



Windchill® Enterprise Systems Integration Administrator's Guide - SAP R/3

Windchill 8.0

April 2006

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Glossary

Change Record

Table 1 Changes for Windchill 8.0 M020 Maintenance Release

Change	Description
Updated book	Updated guide for 8.0 M020.

Table 2 Changes for Windchill 8.0 M010 Maintenance Release

Change	Description
Created book	This is a new guide for Windchill 7.0.
Updated book	<p>The following sections were updated in chapter 3:</p> <ul style="list-style-type: none">• Enabling and Understanding Message Logging and Return Messaging to Windchill Foundation & PDM or Windchill PDMLink• Handling Errors and Notification

About This Guide

The ESI Administrator's Guide serves as a reference guide for Windchill ESI system administrators.

In general, this guide is intended for technical staff members. It assumes you have the following:

- Knowledge of the existing system data structures at your site
- Knowledge of the web architecture used at your site
- Knowledge of Java Server Page (JSP) capabilities
- Knowledge of World Wide Web browser operation
- UNIX system administration skills (if you are using UNIX systems)
- Windows system administration skills (if you are using Windows systems)

Since Windchill ESI is supported with Windchill Foundation & PDM and Windchill PDMLink, this guide assumes that you have installed one of these products and have read and got acquainted with its features.

Windchill ESI also involves using software components of TIBCO BusinessWorks and assumes you are familiar with the features of this product suite.

Updates to this guide will be posted on the PTC Web site.

Related Documentation

The following documents have been referenced in this manual and may be helpful to you:

- *Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP R/3*
- *Windchill Enterprise Systems Integration Customization Guide - SAP R/3*
- *Windchill Business Administrator's Guide*

If books are not installed on your system, see your system administrator.

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For complete details, refer to Contacting Technical Support in the *PTC Customer Service Guide* enclosed with your shipment. This guide can also be found under the Support Bulletins section of the PTC Web site at:

<http://www.ptc.com/support/index.htm>

The PTC Web site also provides a search facility that allows you to locate Technical Support technical documentation of particular interest. To access this page, use the following link:

<http://www.ptc.com/support/support.htm>

You must have a Service Contract Number (SCN) before you can receive technical support. If you do not have an SCN, contact PTC License Management using the instructions found in your *PTC Customer Service Guide* under Contacting License Management.

Documentation for PTC Products

PTC provides documentation in the following forms:

- Help topics
- PDF books

To view and print PDF books, you must have the Adobe Acrobat Reader installed.

All Windchill documentation is included on the CD for the application. In addition, books updated after release (for example, to support a hardware platform certification) are available from the Reference Documents section of the PTC Web site at the following URL:

<http://www.ptc.com/cs/doc/reference/>

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Please include the name of the application and its release number with your comments. For online books, provide the book title.

Documentation Conventions

Windchill documentation uses the following conventions:

Convention	Item	Examples
Bold	Names of elements in the user interface such as buttons, menu paths, and dialog box titles. Required elements and keywords or characters in syntax formats.	Click OK . Select File > Save . License File dialog box create_<tablename>.sql
<i>Italic</i>	Variable and user-defined elements in syntax formats. Angle brackets (< and >) enclose individual elements.	create_<tablename>.sql
<product>	Represents a product installation directory (loadpoint). <i>Product</i> is replaced with the actual product name.	<Windchill> <Info*Engine>
Monospace	Examples Messages	JavaGen "wt.doc.*" F true Processing completed.
<product>	Represents a product installation directory (loadpoint). <i>Product</i> is replaced with the actual product name.	<Windchill> <Info*Engine>
"Quotation marks"	Strings	The string "UsrSCM" . . .
	The CAUTION symbol indicates potentially unsafe situations which may result in minor injury, machine damage or downtime, or corruption or loss of software or data.	When you add a value to an enumerated type (for example, by adding a role in the RolesRB.java resource file), removing that value can result in a serious runtime error. Do not remove a role unless you are certain there is no reference to it within the system.

Third-Party Products

Examples in this guide referencing third-party products are intended for demonstration purposes only. For additional information about third-party products, contact individual product vendors.

Code Examples

Some code examples in this guide have been reformatted for presentation purposes and, therefore, may contain hidden editing characters (such as tabs and end-of-line characters) and extraneous spaces. If you cut and paste code from this manual, check for these characters and remove them before attempting to use the example in your application.

1

Introduction to Windchill ESI

This chapter provides an overview of Windchill Enterprise Systems Integration (Windchill ESI).

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Introduction	1-2
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Introduction

Windchill Enterprise Systems Integration (Windchill ESI) is an Enterprise Application Integration (EAI)-based product, designed to integrate Product Lifecycle Management (PLM) services offered by Windchill Foundation & PDM and Windchill PDMLink, with the services offered by distribution targets such as Enterprise Resource Planning (ERP) systems.

This end-to-end integration provides real-time connection between Windchill PDM or Windchill PDMLink and distribution targets and supports and enables the transfer and mapping of business objects, such as parts, Bills of Materials (BOMs), Enterprise Change Notices (ECNs) and documents, from Windchill PDM or Windchill PDMLink to the distribution targets.

Connecting these systems optimizes and automates business processes, improves operational efficiencies, and creates opportunities to add value not available with isolated systems. By controlling seamless information flow between functional groups, such as engineering and manufacturing and their respective enterprise applications, it ensures that:

- Latest product data information is represented in both systems and changes to product data are automatically reflected in the distribution target.
- Latest design revisions are always available to manufacturing.
- Downstream services, such as logistics, finance, after-market support that depend upon and use ERP systems, are also up-to-date.
- Secure end-to-end connection and transaction control are provided, reducing manual data translation and the related maintenance and support costs.

Much of Windchill ESI's business logic runs within TIBCO's ActiveEnterprise product suite, a leading EAI platform. The ActiveEnterprise suite provides TIBCO's BusinessWorks integration services that include prebuilt ERP adapters, an integrated graphical development environment, transaction management, administrative and monitoring facilities, and other functionality. Using the Graphical User Interface (GUI)-based development environment, Windchill ESI can be customized to include unique business processes that are not provided in its default set of functions.

Windchill PDM or Windchill PDMLink communicates with the TIBCO EAI software through the Windchill Open API. The Windchill Open API enables the product data within Windchill PDM or Windchill PDMLink to be shared with the rest of the enterprise using industry standards such as Simple Object Access Protocol (SOAP), Enterprise Messaging Service (EMS), and eXtended Markup Language (XML). The services are independent of the EAI software and can be used to enable other middleware applications to communicate with Windchill PDM or Windchill PDMLink.

Windchill ESI uses business objects that are shared across the enterprise. These objects have attributes that are shared across systems, as well those that are unique to particular systems. Windchill PDM or Windchill PDMLink is the system of

record for all parts, BOMs, documents, and their associated attributes authored in Windchill PDM or Windchill PDMLink. Refer to System of Record under the Business Processes and Guidelines section of the chapter titled Preparing to Use Windchill Enterprise Systems Integration in the *Windchill ESI User's Guide - SAP R/3* for details.

Windchill ESI Features

Windchill ESI includes the following key features:

- Enables Windchill Foundation & PDM and Windchill PDMLink users to publish various business objects to SAP R/3
- Supports publishing from either a Windchill Foundation & PDM or a Windchill PDMLink instance to one or more SAP R/3 instances
- Allows users to create or change parts, BOMs, or documents associated to parts in SAP R/3 from Windchill Foundation & PDM or Windchill PDMLink
- Allows users to create Enterprise Change Notices (ECNs) in SAP R/3 from Windchill Foundation & PDM or Windchill PDMLink
- Captures the publishing history for all parts, BOMs, documents, and ECNs in either Windchill Foundation & PDM or Windchill PDMLink
- Provides an architectural foundation that can be extended and enhanced for a greater scope of functionality
- Supports the combined Windchill Foundation & PDM and Windchill Project Link out of the box document types

The out-of-the-box Windchill ESI features allow you to:

- Publish new and changed parts, new and changed BOMs, new and changed documents associated to parts, and new Enterprise Change Notices (ECNs)
- Publish objects from within Windchill Foundation & PDM or Windchill PDMLink using multiple methods:
 - Publish via sample workflow
 - Publish via customized workflow
 - Publish via custom calls to various functions available in Windchill Foundation & PDM or Windchill PDMLink.

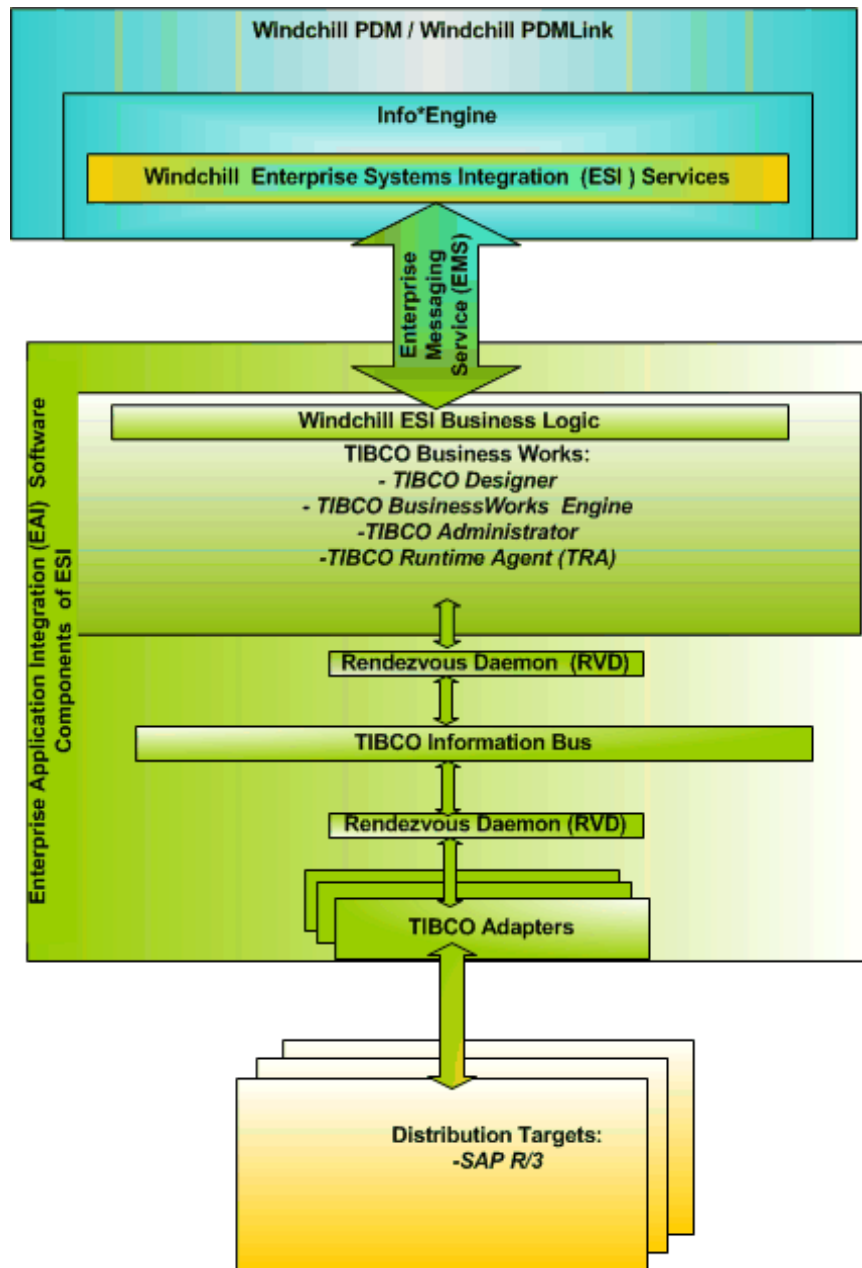


Figure 1-1 Technical Overview of ESI

Technical Overview

The following outlines the functions of the key components of a Windchill ESI system. Refer to Figure 1-1 as you read these descriptions.

Info*Engine provides the standard interface to Windchill PDM or Windchill PDMLink, creating a single channel to multiple external environments, including the Windchill ESI business logic.

Windchill ESI services produce output from Windchill PDM or Windchill PDMLink in a format that can be easily accepted by the EAI software components of Windchill ESI. This output can then be processed and mapped to a distribution target such as an ERP system. The output from Windchill PDM or Windchill PDMLink is in XML format; it is transported to the EAI software through Simple Object Access Protocol (SOAP) Remote Procedure Call (RPC) messages that are delivered using a Enterprise Messaging Service (EMS) provider such as TIBCO Enterprise for EMS.

This messaging architecture supports bidirectional communication, guarantees message delivery, and provides a common interface to different EAI applications. EMS enables Windchill PDM or Windchill PDMLink to send messages that contain data in a predefined format, communicate information about the publishing of this data to the EAI software components of Windchill ESI, and receive the status of the success or failure of attempts to publish. Since EMS communication is between two systems: Windchill PDM or Windchill PDMLink and EAI components. Windchill ESI uses EMS point-to-point communication via EMS queues. EMS guarantees message delivery; therefore, messages published to the queue remain in the queue until the EAI or Windchill ESI services retrieve them. Messages are not dropped if there is no response.

The Windchill ESI business logic in the EAI software accepts the product structure data from Windchill ESI services and parses it to appropriate business objects so that it can be transferred to the distribution targets. Since each distribution target differs in many ways, such as the format in which data is accepted, how updates are performed, or with the type of business-level errors that might arise, the EAI software components keep these differences transparent to Windchill PDM or Windchill PDMLink by automatically mapping and manipulating the data in a format acceptable to the distribution target.

TIBCO BusinessWorks includes the following components that help the flow of data between Windchill PDM or Windchill PDMLink and distribution targets:

- The TIBCO Designer graphical user interface (GUI) allows users to configure ERP adapters, create and test the design of business processes, and deploy these processes.
- The TIBCO BusinessWorks engine runs the business processes.
- TIBCO Administrator, a browser-based interface, monitors and manages the business processes and machines.

