

Wonderware MES, and its ERP integration

2011-05-10

Thommy Djupenström

© 2009 Invensys. All Rights Reserved.

The names, logos, and taglines identifying the products and services of Invensys are proprietary marks of Invensys or its subsidiaries. All third party trademarks and service marks are the proprietary marks of their respective owners.

invensys
Operations Management

Agenda

- Wonderware MES
 - MES Overview
 - Wonderware System Platform
- ERP / MES Integration

Wonderware System Platform

Wonderware System Platform is a strategic Industrial Application Services Software for Supervisory, Geo-Scada and Production & Performance Management **in a single system / application**



- InTouch released 1987, first windowsbased automation software(HMI)

- **More than 600,000 active software licenses**
- **At over 150,000 plants & facilities**
- **Supported in more then 181 countries**
- **Across every vertical market**



DAIMLER



Aena



Aeropuertos Españoles
y Navegación Aérea



KUMBA IRON ORE



YELLOW RIVER



Wonderware MES & EMI Software Solutions Built on Strong Platform

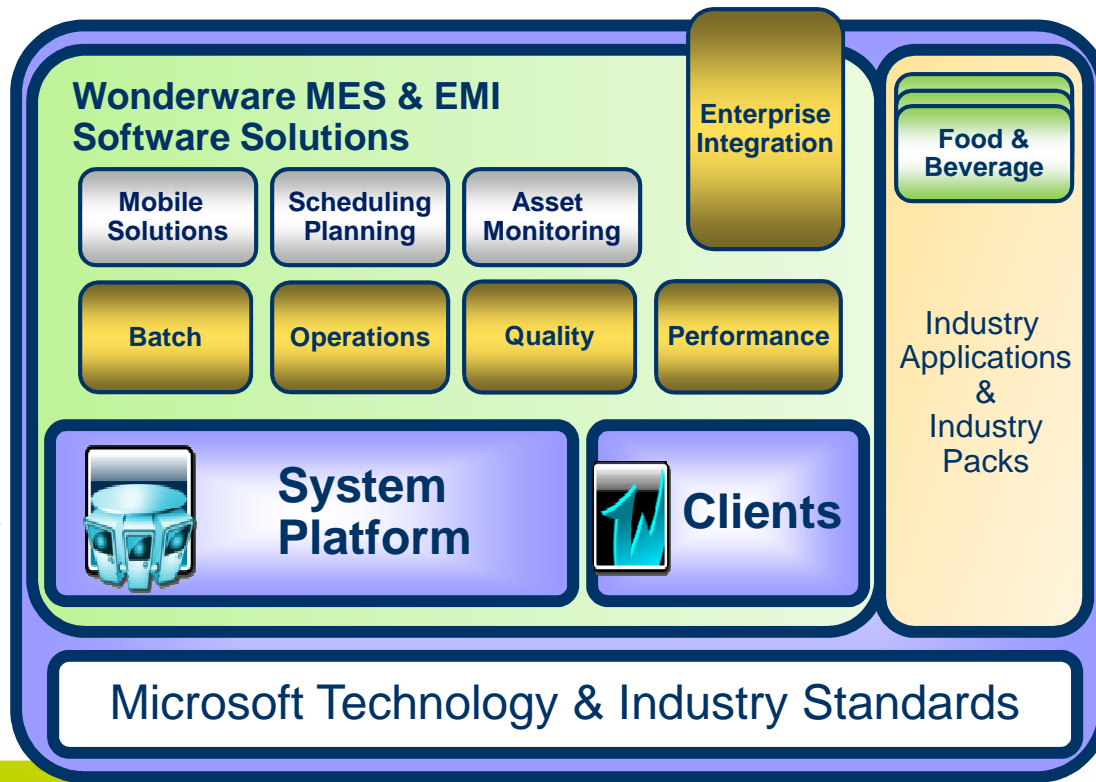
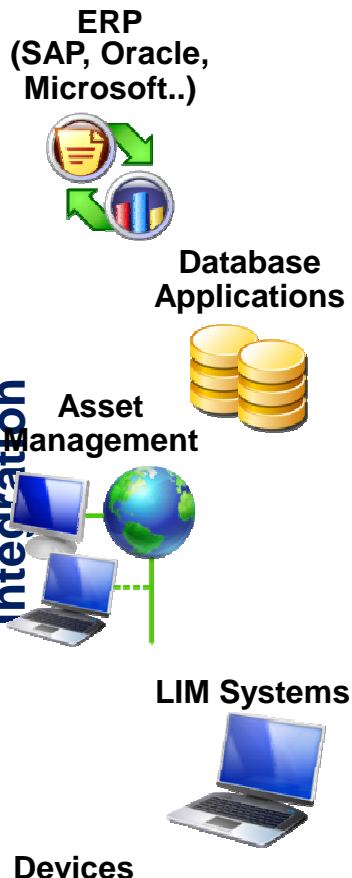
System
Interoperability

