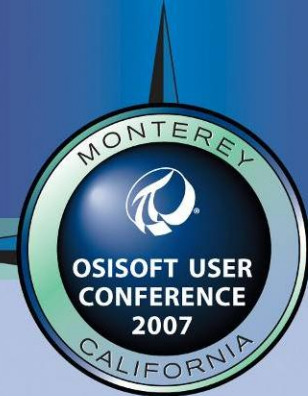




Real-time Web Services for OSIsoft in the SAP NetWeaver Platform

SAP® xApps™ CERTIFIED

POWERED BY
SAP NetWeaver®



Presenter Dr. Gretchen Schwenzer
Title Director of ERP Integration
OSIsoft, Inc.

Enterprise Demands on Manufacturing

- Agile Enterprise, variety of information consumers with rapidly created and easily modifiable composite applications
- Compliance with eSOA for manufacturing data
- Composite applications using manufacturing data
- Use SAP tools for Application Development and Deployment
- Global view of manufacturing operations

Composite Application

- Composed from existing parts
- Accelerated development existing services
- Reuse
- Composed rather than developed – assembling and orchestrating to perform a task
- Flexible, integrate collaborative tools. Search and knowledge management, distributed persistence
- Example
 - ▶ Configurable Application built with OSIsoft RtPM Business Package uses services for data retrieval, events integrate to other components
 - ▶ SAP Visual Composer Application against library of services

Platform Evolution

- Transaction Platform
- Integration Platform
- Composition Platform
- Business Process Platform
 - ▶ Core business objects
 - ▶ Ready to run business processes
 - ▶ Accessible through Enterprise Services
 - Service composition

Enterprise Services

- Service Interface
 - ▶ Structure defined by a WSDL file
 - ▶ Code that sends and receives messages to and from applications and other services that wish to consume the service
- Service Implementation
 - ▶ Contains the functionality and performs the actual work
 - ▶ Performs transformation, manage persistent state and prepare reply
- Service Documentation
- Dual Identity
 - ▶ Units of functionality used to model and automate business processes
 - ▶ Building blocks for reusable functionality designed for use in model-driven environments

How does one define Enterprise Services?

- No existing methodology
 - ▶ Service enable existing interfaces
 - ▶ Define case studies and service enable
 - ▶ Examine past integration issues
 - ▶ Build low level building blocks
 - ▶ Define Roles and capture tasks
 - ▶ Establish working groups
- SAP ES Community
 - ▶ Focused groups on discipline areas
 - ▶ Methodology Group
 - ▶ Documentation – Global Data Types, Wiki, UDDI

Enterprise Service Architecture

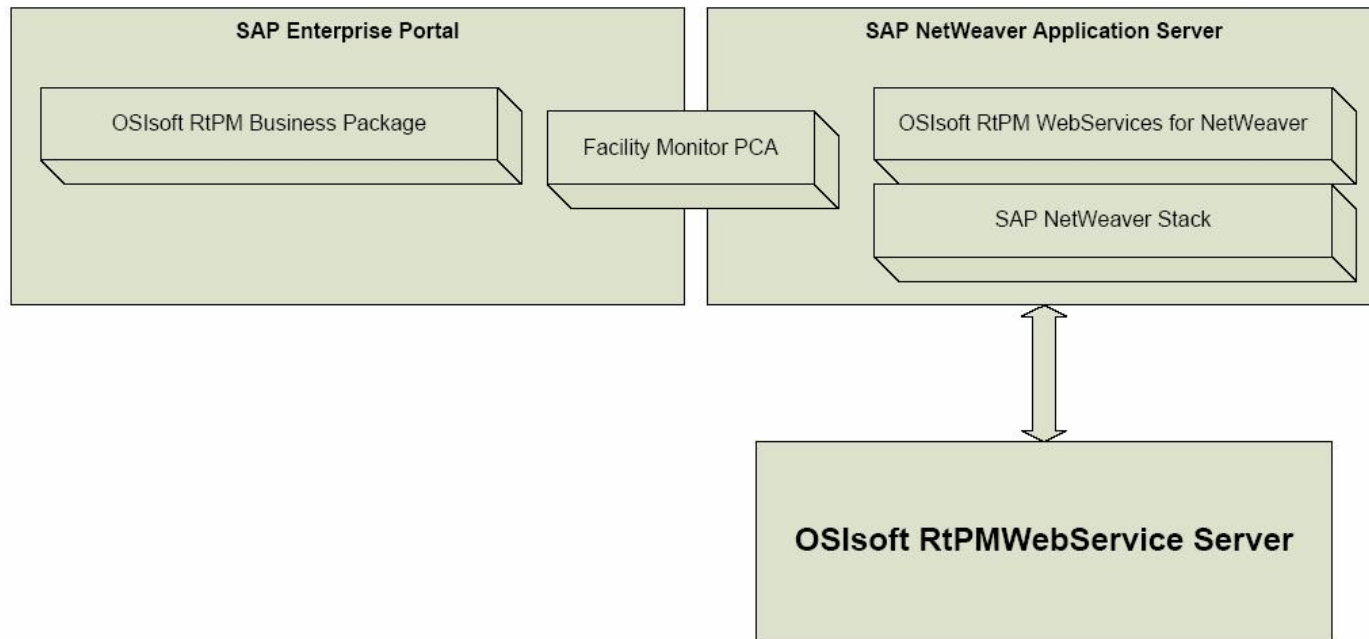
- User Interface
- Modeling
- Composition of Services
- Orchestration – examples: Guided Procedures, workflow
- Process Integration
- Service Repository
- Sample ESA
 - ▶ SAP NetWeaver
 - ▶ Composition Environment CE 7
- Ecosystem – providing Business Objects and Enterprise Services