Each of these components communicates using a messaging system called TIBCO Rendezvous (RV).

TIBCO provides several off-the-shelf ERP adapters for major ERP vendors to enable seamless data translation. The EAI software components use these adapters to integrate Windchill PDM or Windchill PDMLink applications with the distribution targets.

2

Administering Windchill ESI

This chapter provides Windchill ESI system administrators with helpful information regarding their role in administering Windchill ESI.

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Windchill ESI Administrator's Role

As a Windchill ESI administrator, you have the responsibility for maintaining Windchill ESI deployments in production environments. We recommend you are involved from the very beginning of a Windchill ESI implementation so that you are able to develop hands-on experience and can provide support to systems integrators, developers, and testers.

Generally, your role is to support Windchill ESI end users, dealing with issues that end users cannot resolve on their own. Primarily, you would be dealing with technical issues that affect the stability and accessibility of the Windchill ESI systems. You may need to coordinate and consult with additional specialists to resolve any issues that arise.

Production activities may include monitoring systems, troubleshooting and resolving technical issues, performance tuning, dealing with user and data security, maintaining logs, backups, and archiving.

Required Skills and Knowledge

As a Windchill ESI administrator, you need a strong understanding of the Windchill ESI architecture. You also need to be familiar with TIBCO BusinessWorks, Enterprise for EMS and Adapter for R/3 software components.

Refer to the Windchill *ESI Installation and Configuration Guide - SAP R/3* for the following information:

- Chapter 2 for an in-depth discussion of Windchill ESI architectural concepts.
- Chapter 4 for information on types and location of various TIBCO documentation.

Note: Implementation teams may determine any additional skills sets you might require such as, Windchill PDM or Windchill PDMLink administration, SAP R/3 Basis support, as well as business process functional skills.

Adding Users to Windchill ESI Groups and Mapping Roles

As a Windchill ESI administrator, you may need to create Windchill ESI users and then add them to certain groups and map these groups to defined roles so that they can receive appropriate tasks and email notifications.

During the installation process, Windchill ESI creates two groups with specific access controls. It also creates a team template called **ESI Team** which has two roles associated with the Windchill ESI workflow. Initially, these two roles are assigned to the Windchill PDM or Windchill PDMLink Administrator group.

However, you can assign users to the different groups, or map either these groups or individual users to the roles to suit your environment and business requirements.

It is recommended that you get very familiar with teams, groups, roles, and participants and how they work, before modifying these settings. Refer to [Adding Users to Windchill ESI Groups](#) for more information.

Note: The two ESI team template roles can also be defined by a team instance of the business object that is being published. If users are already assigned to one or more of these roles, those users retain their privileges and any users that you define through the ESI team template are overridden. For example, if User A has been assigned to the group ESI Administrators by the team instance of a business object and if User B is assigned the same role in the ESI Team template, only User A retains the privileges assigned to that role, overriding those assigned to User B.

The following table lists the ESI groups, the ESI team template roles that they map into and the minimum permissions that are required for each of these roles.

Group	ESI Team Template Role	Minimum Permissions Required
ESI Administrators	Change Admin III	<ul style="list-style-type: none"> • Able to view all the Windchill ESI transactions through the Enterprise Systems Transaction Log, accessed through the Business Administration or Site Utilities page in Windchill Foundation & PDM and Windchill PDMLink respectively. • Able to view and assign Windchill ESI Targets via the Object Properties page or the Details page in Windchill Foundation & PDM and Windchill PDMLink respectively. • Able to view task assignments via e-mail notification and when logging into Windchill PDM or Windchill PDMLink. <p>Note: To create Windchill ESI targets or view all Windchill ESI transactions via the Site tab, the ESI Administrators group also has to be a member of the Site Administrator's group. Refer to the <i>Windchill Business Administrator's Guide</i> for detailed information on this group.</p>
ESI Authors	Engineers	Able to view task assignments via email notification and when logging into Windchill Foundation & PDM or Windchill PDMLink.

Windchill ESI Administrator Accounts and Authorizations

As a Windchill ESI administrator, you may require the following access privileges to effectively perform your job:

Component	Type of Account or Authorization
Windchill Foundation & PDM or Windchill PDMLink	Operating system access
TIBCO Enterprise for EMS	<ul style="list-style-type: none">• Server administrator account
TIBCO BusinessWorks	<ul style="list-style-type: none">• Administration domain account• Operating system access
SAP R/3	<ul style="list-style-type: none">• User account for the following transaction codes: Create, Change, View Material MM01, MM02, MM03 Create, Change, View Material BOM CS01, CS02, CS03 Create, Change, View Document CV01N, CVS02N, CVS03N Create, Change, View Change Master CC01, CC02, CC03• Operating system access

Administering Security

Since security is an important aspect of Windchill ESI administration, you would need to be familiar with the following security-related topics:

- User account security
- Data security

Note: The following section deals primarily with security administration as it relates to the EAI components of Windchill ESI, particularly to the TIBCO BusinessWorks environment. Refer to the *Windchill Systems Administrator's Guide* for security information related to Windchill Foundation & PDM or Windchill PDMLink.

User Account Security

User access to the TIBCO environment is configurable and is controlled via the TIBCO BusinessWorks Administrator. As the Windchill ESI administrator, you should determine the TIBCO user security approach that best matches your environment and its requirements. Refer to the *TIBCO BusinessWorks* documents for further details.

The following sections discuss security considerations for the following:

- Windchill ESI SAP R/3 user account
- TIBCO Enterprise for EMS.

SAP R/3 User Account for Windchill ESI

Windchill EAI software components access distribution targets such as SAP R/3 systems via the user name (ESISYS) and a password which are specified in the adapter configuration.

This user name is the name that is typically recorded in **Last Changed By** fields in the SAP R/3 distribution target for the affected business objects: ECNs, BOMs, parts, and documents. This account should not be configured as a GUI-enabled dialog-type user. For security reasons, an SAP R/3 system should not allow end-users to log onto the account through the SAP R/3 GUI.

You should be familiar with the security authorization profile of this account, and may wish to configure alerts and notification in case of invalid logon attempts, password expiration, or a locked account in an SAP R/3 system.

To maintain security, do not grant a broad security authorization profile, such as SAP_ALL to the ESISYS account.

You can also use TIBCO BusinessWorks security features, to obfuscate the account credentials in the associated TIBCO Runtime Agent (.tra) file.

Refer to the *Windchill ESI Installation and Configuration Guide - SAP R/3* for details on setting up this account.

TIBCO Enterprise for EMS

The TIBCO Enterprise for EMS queues are secured via:

- Server administrator user account
- Client user accounts for both Windchill Foundation & PDM or Windchill PDMLink and the ESI BusinessWorks application.
- Required authentication to access the queues

The user account credentials are not obfuscated. Refer to the *Windchill ESI Installation and Configuration Guide - SAP R/3* for details on setting up EMS security measures. As the Windchill ESI administrator, you should be familiar

with these measures and may wish to configure alerts or notification in case there is a security breach.

Data Security

The EAI software components of Windchill ESI do not use an external or third-party database. Most operations occur in memory. Persistence to disk occurs primarily for:

- Checkpointing (state management)
- Writing to log

Windchill ESI does not encrypt data in storage or in transit. You may need to customize the Windchill ESI application to support encryption if your product structure data is particularly sensitive or must traverse unsecured network links.

Refer to the *Windchill ESI Installation and Configuration Guide - SAP R/3* for details on traversing Wide Area Networks (WANs) and firewalls with TIBCO Enterprise for EMS and Rendezvous.

Administering Windchill ESI Properties

Administering Windchill ESI, involves configuring and modifying Windchill ESI properties. These properties are stored and maintained in the same way as other Windchill Foundation & PDM and Windchill PDMLink properties. The Windchill ESI properties file, named esi.properties.xconf, is located in the following directory:

< *Windchill* >/codebase/com/ptc/windchill/esi.

Windchill ESI properties are defined using XML and stored in text files. An important aspect of the XML-based properties is that they should never be manually edited. To set and maintain the property file, you need to use the xconfmanager utility which is provided with Windchill PDM or Windchill PDMLink.

Note: This manual, assumes that you are familiar with the xconfmanager utility and are using it for tasks that involve configuring and modifying Windchill ESI properties.

Refer to [Using Administration Utilities](#) section for additional information on how the xconfmanager utility is used with Windchill ESI. Also, refer to the *Windchill Business Administrator's Guide* for detailed information on how to use the xconfmanager utility.

Windchill ESI Properties

Windchill ESI properties fall into the following two general categories:

- Properties that are configurable. These include properties that are used with the standard Windchill ESI product without being modified. Tasks listed in the chapter titled Administrative Tasks, involve these properties.
- Properties that are used in customization of Windchill ESI. These include properties that should only be modified when customizing Windchill ESI. Windchill ESI provides a number of customization points that allow the Windchill ESI environment to be modified and extended to suite the needs of different business needs. Refer to the *Windchill ESI Customization Guide - SAP R/3* for more information.

The configuration properties for Windchill ESI are listed in Appendix. A. For a list of all Windchill ESI properties and their descriptions, see Appendix B in the *Windchill ESI Installation and Configuration Guide - SAP R/3*.

Using Administration Utilities

The following utilities are used to configure the various components of Windchill ESI:

- Windchill Task Delegate Administrator
- xconfmanager utility
- TIBCO utilities

Note: The instructions in this manual, assume that you are familiar or are getting familiar with these utilities.

Windchill Task Delegate Administrator

The standard Windchill ESI Remote Procedure Call (RPC) definitions are created during the installation process. RPC definitions are stored in the LDAP directory that was created when Info*Engine was installed. Generally you do not need to modify the standard RPC definitions for Windchill ESI, unless you are customizing your environment. The RPC definitions can be accessed using the Info*Engine property administrator or an LDAP browser. Refer to the *Windchill Info*Engine Installation and Configuration Guide* for details on this.

Refer to the *Windchill ESI Customization Guide - SAP R/3* for details on customizing ESI.

xconfmanager Utility

As mentioned earlier, Windchill ESI properties, like other Windchill PDM or Windchill PDMLink, properties, are configured using the xconfmanager utility. The xconfmanager utility is also used to maintain files that contain XML-based property definitions.

The xconfmanager utility is invoked from the command line and has a number of different options to set and maintain properties. After modifying a property file

with the xconfmanager utility the property file is parsed and used to produce an output file. This is also done using the xconfmanager utility with the appropriate options. The output file has the same name as the input file, but without the xconfmanager extension. Windchill PDM or Windchill PDMLink and Windchill ESI use the xconfmanager output files to obtain property settings.

Refer to the *Windchill Business Administrator's Guide* for detailed information on how to use the xconfmanager utility.

TIBCO Utilities

The following table lists the utilities provided with the TIBCO software that are used to perform various administrative tasks. Refer to the *Windchill ESI Installation and Configuration Guide - SAP R/3* for information on the documents describing these utilities.

Utility	Purpose
TIBCO EMS Administration tool	Configures EMS queues for tasks such as authenticating and setting permissions for various users.
TIBCO Administrator	Supports security administration as well as monitoring and management of processes and machines. The TIBCO Administrator consists of the following: <ul style="list-style-type: none"> • TIBCO Administration Server • The web-based TIBCO Administrator graphical user interface (GUI).
TIBCO Designer	Provides a GUI that supports the following: <ul style="list-style-type: none"> • Configuring adapters at design-time • Designing processes • Configuring deployments • Deploying the integration project.

3

Administration Tasks

This chapter lists the tasks that need to be performed by a system administrator to maintain Windchill ESI deployments in production environments.

Topics	Page
Enabling Windchill ESI.....	3-2
Administering Windchill ESI Distribution Targets.....	3-3
Adding Users to Windchill ESI Groups	3-3
Configuring and Administering EMS Queues	3-11
Enabling and Understanding Message Logging and Return Messaging to Windchill Foundation & PDM or Windchill PDMLink	3-18
Handling Errors and Notification	3-35
Guidelines for Monitoring, Diagnosing and Resolving Problems	3-40

This chapter describes the following tasks that need to be performed to maintain Windchill ESI deployments in production environments:

- Enable Windchill ESI
- Administer Windchill ESI distribution targets
- Add users to Windchill ESI groups
- Configure and administer EMS Queue
- Enable and understand logging of messages
- Handle errors and notifications
- Monitor, detect, diagnose and resolve problems

Enabling Windchill ESI

Windchill ESI is enabled by running the `xconfmanager` utility which makes the appropriate changes to the `wt.properties`, `installed.properties`, and `wt.load.configLoader.properties` files. These files are located in the `<Windchill>/codebase` directory. Refer to the *Windchill Business Administrator's Guide* for details on how to use this utility.

To enable Windchill ESI

Use the `xconfmanager` utility to run the `esi.xconf` file from your Windchill Foundation & PDM or Windchill PDMLink home command prompt:

```
<Windchill> xconfmanager -i  
codebase/com/ptc/windchill/esi/esi.xconf -p
```

For example:

```
X:\Windchill\bin>xconfmanager -i  
codebase/com/ptc/windchill/esi/esi.xconf -p
```

The following table lists the properties that are changed when Windchill ESI is enabled::

Property Name	Default Value	Description
wt.services.service.1160	com.ptc.windchill.esi.svc. ESIService/com.ptc.windchill. esi.svc. StandardESIService	Enables the standard Windchill ESI services. This property is located in the <code>wt.properties</code> file.
wt.services.service.1161	com.ptc.windchill.esi.svc. ESISvrService/com.ptc. windchill.esi.svc. StandardESIService	

Property Name	Default Value	Description
wt.federation.task.startup	com/ptc/windchill/esi/SubscribeQueues.xml	Starts the EMS queues that are used by Windchill ESI to communicate with the EAI software components which also include the TIBCO components. This property is located in the wt.properties file.
Windchill. EnterpriseSystemsIntegration	false	Enables Windchill ESI user interface features. This property is located in the installed.properties file.

