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1. SAP Manufacturing Direction
2. SAP MII Past, Present, Future Architectures
3. SAP MII 12.2 + Plant Connectivity (PCo) 2.1
4. SAP Composites
Manufacturers must make the leap
... from collaboration across islands of production

- New Product
- Change order
- New Supplier
- Quality Recall
- Acquired Plant
- Out of Stock
- Late Delivery
- Aging Asset
Manufacturers must make the leap to co-innovating across a global plant floor.

Network Coordination, Network Visibility, Network Execution
Global Trends and their Impact on Manufacturing

Accelerated Demand & Supply Volatility

Mounting Operational Complexity

Intense Pressure to protect margins

Agility
Responsive, network-wide Collaboration & Coordination
- High Demand & Supply volatility
- High supply network inventories
- Focus on Operating Margins

Operations

Visibility
Real-time Visibility & Transparency
- High TCO from distributed, heterogeneous system landscape
- Data redundancy and latency results in delayed, or poor quality decisions
- Lack of standardization across multiple plants

IT

Sustainability
Efficient, Cost Effective Plant Floor Operations
- Unpredictable product lifecycles
- Decrease production costs without compromising service
- Ensure compliance and quality
- Optimize asset utilization

Production
SAP Manufacturing Direction

Old Architecture

New Architecture

Core idea:
“Smaller pieces of reusable software components provide greater flexibility”

Manufacturing 2.0
“Manufacturing 2.0 capitalizes on service-based and collaboration-based architectures to let manufacturers dynamically reconfigure [...] supply networks to make products right first time and on demand.”

Source: AMR (July 2007)
SAP Manufacturing and MII
Think Globally, Act Locally

Global Planning, Inter-Networked Integration, Local Execution for both Intra and Extra Net

Deliver a full set of plant operations management capabilities through both ERP data and processes as well as local integrated execution systems

Enable a true Composite Development and Execution model based on a manufacturing service oriented architecture

Outcome of this evolution: Manufacturing Operations Management Server in a SOA Environment

- This will enable:
  - Partners, SAP, and Customers to deliver composites to meet customer needs and specific vertical integrated scenarios
    - Complete solution map through a combination of partners products and SAP products
  - True global thinking and planning, fully integrated with local execution systems
    - Regardless of physical deployment, one single architecture
  - Provide a full breadth of applications on common platform that can be assembled for vertical packaged solutions – “SAP Mfg Operations Mgt for Discrete Industries”
    - (plant deployment unit of MII, SAP ME, and complimentary composites)
SAP MII: Manufacturing Integration & Intelligence

Delivering High Value Manufacturing Applications

Positioning
- Delivers manufacturing applications for performance management, continuous improvement, user interface and manufacturing analytics
- Integrates existing plant floor applications to the enterprise
- Extends and simplifies SAP Business Processes to shop floor workers in context to their role
- Composite Application Development Environment for Manufacturing based on SOA Principles
- Enabling Global Planning, Inter-Networked Integration, Local Execution

Highlights
- Data – connectors to the shop floor
- Business Logic Services – advanced data integration and composition layer
- Visualization – role based content creation
- Manufacturing Analytics – SPC/SQC
- Service Based Architecture meets SAP ESA strategy
- Integrates with SAP Business Suite as well as Competitive ERP Solutions
- Applications are developed very quickly – time to benefit in weeks
- Includes pre-built templates for integrating to SAP Business Suite
- Partners, SAP, and Customers to deliver composites to meet customer needs and specific vertical integrated scenarios

Prerequisite
- Runs on SAP NW Composition Environment (Java v1.5)
SAP MII in a Multi-Plant Context
Deployments of SAP MII have been from a single site production server to as many as 60 production servers globally.
Agenda

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1. Maintain MII as an “extension toolkit” to react to changing Mfg Operations Mgt landscape, providing solutions for:
   - Data integration
   - Data enrichment and transformation
   - Plant specific event processing
   - Operational composites
   - Manufacturing Intelligence dashboards
   - Service enable legacy plant operations applications

2. Converge with core SAP architecture solutions, specifically:
   - NW CE Platform
   - Development Environment (Eclipse & NWDI)
   - Analytics (BOBJ +BW, VC)
   - BPM
   - Process Integration

   It is important to note that NWDI, PI, ERP, Galaxy, and BOBJ are all OPTIONAL integration points. Customers can still implement lean MII solutions (MII only on NW CE) with no dependence on other SAP Suite components. This allows plants with minimal IT infrastructure and staff to implement MII solutions, and provides an evolutionary approach for those customers to embrace deeper integration scenarios.

3. Develop integrated industry specific deployment models for simple selling and delivery
   - “SAP Mfg Operations Mgt for Discrete Industries” – (plant deployment unit)
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Manufacturing Data Objects (MDO) - SAP MII v12.2

New Semantic Layer for content development/support of composite applications
- Friendlier namespace
- Full WSDL enabled namespace
- Global, common namespace (fully transportable)
- Project based namespace for deployment with a project
- Easier to create content centrally, then “wire it in” at the plant

New Object Modeling environment with persistence
- Ability to put any data object (XML, query object, simple scalar data points, etc.) into model/namespace
  - Production Orders from ERP
  - Query (on-demand or cached) from plant systems
  - “Temporal” Data staging (material consumption for reporting back to ERP at end of run)
- Rules for data persistence and cleanup (replace, append, update, delete when, on-demand only)

New Query Type to support use of objects in Content
- Similar to SQL Query
- Ability to track usage of objects
- Security model consistent with all query types
SOA Strategy for Manufacturing
- SAP MII v12.2

WSDL Interface for all MII data services through Query Templates
- Generic /Rowsets/Rowset/Row definition that can be used to call any template