Facility Monitor

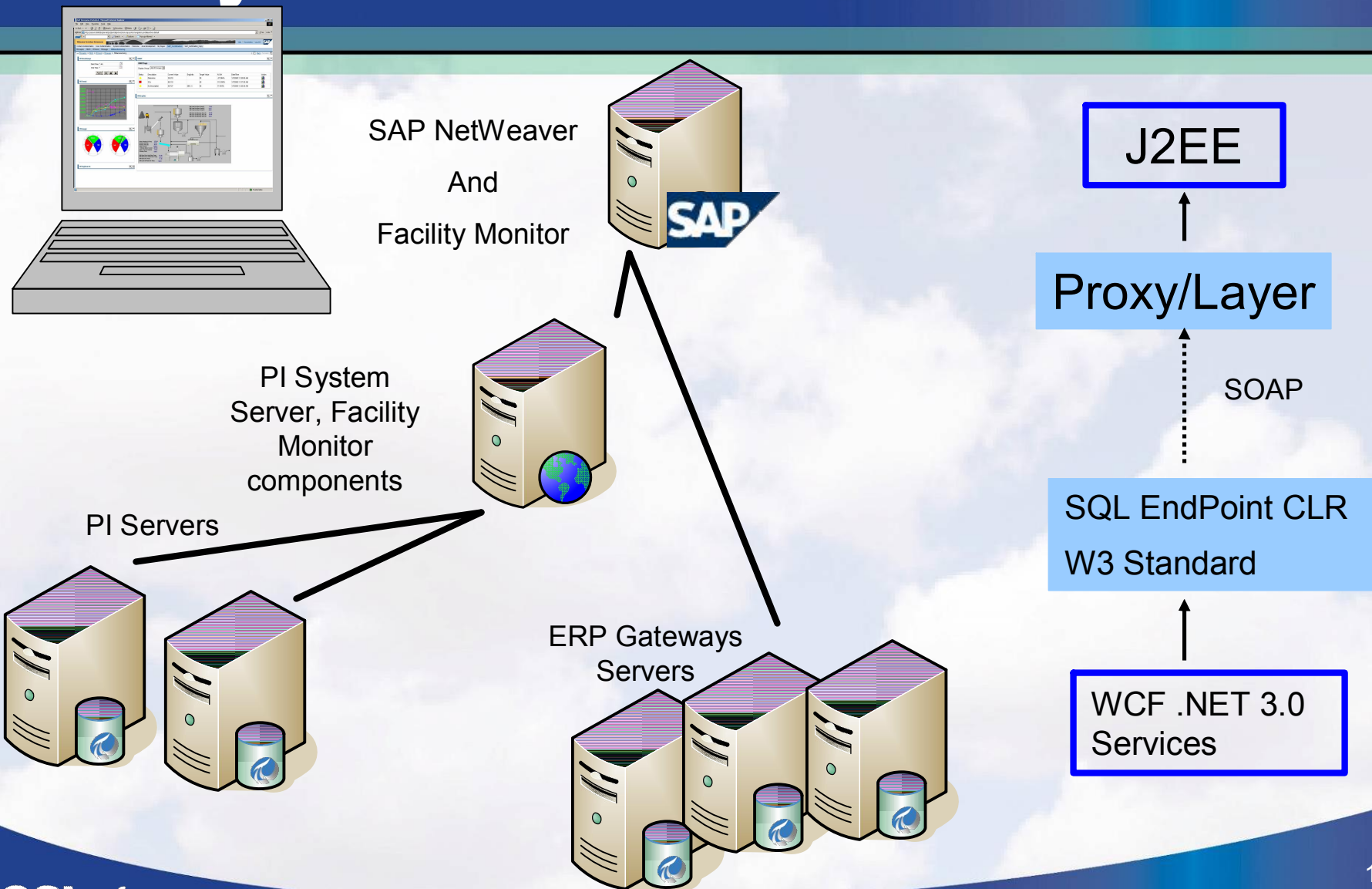
- Packaged Composite Application for SAP NetWeaver
- Delivers enterprise services and iViews for the SAP Enterprise Portal that allow the access and viewing of aggregated event based information from OSIsoft
- Removes complexity of obtaining real-time data from the enterprise user and developer
- Application designers can use the services and iViews to create additional Composite applications with SAP Products, VC- Visual Composer, CAF- Composite Application Framework and xMII