Real-Time Manufacturing Operations Management

Information /
Visibility

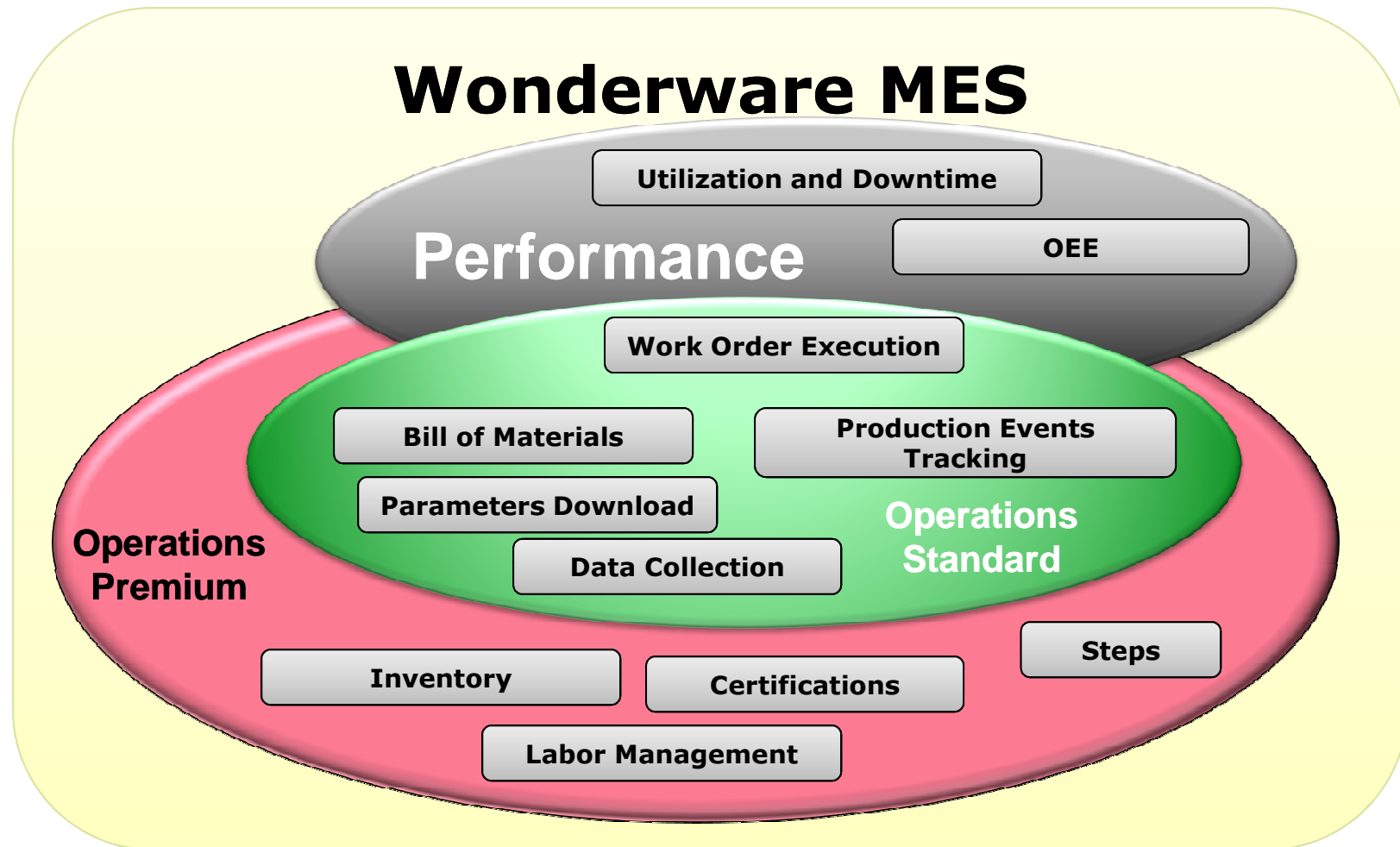


Devices, Applications, Enterprise
Integration

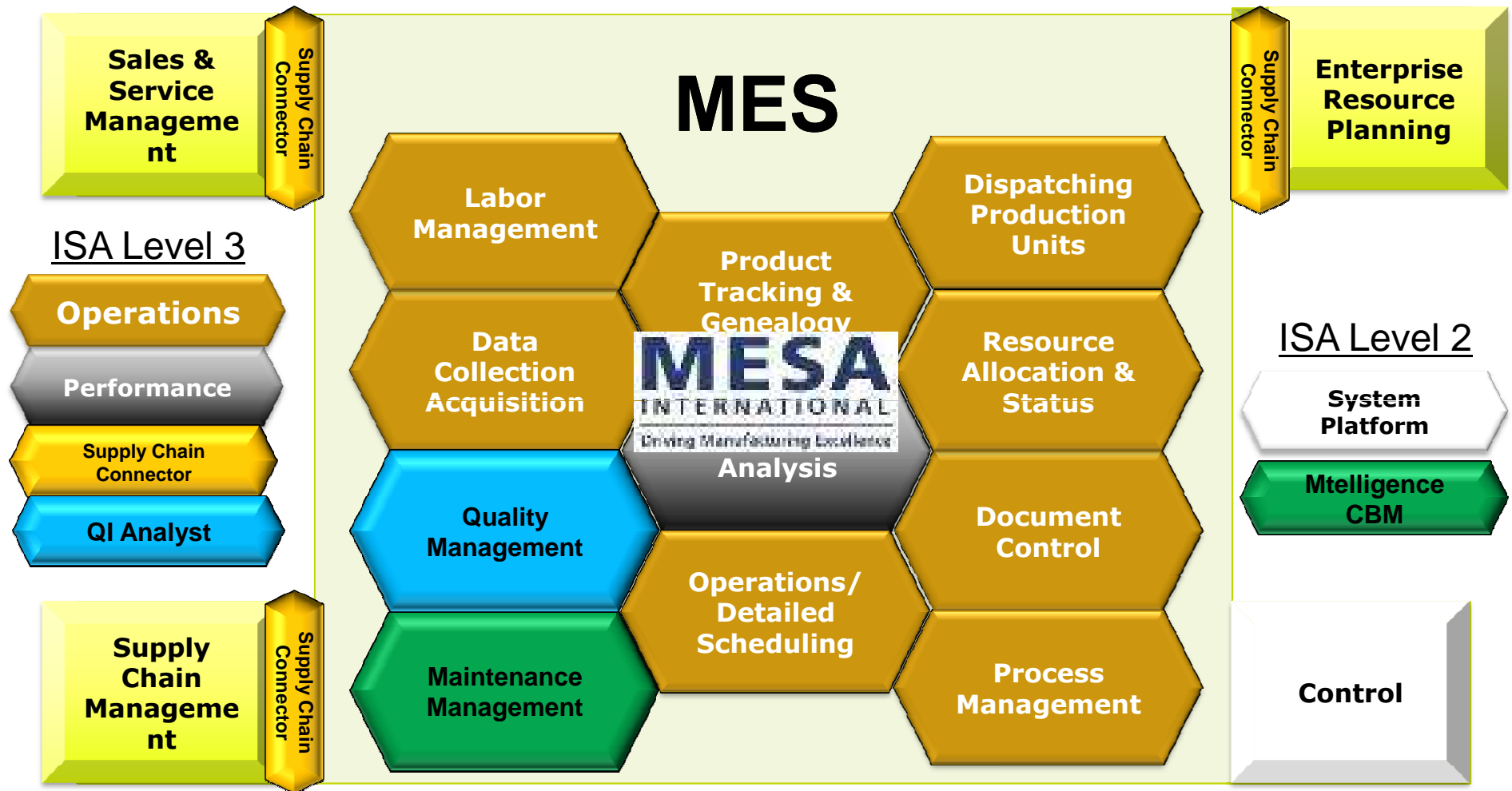


Empowering All Roles in the Plant

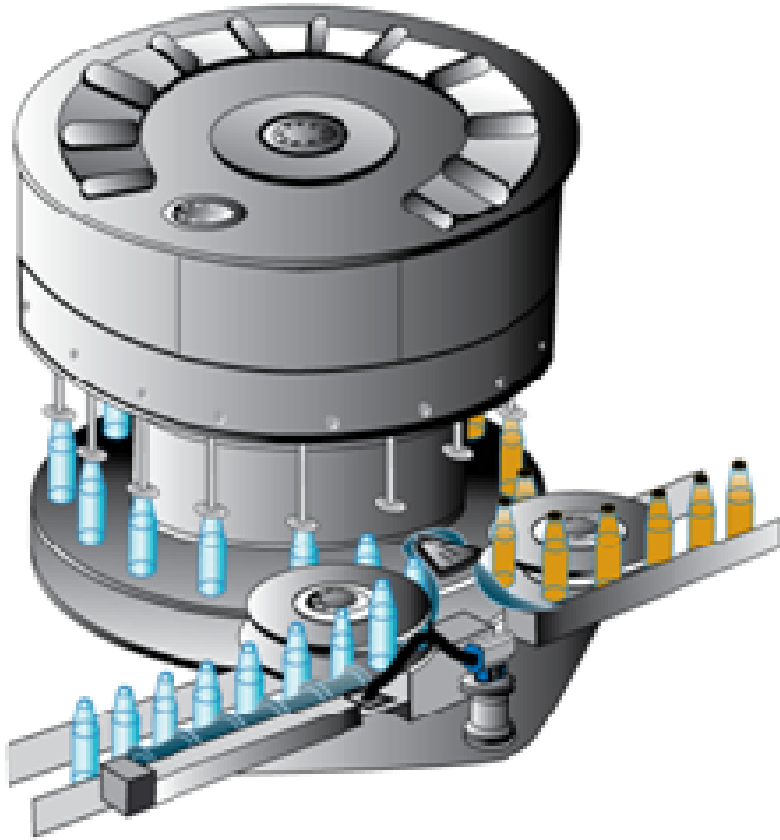
What does Wonderware MES provide?



MES Components



Wonderware MES Strengths



Comprehensive functionality

- “Out of the Box”
- Highly configurable
- Modular capabilities

Open extensible architecture

Configurable business rules

Rapid implementation

Quicker time to benefit

Equipment based plant model

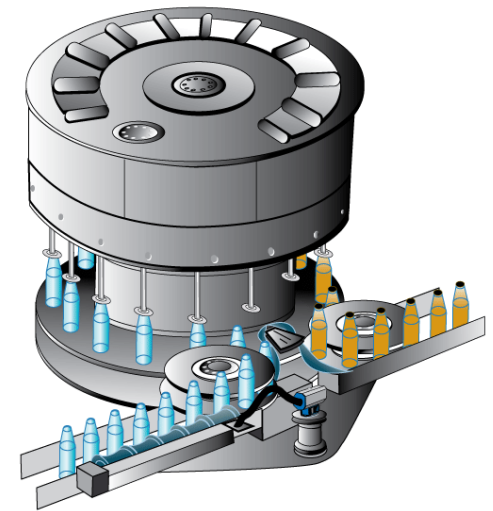
Improve Decision-Making via Information Visibility...

Real-Time Visibility of the Manufacturing Floor

- Production/process orders
- Work in process (WIP)
- Raw material inventory
- Cycle times & yields
- Labor resources

Comprehensive Manufacturing Genealogy

- Forward & reverse traceability of products
- Complete production routing history, including assets
- Complete labor history
- "As-built" vs. "Planned"



Improve Consistency...