Service Repository Integration with enhanced local service browsing
- Browse SR by classification and search pattern via BLS action
- Improved integration within MII for consuming ESOA services
- Ability to publish MII services to Central or local SR
UI Updates
- SAP MII 12.2

SPC Chart
- Ability to identify Nelson rule violation through label on chart point
- Configurable authorization for Point Suppression
- Configurable authorization for Comment
- Can show limit values in chart or on legend

Grid
- Check boxes for Boolean values

Standard Chart
- New “Limit” Chart: Simple line chart with control limits, violations for 1-32 pens
- Regions / color banding in line charts

Web Content Development
- Standard Tag Library Upload interface
  - For embedding content objects on MII pages for example JSTL
Limit Chart – Ability to show quality data without calculation overhead (v12.2)

- **Purpose**: Provide the ability on a chart to add in upper, center, and lower limit lines
- **Benefit**: Highlight out of range points without adding in SPC Calculation overhead.

![Limit Chart](image)

<table>
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<th>Limit Type</th>
<th>Show Limit Text</th>
<th>Horizontal Text Alignment</th>
<th>Vertical Text Alignment</th>
<th>Font Size</th>
<th>Font Style</th>
<th>Reverse Coloring</th>
</tr>
</thead>
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<tr>
<td>Upper Limit</td>
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<td>L</td>
<td>AUTO</td>
<td>10</td>
<td>Plain</td>
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<tr>
<td>Center Line</td>
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<td>AUTO</td>
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<tr>
<td>Lower Limit</td>
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<td>L</td>
<td>AUTO</td>
<td>10</td>
<td>Plain</td>
<td>☐</td>
</tr>
</tbody>
</table>
SPC Chart Alarm Texts

- **Purpose**: Provide the ability to label alarming points
- **Benefit**: Highlight out of range points and reason why for the operator
SPC Chart Comments and Point Suppression Security

**Purpose:** Provide the ability to allow roles access to comments and point suppression

**Benefit:** Restrict or enable users to interact with the SPC Chart
SPC Chart Limit Texts

- **Purpose**: Provide the ability to label limits directly on the SPC Chart
- **Benefit**: Define the limit values for the operation to verify
New Features

- Try/Catch construct in BLS transaction through new actions
- Value Mapping
  - Define rules for data value lookup and transformation
  - Rules can have expressions
  - Change document values based on rule
  - Lookup values based on a rule (Find the tag for material consumption based on the line)
  - Import/Export rules into csv for editing in Excel
- Time Zone conversion in expression editor
- JCo Action has timeout
- Localize return messages via localization file
- Sort and Filter action updated to include Message element if present
Design Time Updates

- Step Through Debug
  - Break Points
  - Color Coding of action success/failure/not executed
  - Watch variables
  - Ability to modify variable value at break point
  - The ability to take debug output and view in another editor to help when looking at large strings / XML docs, etc (watch variables)

- Custom action SDK updated to allow use of Connection & Credential stores
Step Through Debug of Transaction

- **Purpose**: Provide the ability of the developer to control the execution of a transaction.
- **Benefit**: Provides action introspection and variable control at runtime in order to provide real-time feedback to the developer on the state of each action within the transaction.
- **Configuration**: Create a break point on an action and run the transaction in Debug mode.
MII Content Project Management and Administration – SAP MII v12.2

Projects:
- Manage and export/import/deploy roles with a project
- Manage and export/import/deploy role navigation with a project
- Manage and export/import/deploy MDO model with a project
- Ability to have applet “skins” per project – deployable with project
- Meta Data for a project (for informational purposes)

Administration:
- Ability to track usage of queries in transactions and transactions used in objects, “Where Used”
- Runtime Content Usage Statistics
Where Used

Where Used for MII content in Transactions and Objects

- **Purpose**: Provide visibility to all the places where an MII content object is utilized
- **Benefit**: Allows the developer to know where content is utilized and to understand the potential impact a change to or deletion of that object will have on other objects
- **Configuration**: Right click on the object in the folder and select “Usage”.

![Diagram of MII content usage](image-url)
General Enhancements  
- SAP MII v12.2

Security
- Credentials are locked to a specific role or locked to creator
- Additional lock down configuration capability for URL queries
  - For example, only allow Param.N parameters to be overwritten in a SQL Query

Rewrite of all MII Administration pages in Web Dynpro

Updates to Query Caching
- Auto update of cache, schedule to populate cache instead of a user request
- New query script methods to help manage data set (isCached(), getCachTime())
Integration of ME Specific Agents into core PCo capability with ME 5.2
- File Monitor Agent
- ME Destination and Agent

Integration to SAP System Landscape Directory (SLD)
Remote Health Monitoring through MII or through local admin console
SDK for customers and partners to develop their own agents

Query Execution Capability
- Query capability equivalent to old UDS query capability
- Better exception management
- Ability to query tag attributes – select in query

Specifically, new event agents for:
- OPC-UA Current Values (historical spec has been delayed), OPC-HDA, OSISoft PI Native Connector, GE Fanuc Proficy Historian

New Query Agents for:
- OPC-DA, OPC-UA Current Values, OPC-HAD, GE Fanuc Proficy Historian, OSISoft PI Historian, OLE-DB
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MII v12.1 (2009)
- SAP ME Integration to ERP – SAP ME
- Quality Management Integration – SDN
- Batch Manufacturing with SAP MII – SDN

MII v12.2 (2010)
- Global Hydrocarbon Operations (GHO)

For more information see the SAP Developer Network (SDN)
- [http://sdn.sap.com](http://sdn.sap.com)
We do have QM Applications (v12.1)

- We do have QM applications available to the customer on the SAP SDN for download:

Data viewing recording into ERP QM with option to export data

Single Lot & Cross-Lot Analysis for ERP QM
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