Packaged Composite Application

Facility Monitor PCA Architecture



Facility Monitor Architecture



Requirements

- **PI System Server**

- ▶ Windows Server 2003
- ▶ SQL2005
- ▶ Write access to a PI System
- ▶ Machine Sizing
 - Sized as a function of the number of users
 - E.g., 200 users
 - Dual P4, 2GB Ram, 2 GB Disk space (NTFS only)

- **SAP NetWeaver**

- ▶ NetWeaver 7.0
- ▶ Any NetWeaver operating system
- ▶ CE – Visual Composer and CAF Composition Application Framework

Facility Monitor web services - NetWeaver

OSIsoft RtPMWebService – PI System Server

OSIsoft Product for the associated service

OSIsoft RtPM Business Package 60.1.2

Features and Goals

- Web Service access to OSIsoft product data
- Ability to build composite applications for Enterprise Data and Manufacturing Data with SAP CAF or xMII
- Web Service support of Enterprise data into OSIsoft products
- Visualization of OSIsoft data with SAP's Visual Composer
- Registration of OSIsoft web services in the SAP ESR (Enterprise Service Repository)

Examples:

- Using Facility Monitor in Inventory Management
 - ▶ [Mining_Material_Balance.exe](#)
- Using Facility Monitor in Energy Management
 - ▶ [CampusPowerUtilization.exe](#)

AF General

- List of Databases
- List of elements
- List of element attributes
- List of element attribute values
- List of elements by Node Type
- Creation of element with attributes
- Creation of Transfer
- List of TableEntrys
- List of TableAttributeValue
- Unit of Measure by Class

Sigmafine Specific

- List of Cases
- List of models
- List of model analysis
- List of elements in case
- List of attributes for Model
- List of attributes for elements in case
- Attribute value for element, attribute in case
- List of attribute values for all elements in case
- List of element, attribute values across cases from start time to end time
- Inventory for materials in nodes of specific type

Methods

The screenshot shows a Microsoft Internet Explorer window titled "Web Services Navigator - Microsoft Internet Explorer". The address bar displays a URL starting with "http://elara:50100/wsnavigator/jsp/explorer.jsp?localWS=Y29X29zaXNvZnRfcGN0X1J0UE1fN59jb20ub3Npc29mdC...". The page header features the SAP logo and the tagline "THE BEST-RUN BUSINESSES RUN SAP". Below the header, there are navigation tabs: "Home", "Overview", "WSDLs", and "Test". The main content area is titled "com_osisoft_pct_RtPM_5" and includes a "Test" button. A "Config1Port_Document" tab is active, showing a list of operations under the heading "Operations". The operations listed are:

- PIFD_CaseElementsList_GetList (test.types.p1.PIFD_CaseElementsListGetList parameters)
- PIFD_CaseList_GetList (test.types.p1.PIFD_CaseListGetList parameters)
- PIFD_CaseResultList_GetList (test.types.p1.PIFD_CaseResultListGetList parameters)
- PIFD_CreateElements_CreateElements (test.types.p1.PIFD_CreateElementsCreateElements parameters)
- PIFD_CreateTransfer_CreateTransfer (test.types.p1.PIFD_CreateTransferCreateTransfer parameters)
- PIFD_Database_GetList (test.types.p1.PIFD_DatabaseGetList parameters)
- PIFD_ElementAttributeList_GetList (test.types.p1.PIFD_ElementAttributeListGetList parameters)
- PIFD_ElementListByNode_GetList (test.types.p1.PIFD_ElementListByNodeGetList parameters)
- PIFD_GetElementValue_GetElementValue (test.types.p1.PIFD_GetElementValueGetElementValue parameters)
- PIFD_ModelAnalysis_GetList (test.types.p1.PIFD_ModelAnalysisGetList parameters)
- PIFD_ModelAttributesList_GetList (test.types.p1.PIFD_ModelAttributesListGetList parameters)
- PIFD_Models_GetList (test.types.p1.PIFD_ModelsGetList parameters)
- PIFD_NodeNameList_GetList (test.types.p1.PIFD_NodeNameListGetList parameters)
- PIFD_ReadCaseResults_ReadCaseResults (test.types.p1.PIFD_ReadCaseResultsReadCaseResults parameters)
- PIFD_ReadTransfer_ReadTransfer (test.types.p1.PIFD_ReadTransferReadTransfer parameters)
- PIFD_TableAttributeList_GetList (test.types.p1.PIFD_TableAttributeListGetList parameters)
- PIFD_TableList_GetList (test.types.p1.PIFD_TableListGetList parameters)
- PIFD_Transfer_GetList (test.types.p1.PIFD_TransferGetList parameters)
- PIFD_UOM_GetList (test.types.p1.PIFD_UOMGetList parameters)