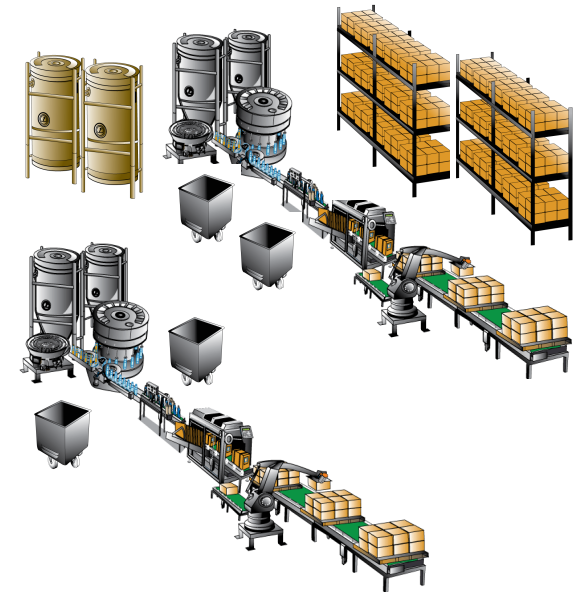
Empower the Supply Chain...

Consistent Production Processes

- Consistent, electronic procedural enforcement (process, operator, equipment & materials)
- Electronic audit trail of adherence to processes
- Enforcement of "Best Practices"
- Improved "Compliance" & "Governance"

Supply Chain Empowerment

- Provide real-time labor, equipment and material (consume & produce) status to improve planning & decision support at Supply Chain level
- Enable real-time/demand driven supply networks
- Enable manufacturing agility



Wonderware MES

Operations and Performance Software

Configurable and Modular

- “Right-size” solution – purchase & deploy functional modules that address specific manufacturing business needs - focus on ROI!!
- Configure the behavior of standard business rules to meet specific solution requirements
- Not a point solution – a component of a comprehensive MES offering/strategy

Wonderware MES

Incremental Investment

- Start small and incrementally extend Execution applications as manufacturing business needs evolve - “built for change”

“Adaptable” Execution Strategy

- Provides the ability to configure a comprehensive execution model internally, or accept and enforce execution instructions from external systems

“Adaptable” User Experience

- Adapt the “User Experience” to reduce complexity and increase the “ownership” of the solution with manufacturing operations

Solutions "Powered By" Wonderware MES...

- ▶ Track & Trace
- ▶ Error Proofing
- ▶ "Paper-on-Glass"
- ▶ Electronic Batch Records (EBR)
- ▶ Electronic Work Instructions
- ▶ Procedural Execution
- ▶ Labor Mgt.
- ▶ Receiving & Inspection
- ▶ Order Management
- ▶ WIP Management
- ▶ Inventory Management
- ▶ Shipping
- ▶ Quality Data Collection
- ▶ Weigh & Dispense
- ▶ Batch Processing
- ▶ Recipe/Spec. Mgt.
- ▶ Master Data Mgt.
- ▶ HACCP

MES Client Application

The screenshot displays the MES Client Application interface, which is divided into several panes and sections:

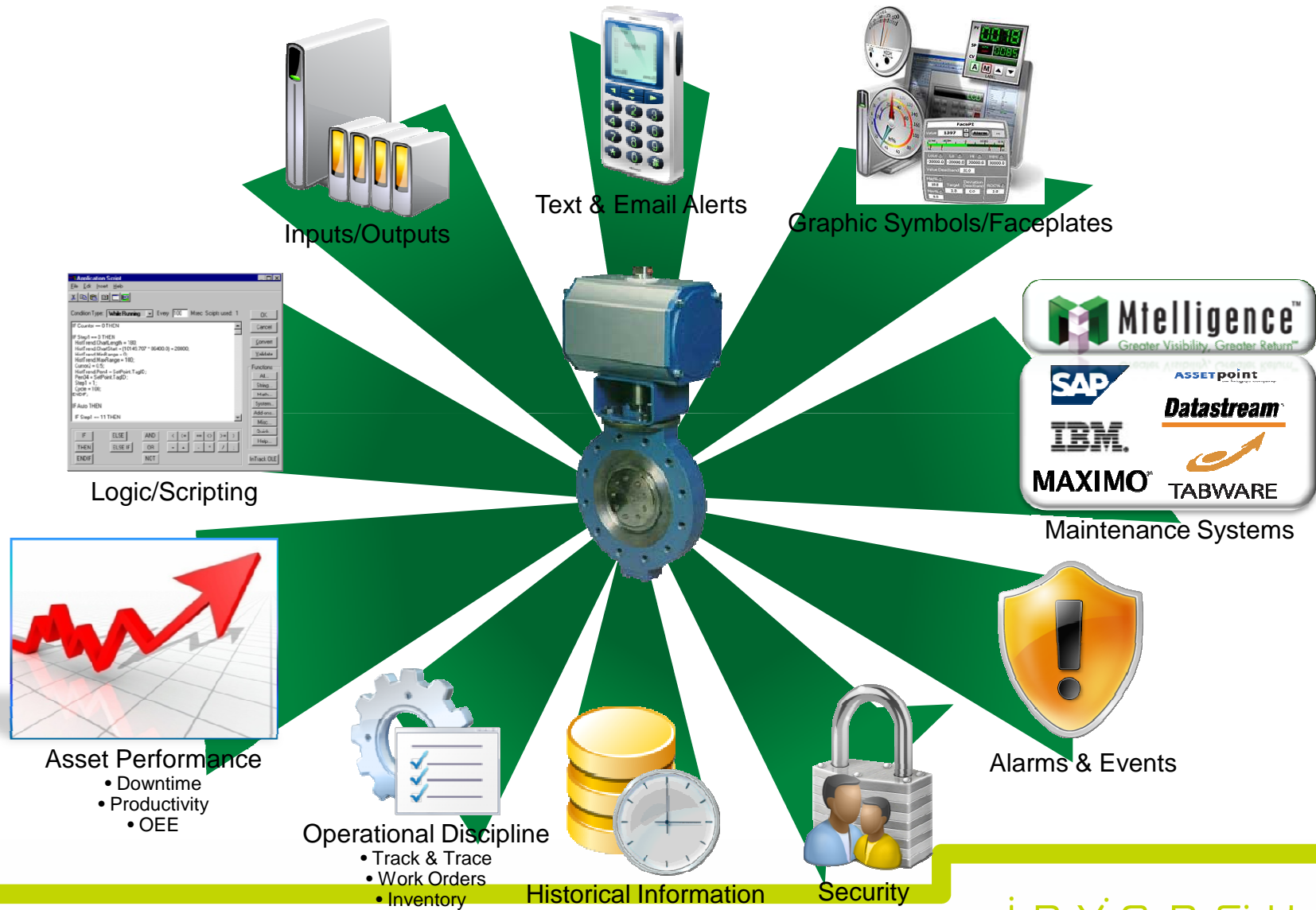
- Navigation Bar:** Located at the top left, it includes tabs for Home, Tools, and View, and a 'Current View' section with buttons for 'Save as default', 'Save to logged-in', and 'Revert to default'.
- Order Management:** A central pane on the left showing a list of work orders and jobs. It includes buttons for 'Apply filters', 'Clear filters', and 'Set per Operator'. Below this is a 'Filters' section and a 'Job State' section.
- Master Data Config:** A section on the left containing links for 'Product Definition', 'Process Definition', 'Order Management', and 'System Management'.
- Process Definition:** A central pane on the right showing a detailed view of a process flow for 'Diet Chocolate-500gm'. It includes a 'Welcome' tab, a 'Processes' tab, and a 'Queue' tab. The process flow is visualized as a sequence of operations: Op10 (Mixer_1), Op20 (QC_Inspect_1), and Op30 (Packer_1), connected by arrows indicating the flow. Below the flow is a table with columns for Status, Operation, Entity, and Input Percent.
- Properties:** A pane on the far right showing various properties for the selected operation, including Operation ID, Description, Type, Default Reject Rate %, File, File Type, Notes, Operation Cost, and several 'Oper spare' fields.
- Error List:** A pane at the bottom left showing a table with columns for Type, Instance, Description, and Extension.

The status bar at the bottom of the application indicates 'Total : 28', 'Selected : 1', and 'Error : 0'.