Note: When these properties are set and Windchill ESI features are enabled, it is assumed that all of the Windchill ESI installation procedures have also been correctly followed and Windchill ESI is configured properly. Refer to the *Windchill ESI Installation and Configuration Guide - SAP R/3* for details on these procedures.

Administering Windchill ESI Distribution Targets

For Windchill ESI to publish Windchill objects to distribution targets, information about these destination systems must be made available to Windchill ESI. This is done by creating distribution target definitions known as ESI targets. Once the Windchill ESI targets are created, they can be associated to various Windchill objects or parts. This association allows Windchill ESI to determine which distribution targets the Windchill PDM or Windchill PDMLink objects are being published to. Refer to the *Windchill Enterprise Systems Integration User's Guide - SAP R/3* for details on this.

In addition to associating various Windchill PDM or Windchill PDMLink objects to a distribution target, you also need to define a strategy for how to assign distribution targets for all the other objects that are related to the object being published.

The following sections describe the Windchill ESI distribution target identifier and how to:

- Create or delete a distribution target
- Associate Windchill ESI distribution targets to Windchill PDM or Windchill PDMLink objects.
- Define a strategy for assigning ESI distribution targets for all objects associated with the object being published.

Windchill ESI Distribution Target Identifier

Windchill ESI distribution targets have the following three attributes:

Attribute	Description
Name	A string used by Windchill PDM or Windchill PDMLink to refer to the ESI target.
Description	A user-friendly text string suitable for displaying in a user interface.

Attribute	Description
Identifier	<p>Information that allows Windchill ESI to completely identify a particular distribution target.</p> <p>Windchill ESI uses this identifier when reporting Windchill ESI transactions. It ensures that the value of an identifier is unique within a Windchill PDM or Windchill PDMLink system before allowing the Windchill ESI distribution target to be created. The format of the Windchill ESI distribution target identifier is:</p> <p><i><Target System Type>.<Target System Version>:<Adapter Logon Entity>:<Target Organization></i></p> <p>where:</p> <p><i><Target System Type></i> is specified as a 3-character code, in all capital letters. The value supported in the current Windchill ESI release is SAP.</p> <p><i><Target System Version></i> is specified using all capital letters and without any delimiters. The value supported in the current Windchill ESI release is 46C.</p> <p><i><Adapter Logon Entity></i> is specified using periods as delimiters. The format varies by distribution target type. The supported format for the current Windchill ESI release is:</p> <p><i><SAP R/3 system ID>.<SAP R/3 client></i></p> <p>For example:</p> <p>PR1.100</p> <p><i><Target Organization></i> is specified to uniquely identify the organization within the distribution target. It is not included when objects are published across organizations or if they are not specific to organizations.</p> <p>For the current Windchill ESI release, <i><Target Organization></i> when used, must be a valid plant within SAP R/3.</p> <p>Examples:</p> <p>SAP.46C:PR1.100:0400</p> <p>which indicates an object being published to plant 0400 of SAP R/3 Release 4.6C system PR1, client 100.</p> <p>A TargetID that is not plant-specific might look like:</p> <p>SAP.46C:PR1.100</p>

Creating and Deleting Windchill ESI Distribution Targets

To help you create and change Windchill ESI distribution targets, the following two sample tasks are included with Windchill ESI:

- `CreateESITargets.xml`
Creates one or more Windchill ESI distribution targets.
- `DeleteESITargets.xml`
Removes one or more Windchill ESI distribution targets.

These sample tasks are located in the
<Windchill> /tasks/com/ptc/windchill/esi/examples directory.

You must edit the tasks so they perform the operations you wish to execute. Refer to the instructions included in these sample tasks for information on how use the tasks.

Note: To create or delete Windchill ESI targets, you need to be part of the ESI Administrators group as well as be a member of the Site Administrator's group. Refer to the *Windchill Business Administrator's Guide* for detailed information on this group.

Defining Distribution Target Assignment Strategy

Windchill ESI uses two strategies to identify Windchill ESI distribution targets when publishing objects. The two strategies that are available with the standard installation are:

- Top-level target assignment
- Explicit target assignment.

The target assignment strategy used by Windchill ESI is controlled by the `com.ptc.windchill.esi.tgt.class.ESITargetFinder` property.

Note: It is important to understand the differences between the two assignment strategies. If these differences are not understood, the published objects may not reach the intended distribution target systems, or objects may be published unintentionally to the wrong distribution targets.

When a product structure is published, Windchill ESI determines the destination by navigating the product structure and identifying the distribution target for each object in the structure. During this target identification process, it is possible for objects to have no associated objects, or to have differences in associations between parents and children. By using different distribution target assignment strategies, Windchill ESI is able to determine the correct assignments.

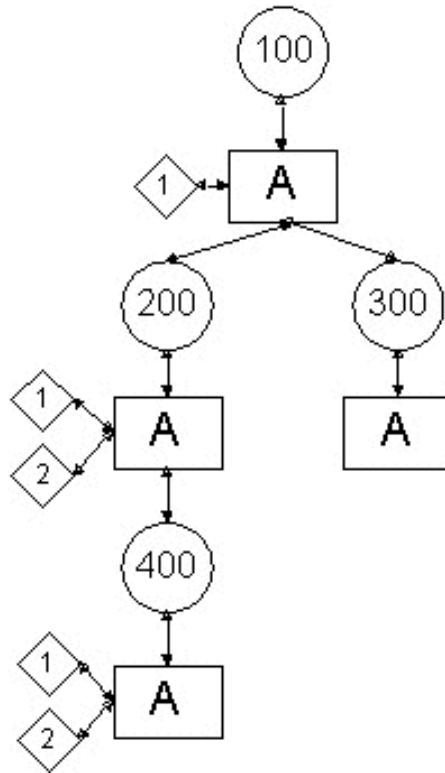


Figure 3-2 Windchill ESI Distribution Target Assignment on a Multi-Level Product Structure

Using an example product structure, the following sections describe the two assignment strategies and the objects they would publish.

Note: In the preceding figure, circles represent Windchill PDM or Windchill PDMLink part master objects; rectangles represent part iteration objects, and diamonds represent Windchill ESI distribution target objects.

Top-Level Distribution Target Assignment

The top-level assignment strategy assumes that objects in a product structure inherit their target assignments from the top-level assembly in the product structure that the user has selected to publish. The inheritance can be cancelled by explicitly assigning distribution targets for any child object in the structure. This is the default navigation strategy that is used when Windchill ESI is installed.

For example, when we apply this navigation strategy to the multi-level product structure shown in the preceding figure, assembly 100-A is published with the following results:

- Part 100-A is published to Windchill ESI distribution target 1 because of explicit assignment
- Part 300-A is published to distribution target 1 because of implicit assignment
- Parts 200-A and 400-A are published to Windchill ESI distribution target 1 and Windchill ESI distribution target 2 because of explicit assignment
- BOM 100-A is published to Windchill ESI distribution target 1 with two components, part 200 and part 300
- BOM 200-A is published to Windchill ESI distribution target 1 and to Windchill ESI distribution target 2 with one component, part 400

Explicit Distribution Target Assignment

Explicit assignment is an association between a Windchill ESI distribution target and an object that can be published. Explicit assignments persist in Windchill Foundation & PDM or Windchill PDMLink and can be viewed in the user interface. You are responsible to identify and maintain the correct associations before the objects are published.

For example, when we apply this navigation strategy to the multi-level product structure in the preceding figure, assembly 100-A is published with the following results:

- Part 100-A is published to Windchill ESI distribution target 1
- Parts 200-A and 400-A are published to Windchill ESI distribution target 1 and Windchill ESI distribution target 2
- BOM 100-A is published to Windchill ESI distribution target 1 with two components, part 200 and part 300
- BOM 200-A is published to Windchill ESI distribution target 1 and to Windchill ESI distribution target 2 with one component, part 400

Note: Unless part 300 has been created in the distribution target by a previous publishing activity, the request fails in the distribution target when attempting to create BOM 100-A. It fails because part 300 is not created for Windchill ESI distribution target 1. As a general rule, every component of an assembly must be assigned to all of the Windchill ESI targets that are assigned to the assembly. The components may also be assigned to additional Windchill ESI distribution targets.

Changing the Default Distribution Target Assignment Strategy

By default, Windchill ESI is configured to use the explicit distribution target assignment strategy. To change the distribution target assignment strategy, you need to use the xconfmanager utility to change the following property value.

Property Name	Values and Description
com.ptc.windchill.esi.tgt.class. ESITargetFinder	<p>Specify one of the following values for the type of target assignment strategy to be used:</p> <p>com.ptc.windchill.esi.tgt.ESISimplePartTargetFinder</p> <p>Selects explicit target assignment strategy (Default).</p> <p>com.ptc.windchill.esi.tgt.class.ESIRootInheritTargetFinder</p> <p>Selects top-level target assignment strategy.</p>

Adding Users to Windchill ESI Groups

As mentioned earlier, in the [Adding Users to Windchill ESI Groups and Mapping Roles](#) section, Windchill ESI creates a team template named **ESI Team** during the installation process. This template is associated to the Windchill ESI workflow roles. Also, during installation, two ESI groups, ESI Administrator and ESI Author are created. Initially, these two groups have the Administrators group specified as the participant. You can modify any of these defaults by allowing new or existing users access to these groups.

The following describes how to add users to the Windchill ESI groups and map the groups to the ESI Team template workflow roles in Windchill PDMLink or Windchill Foundation & PDM.

Adding Users in Windchill Foundation & PDM

The following is an overview of how to add users to Windchill ESI groups if you are using Windchill Foundation & PDM. The user interfaces used in the following steps are accessed through the Business Administration page. Refer to the *Windchill Business Administrator's Guide* for detailed instructions.

1. Verify that the following Windchill ESI groups and their values have been created in Windchill Foundation & PDM.

Group Name	Group Description	Group Domain
ESI Administrators	Change Admin III role principal	[/]/Site /User/Unaffiliated
ESI Authors	Engineer role principal	[/]/Site /User/Unaffiliated

2. If needed, create new users to add to the Windchill ESI groups. Set appropriate values such as usernames, fullname, passwords, domains.
3. Add the new users you created in the previous step or existing users to the Windchill ESI groups.
4. If users need to access the ESI transaction pages, add those users into both the ESI Administrator group and the Administrators group.

Note: Before performing the following step, make sure that users are part of a Windchill ESI group before they are mapped to ESI team roles.

5. If needed, map Windchill ESI groups to the ESI team roles.
6. Verify that the following access control lists (ACLs) have been set for the listed groups:

ESI Administrators

Domain	State	Objects and Permissions
Site	All	ESITarget: Read. ESITransaction: FullControl (ALL)

ESI Authors

Domain	State	Object and Permission
Site	All	ESITarget: Read. ESITransaction: Read.

Adding Users in Windchill PDMLink

The following is an overview of how to add users to the Windchill ESI groups if you are using Windchill PDMLink. The user interfaces used in the following steps are accessed through the Site Utilities page. Refer to the *Windchill Business Administrator's Guide* for detailed instructions.

1. Verify that the following Windchill ESI groups and their values have been created in Windchill PDMLink:

Group Name	Group Description	Group Domain
ESI Administrators	Change Admin III role principal	[/]/Site/User/Unaffiliated
ESI Authors	Engineer role principal	[/]/Site/User/Unaffiliated

2. If needed, create new users to add to the Windchill ESI groups. Set appropriate values such as usernames, fullname, passwords, domains.
3. Add the new users you created in the previous step or existing users to the Windchill ESI groups.
4. If users need to access the ESI transaction pages, add those users into both the ESI Administrator group and the Administrators group.
5. If required, create ESI roles in a specific product team.
6. Add users or ESI groups to ESI roles or any other role in the product team.
7. Verify that the ESI groups are part of the ECN team
8. If required, add other users or groups to the ECN team.
9. Verify that the following access control lists (ACLs) have been set for the listed groups:

ESI Administrators

Domain	State	Objects and Permissions
Site	All	ESITarget: Read ESITransaction: FullControl (ALL)

ESI Authors

Domain	State	Object and Permission
Site	All	ESITarget: Read ESITransaction: Read

Configuring and Administering EMS Queues

Windchill ESI services subscribe to and use EMS queues to communicate with Windchill EAI software components. Three of the five EMS queues, com.ptc.windchill.esi.Event, com.ptc.windchill.esi.DataRequest, and

com.ptc.windchill.esi.Request, must be configured with the EMS server for Windchill ESI to function correctly.

Note: The other two EMS queues, com.ptc.windchill.esi.DataResponse and com.ptc.windchill.esi.ResultResponse use default values and do not need to be configured.

The following lists the various tasks associated with the EMS Queues.

Windchill ESI Services Tasks

- Subscribe to EMS queues
- Authenticate EMS queues
- Configure EMS queue performance

Windchill EAI Software Components Tasks

- Start and connect to the EMS server
- Administer and configure EMS queues
- Set administrator password
- Create the EMS queues
- Enable authentication
- Secure EMS queues
- Create an ESI user
- Create a Windchill user
- Set permissions
- Set QueueConnectionFactory
- Enable EMS message logging

Properties are available to control certain performance aspects of the EMS queues and to enable or disable the startup of the EMS queues. The following describe the tasks associated with maintaining and administering the EMS queues.

Subscribing to EMS Queues

Windchill ESI services subscribe to the EMS queues, com.ptc.windchill.esi.Results and com.ptc.windchill.esi.Request by invoking an Info*Engine task when the Windchill Method Server is started. Refer to the [Enabling Windchill ESI](#) section described earlier.

Authenticating the EMS Queues

The EMS queues used by Windchill ESI services are defined in the Windchill ESI properties file. Each queue is identified by a name property, a username property, and password property. If any of these properties do not match the properties used to configure the EMS server, Windchill ESI is not able to communicate correctly with the EAI software components. The following lists the default settings for the three queues. Use the xconfmanager utility to change any of these defaults.

