objects server via Web service interface  
               ■ Use SAP MII as data source for Business Objects Xcelsius (SDN article) |
| SAP MII 12.2   | 2009     | ■ Provide connector for Business Objects Crystal reports to report on top of SAP MII data/queries.  
               ■ Provide local Crystal reporting runtime engine inside SAP MII. |
| SAP MII 14.0   | 2010     | Manufacturing Analytics  
               ■ Rich set of analytical composites for targeted industries available |
SAP MII and Business Objects Differentiation

SAP MII - Manufacturing Intelligence and Integration:

- **Product Space** – Enterprise Manufacturing Intelligence, Operations Management, Manufacturing Execution Systems
- **Key words** – Real Time data, Manufacturing, Transactional, Distributed Architecture
- Manufacturing Composition Environment for real time plant applications
- Integrates existing applications from Plant floor to SAP Business Suite
- Used for Synchronous and Asynchronous transactions between applications
- Does Not Require data replication to an OLAP Database for reporting
- **Note** - Plans underway to integrate SAP MII to Business Objects applications (reporting and dashboards)

Business Objects

- **Product Space** – Business Intelligence, Enterprise Performance Management, Enterprise Information Management
- **Key Words** – Enterprise, Analytics
- **Enterprise Reporting** Solution
- Query, Reporting, Dashboards, and Analytics on top of corporate data sources
- Data integration, data quality, and metadata management
- Information discovery, search and navigation
- **Note** – All SAP MII customers have a complementary Business Intelligence strategy
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Summary

The SAP NetWeaver® Portal component enables you to centralize and integrate resources and processes from across the enterprise – creating a Web-based work environment that maximizes the productivity of your employees, partners, and customers.

Key Features

• **Unified interfaces** – Create a single point of access for all info and applications
• **Intuitive design** – Helps users quickly access the right resources
• **Personalization** – Meet the exact needs of individual users
• **Flexibility** – Recombine functionality and customize portals as your needs change
• **Enhanced usability** – Reduce user learning time and develop custom user interfaces
• **Unmatched integration** – Interface with SAP® and non-SAP enterprise applications
• **Extensibility** – Support cross-enterprise applications
NOTICE: Production Meeting scheduled for 10:00 AM has been resch
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Connectors provide instant integration to plant systems

Leverages existing investments – data replication not required

Provides integration and intelligence in one framework

Applications are developed very quickly – time to benefit in weeks

Includes pre-built templates for integrating to SAP Business Suite

Designed for real-time manufacturing applications

Delivers transactional integration for simplifying user interaction with ERP
Thank you!
SAP MII Integration Landscape
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