System Platform overview

Takes advantages of System Platform

Equipment Centric Objects



© Logica 2010 All rights reserved



invenysys

Create, evolve and enforce standards through multi-level derivation

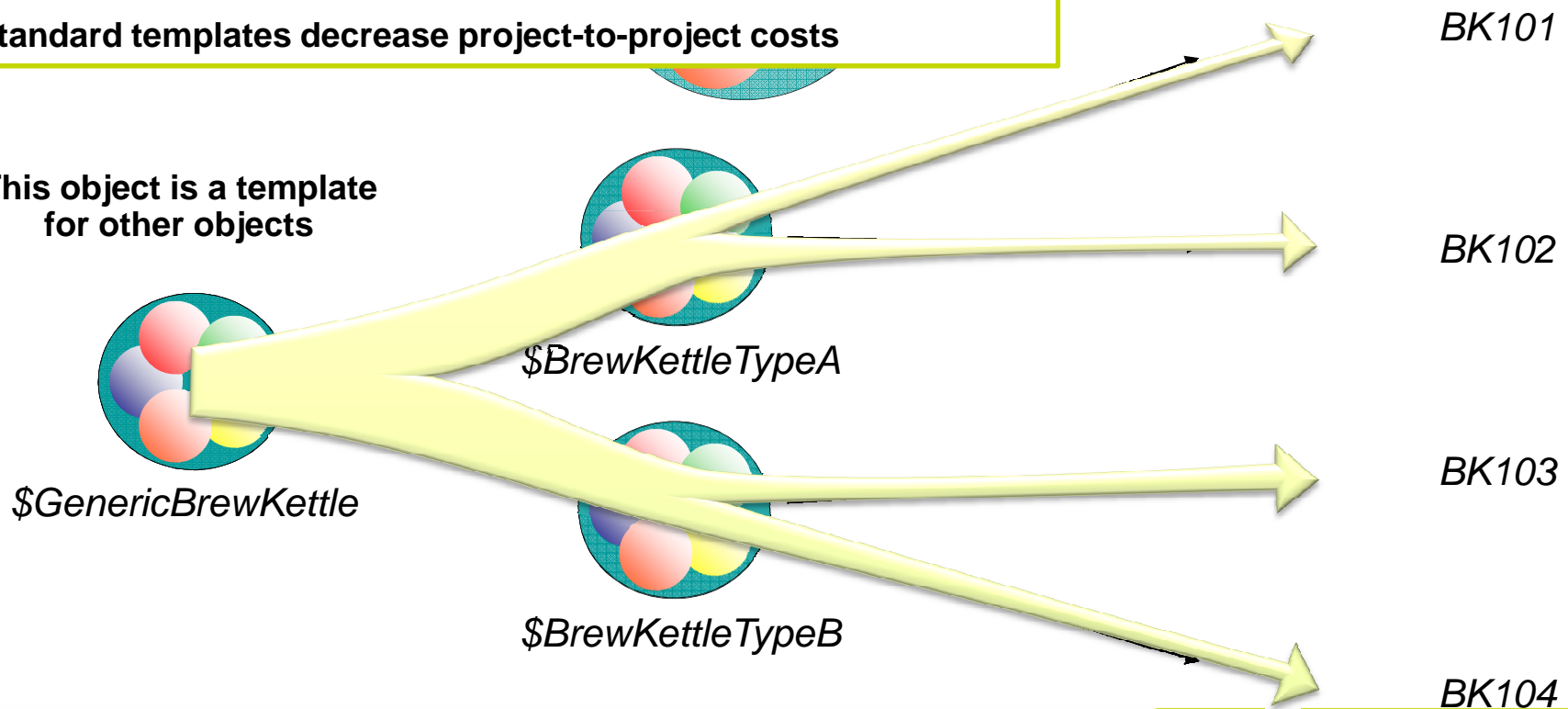
Changes to template automatically propagate to instances