Note: In addition to the three queues listed in the following tables, two other EMS queues, `com.ptc.windchill.esi.ResultResponse` and `com.ptc.windchill.esi.DataResponse`, are used by Windchill ESI. However, these queues are not described here because Info*Engine dynamically determines authentication information for them. Thus, no additional Windchill ESI services configuration is required.

com.ptc.windchill.esi.Event Queue

Property Name	Default	Description
<code>com.ptc.windchill.esi.event.queueName</code>	<code>com.ptc.windchill.esi.Event</code>	Defines the name of the EMS queue where events are to be written
<code>com.ptc.windchill.esi.event.queueUser</code>	WCESI	Defines the user name to supply when connecting to secure EMS queues to write ESI events.
<code>com.ptc.windchill.esi.event.queuePassword</code>	WCESI	Defines the password to supply when connecting to secure EMS queues to write ESI events.

com.ptc.windchill.esi.Results Queue

Property Name	Default	Description
com.ptc.windchill.esi.result.queueName	com.ptc.windchill.esi.Result	Defines the name of the EMS queue where the Result RPC request are to be accepted.
com.ptc.windchill.esi.result.queueUser	WCESI	Defines the user name to supply when connecting to secure EMS queues to accept Result RPC requests.
com.ptc.windchill.esi.result.queuePassword	WCESI	Defines the password to supply when connecting to secure EMS queues to accept Result RPC requests.

com.ptc.windchill.esi.DataRequest Queue

Property Name	Default	Description
com.ptc.windchill.esi.request.queueName	com.ptc.windchill.esi.DataRequest	Defines the name of the EMS queue where RPC requests are to be accepted
com.ptc.windchill.esi.request.queueUser	WCESI	Defines the user name to supply when connecting to secure EMS queues to accept RPC requests.
com.ptc.windchill.esi.request.queuePassword	WCESI	Defines the password to supply when connecting to secure EMS queues to accept RPC requests.

Configuring EMS Queue Performance

Windchill ESI services offer three performance-related properties that affect how it communicates with the EMS queues. Reasonable default values have been established for the properties and these values are used during installation. However, depending on your environment, you may need to adjust these properties to suit your particular needs.

The recommended approach is to modify the properties incrementally and observe the performance effects. You can experiment with different values until the you achieve the best overall performance.



Caution: Large-scale changes can lead to performance degradation. Make small incremental changes and observe performance before making further changes.

The following lists the default settings for the these properties. Use the xconf manager utility to change any of these defaults.

Property	Default	Description
com.ptc.windchill.esi.subscribe.tries	12	Defines the number of times the task helper should wait for the interval (specified by com.ptc.windchill.esi.subscribe.wait) after a failed test to see if the Windchill Method Server is ready to process Windchill ESI RPCs.
com.ptc.windchill.esi.subscribe.wait	10000	Defines the amount of time, in milliseconds, the task helper should wait after a failed test to see if the Windchill Method Server is ready to process Windchill ESI RPCs.
com.ptc.windchill.esi.collectionSizeMultiplier	4	Defines the collection size intended to hold the result calculations of other new collections that some Windchill ESI java classes create. When the calculation is expected to create additional entries, the new collection is given an initial size using the following formula: new collection size = the original collection size multiplied by the value of this property.

Administrating TIBCO Enterprise for EMS Server

To configure and administer TIBCO Enterprise for EMS, you need to do the following:

1. Start the EMS server
2. Start the EMS administration tool

3. Connect to the EMS server through the administration tool.

Note: The EMS Server must be running for the administration tool to connect. If the EMS server is not running, the administration tool runs, but when you type the connect command, you get an error message because there is no server to connect to.

You can then configure TIBCO Enterprise for EMS using either one of the following two methods.

- Using the administration tool
- Using a text editor to make changes directly into a main configuration file (tibems.conf) or other TIBCO EMS configuration files.

Note: Even though you could use either of these two methods, TIBCO recommends using the administration tool to configure Enterprise for EMS. For more information, refer to the *TIBCO Enterprise for EMS User's Guide*.

Enable EMS Message Logging

It may be helpful for you to turn on logging for all EMS queues so that you can look at every message that is being exchanged across the Windchill ESI interface.

Note: Shutdown the EMS server and purge any messages on the queues before performing the following steps.

1. Enable logging on the server by following these steps:
 - a. Locate the tibemsd.conf file in the tibco/ ems/bin directory and open it using a text editor, such as Notepad.
 - b. Locate the following properties related to logging and make the changes:

Property	Description	Example
logfile	Specifies the path and name of your ems log file.	c:\tibco\ems\ems.log
logfile_max_size	Specifies maximum size of the log file before it is rotated. Specified as KB and MB.	1MB

Property	Description	Example
log_trace	<p>Specifies what you want logged to the log file. Possible tracing options are:</p> <p>INFO, WARNING, ACL, LIMITS, SSL, SSL_DEBUG, ROUTE, ROUTE_DEBUG, ADMIN, RVADV, CONNECT, CONNECT_ERROR, PRODCONS, DEST.</p> <p>Note: A value called DEFAULT logs the following: INFO, WARNING, ACL, LIMITS, ROUTE, ADMIN, RVADV, CONNECT_ERROR. You can add or remove from the default by using a + or - in front of the property.</p>	<p>console_trace = DEFAULT,-LIMITS,-ACL,+SSL,+ROUTE,+ROUTE_DEBUG</p> <p>sets default without LIMITS and ACL, but adds SSL, ROUTE, and ROUTE_DEBUG.</p>
console_trace	<p>Determines what you want logged on the console window.</p> <p>Note: This can impact performance. It is recommended that you log to file rather than to the console.</p> <p>See log_trace, described earlier in this table, for values and examples.</p>	

The next time you start your EMS server, the changed properties take effect.

2. Specify what should be logged on each queue:
 - a. Locate the queues.conf file in the tibco/ ems/bin directory and open it using a text editor, such as Notepad.

- b. Add one of the following properties to the list of properties for each queue you would like to trace, separating each property with commas.

Property	Description	Example
trace	Logs the time the message was put on the queue, the user that sent the message onto the queue, the time the message was taken off of the queue and the user that received the message from the queue.	Tracing messages on the Event queue, you would have the following line in your queues.conf file: <code>com.ptc.windchill.esi. Event secure,trace</code>
trace=body	Logs everything that the trace property logs, but also the actual content of the EMS message.	Tracing the DataResponse queue and collecting the actual content of the EMS message, you would have the following line in your queues.conf file: <code>com.ptc.windchill.esi. DataResponse secure,trace=body</code>

3. Restart your EMS server.

Note: You can also use the EMS Administration tool to perform these steps. Refer to the *TIBCO Enterprise for EMS Users Guide* for details. You can also type **help** in the Administration tool to get more information about each command.

Enabling and Understanding Message Logging and Return Messaging to Windchill Foundation & PDM or Windchill PDMLink

As a Windchill ESI administrator, you would be reviewing message logs from the Windchill ESI services components as well as from the Windchill EAI components. This section describes how to enable Windchill ESI services logging and how to view the logs for the EAI components. It also describes the logging flags for the EAI components that can be configured.

Enabling Windchill ESI Services Logging

To enable Windchill ESI services to write messages to the Windchill PDM or Windchill PDMLink log, you need to set the following property value, using the xconfmanager utility.

Note: Windchill ESI can also write messages in the Info*Engine message logs. However the com.ptc.windchill.esi.verbose property does not control Info*Engine message logging; the message logging must be active in Info*Engine for the Windchill ESI verbose property to write information into the Windchill PDM or Windchill PDMLink log. Refer to the *Info*Engine Installation and Configuration Guide* for more details.

Property Name	Default Value	Description
com.ptc.windchill.esi.verbose	true	Controls Windchill ESI log messages. It has the following values: true (default) Enables logging of Windchill ESI messages false Disables logging of Windchill ESI messages.

EAI Logging Process

The logging architecture in EAI components is designed to allow you to easily track the EAI software component process. The Windchill ESI business logic logs all transaction activity to log files and provides messages that specifically describe routine and functional error processing.

Log entries are generated immediately after the Windchill ESI business logic reaches the following processing milestones:

- Receives EMS messages
- Sends EMS messages
- Invokes a distribution target API, including commit and rollback
- Receives a response from a distribution target API, including commit and rollback
- Handles certain types of errors.

Note: Logging can be extended to other key milestones through customization.

Log entries are recorded chronologically; to avoid confusion due to parallel processing, entries should be filtered or sorted based on the transaction number. The logging process uses the ESILog schema as an input. For detailed information on the logging schema, see the *Windchill ESI Installation and Configuration Guide - SAP R/3* guide.

All Windchill ESI logs generated by the EAI software components are maintained in the TIBCO BusinessWorks process engine logs with a role designation of **ESI** to distinguish them from other standard TIBCO product messages. The log file size is configurable and logs can be viewed through the web-based, TIBCO BusinessWorks Administrator. For more information on how to view the logs refer to the *TIBCO Administrator User's Guide*.

You can export log files to a text file and view them using any text editor or export them as a .CSV file into a spreadsheet program such as Microsoft Excel which you can use to filter or sort the messages. Log messages can be disabled or enabled and also configured and customized to provide different levels of details and severities.

Components of a Log Entry

The following table describes the components of a log entry, in the order in which they are placed. The fields in the log are delimited by a configurable delimiter that is set to a comma, (,) by default

Field	Length	Description
Transaction Number	200	The ESI transaction number that is being processed.

Field	Length	Description
Target	25	<p>Uniquely identifies the target where the object is being published and has the following format:</p> <pre><Target System Type>.<Target System Version>:<Adapter Logon Entity>:<Target Organization></pre> <p>where</p> <p><Target System Type> is specified as a 3-character code, in all capital letters. The value supported in the current Windchill ESI release is SAP.</p> <p><Target System Version> is specified using all capital letters and without any delimiters. The value supported in the current Windchill ESI release is 46C. For example: SAP.46C</p> <p><Adapter Logon Entity> is specified using periods as delimiters. The format varies by distribution target type. The supported format for the current Windchill ESI release is:</p> <pre><SAP R/3 system ID>.<SAP R/3 client></pre> <p>For example: PR1.100</p> <p><Target Organization> is specified to uniquely identify the organization within the distribution target. It is not included when objects are published across organizations or if they are not specific to organizations.</p> <p>For the current Windchill ESI release, <Target Organization> when used, must be a valid plant within SAP R/3.</p> <p>Examples:</p> <pre>SAP.46C:PR1.100:0400</pre> <p>which indicates an object being published to plant 0400 of SAP R/3 Release 4.6C system PR1, client 100.</p> <p>A TargetID that is not plant-specific might look like this:</p> <pre>SAP.46C:PR1.100:</pre>
Application	1	Identifies the application which originated the message. For details, see the Application section.
Type	1	Indicates the type of message. For details, see the Type section.
Severity	1	Indicates the severity level of the message. For details, see the Severity section.

Field	Length	Description
Message Code	5	Unique message code identifier, used as the cross reference key to the appropriate localized message text. This field is hard-coded by the developer or a customizer when invoking the Logging_Service. For details, see the Message Code section.
EAI Primary Message Text		<p>Descriptive text such as a message description (corresponds to the Message Code).</p> <p>This text is localized based on the ESILogLocale global variable. (See the Internationalization Considerations section in the <i>Windchill ESI Installation and Configuration Guide - SAP R/3</i> for details)</p> <p>For example: "Received ESI Response."</p>
Descriptive Text		Any descriptive text. For example: Object Number
Root Cause Analysis Message		<p>Text describing possible root cause of error, or where user may find more information about the error.</p> <p>This text is localized based on the ESILogLocale global variable (refer to the Internationalization Considerations section in the <i>Windchill ESI Installation and Configuration Guide - SAP R/3</i> for more details).</p> <p>The logging of this information is enabled via a global variable ESILog_RootCause. Refer to the Logging Flags section for more details.</p> <p>For example, "For more information regarding this error, please refer to the SAP Application Log (transaction SLG1)"</p>

Field	Length	Description
ERP Primary Message	300	<p>If applicable, the primary API return message from the ERP system. For SAP R/3 distribution target only, this includes the following SAP R/3 message parameters, delimited by colons, with leading and trailing spaces removed:</p> <ul style="list-style-type: none"> • Type (A, E, S, I, W, X) • ID • Number • Text <p>This text is not localized. (See the Internationalization Considerations section in the <i>Windchill ESI Installation and Configuration Guide - SAP R/3</i> for more details)</p> <p>The logging of this information is enabled via a global variable ESILog_ERPPPrimary. Refer to the Logging Flags section for more details. Since this information applies to different message types and severities, it may be repeated several times in the log.</p> <p>For example:</p> <p>S:MM:356:The material GS_700_IB4D has been created or extended</p>

Field	Length	Description
ERP Secondary Message	300	<p>If applicable, the secondary API return message from the ERP system. For SAP R/3 distribution target only, this includes the following SAP R/3 message parameters, delimited by colons, with leading and trailing spaces removed:</p> <ul style="list-style-type: none"> • Type (A, E, S, I, W, X) • ID • Number • Text <p>Each secondary information entry is delimited by semicolons.</p> <p>This text is not localized. (See the Internationalization Considerations section in the <i>Windchill ESI Installation and Configuration Guide - SAP R/3</i> for more details)</p> <p>The logging of this information is enabled via a global variable ESILog_ERPSecondary. Refer to the Logging Flags section for more details. Since this information applies to different message types and severities, it may be repeated several times in the log.</p> <p>For example:</p> <p>H:MK:102:Trying to create: GS_700_IB4D 1200; S:M3:800:Material GS_700_IB4D created; H:MK:103:Trying to change: GS_700_IB4D 1200; S:M3:810:No changes made</p>
EAI Additional Information	2500	<p>Any pertinent information from EAI components (non-ERP). This text is not localized. (See the Internationalization Considerations section in the <i>Windchill ESI Installation and Configuration Guide - SAP R/3</i> for more details). Since this information applies to different message types and severities, it may be repeated several times in the log.</p> <p>For example, in case of error, this field might contain a stack trace.</p>
Extra Information	2500	Additional field for customization.