On the right side of the page, there is a "Need Help?" section with a "Test" button and text explaining that the Test page is used to test web services by sending a client request. It also mentions that the first step is to choose which web service operation to test and that for each endpoint, a tab page is created with all the available operations. At the bottom right, there is a link to "Web Services @ SAP".

Test Method

The screenshot displays the Web Services Navigator interface within a Microsoft Internet Explorer browser window. The address bar shows the URL: `http://elara:50100/wsnavigator/jsp/explorer.jsp?localWS=Y29kX29zaXNvZnRfGN0X1J0UE1fN59jb20ub3Npc29mdCUyRmNvbV9vc2lzb2Z0X3BjdF95dFBN%0D%0A%2UvU1FM\`. The page features the SAP logo and the slogan "THE BEST-RUN BUSINESSES RUN SAP". A navigation bar includes links for Home, Overview, WSDLs, and Test. The main content area is divided into two columns: Request and Response. The Request column shows a tree view for the `PIFD_Database_GetList` service, with parameters listed as `(test.types.p1.PIFD_DatabaseGetList)`. The Response column shows a tree view for the `PIFD_Database_GetList` service, with a response object `(test.types.p1.PIFD_DatabaseGetListResponse)` containing a `Response (test.types.PIFDDatabaseGetListContainer[])` array. This array contains three `(test.types.PIFDDatabaseGetListContainer)` objects, each with a `DBName (String)` property. The first two are `EnergyManagement` and `Configuration`, and the third is `Chocolate Milk Tutorial`. Below the tree views, there are two text areas showing the raw HTTP request and response. The Request text area shows a POST request to `/com_osisoft_pct_RtPM_5/Config1?sty` with headers: `Host: elara:50100`, `Content-Type: text/xml; charset=UTF-8`, `Connection: close`, `Content-Length: 535`, and `SOAPAction: ""`. The Response text area shows an HTTP 200 OK response with headers: `Connection: close`, `Server: SAP J2EE Engine/7.00`, `Content-Type: text/xml; charset=UTF-8`, `Set-Cookie: <value is hidden>`, and `Date: Tue, 24 Jul 2007 20:42:26 GMT`. The SOAP envelope is partially visible. On the right side of the page, there is a "Need Help?" section with a "Send Test Request" button and a description: "This page shows the real request and response in tree-like structures as well as in plain text." Below this is a link to "Web Services @ SAP". The status bar at the bottom indicates "Done" and "Local intranet".

Request

PIFD_Database_GetList

- parameters (test.types.p1.PIFD_DatabaseGetList)

Response

PIFD_Database_GetList

- response (test.types.p1.PIFD_DatabaseGetListResponse)
 - Response (test.types.PIFDDatabaseGetListContainer[])
 - (test.types.PIFDDatabaseGetListContainer)
 - DBName (String) EnergyManagement
 - (test.types.PIFDDatabaseGetListContainer)
 - DBName (String) Configuration
 - (test.types.PIFDDatabaseGetListContainer)
 - DBName (String) Chocolate Milk Tutorial

Need Help?

Send Test Request

This page shows the real request and response in tree-like structures as well as in plain text.

Web Services @ SAP

Request (Raw)

```
POST /com_osisoft_pct_RtPM_5/Config1?sty
Host: elara:50100
Content-Type: text/xml; charset=UTF-8
Connection: close
Content-Length: 535
SOAPAction: ""

<?xml version="1.0" encoding="UTF-8" ?><
```

Response (Raw)

```
HTTP/1.1 200 OK
Connection: close
Server: SAP J2EE Engine/7.00
Content-Type: text/xml; charset=UTF-8
Set-Cookie: <value is hidden>
Date: Tue, 24 Jul 2007 20:42:26 GMT

<SOAP-ENV:Envelope xmlns:SOAP-ENV="http:
```