New templates can be derived from existing templates

Libraries of standard objects can be developed

Standard templates decrease project-to-project costs

This object is a template
for other objects



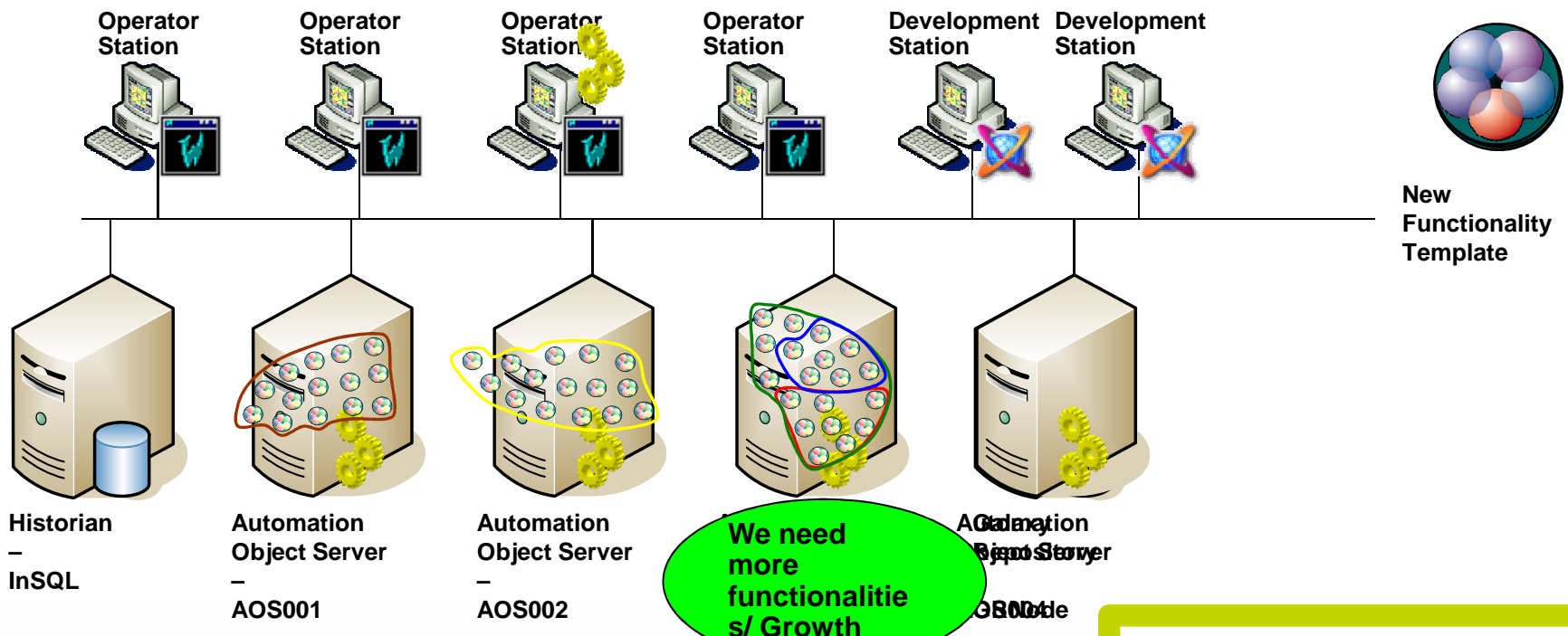
From 1 node / 256 I/O

To 400 nodes / 1 Million I/O

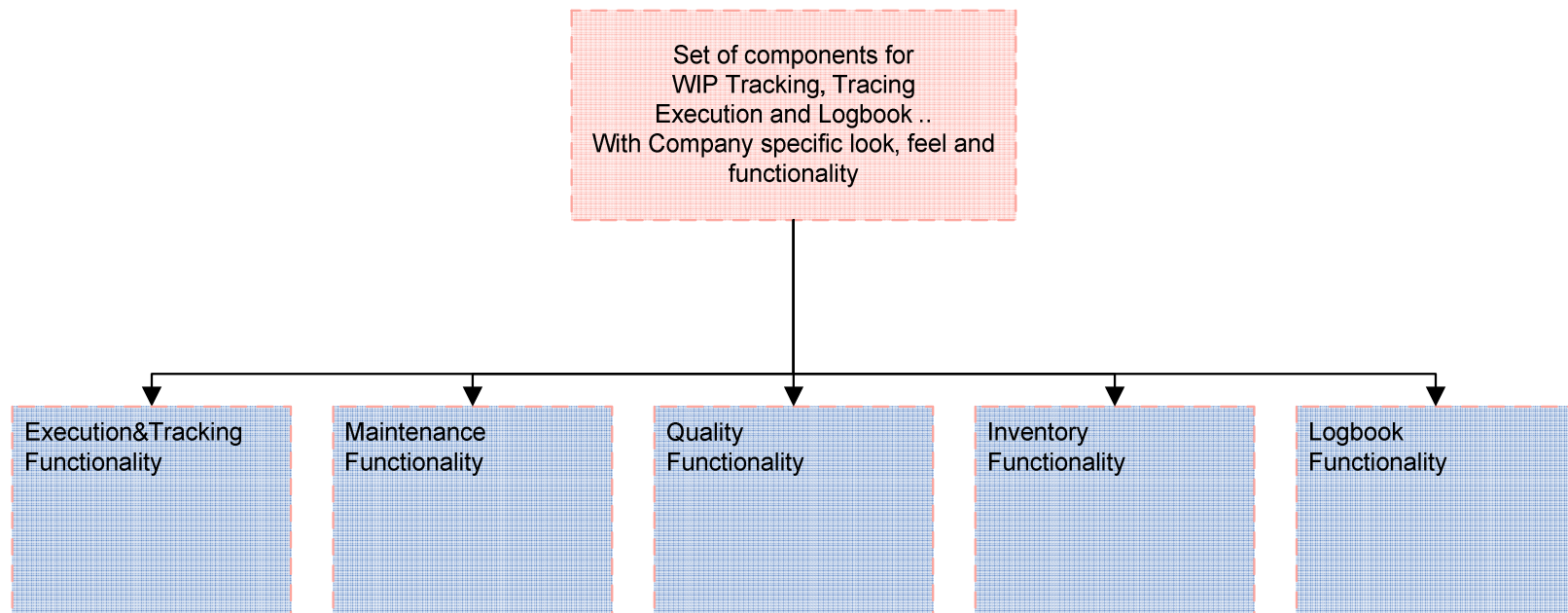
Small System



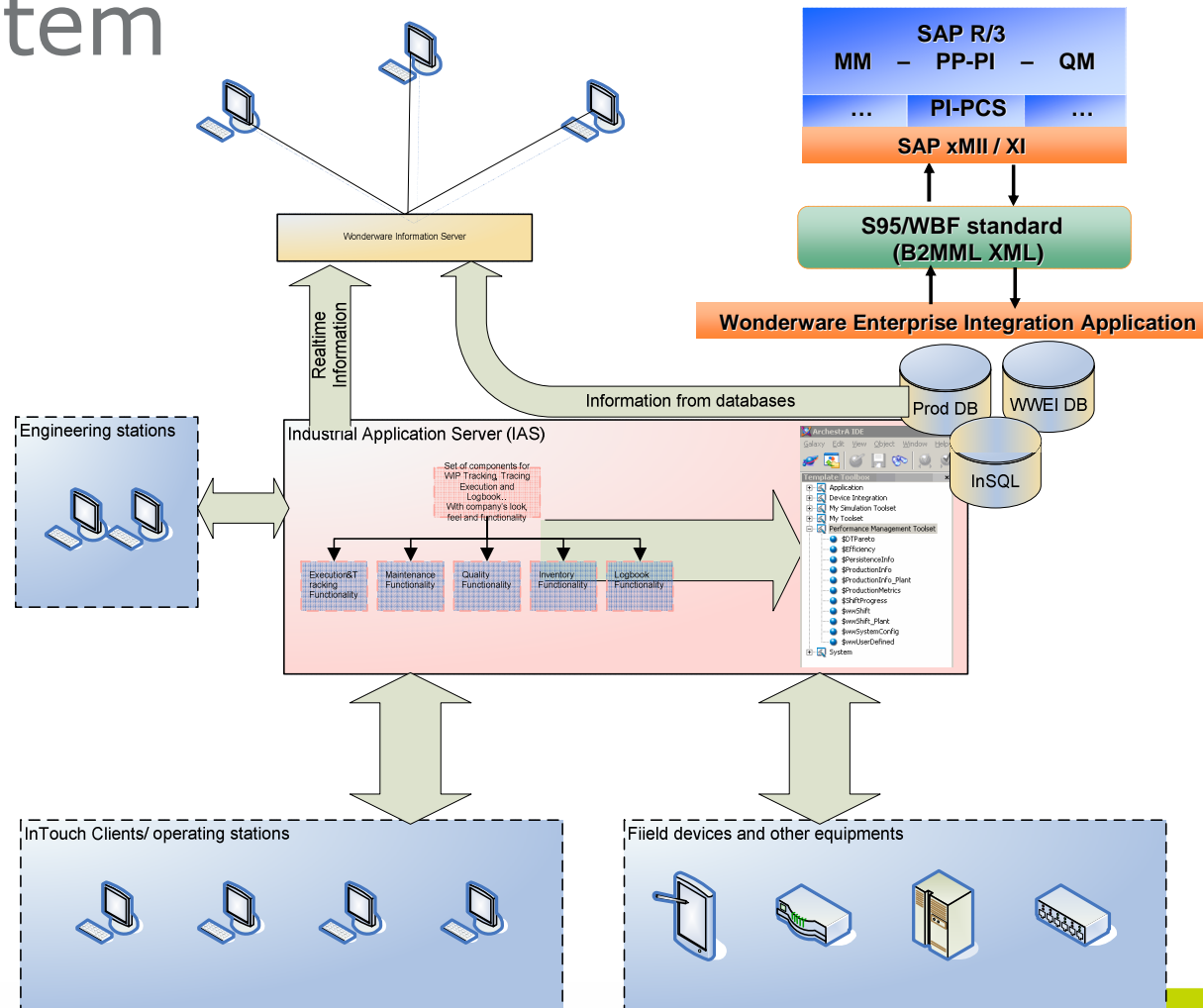
Huge System



Company “Best practices” toolbox



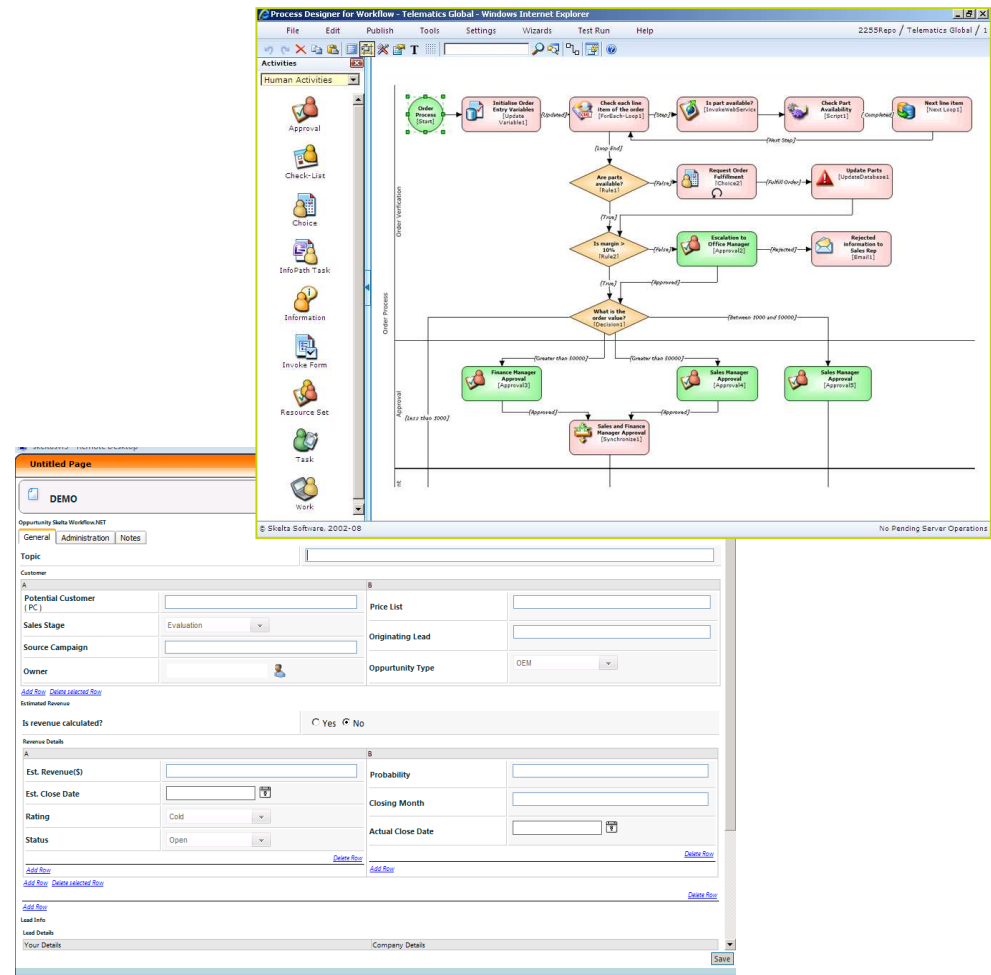
Use company toolbox to implement each system / subsystem



ERP / MES Integration

ERP Integration
S95
Custom...