Log Message Codes

The following sections provide details on the codes or numbers associated with the various fields in the log messages.

Application

The application field indicates which application is the source of the information in the log entry. There is no systematically enforced correlation between the application fields and any other fields of the log entry. The following table lists the number associated with the applications.

Application Number	Description
1	TIBCO BusinessWorks
2	Windchill
3	EMS Queues
4	TIBCO Adapter for R/3
5	TIBCO Adapter for Oracle Applications
6+	Reserved for Future Use

Type

To help classify messages, Windchill ESI assigns a type to each log entry at the point in the Windchill ESI business logic where it is generated. The following table lists the message types:

Type Value	Message Type	Description
1	Functional	Provides status information on the processing of the business objects between Windchill and the Windchill ESI business logic or between the Windchill ESI business logic and the distribution target. For example, creating parts, or deleting document links.
2	Technical	Provides status information relating to technical aspects of processing. For example, failed to parse response message.

Severity

The severity level indicates the impact of the message on the system. Severity level numbers five (5) and above (except 9) can be used for customized message severity types. The following lists the current severity levels:

Severity Field Value	Severity Type	Description	Action Required by Administrator
0	Fatal	Indicates a failure has occurred and that the EAI components have stopped processing.	Yes. Requires immediate attention from an EAI systems administrator. Refer to the <i>Windchill Enterprise Systems Integration Administrator's Guide - SAP R/3</i> for details.
1	Error	Indicates that a non-fatal error has occurred. EAI components will continue processing.	Yes. May require EAI systems administrator attention in the case of technical errors. May require attention from a Windchill Foundation & PDM or PDMLink user for functional errors.
2	Warning	Indicates that an important or significant condition occurred but did not cause the Windchill ESI business logic to stop abnormally.	Action sometimes required through standard Windchill Foundation & PDM or Windchill PDMLink tools.
3	Success	Indicates that desired action was completed successfully.	None

Severity Field Value	Severity Type	Description	Action Required by Administrator
4	Informational	Indicates that a normal processing step was performed	None
9	Debug	Intended to track the progress of the BusinessWorks flow for debugging purposes.	None

Message Code

The following provides details on message code related to:

- Internationalization
- Numbering scheme

Internationalization

Each message is associated with a five-digit code, for example, 40003. This helps message logging configuration by locale and distribution target. Windchill ESI provides localized message text for several supported languages. You can choose the desired logging language for each deployed BusinessWorks process engine via the global variable, ESILogLocale. Messages, by default, are stored in the ESIMessageLookups.properties. You may configure the default ESI message texts in this file for specific distribution targets and additional locales. Message lookup keys can contain wildcards. That is, you may set a code to work for any locale and any system.

Log messages are chosen in the following order of precedence: locale, system, wildcard.

The format of an entry is: Code.System.Locale=Localized Text

For example:

```
40000.PR1.800.en_US=<Text for SAP R/3 system PR1 client 800 in US English>
40000.*.de_DE=<Text for all systems in German>
40000.*.*=<Default text for all systems and locales>
```

Numbering Scheme

Message codes are numbered according to a loosely-defined scheme. These numbers are intended to help you quickly determine the severity of the message and are not systematically enforced.

The following table lists the numbering scheme:

First-Digit Range	Description	Sample Usage
0-1	ERP Error Messages	API failures.
2-3	System Error Messages	EMS processing errors.
4-5	Routine messages	Successful API invokes.
5+	Reserved	For future use.

Logging Flags

As mentioned earlier, depending on site needs, you may configure which message types and severity levels are to be written into the log. You can use global variables to configure these messages.

The following table lists the flags that are stored as global variables. Messages that have a severity level of 0 (fatal messages) are always logged; there are no flags to turn this messaging off. Acceptable values for these flags are 0 (false) or 1 (true). For more information, see the *Windchill ESI Installation and Configuration Guide - SAP R/3*.

Flag	Description
ESILog_Functional_Debug	Enables logging of messages that are type functional and severity debug.
ESILog_Functional_Informational	Enables logging of messages that are type functional and severity informational.
ESILog_Functional_Success	Enables logging of messages that are type functional and severity success.
ESILog_Functional_Warning	Enables logging of messages that are type functional and severity warning.
ESILog_Functional_Error	Enables logging of messages that are type functional and severity error.
ESILog_Technical_Debug	Enables logging of messages that are type technical and severity debug.

Flag	Description
ESILog_Technical_Informational	Enables logging of messages that are type technical and severity informational.
ESILog_Technical_Success	Enables logging of messages that are type technical and severity success.
ESILog_Technical_Warning	Enables logging of messages that are type technical and severity warning.
ESILog_Technical_Error	Enables logging of messages that are type technical and severity error.

The flags in the previous table determine when to log messages. There are additional flags that determine what to log. The following table describes these global variables in detail:

Flag	Description
ESILog_ERPPPrimary	Enables logging of ERP primary messages. See the logging structure for more details.
ESILog_ERPSecondary	Enables logging of ERP secondary messages. See the logging structure for more details.
ESILog_RootCause	Enables logging of root cause messages. See the logging structure for more details.

Return Messaging to Windchill

ESI EAI software components send a subtransaction PostResult message for every object/action/organization (the objects are Parts, BOMs, Documents, ECNs, DocumentLinks). The Message field of the ESIPostResult schema is a string field that contains explanatory text about the status of the object. (Please see the Windchill ESI Open Application Programming Interface Guide for more details on the structure of the PostResult schema). This field is populated with several pieces of information. The following table describes the structure of the message field. The fields are delimited using a global variable ESIWCMessagingDelimiter, which is set to a double pipe (||) by default. This delimiter is also prepended to the entire message string field. This is a feature put in to allow the source application to be able to dynamically parse the message using the delimiter specified in the message.

Components of ESIPostResult Message

Field	Description
EAI Primary Message	Text generated by EAI software components that describes the object/action/status of the subtransaction. This text is localized based on the locale (from the <code>com_infoengine_locale</code> property) of the data in the <code>ESIResponse</code> (see the Internationalization Considerations section in this guide or the Windchill ESI Open Application Programming Interface Guide for more details). For example: "Successfully created part in SAP"
EAI Secondary Message	Text generated by EAI software components that tells the user of any warning or functional decision messages. This text is localized based on the locale (from the <code>com_infoengine_locale</code> property) of the data in the <code>ESIResponse</code> (see the Internationalization Considerations section in this guide or the Windchill ESI Open Application Programming Interface Guide for more details) Including this information in the message is enabled via a global variable <code>ESIWCMessaging_EAISecndary</code> . See Return Messaging Flags section for more details. For example: "Creating document version failed but assuming functional success"

Field	Description
Root Cause Analysis Message	<p>Text generated by EAI software components that indicates the possible root causes of the error or provides hints and tips on where to find additional information about the error. This text is localized based on the locale (from the <code>com_infoengine_locale</code> property) of the data in the <code>ESIResponse</code> (see the Internationalization Considerations section in this guide or the Windchill ESI Open Application Programming Interface Guide for more details)</p> <p>Including this information in the message is enabled via a global variable <code>ESIWCMessaging_RootCause</code>. See Return Messaging Flags section for more details. For example: "For more information about this error, please see the SAP Internal Application Log (transaction SLG1)"</p>

Field	Description
ERP Primary Message	<p>If applicable, the primary API return message from the ERP system. For SAP R/3 distribution target only, when using SAP R/3 BAPIs, this may include the following SAP R/3 message parameters, delimited by colons, with leading and trailing spaces removed:</p> <ul style="list-style-type: none"> • Type (A, E, S, I, W, X) • ID • Number • Text <p>For SAP R/3 CCAP and CSAP remotely-enabled API function modules, this field may be the object name or internal SAP R/3 object number.</p> <p>This text is not localized (See the Internationalization Considerations section in the <i>Windchill ESI Installation and Configuration Guide - SAP R/3</i> for more details)</p> <p>Including this information in the message is enabled via a global variable ESIWCMessaging_ERPPPrimary. See Return Messaging Flags section for more details.</p> <p>For example:</p> <p>S:MM:356:The material GS_700_IB4D has been created or extended</p>

Field	Description
ERP Secondary Message	<p>If applicable, the secondary API return message from the ERP system. For SAP R/3 distribution target only, when using SAP R/3 BAPIs, this may include the following SAP R/3 message parameters, delimited by colons, with leading and trailing spaces removed:</p> <ul style="list-style-type: none"> • Type (A, E, S, I, W, X) • ID • Number • Text <p>For SAP R/3 CCAP and CSAP remotely-enabled API function modules, this field will typically remain empty.</p> <p>Each secondary information entry is delimited by semicolons</p> <p>This text is not localized. (See the Internationalization Considerations section in the <i>Windchill ESI Installation and Configuration Guide - SAP R/3</i> for more details)</p> <p>Including this information in the message is enabled via a global variable ESIWCMessaging_ERPSecondary. See Return Messaging Flags section for more details.</p> <p>For example:</p> <p>H:MK:102:Trying to create: GS_700_IB4D 1200; S:M3:800:Material GS_700_IB4D created; H:MK:103:Trying to change: GS_700_IB4D 1200; S:M3:810:No changes made</p>

Field	Description
EAI Additional Information	Any pertinent information from EAI components (non-ERP). This text is not localized (See the section, Internationalization Considerations, in the <i>Windchill ESI Installation and Configuration Guide - SAP R/3</i> for more details). Including this information in the message is enabled via a global variable ESIWCMessaging_EAISecondary. See Return Messaging Flags section for more details. For example, in case of error, this field might contain a stack trace.
Extra Information	Additional field for customization

Unlike logging, return messaging to Windchill does not contain flags to determine when to send messages - messages are required to be sent for every object/action/organization. However, there are flags that determine what can be returned to Windchill Foundation & PDM or Windchill PDMLink. The following table describes these flags.

Return Messaging Flags

Flag	Description
ESIWCMessaging_ERPPPrimary	Enables returning ERP primary information to Windchill Foundation & PDM or PDMLink. See the section entitled Components of ESIPostResult Message for more details.
ESIWCMessaging_ERPSecondary	Enables returning ERP secondary information to Windchill Foundation & PDM or PDMLink. See the section entitled Components of ESIPostResult Message for more details.
ESIWCMessaging_RootCause	Enables returning root cause information to Windchill Foundation & PDM or PDMLink. See the section entitled Components of ESIPostResult Message for more details.
ESIWCMessaging_EAISecondary	Enables returning functional decision/warning information to Windchill Foundation & PDM or PDMLink. See the section entitled Components of ESIPostResult Message for more details.

Handling Errors and Notification

As a Windchill ESI administrator, you would be reviewing errors and notifications. Errors in the Windchill ESI system are handled in a closed-loop manner. This means that each error is logged and handled in some way. Windchill ESI users are actively notified and given the opportunity to view the errors, fix the cause of each of these errors, and then resubmit the transaction for further processing.

Overview of Error Handling Process

The ESI business logic contains a custom, separately threaded error-handling process. This process is called in-line after an error is detected by the TIBCO BusinessWorks application. Once started, the process evaluates the type of error and determines the action needed to handle the error including whether to:

- Send a subtransaction PostResult message to Windchill ESI

- Send an overall PostResult and PostEvent message to Windchill Foundation & PDM or Windchill PDMLink
- Halt the process or continue from the point where the error occurred.

Whether an error is logged is determined via the logging flags. The severity of an error is determined via the error handling codes. An error code that stops all processing will have a severity of 0 (fatal). Severity 0 errors will always be logged. An error code that continues processing will have a severity of 1 (error). Severity 1 errors will be logged if the appropriate logging flags are enabled.

Windchill Foundation & PDM users are actively notified and given the opportunity to fix the source of failures. However, in cases where there is not enough data to provide these notifications, presenting a possible risk of inconsistencies in the data between Windchill PDM or Windchill PDMLink and the distribution target, a higher-level customized notification such as an email message to the administrator or a call to a pager, can be sent.

Once the error is handled, the process thread for that error terminates naturally. The error handling process uses the ESIError schema as an input. It must be populated with the required information when the error-handling service is invoked. For more information on the ESIError schema see, *Windchill ESI Installation and Configuration Guide - SAP R/3*.

Types of Errors

Errors in the EAI components of an Windchill ESI system can be grouped into the following three types:

- BusinessWorks Processing Errors

Errors detected by TIBCO BusinessWorks application in the Windchill EAI components, are handled by the BusinessWorks error-handling process. When these types of errors occur, normal processing stops and the error is logged in the BusinessWorks Process Engine log with information such as when, where and what type of error occurred.

- Functional ERP Errors

Errors occurring in an ERP system are handled as part of normal processing and are not recorded by the error handling process or written to an error log. Instead, all errors as well as successes are recorded in the Transaction Management Log. See the *Windchill ESI User's Guide*.

- System Errors

When engines, adapters, or servers fail, TIBCO Administrator sends an error message to the error handling process and attempts to automatically restart the failed program or alert an administrator of system performance problems.

The majority of errors occur under anticipated circumstances. In these cases the Windchill ESI business logic processes the error in a prearranged way. In

some cases the code may fail in situations that were not anticipated. In all cases, the Windchill ESI business logic calls the error handling process, which determines whether a PostResult message is sent to Windchill PDM or Windchill PDMLink, whether or not to write to the log, and whether to halt the process or continue from the point where the error occurred.

Checkpoints are used to store information about the status of jobs so that they can, after they fail, be restarted from that point on without causing data duplication or data corruption. Checkpoints are used in the following locations in the Windchill ESI business logic:

- After receiving an event from Windchill PDM or Windchill PDMLink
- After receiving a response from Windchill PDM or Windchill PDMLink to a request
- After receiving the status of an object published to an ERP system from the EAI application.

Refer to the *Windchill ESI Installation and Configuration Guide - SAP R/3* for further information and guidelines on checkpoints.