AFTtransfer

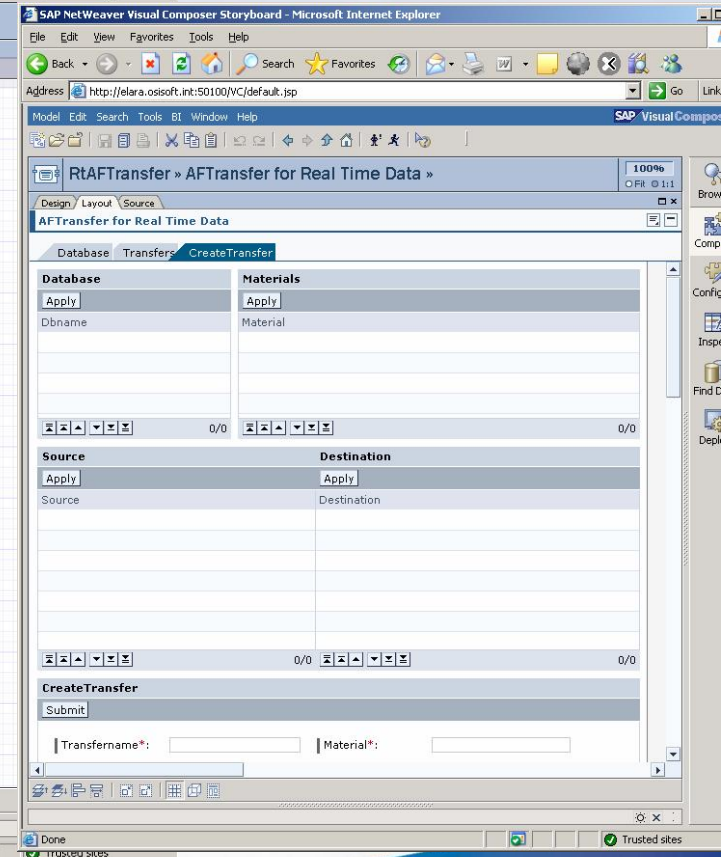
- Transfers

- ▶ List of transfers
- ▶ Transfer details
- ▶ Create a transfer

- Use case

- ▶ Combine with RtTrend and RtAnnotation
- ▶ Event a data stream
- ▶ Enter an annotation for the transfer

VALUE NOW, VALUE OVER TIME



AFTtransfer

RtTransfer - SAP NetWeaver Portal - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://elara:50100/irj/portal

Welcome Gretchen Schwenzer

Search Advanced Search

Home Content Administration User Administration System Administration Standard User Role PCD Tools Accessible Content Administration Content Management

FacilityMonitor

RtTransfer

Detailed Navigation

- RtCaseInventory
- RtCaseMonitor
- RtFacilityMonitor
- RtFacilityMonitorbyCategory
- RtMaterial
- RtTransfer**

Portal Favorites

There are no items to display

Database Transfers CreateTransfer

AFTransfers

Transfername	Starttime	Endtime	Source	Destination
T1121320063PM	12/13/2006 05:00:00	12/13/2006 06:00:00	N003_0016_PL_S	R003_0016_PL_S
T1121320064PM	12/13/2006 07:00:00	12/13/2006 08:00:00	N003_0302_TK_S	R003_0302_TK_S
T1121320069AM	12/13/2006 09:00:00	12/13/2006 10:00:00	N003_0016_PL_S	R003_0016_PL_S
TG12132006-013	12/13/2006 16:00:00	12/13/2006 16:30:00	N003_0016_PL_S	R003_0016_PL_S
TG12132006-022	12/13/2006 06:10:00	12/14/2006 07:30:00	N003_0016_PL_S	R003_0016_PL_S
TG12132006-023	12/14/2006 07:31:00	12/14/2006 07:45:00	N003_0016_PL_S	R003_0016_PL_S
TG12132006-024	12/14/2006 07:46:00	12/14/2006 07:55:00	N003_0016_PL_S	R003_0016_PL_S
TG12132006-025	12/14/2006 07:56:00	12/14/2006 08:06:00	N003_0016_PL_S	R003_0016_PL_S
TG12132006-026	12/14/2006 08:07:00	12/14/2006 08:11:00	N003_0016_PL_S	R003_0016_PL_S
TG12132006-027	12/14/2006 08:12:00	12/14/2006 08:15:00	N003_0016_PL_S	R003_0016_PL_S
TG12132006-028	12/14/2006 08:15:00	12/14/2006 08:20:00	N003_0016_PL_S	R003_0016_PL_S
TG12132006-029	12/14/2006 08:21:00	12/14/2006 08:25:00	N003_0016_PL_S	R003_0016_PL_S

TransferDetail

Attributename	Attributevalue	Uom
MassTolerance	1.23150328455	lb
Material	0261	
MeasuredMass	41.050109485	lb
MolecularWeight	0	lb/lbmol
NetVolume	0	bbbl