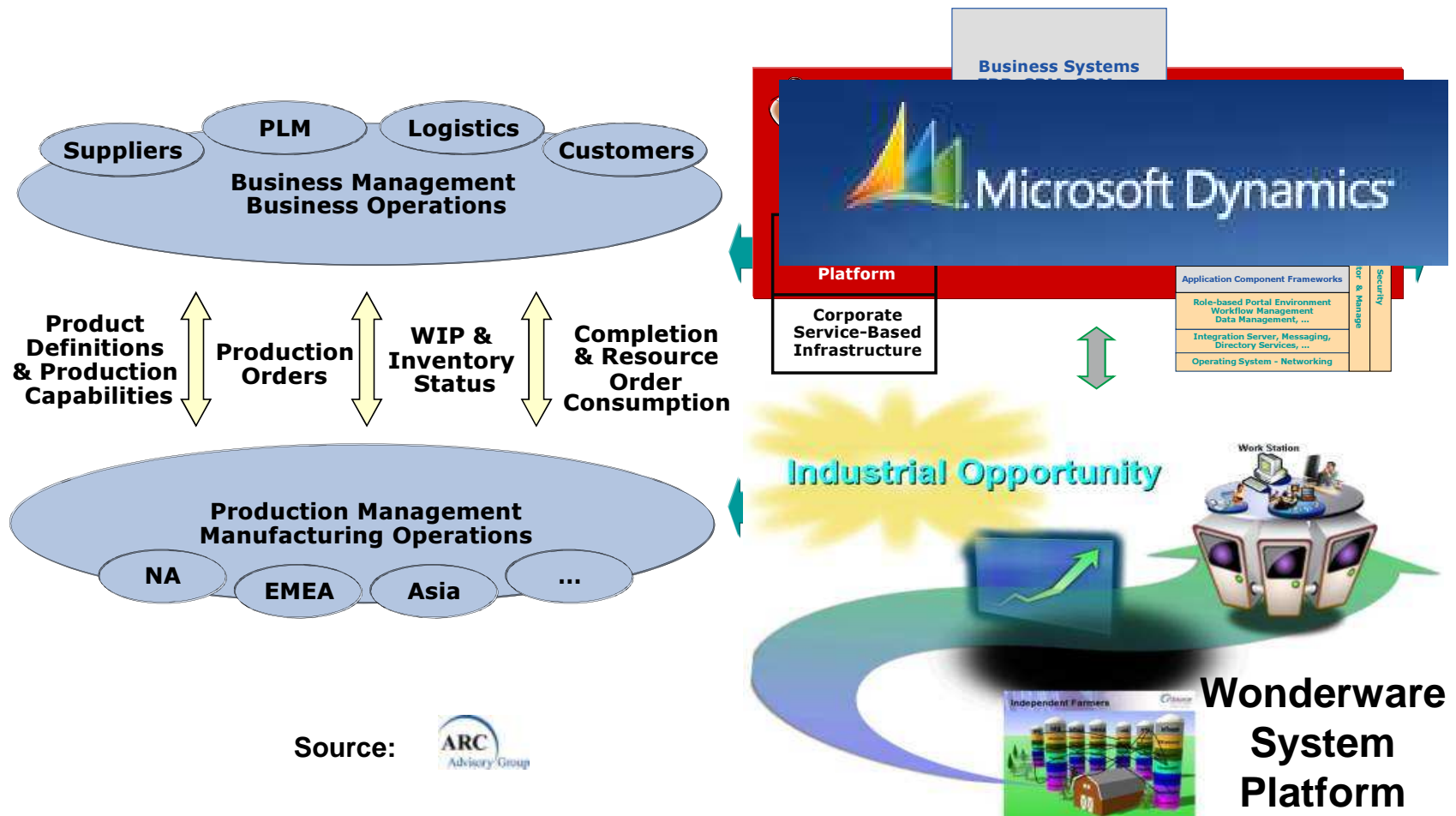
Now also ArchestrA Workflow



Example Microsoft Dynamics AX

Manufacturing Wants To Consolidate

There is a Need for Two Platforms



Demo scenario

Microsoft Dynamics AX - Contoso Entertainment - VPC [AX-SRV-01: Session ID - 4] - [1 - wbk]

Production orders (1 - wbk) - Production: PRD_00004920, Standard bike

File Edit Tools Command Help

Overview General Setup

Create production order (1 - wbk) - New Record

Identification

Production: PRD_00004920 BOM/date: 5/26/2010

Item number: BK-2 BOM number:

Name: Standard bike Route number:

Inventory dimensions

Site: Warehouse: Pool:

Production

Type: Quantity: Delivery: Time:

Item+Category: Manual

OK Cancel

Site	Name
1	Site 1
2	Site 2
3	Site 3

Identify the site

Site	Name
3	Started
3	Created

Identify the production order.

135 unread notifications

USD wbk usr Admin

BOM Route Jobs Update Inquiries Journals Inventory

Production orders (1 - wbk) - Production: PRD_00004921, Standard bike

File Edit Tools Command Help



Overview General Setup References Update Filter Dimension

Production	Item number	Project	Site	Status	Remain status	Pool	Quality order status
PRD_00004898	BK-2		3	Started	Material consumption		
PRD_00004899	BK-2		3	Started	Material consumption		
PRD_00004900	BK-2		3	Started	Material consumption		
PRD_00004901	BK-1		3	Started	Material consumption		
PRD_00004902	BK-2		3	Started	Material consumption		
PRD_00004903	BK-3		3	Started	Material consumption		
PRD_00004904	BK-4		3	Started	Material consumption		
PRD_00004905	BK-1		3	Released	Material consumption		
PRD_00004906	BK-1		3	Released	Material consumption		
PRD_00004907	BK-2		3	Started	Material consumption		
PRD_00004908	BK-3		3	Released	Material consumption		
PRD_00004909	BK-2		3	Released	Material consumption		
PRD_00004910	BK-3		3	Released	Material consumption		
PRD_00004911	BK-4		3	Started	Material consumption		
PRD_00004912	BK-2		3	Released	Material consumption		
PRD_00004913	BK-2		3	Started	Material consumption		
PRD_00004914	BK-2		3	Released	Material consumption		
PRD_00004915	BK-2		3	Released	Material consumption		
PRD_00004916	BK-2		3	Created			
PRD_00004917	BK-2		3	Started	Material consumption		
PRD_00004918	BK-2		3	Started	Material consumption		
PRD_00004920	BK-2		3	Started	Material consumption		
PRD_00004921	BK-2		3	Released	Material consumption		

- Estimation
- Operations scheduling
- Job scheduling
- Release**
- Start
- Report as finished
- End
- Price calculation
- Split
- Reset status
- Log

BOM

Route

Jobs

Update

Inquiries

Journals

Inventory

Gantt

Release current or selected productions

Production papers

I Inlate Inn

135 unread notifications

USD wbk usr Admin

Message Display - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address http://localhost/WonderwareWEI/Messaging/MessageDisplayHolder.aspx Go Links

Wonderware **Wonderware Enterprise Integrator** VMAXDYNAMICS\Administrator Logout

Message Summary Message Log Event Log Listing Configuration

Message Display << Previous Screen

Refresh Listing Export Archive Re-Process As Text

Message # 12830 Summary Update

Creation Date 2010-05-26 16:48:04 Location Id InBoundMessages

Direction IN Message Type AX Inbound Messages

Location Group AX Message Category Inbound Messages

Source Message # Label Prod2010052616475118

Status Processed Status Message

Transfer Destinations

Location Id	Group Id	Transfer Status	Status Message	Dest. Msg #	Dest Msg Status	Re-Process Transfer
InBoundMessagesOUT	AX	Processed		12831	Processed	Re-Process Transfer