Error Handling Codes

The Windchill ESI business logic uses a five-digit message code each time it invokes the error handling process. This code is used to look up a handling code which determines the behavior of the error handling process. Error handling has several handling codes and each code has permutations of actions that include the following options:

- Send subtransaction messages or do not send subtransaction messages
- Send overall messages or do not send overall messages
- Stop processing or continue processing

Fatal messages (severity "0") are always logged in the middleware log. Error messages (severity "1") are logged when the corresponding logging flag is set to

true. The 5-digit code that was originally used to determine the handling code is also used to determine the message that appears in the log.

The following table gives a high-level overview of each code.

Code/ Action	Severity	Send Subtransactions Messages to Windchill	Send Overall Transaction Messages to Windchill	Continue Processing¹	Stop Processing
0	None ²				X
1	0				X
2	0		X		X
3	0	X	X		X
4	1	X		X	
5	1			X	

-
1. When BusinessWorks flow returns to the point where it was called, it continues to process normally. In some cases however, this may cause erroneous processing such as sending a second PostResult message. It is therefore recommended that these codes are used with caution.
 2. Reserved for internal use.

Error Codes

The following table lists the error codes.:

Error Code Number	Windchill PDM or Windchill PDMLink Notification	Final Action
0	No Windchill Foundation & PDM or Windchill PDMLink notification.	Processing stops.
1	No Windchill Foundation & PDM or Windchill PDMLink notification.	Processing stops.
2	Windchill ESI sends a PostResult message to Windchill Foundation & PDM or Windchill PDMLink for the overall release transaction. If Windchill ESI initially received a WaitingEventID in the ESI Event message from Windchill Foundation & PDM or Windchill PDMLink, Windchill ESI also sends a PostEvent message to Windchill Foundation & PDM or Windchill PDMLink.	Processing stops.
3	Windchill ESI sends a subtransaction PostResult message to Windchill Foundation & PDM or Windchill PDMLink. Windchill ESI sends a PostResult message to Windchill PDM or Windchill PDMLink for the overall release transaction. If Windchill ESI initially received a WaitingEventID in the ESI Event message from Windchill PDM or Windchill PDMLink, Windchill ESI also sends a PostEvent message to Windchill PDM or Windchill PDMLink.	Processing stops.
4	Windchill ESI sends a PostResult message to Windchill Foundation & PDM or Windchill PDMLink for the subtransaction.	Continues processing and returns to where the error handler was called
5	No Windchill Foundation & PDM or Windchill PDMLink notification.	Continues processing and returns to where the error handler was called.

Guidelines for Monitoring, Diagnosing and Resolving Problems

This section provides you with:

- General guidelines on how to monitor and diagnose problems and lists some specific techniques you can use to resolve them
- A listing of specific problems, their causes and resolution.

Monitoring Problems

As a Windchill ESI Administrator you are alerted to problems through reporting channels such as user reports which includes trouble tickets logged via a help desk or through e-mails and through automated system alerts.

User reports are a passive, reactive means of detecting problems. To improve Windchill ESI system stability and lower the overall cost-of-ownership, it is recommended that you supplement user reports with automated system alerts which is a proactive approach that can prevent problems before they become critical.

The following describe how to monitor problems using the following:

- TIBCO BusinessWorks monitoring services
- Error handling processes and logging services
- Event rules and problem-detection approaches

Monitoring with BusinessWorks

TIBCO BusinessWorks is used by the Windchill ESI Error Handling process to monitor the Windchill EAI software components and to handle system problems. TIBCO BusinessWorks Administrator provides you with a Graphical User Interface and microagents to monitor and maintain hardware and software components within BusinessWorks administrative domains. These tools can be configured to monitor BusinessWorks process engines, adapters, log file entries, available disk space, operating system parameters, and more. When defining a deployment configuration, TIBCO BusinessWorks provides facilities to create alert and escalation rules triggered by predefined events, such as a component failure, suspended process, or log event.

You can use BusinessWorks to monitor the following:

- BusinessWorks engine problems
- Adapter problems
- EMS problems

BusinessWorks Engine Problems

TIBCO BusinessWorks engines need to be running for every process used in Windchill ESI. Therefore the BusinessWorks monitoring component must be able to do the following:

- Handle events raised when a failure of a BusinessWorks engine causes messages to be lost or for processing to stop
- Send alerts to TIBCO Administrator monitoring when failures occur
- Escalate actions as failure frequency increases

Failure Categories

In a deployment, failures can be separated into the following categories:

- **Any Failure:** Catches any failure and performs an action
- **First Failure:** Catches the first failure of an engine and performs an action
- **Second Failure:** Catches the second failure of an engine and performs an action
- **Subsequent Failure:** Catches any failure which is the third or higher failure

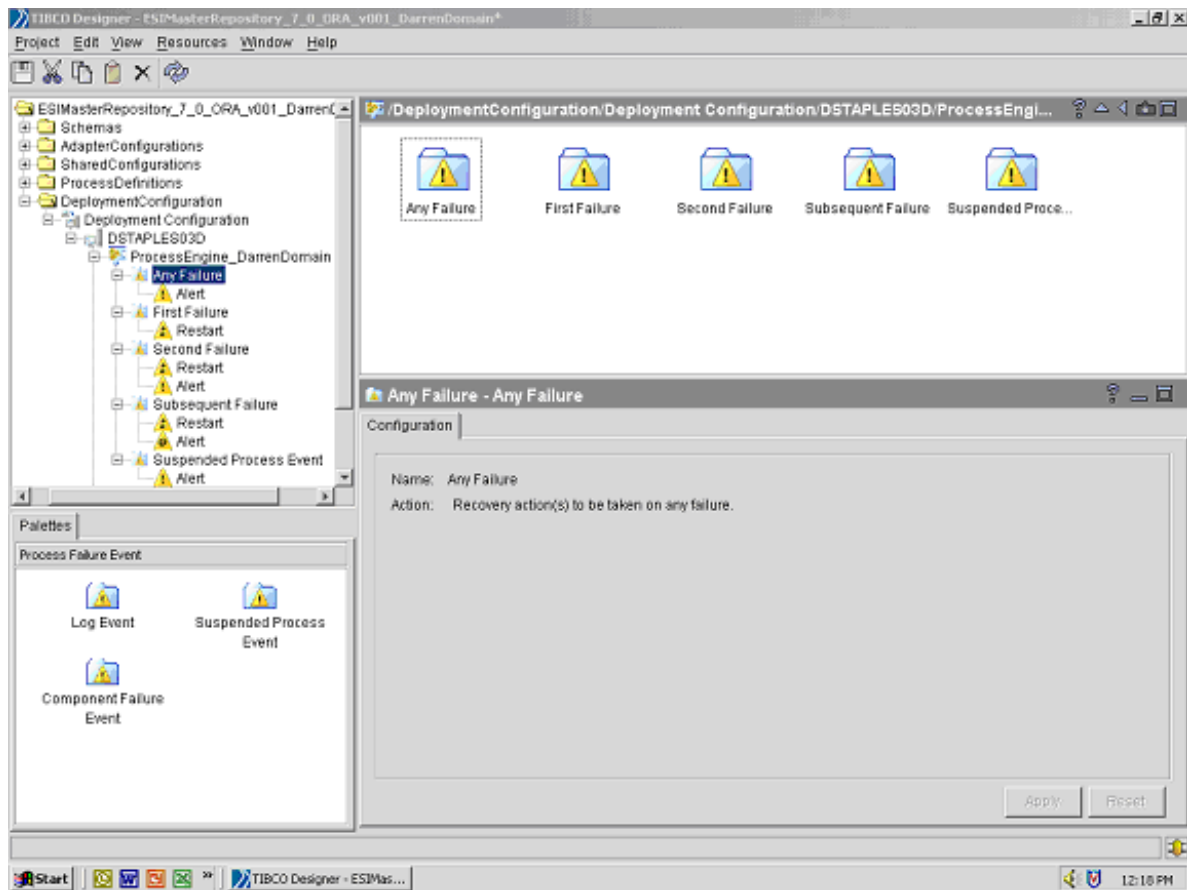
Suggested Deployment Configuration

The following lists suggested actions that you can configure during deployment, for the various type of failures:

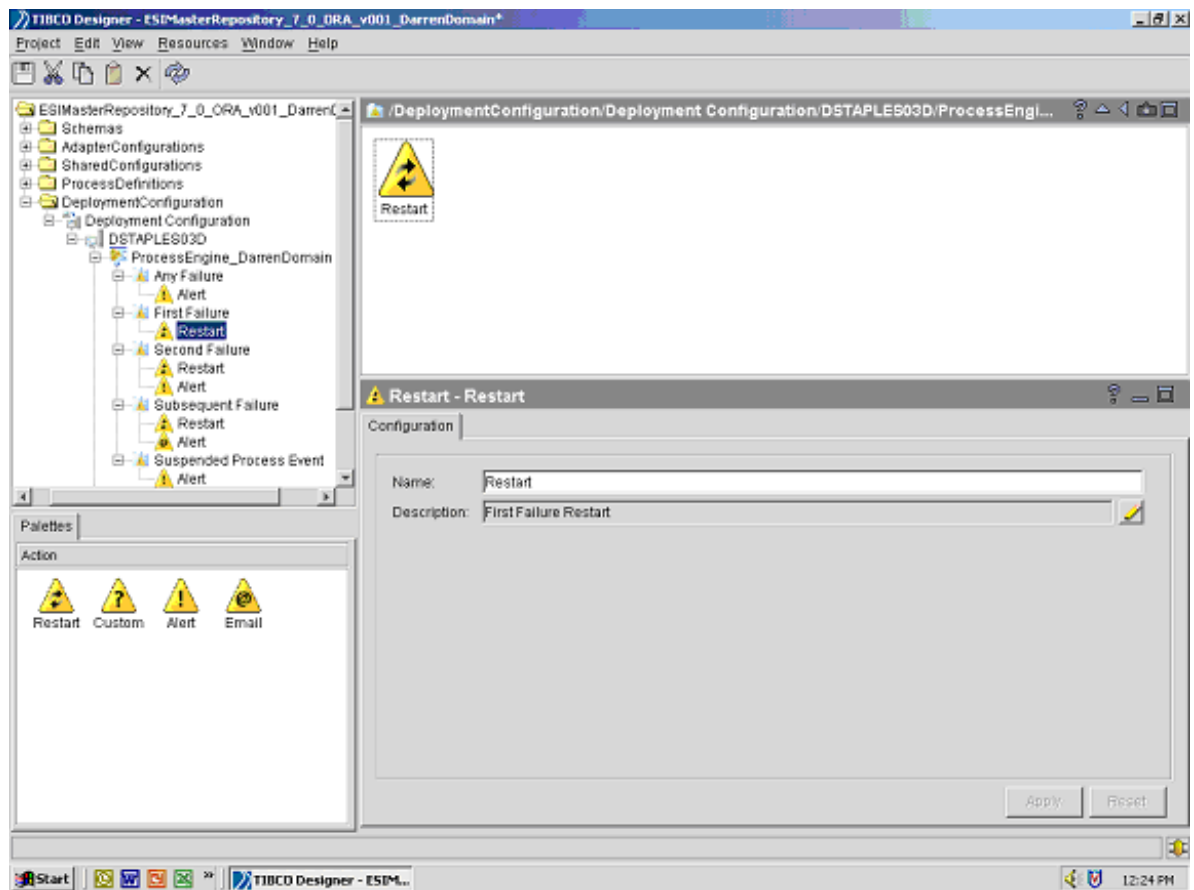
- **Any Failure:** Raise an alert to the administrator
- **First Failure:** Restart the engine
- **Second Failure:** Failure: Restart the engine and raise a second failure alert
- **Subsequent Failure:** Restart the engine and send email to the administrator

A configurable counter and timer exists which determines when to reset the failure count to first. Use the timer setting on this counter to set to a particular time frame in which more than two failures in that time frame raises considerable concern about the system's overall integrity. The following screen shots show examples of the suggested deployment.

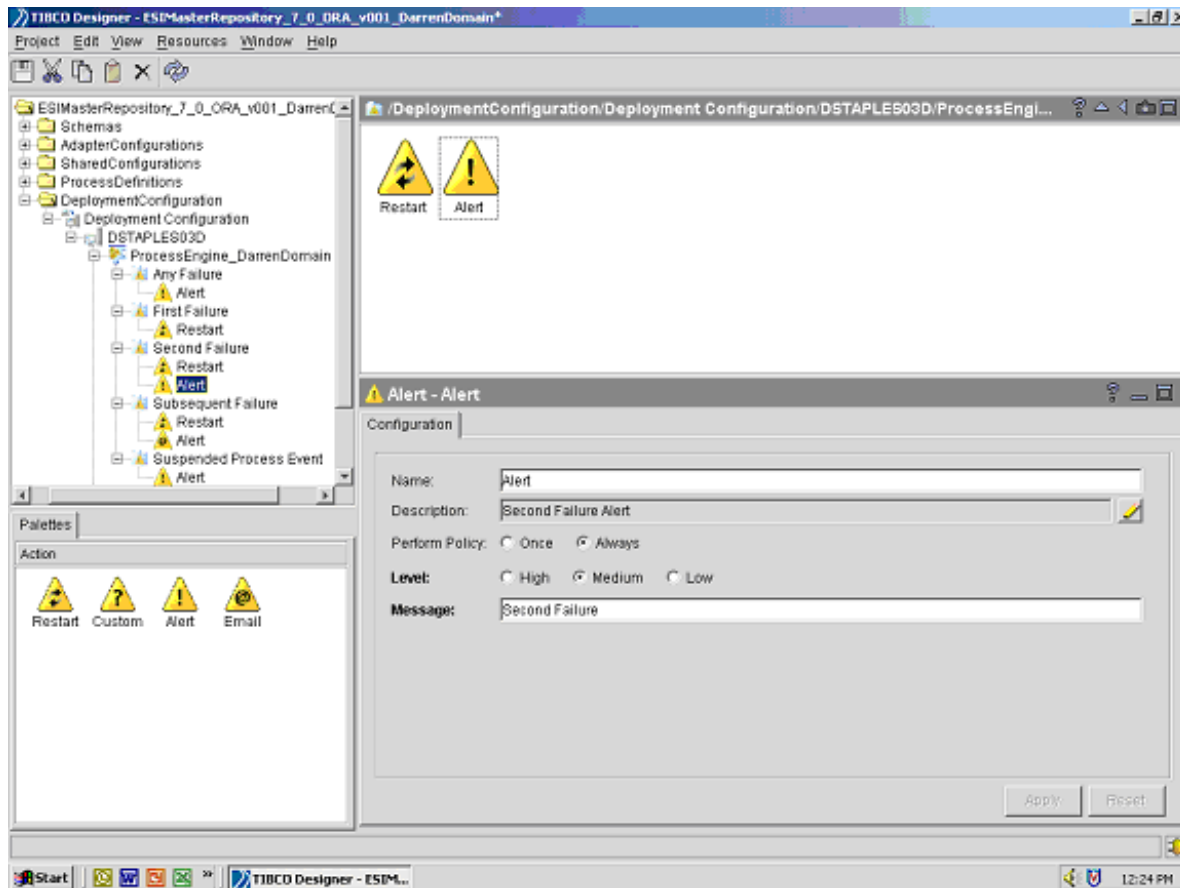
The following screen shows a process engine with all possible event handlers in place. The **Any Failure** is invoked regardless of the order of the error.