Done Local intranet

AFTtransfer – Create A Transfer

The screenshot displays the SAP NetWeaver Portal interface within a Microsoft Internet Explorer browser window. The browser's address bar shows the URL `http://elara:50100/irj/portal`. The portal's top navigation bar includes a welcome message for 'Gretchen Schwenzer' and links for 'Help', 'Personalize', and 'Log Off'. Below this, a menu bar contains various administrative and user-related options. The main content area is titled 'AFTransfer for Real Time Data' and features a 'CreateTransfer' tab. This tab is divided into four sections: 'Database', 'Materials', 'Source', and 'Destination'. Each section contains an 'Apply' button and a list of items. The 'Database' list includes 'Sigmafine Demo', 'PowerPlant', 'RefiningModel', and 'Chocolate Milk Tutorial'. The 'Materials' list includes '0261', '0263', '0264', '0271', and '0272'. The 'Source' and 'Destination' sections are currently empty. A left-hand navigation pane shows a 'Detailed Navigation' tree with options like 'RtCaseInventory', 'RtCaseMonitor', 'RtFacilityMonitor', and 'RtTransfer'. A 'Portal Favorites' section at the bottom left indicates 'There are no items to display'. The bottom of the browser window shows a 'Local intranet' status bar.

RtTransfer - SAP NetWeaver Portal - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address `http://elara:50100/irj/portal`

Welcome Gretchen Schwenzer

Search Advanced Search

Home Content Administration User Administration System Administration Standard User Role PCD Tools Accessible Content Administration Content Management

FacilityMonitor

RtTransfer

History Back Forward

AFTransfer for Real Time Data

Database Transfers **CreateTransfer**

Database

Apply

Dbname

Sigmafine Demo

PowerPlant

RefiningModel

Chocolate Milk Tutorial

Materials

Apply

Material

0261

0263

0264

0271

0272

Source

Apply

Source

Destination

Apply

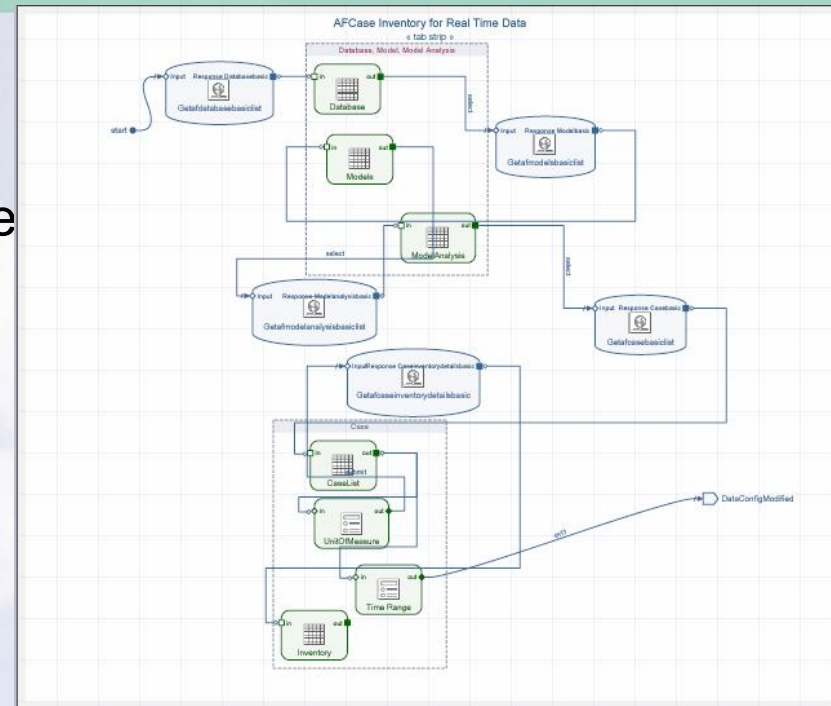
Destination

There are no items to display

Local intranet

AFCase

- Reconciled Data Results
 - ▶ Case results produced by Sigmafine
 - ▶ All values for selected element
- Events to other iViews
 - ▶ Case time range
- Use Case
 - ▶ Report Inventory
 - ▶ Combine with RtGraphic and RtTrend
 - ▶ Display values relative to case time range



AFCasInventory

RtCaseInventory - SAP NetWeaver Portal - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Refresh Mail Print Camera Address Bar Links

Address http://elara:50100/irj/portal

Welcome Gretchen Schwenzer Help Personalize Log Off SAP

Search Advanced Search

Home Content Administration User Administration System Administration Standard User Role PCD Tools Accessible Content Administration Content Management FacilityMonitor

FacilityMonitor

RtCaseInventory History Back Forward

Detailed Navigation

- RtCaseInventory
- RtCaseMonitor
- RtFacilityMonitor
- RtFacilityMonitorbyCategory
- RtMaterial
- RtTransfer

Portal Favorites

There are no items to display

Database, Model, Model Analysis **Case**

CaseList

Starttime	Endtime
11/14/2006 11:00:00	11/14/2006 12:00:00
11/14/2006 12:00:00	11/14/2006 13:00:00
11/14/2006 13:00:00	11/14/2006 14:00:00
11/14/2006 14:00:00	11/14/2006 15:00:00
11/14/2006 15:00:00	11/14/2006 16:00:00