Message Body

```
<?xml version="1.0" encoding="utf-8" ?>
- <ProductionOrderDeclaration>
- <ProductionOrderRecord>
  <ProductionOrder>PRD_00004908</ProductionOrder>
  <InventDimID>00000241_069</InventDimID>
  <ItemID>BK-3</ItemID>
  <WorkCenter>402</WorkCenter>
  <BOMID>BOM_00000021</BOMID>
  <ScheduledStart>4/21/2010 12:00:00 AM</ScheduledStart>
  <ScheduledEnd>4/21/2010 12:00:00 AM</ScheduledEnd>
  <ScheduledQty>1</ScheduledQty>
  <Status>3</Status>
- <EstimatedBOM>
  <WorkCenter>402</WorkCenter>
  <BOMID>BOM_00000021</BOMID>
  <OperationNum>10</OperationNum>
  <OperationDesc>BikeAss</OperationDesc>
  <ParentItem>BK-3</ParentItem>
  <BOMPns>1</BOMPns>
```

Done Supervisor admin - [Q... Archestra IDE InTouch - WindowMaker... InTouch - WindowViewer... Message Display - Mi... Local intranet 4:49 PM

Filter By Status:

Production Order	Item ID	Oper ID	Oper Desc	Scheduled Qty	UOM	Status	Work Center	Sched. Start Time	Sched. End Time	Act. Start
PRD_00004902	BK-2	10	BikeAss	0	Pcs.	COMPLETE	402	4/20/2010	4/20/2010	4/20/2010 8
PRD_00004903	BK-3	10	BikeAss	0	Pcs.	COMPLETE	402	4/20/2010	4/20/2010	4/22/2010 1
PRD_00004904	BK-4	10	BikeAss	0	Pcs.	COMPLETE	402	4/20/2010	4/20/2010	4/22/2010 1
PRD_00004907	BK-2	10	BikeAss	0	Pcs.	COMPLETE	402	4/20/2010	4/20/2010	4/21/2010 1
PRD_00004908	BK-2	10	BikeAss	1	Pcs.	COMPLETE	402	4/21/2010	4/21/2010	4/25/2010 1
PRD_00004909	BK-2	10	BikeAss	0	Pcs.	READY	402	4/27/2010	4/27/2010	
PRD_00004910	BK-3	10	BikeAss	0	Pcs.	READY	402	4/30/2010	5/18/2010	
PRD_00004911	BK-4	10	BikeAss	0	Pcs.	COMPLETE	402	4/27/2010	4/27/2010	4/25/2010 1
PRD_00004912	BK-2	10	BikeAss	0	Pcs.	READY	402	4/27/2010	4/27/2010	
PRD_00004913	BK-2	10	BikeAss	0	Pcs.	COMPLETE	402	4/27/2010	4/27/2010	4/26/2010 1
PRD_00004914	BK-2	10	BikeAss	0	Pcs.	COMPLETE	402	4/27/2010	4/27/2010	4/27/2010 7
PRD_00004915	BK-2	10	BikeAss	0	Pcs.	READY	402	4/27/2010	4/27/2010	
PRD_00004917	BK-2	10	BikeAss	0	Pcs.	COMPLETE	402	4/27/2010	4/27/2010	4/27/2010 1
PRD_00004918	BK-2	10	BikeAss	0	Pcs.	COMPLETE	402	5/18/2010	5/18/2010	5/26/2010 3
PRD_00004920	BK-2	10	BikeAss	0	Pcs.	RUNNING	402	5/26/2010	5/26/2010	5/26/2010 4
PRD_00004921	BK-2	10	BikeAss	0	Pcs.	READY	402	5/26/2010	5/26/2010	

Start Prod.
OrderEnter
ConfirmationComplete
Order

Filter By Status:

Production Order	Item ID	Oper ID	Oper Desc	Scheduled Qty	UOM	Status	Work Center	Sched. Start Time	Sched. End Time	Act. Start
PRD_00004902	BK-2	10	BikeAss	0	Pcs.	COMPLETE	402	4/20/2010	4/20/2010	4/20/2010 8
PRD_00004903	BK-3	10	BikeAss	0	Pcs.	COMPLETE	402	4/20/2010	4/20/2010	4/22/2010 1
PRD_00004904	BK-4	10	BikeAss	0	Pcs.	COMPLETE	402	4/20/2010	4/20/2010	4/22/2010 1
PRD_00004907	BK-2	10	BikeAss	0	Pcs.	COMPLETE	402	4/20/2010	4/20/2010	4/21/2010 1
PRD_00004908	BK-2	10	BikeAss	1	Pcs.	COMPLETE	402	4/21/2010	4/21/2010	4/25/2010 1
PRD_00004909	BK-2	10	BikeAss	0	Pcs.	READY	402	4/27/2010	4/27/2010	
PRD_00004910	BK-3	10	BikeAss	0	Pcs.	READY	402	4/30/2010	5/18/2010	
PRD_00004911	BK-4	10	BikeAss	0	Pcs.	COMPLETE	402	4/27/2010	4/27/2010	4/25/2010 1
PRD_00004912	BK-2	10	BikeAss	0	Pcs.	READY	402	4/27/2010	4/27/2010	
PRD_00004913	BK-2	10	BikeAss	0	Pcs.	COMPLETE	402	4/27/2010	4/27/2010	4/26/2010 1
PRD_00004914	BK-2	10	BikeAss	0	Pcs.	COMPLETE	402	4/27/2010	4/27/2010	4/27/2010 3
PRD_00004915	BK-2	10	BikeAss	0	Pcs.	READY	402	4/27/2010	4/27/2010	
PRD_00004917	BK-2	10	BikeAss	0	Pcs.	COMPLETE	402	4/27/2010	4/27/2010	4/27/2010 1
PRD_00004918	BK-2	10	BikeAss	0	Pcs.	COMPLETE	402	5/18/2010	5/18/2010	5/26/2010 3
PRD_00004920	BK-2	10	BikeAss	0	Pcs.	COMPLETE	402	5/26/2010	5/26/2010	5/26/2010 4
PRD_00004921	BK-2	10	BikeAss	0	Pcs.	RUNNING	402	5/26/2010	5/26/2010	

Start Prod.
OrderEnter
ConfirmationComplete
Order

Message Display - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address http://localhost/WonderwareWEI/Messaging/MessageDisplayHolder.aspx Go Links

Wonderware Enterprise Integrator VMAXDYNAMICS\Administrator Logout

Message Summary Message Log Event Log Listing Configuration

Message Display << Previous Screen

Refresh Listing Export Archive Re-Process As Text

Message # 12842 Summary Update

Creation Date 2010-05-26 16:53:30 Location Id ConsumptionDeclarations

Direction IN Message Type AX Outbound Messages

Location Group AX Message Category Consumption Declarations

Source Message # Label StartProd2010052604532753

Status Processed Status Message

Transfer Destinations

Location Id	Group Id	Transfer Status	Status Message	Dest. Msg #	Dest Msg Status	Re-Process Transfer
ConsumptionDeclarationsOut	AX	Processed		12843	Processed	Re-Process Transfer

Message Body

```

- <response>
- <startorderdeclaration>
  <wo_id>PRD_00004921</wo_id>
  <created_at_local>05/26/2010 04:53:27 PM</created_at_local>
  <item_id>BK-2</item_id>
</startorderdeclaration>
</response>

```

Done Local intranet

Start Supervisor admin - [Q... Archestra IDE InTouch - WindowMaker ... InTouch - WindowViewer... Message Display - Mi... 4:53 PM

Microsoft Dynamics AX - Contoso Entertainment - VPC [AX-SRV-01; Session ID - 4] - [1 - wbk]

Production orders (1 - wbk) - Production: PRD_00004921, Standard bike

File Edit Tools Command Help

Overview General Setup References Update Filter Dimension

Production	Item number	Project	Site	Status	Remain status	Pool	Quality order status
PRD_00004898	BK-2		3	Started	Material consumption		
PRD_00004899	BK-2		3	Started	Material consumption		
PRD_00004900	BK-2		3	Started	Material consumption		
PRD_00004901	BK-1		3	Started	Material consumption		
PRD_00004902	BK-2		3	Started	Material consumption		
PRD_00004903	BK-3		3	Started	Material consumption		
PRD_00004904	BK-4		3	Started	Material consumption		
PRD_00004905	BK-1		3	Released	Material consumption		
PRD_00004906	BK-1		3	Released	Material consumption		
PRD_00004907	BK-2		3	Started	Material consumption		
PRD_00004908	BK-3		3	Released	Material consumption		
PRD_00004909	BK-2		3	Released	Material consumption		
PRD_00004910	BK-3		3	Released	Material consumption		
PRD_00004911	BK-4		3	Started	Material consumption		
PRD_00004912	BK-2		3	Released	Material consumption		
PRD_00004913	BK-2		3	Started	Material consumption		
PRD_00004914	BK-2		3	Released	Material consumption		
PRD_00004915	BK-2		3	Released	Material consumption		
PRD_00004916	BK-2		3	Created			
PRD_00004917	BK-2		3	Started	Material consumption		
PRD_00004918	BK-2		3	Started	Material consumption		
PRD_00004920	BK-2		3	Started	Material consumption		
PRD_00004921	BK-2		3	Started	Material consumption		

BOM
Route
Jobs
Update
Inquiries
Journals
Inventory
Gantt

Backorder sales status for the production.