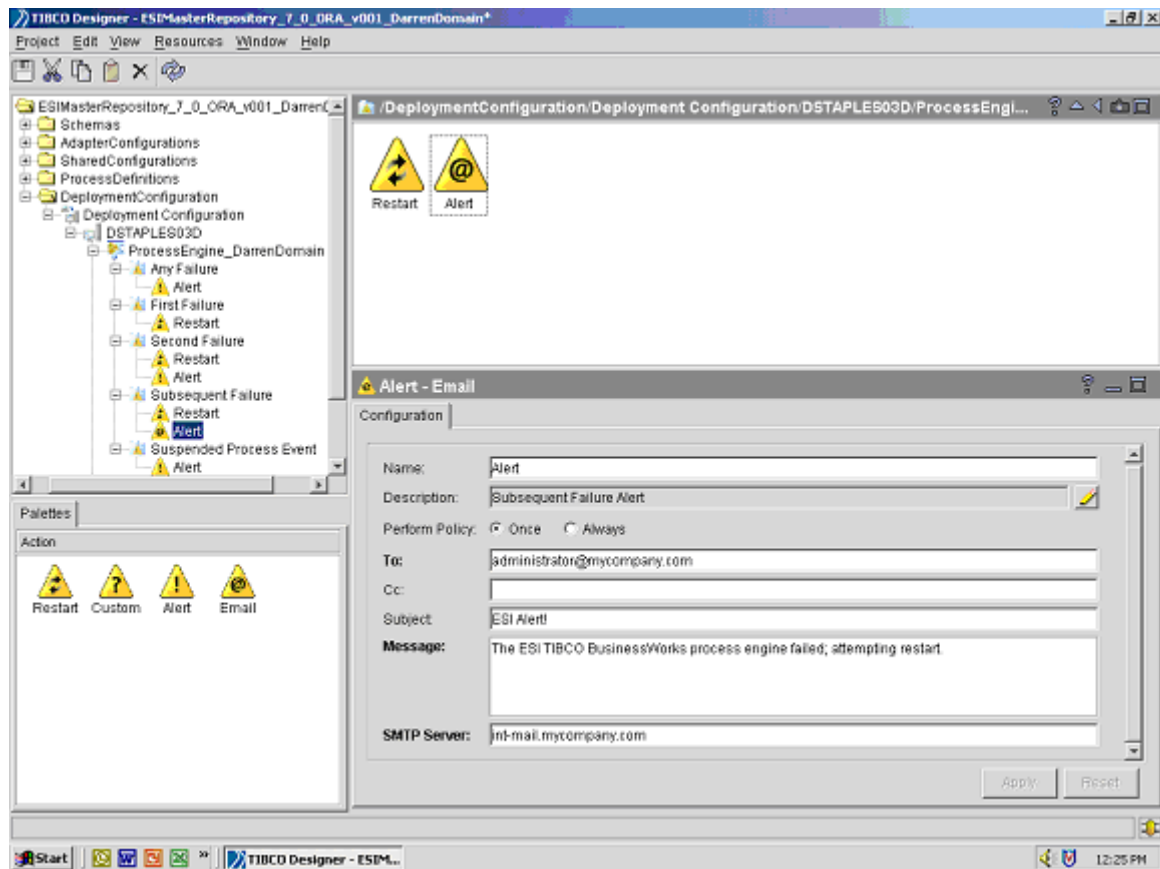
The following screen shows that on **First Failure** the process engine restarts.



The following screen shows that on second failure the process engine restarts and a second alert is sent at a medium-level to indicate that a second failure has occurred.

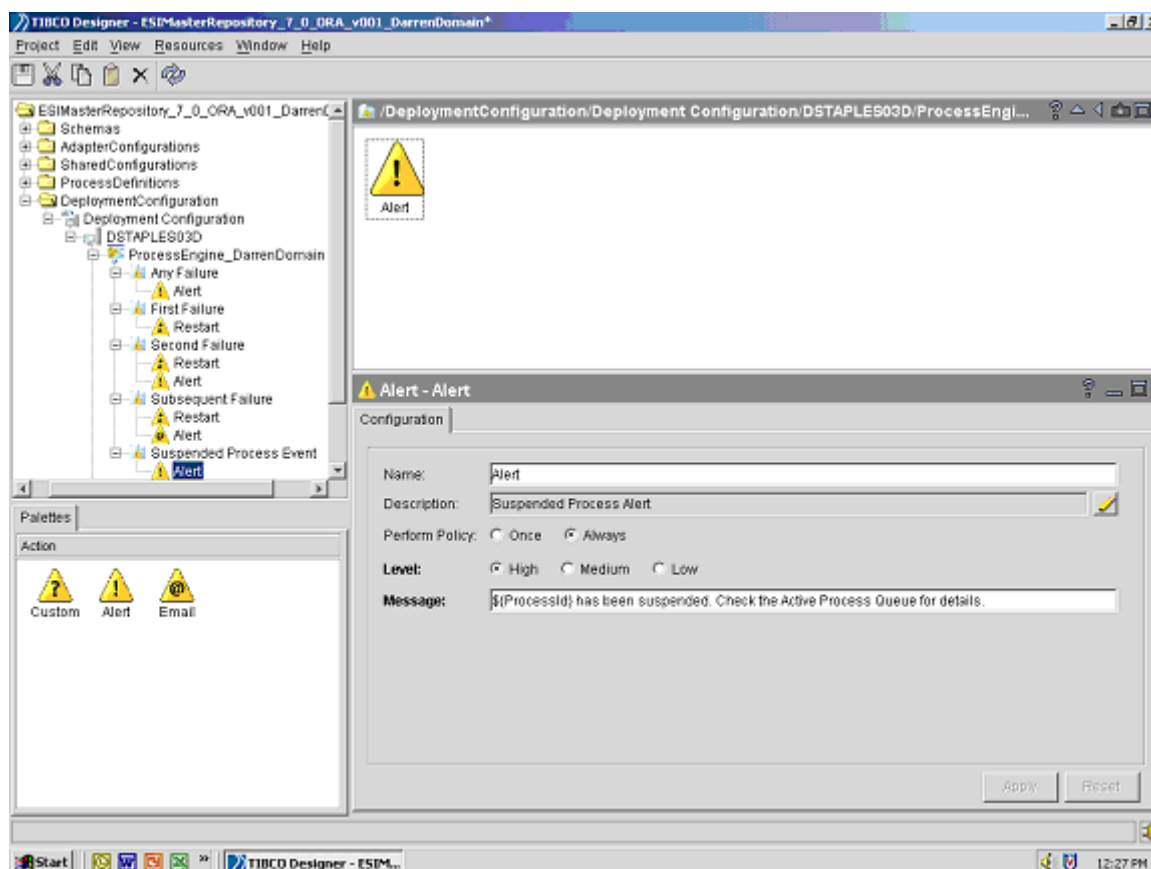


The following screens show that when a third failure or higher occurs, the engine is restarted and an email is sent to indicate the systems failure.



When EMS queues fail, a process becomes suspended. You may configure an alert to detect the process engine suspension, as illustrated in the following screen. As a systems administrator, you have the ability to restart the engine using TIBCO

BusinessWorks Administrator. See the section titled [EMS Problems](#) for more details.



Adapter Problems

The adapter's distribution target system need to be running for many processes used in Windchill ESI. Therefore, the TIBCO BusinessWorks monitoring component must be able to do the following:

- Restart adapter instances when they fail
- Send alerts to TIBCO Administrator when failures occur
- Escalate actions as failure frequency increases

Failure Categories

In a deployment, failures can be separated into the following categories

- **Any Failure:** Catches any failure and performs an action
- **First Failure:** Catches the first failure of an adapter and performs an action

- **Second Failure:** Catches the second failure of an adapter and performs an action
- **Subsequent Failure:** Catches any failure which is the third or higher failure

Suggested Deployment Configuration

The following lists suggested actions that you can configure during deployment, for the various type of failures:

- **Any Failure:** Raise an alert to the administrator
- **First Failure:** Restart the adapter
- **Second Failure:** Restart the adapter and raise a Second Failure alert
- **Subsequent Failure:** Restart the adapter and send email to the administrator

A configurable counter and timer exists which determines when to reset the failure count to first. Use the timer setting on this counter to set to a particular time frame in which more than two failures in that time frame raises considerable concern about the system's overall integrity.

EMS Problems

A EMS Server needs to be running for the master process flow and error handling processes to work properly. The TIBCO Administrator must be able to do the following

- Handle events raised when a EMS server failure occurs
- Send errors to the error handling process when a failure occurs

Unfortunately, TIBCO BusinessWorks does not create an event when EMS servers fail. To combat this, you could do one of the following:

- *No suspend:* When a EMS queue does not respond or cannot be connected to at runtime after a repeat-on-error-until-true group with the suspend checkbox option *not selected*, BusinessWorks creates a process engine log entry indicating a timeout of the EMS activity. You could configure a log event in TIBCO Administrator to monitor the log for this and raise an alert.
- *Suspend:* When a EMS queue does not respond or cannot be connected to at runtime after a repeat-on-error-until-true group with the suspend checkbox option *selected*, BusinessWorks suspends the process engine and you can configure a TIBCO Administrator rule base to raise an alert.

By default, Windchill ESI is configured for the suspend approach, as this allows for the process that caught the EMS queue failure to continue after restarting the EMS server.

Special Guidelines for EMS Server Problems

Windchill PDM or Windchill PDMLink allows a single EMS provider. Therefore, the TIBCO Enterprise for EMS server becomes an integral part of the Windchill

ESI architecture, and Windchill PDM or Windchill PDMLink users may use it for functions other than Windchill ESI applications. Therefore, it may not be prudent to configure Windchill ESI to automatically restart the EMS server when there is a problem with Windchill ESI that is related to a EMS problem. Rather, the default and recommended configuration is to have the error-handling process place the current BusinessWorks job in suspend mode when it detects a serious EMS problem.

Suspend mode allows you to manually intervene and does not pose a risk of data loss. Only the affected BusinessWorks job - that is, the product data transaction that is being published - is suspended while other jobs in the same process engine may continue. If other jobs encounter the same EMS problem, they get individually suspended as well. You can individually restart jobs via the TIBCO BusinessWorks Administrator. Jobs get resumed from the point of suspension, not from the last checkpoint.

TIBCO Administrator does not provide built-in administration domain monitoring of TIBCO Enterprise for EMS. You may, however, configure TIBCO BusinessWorks to issue alerts in the event that the EMS server is suspended or requires restarting. End-users can use the basic administration console in TIBCO Enterprise for EMS to configure TIBCO BusinessWorks to issue alerts in the event that the EMS server is suspended or requires to be restarted. See [Configuring E-Mail Alerts](#) for more information.

SAP R/3 Problems

The TIBCO Adapter for R/3 log files can report problems such as an invalid or locked SAP R/3 ESI user account. These situations generally occur because of problems such as typographical errors made during installation, passwords expiring after a predetermined period; these can be unexpected and difficult to diagnose. Therefore, you may wish to configure TIBCO BusinessWorks to monitor these log files for the relevant message text and to issue alerts should the event occur.

Using Error Handling Processes and Logging Services

In addition to configuring alerts for problems with the underlying TIBCO products, you can also use the error handling and logging shared services to detect and pinpoint Windchill ESI problems as described in the [Handling Errors and Notification](#) section.

Developing Event Rules and Problem-Detection Approaches

Since event rules are closely tied to hardware deployment, it is not feasible for Windchill ESI to provide a predefined, ready-to-use configuration. However, you can develop and adjust event rules as needed, over time, in a non-invasive manner to the underlying TIBCO products and Windchill ESI business logic component. You can prioritize developing rules based on the most common or troublesome issues you have encountered, and thus gradually, over time move from a reactive to a proactive problem-detection approach.

Diagnosing Problems

After detecting a problem that cannot be corrected automatically or by the user, you need to begin diagnosing the problem. This involves categorizing and localizing the problem to determine its root cause.

Localizing Problems

To localize the source of the problem, you need to ask questions such as:

- Is the problem associated with a business process issue such as a system-of-record violation, functional issue such as, invalid data, or technical issue, such as a server being down?
- Is the problem associated with Windchill PDM or Windchill PDMLink, TIBCO, or the distribution target ERP system?
- If it is a problem related to TIBCO, is it associated with TIBCO Enterprise for EMS, BusinessWorks, or Adapter for R/3?
- Is the problem associated with the BusinessWorks deployment and/or run-time agents?
- Is the problem associated with the underlying physical network and computing, rather than Windchill ESI?
- Can the problem scenario be duplicated in a test system with the same configuration as the production environment?