UnitOfMeasure

Apply

Unit of Measure: kg

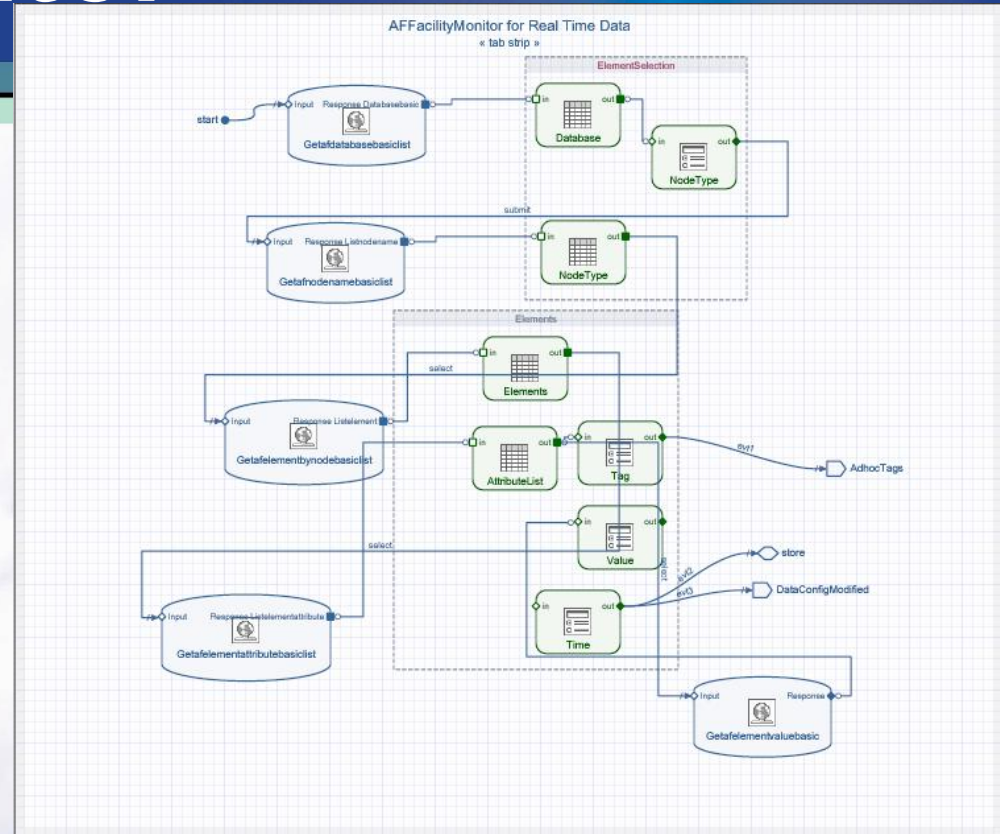
Inventory

Asset	Material	Quantity	UOM
TKCRDE_2036	2013	0	kg
TK00009	#CRUDE	1509595.26451609	kg
TK_BK0167	0016	0	kg
TK00203	#CRUDE	14319301.0433078	kg
TKCRDE_2236	2051	0	kg
TKCRDE_2277	2055	0	kg
TK00248	#CRUDE	2398962.04297175	kg
TK00910	0308	20489.0998479349	kg
TK_BK0096	2706	0	kg