135 unread notifications

USD wbk usr Admin

Production papers
1 Inflate Inn

135 unread notifications

USD wbk usr Admin

start

Microsoft Dynamics A... Production orders (1 ...

4:56 PM

Filter By Status:

Production Order	Item ID	Oper ID	Oper Desc	Scheduled Qty	UOM	Status	Work Center	Sched. Start Time	Sched. End Time	Act. Start
PRD_00004902	BK-2	10	BikeAss	0	Pcs	COMPLETED	402	4/20/2010	4/20/2010	4/20/2010 8
PRD_000049	Partial Confirmation Entry									4/22/2010
PRD_000049										4/22/2010
PRD_000049	Production Order: PRD_00004921									4/21/2010
PRD_000049										4/25/2010
PRD_000049	BOM Pos	Item ID	Item Desc	Required Qty	Consumed Qty	UOM				
PRD_000049	1	SA-1	Standard Saddle	1	1	Pcs.				
PRD_000049	2	WH-1	Standard wheel	2	0	Pcs.				
PRD_000049	3	FR-2	Standard Bike Frame	1	0	Pcs.				
PRD_000049										4/26/2010
PRD_000049										4/27/2010
PRD_000049										4/27/2010
PRD_000049										5/26/2010
PRD_000049										5/26/2010
PRD_000049										5/26/2010

Location: 34

Avail. Quantity 88

Quantity: 

Start Prod. Order

**Enter
Confirmation**

Complete Order

Message Display - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Go Links

Address http://localhost/WonderwareWEI/Messaging/MessageDisplayHolder.aspx

Wonderware **Wonderware Enterprise Integrator** VMAXDYNAMICS\Administrator Logout

Message Summary Message Log Event Log Listing Configuration

Message Display << Previous Screen

Refresh Listing Export Archive Re-Process As Text

Message # 12846 Summary Update

Creation Date 2010-05-26 16:54:53 Location Id ConsumptionDeclarations

Direction IN Message Type AX Outbound Messages

Location Group AX Message Category Consumption Declarations

Source Message # Label Cons2010052604545054

Status Processed Status Message

Transfer Destinations

Location Id	Group Id	Transfer Status	Status Message	Dest. Msg #	Dest Msg Status	Re-Process Transfer
ConsumptionDeclarationsOut	AX	Processed		12847	Processed	Re-Process Transfer

Message Body

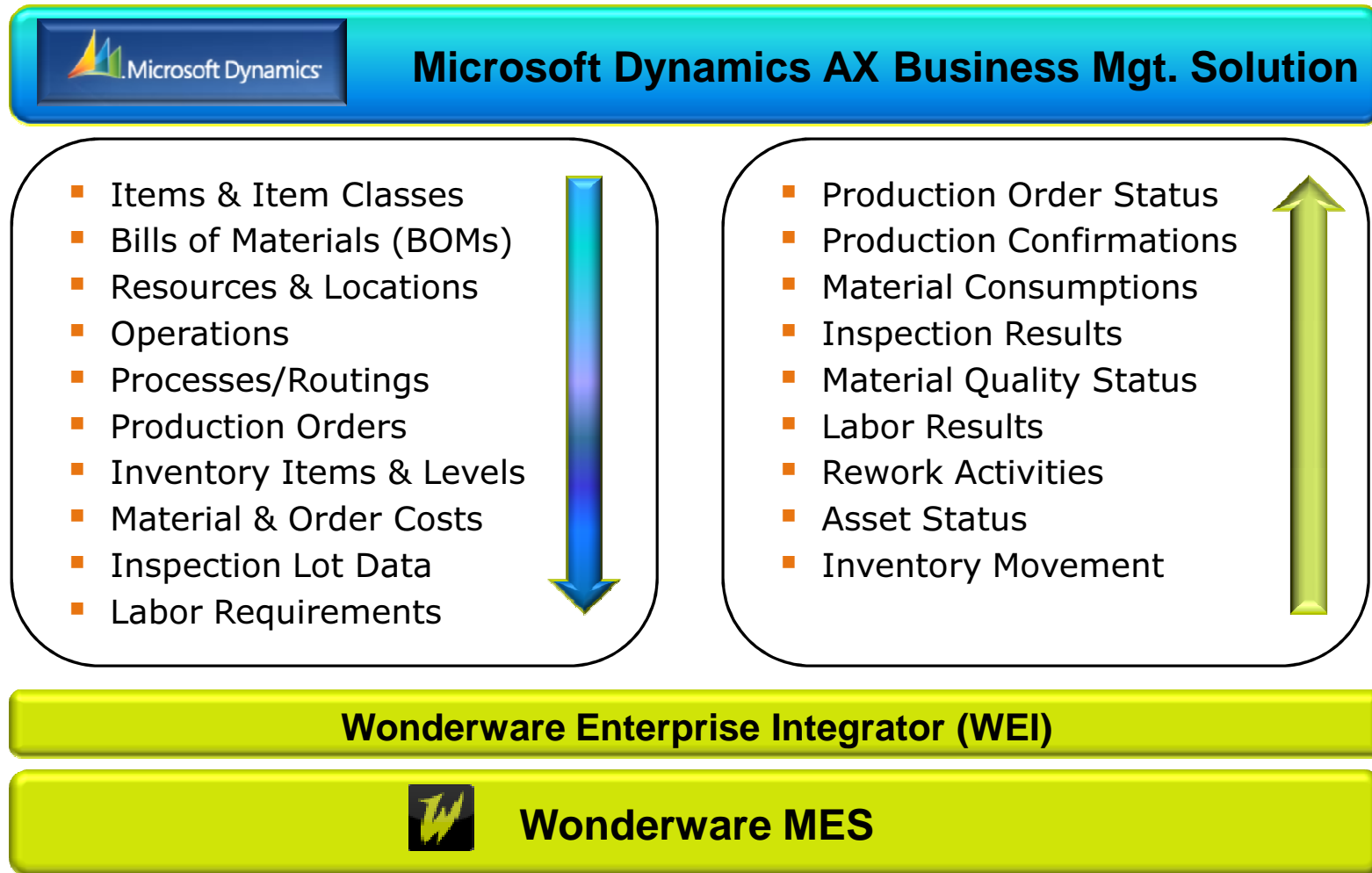
```
- <response>
- <consumptiondeclaration>
  <wo_id>PRD_00004921</wo_id>
  <created_at_local>05/26/2010 04:54:50 PM</created_at_local>
  <item_id>SA-1</item_id>
  <qty_cons>1</qty_cons>
  <uom>Pcs.</uom>
</consumptiondeclaration>
</response>
```

Done Local intranet

Start Supervisor admin - [Q... Archestra IDE InTouch - WindowMaker... InTouch - WindowViewer... Message Display - Mi... 4:55 PM

WW MES & Dynamics AX Integration

Full Integration Scenario



Implementation

Wonderware have network of System Integrators

Wonderware running on Microsoft Hyper-V

Virtualization



Windows Server® 2008
Hyper-V™

© Logica 2010 All rights reserved



i n v e n s y s No. 33

Demo running on Microsoft Hyper-V

Thank You



Windows Server[®] 2008
Hyper-V[™]