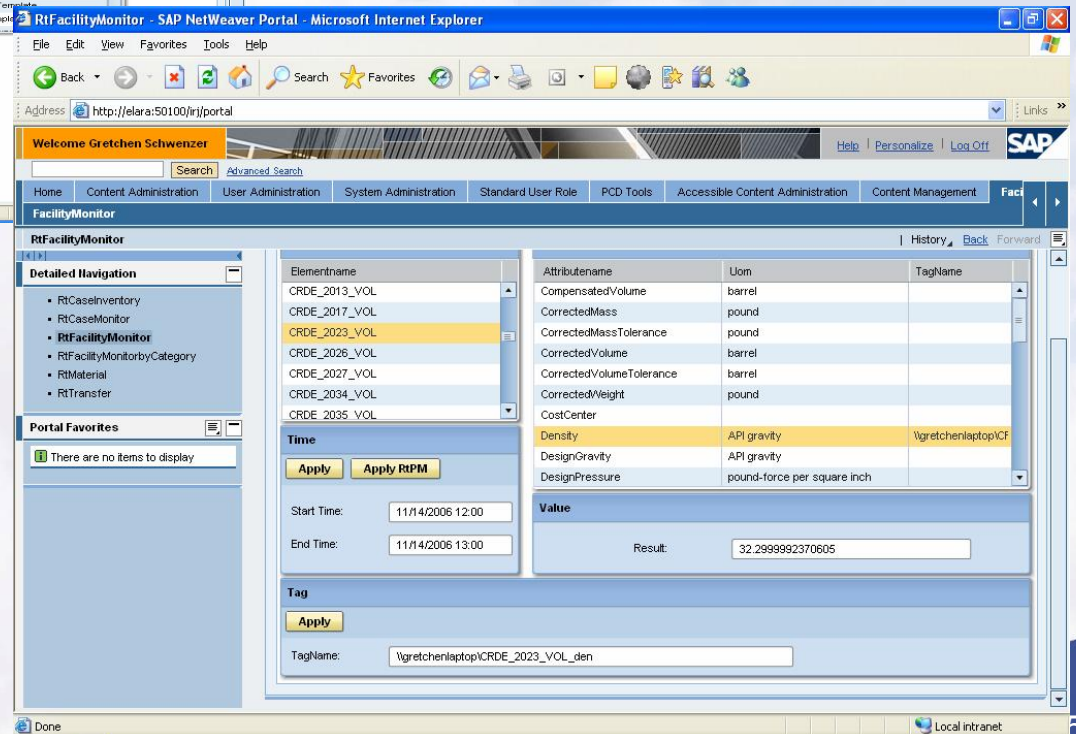
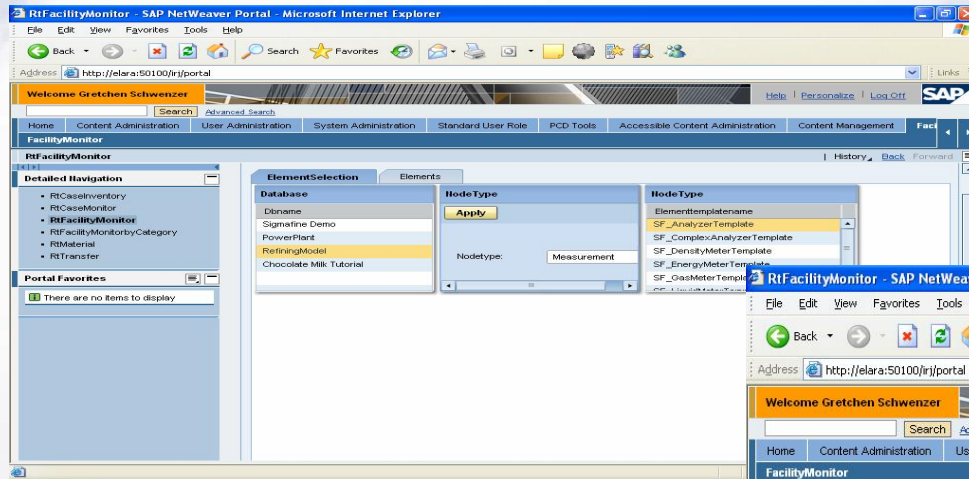
Done Local intranet

AFFacility Monitor

- Live data by node type
 - ▶ Select Elements
 - ▶ Select Attributes
 - ▶ Enter Time Range
- Events to other iViews
 - ▶ Data set name
- Use Case
 - ▶ Combine with RtTrend and RtAnnotation
 - ▶ Display values relative to time range
 - ▶ Enter comments stored as annotation



AFFacilityMonitor



SAP Ramp-up Participation

- Ramp-UP

- ▶ CE 7.1 Composition Environment

- Web Service Repository for OSIsoft services
 - Visual Composer access for OSIsoft services
 - Integration of OSIsoft visualization components into SAP's Visual Composer
 - Explore composition of Enterprise and Manufacturing Data

- Enhancement Packages for SAP Services

Get Involved

- SAP ES Community
- Establish SIG
- Please contact me with ideas, requirements etc.
- Reference “Enterprise SOA Designing IT for Business Innovation”, Dan Woods and Thomas Mattern

OSIsoft Commitment to SAP Partnership

ES Community Member

Manufacturing
Asset Management
Methodology

Industry Value Network

Chemicals
Metals and Mining
Others under discussion

Powered By NetWeaver

Facility Monitor

Certified by NetWeaver

Business Package for Real-time Performance
Management

Certified Applications

PP-PI, PM, QM



COMMUNITY

SAP® xApps™ CERTIFIED

POWERED BY
SAP NetWeaver®



SAP® Certified
Integration



Questions?

- Do you believe in the Composite Application premise?
- Are you looking at SOA?
- Are you aware of the ES Community?
- Do you use SAP NetWeaver?
- Do you use the SAP Portal?
- Have you been doing this yourselves?
- What tools are you using?
- Are you using another ESA architecture?

VOYAGE2007



***Thank
You***

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VALUE NOW, VALUE OVER TIME