Categorizing Problems: Key Areas of Focus for Troubleshooting

To categorize problems, you need to focus on key problem areas and get familiar with error handling reports such as error logs and error handling codes.

Most system-related, technical issues can be categorized according to the location of the root cause. Refer to the *Windchill ESI Installation and Configuration Guide - SAP R/3* and applicable documentation provided by your systems integrator, as necessary, to verify and restore correct configuration settings.

It is also important for you to become familiar with the business process and functional troubleshooting information in the *Windchill Enterprise Systems Integration User's Guide - SAP R/3*. Users who are not familiar with this information may escalate such issues to you.

The following categories of problems and their descriptions are *not* intended to be exhaustive with detailed step-by-step procedures. Rather, they are provided to help you to focus on some of the key or potential root causes of technical issues:

- Problems originating from Windchill ESI
- Problems originating from TIBCO components such as:
 - Enterprise for EMS

- BusinessWorks
- Adapter for R/3
- Problems originating from the SAP R/3 distribution target.
- Problems indicated in Windchill ESI logs.

Windchill ESI Problems

The following lists how to deal with problems that may originate from Windchill ESI services:

- Verify that Windchill server and application are running
- Verify that the Windchill EMS client is connecting to the TIBCO Enterprise for EMS server
- Verify that the Windchill ESI user account for the EMS server is correctly configured
- Verify all other EMS-related configuration
- Scan for error messages in the Windchill administrative logs
- Validate the distribution target organizations and ESITarget for the release transaction
- Verify correct operation of the Windchill Enterprise Integration Access Remote Procedure Calls (RPCs)

TIBCO Problems

The following list how to deal with problems that may originate from TIBCO components:

Enterprise for EMS Problems

- Verify that the EMS server is running
- Verify the EMS server is correctly configured
- Ensure that the correct five Windchill ESI EMS queues are defined
- Ensure that there is one and only one listener per queue at a given time
- Verify that the BusinessWorks ESI user account for the EMS server is correctly configured
- Verify the secure queue authentication configuration
- Isolate any Java Virtual Machine (JVM) issues, such as unsupported versions or memory overflow errors

BusinessWorks Problems

- Verify that all required TIBCO services are running. Process engines do not start if the following required services are not running:
 - TIBCO Administration Server
 - TIBCO Runtime Agent (TRA)
 - TIBCO Hawk Microagent
 - TIBCO Adapter for R/3 Design Time Agent (DTA)
 - Rendezvous Daemon (RVD)
- Verify the existence and contents of required Windchill ESI BusinessWorks application properties and configuration files:
 - ESIEmailMessageLookups.properties
 - ESIDefaults.properties
 - ESIErrorHandlingCodes.properties
 - ESILookups.properties
 - ESIMessageLookups.properties
 - FilesToRead.properties
 - loader.jar
 - soap.jar
 - SoapParser.jar
- Verify that the BusinessWorks EMS client is connecting to the TIBCO Enterprise for EMS server
- Verify all other EMS-related configuration
- Isolate any Java Virtual Machine (JVM) issues, such as unsupported versions or memory overflow errors
- Verify that the Windchill ESI components are deployed to the correct domain
- Verify the ESI business logic configuration and deployment settings, including the global variable values.

Note: You must restart the process engine for new global variable values to take effect.
- Verify the Java classpath
- Validate the configuration settings in the TRA file
- Validate the BusinessWorks Administrator server configuration by:

- Authorizing user accounts
- Making sure that multiple repositories with the same Rendezvous configuration (network, service, and daemon) on the same subnet have unique names, regardless of the BusinessWorks administration domain
- Ensuring that the server-based repository (.dat) files are not deleted directly. To properly delete a server-based project from an administration domain, follow these steps:
 - Undeploy the project (this removes all of the .tra and .cmd files)
 - Close BusinessWorks Designer
 - Stop the administration server service
 - Delete the .dat and .lck files specifically associated with the repository from the /administrator/data/domain folder
 - Restart the administration server service
- Isolate any issues with internationalization (I18N) or locale configuration settings. Check out the following:
 - *com_infoengine_locale* attribute in the EMS header of Windchill ESI messages
 - *ESIR3Locale* global variable
 - Defaults and cross-referencing lookup file entries used in data mapping

Adapter for R/3 Problems

The following lists how to deal with problems that may originate in the Adapter for R/3.

- Verify that all required adapter instances are deployed and running
- Validate adapter deployment configuration settings
- Verify that adapter deployment names are unique (to prevent conflicts between adapter instances for the same business object configuration - part, document, BOM, or ECN - to different target SAP R/3 systems, clients, or locales)
- Validate the SAP R/3 connection parameters defined by the following global variables (case-sensitive):
 - ESIR3ApplicationServer
 - ESIR3SystemID
 - ESIR3SystemNumber
 - ESIR3Client
 - ESIR3Username

- ESIR3Password
- ESIR3Locale

Note: Adapter timeout errors may be caused by a mismatch between parameters in the adapter configuration and the ESITarget value. These values are case-sensitive. Some values, such as ESIR3SystemID and ESIR3Locale, are not used by the adapter to log onto the SAP R/3 system. The adapter does not immediately produce a direct error, but the BusinessWorks process engine is not be able to communicate with the adapter, so a timeout error likely occurs. If the other values, such as ESIR3ApplicationServer, ESIR3SystemNumber, ESIR3Client, ESIR3Username, or ESIR3Password are incorrect, the adapter is not able to log onto the SAP R/3 system and appropriate error messages appear in the TIBCO Adapter for R/3 logs and the TIBCO Adapter for R/3 gateway trace file.

- Validate that the Windchill ESI distribution targets (ESITarget values) sent from Windchill PDM or Windchill PDMLink are consistent with the SAP R/3 connection parameters defined in the adapter deployment configuration.
- Validate the BusinessWorks domain user name and password (on the Configuration tab of the adapter deployment configuration)
- Validate that the SAP R/3 user name and password (on the Custom tab of the adapter deployment configuration) are correct and that the account is not locked in SAP R/3.
- Isolate any problems with Internationalization (I18N) or locale configuration settings
 - The *com_infoengine_locale* custom property in the EMS header of the Windchill Event message must be consistent with the locales defined in the deployed adapter instances.
 - Within each adapter deployment configuration, the *ESIR3Locale* global variable value (on the Custom tab) must be consistent with the *Locale Encoding* parameter value (on the Advanced tab). Note that the *ESIR3Locale* global variable value is used in Rendezvous message subject names to identify the correct target adapter.
 - ESIORALocale global variable
 - All locale parameter values must be valid (i.e., chosen from the list of acceptable possible values).
- Confirm that the number of adapter connections is compatible with ESI data loads and the distribution target SAP R/3 system configuration.

SAP R/3 Problems

The following lists how to deal with problems that may originate in an SAP R/3 distribution target. Refer to the *Windchill ESI Installation and Configuration Guide - SAP R/3* for more details.

- Verify that all SAP R/3 application and database servers are running
- Verify that the SAP R/3 system is running Release 4.6C
- Verify that the SAP R/3 system meets the minimum Support Package levels assumed by Windchill ESI
- Verify that the SAP R/3 system has applied the specific OSS Notes assumed by Windchill ESI
- Ensure that all APIs assumed by Windchill ESI are available and characterized to Windchill ESI specifications as described in *Windchill ESI Installation and Configuration Guide - SAP R/3*.
- Ensure that all APIs assumed by Windchill ESI are remotely enabled
- Validate the functional configuration assumed by Windchill ESI
- Verify the existence of the *ESISYS* SAP R/3 user account used by the TIBCO Adapter for R/3 in all ESITarget systems and clients.
- Verify that the *ESISYS* user account has the required security authorization profile
- Verify that the *ESISYS* user account is not locked and does not have an expired password
- Verify that the correct date format setting is defined for the *ESISYS* user account
- Verify that a sufficient number of SAP R/3 gateway connections are available to the TIBCO Adapter for R/3
- Confirm that table record locks are not blocking updates by Windchill ESI.
- Isolate any issues with Internationalization (I18N) or locale configuration settings. The current Windchill ESI release does not support Unicode SAP R/3 systems.

Logs and Error Handling Codes

To help diagnose problems, you need to be thoroughly familiar with the key Windchill ESI logs, described in the *Windchill ESI Installation and Configuration Guide - SAP R/3*. You also need to be familiar with the EAI error-handling architecture, and the error codes as described in the [Handling Errors and](#)

[Notification](#) section. The following lists the available logs and how to access them:

Logs	How to Access
Windchill Enterprise Systems Transaction Log	Windchill PDM or Windchill PDMLink user interface
TIBCO BusinessWorks Process engine logs Note: Windchill ESI application messages appears with a role designation of ESI to distinguish them from the standard TIBCO product messages.	TIBCO BusinessWorks Administrator
TIBCO Enterprise for EMS logs	File name and path are determined by logFile configuration parameter in the tibemsd.conf file. If the logfile_max_size configuration parameter is not set to zero (0), there may be multiple log files appended with sequence numbers.
TIBCO Adapter for R/3 logs	/tibco/adapter/adr3/4.2/logs/[Project].[Adapter Configuration].log[.sequence #]
TIBCO Adapter for R/3 gateway trace.	/tibco/adapter/adr3/4.2/bin/dev_rfc.trc Note: When a TIBCO Adapter for R/3 error occurs, TIBCO appends the gateway trace (dev_rfc.trc) file in the /tibco/adapter/adr3/4.2/bin directory. The error information in this file is often more detailed and helpful than the information that is provided in the standard adapter logs in the /tibco/adapter/adr3/4.2/logs directory.

Logs	How to Access
SAP R/3 gateway and application server logs	<p>Consult your SAP R/3 Basis administrator. For Windchill ESI API call sequences that include CALO_INIT_API (that is, BOMs, ECNs, and Part/Material Revisions), you may obtain additional logging information in the SAP R/3 application log (transaction SLG1). Refer to SAP R/3 online application help for further details on using this transaction¹.</p> <p>You should also be familiar with the SAP R/3 distribution targets and the data objects and attributes impacted by Windchill ESI. You may have direct responsibility for viewing and manipulating data in SAP R/3, or may simply have to coordinate these activities with SAP R/3 Basis administrators. To view the data that was transferred into SAP R/3 by Windchill ESI, the following transactions are particularly important:</p> <p>MM03 (View Material) CS03 (View Material BOM) CV03N (View Document) CC03 (View Change Master)</p>

1. Windchill ESI uses CALO_INIT_API to activate logging to the SAP R/3 application log for subsequent API calls. This only occurs with the "CCAP" and "CSAP" APIs used for BOMs, ECNs, and Part Revisions. SAP R/3 BAPIs, used for Parts and Documents, do not use the SAP R/3 application log.

Resolving Problems

After you have monitored, detected and diagnosed problems, you need to resolve them. The following lists some general techniques you can use when troubleshooting as well as a list of specific problems with their solutions.

Techniques for Resolving Problems

Following lists some of the troubleshooting techniques you can use to resolve problems.

Coordinating Troubleshooting Teams and Escalating Problems

As a Windchill ESI administrator, you may have to involve and coordinate a wide variety of specialists to fully resolve production issues. These parties may include end-users, functional experts, Windchill PDM or Windchill PDMLink administrators, SAP R/3 Basis administrators, database specialists, operating system specialists, network administrators, and others. If, after diagnosing and localizing an issue, you determine that the problem cannot be solved in-house, you may need to escalate it to systems integration partners or to PTC Technical Support, or both, for assistance. Systems integration partners may be particularly critical to help you resolve problems involving special configuration or customizations made to the standard Windchill ESI product.

Manually Overriding Checkpoints

The Windchill ESI application leverages checkpoint activities at key points in the TIBCO BusinessWorks processing flow. A checkpoint saves the process data and state of the current running process instance so that it can be recovered at a later time in the event of a failure. If a process engine fails, all process instances can be recovered and can resume execution at the location of their last checkpoint in the process definition. Only the most recent state is saved by a checkpoint. If you have multiple checkpoints in a process, only the state from the last checkpoint is available for recovering the process.

The location of Windchill ESI checkpoints has been strategically designed to ensure robust transaction integrity while minimizing adverse performance effects. Occasionally, you may need to manually override an activated checkpoint to restart transaction processing from scratch when the process engine is restarted.

Caution: Overriding checkpoints should be done with extreme caution, as it can lead to duplicate or incomplete data, incorrect export history records, and data corruption.

However, if circumstances warrant it, you can override checkpoints by deleting the `/tibco/bw/2.0/working` directory and its contents. Depending on the process engine mode, there may be many other `/working` subdirectories under the `/tibco` path that would need to be deleted. Do a search for `/working` to locate and remove all of these subdirectories.

Resolving Solaris Platforms Issues

On Solaris platforms you may have to resolve problems that arise from:

- Environment variable issues
- Designer deployment configuration issues

The following describe techniques to resolve these.

Environment Variable Issues

Each TIBCO component has a *setenv.sh* file in the home directory for that component, for example:

```
$TIBCO_BW_HOME/setenv.sh
```

To ensure that certain paths are set, these shell scripts must be run before the component can be started. However, under some configurations of Solaris these *setenv.sh* files appear to run correctly, but when the paths are examined using the **echo \$<VARIABLE>** command, the environment variables are not set correctly. In this case, the TIBCO component does not run, and usually returns a *missing library link or file cannot be found* error.

If this occurs, open the *setenv.sh* file and copy the environment variable settings for Solaris SUNW and place them in the *.profile* file at the root directory. Make sure to also add the variable name to the export command at the end of the file. Once this is done, log off and log back on and check the environment variables using the **echo** command; they should now be set correctly. You should then be able to successfully run the TIBCO components.

Designer Deployment Configuration Issues

Occasionally, the TIBCO Administrator and the TIBCO Runtime Agent (TRA) become corrupted and without warning, shut down on the Solaris platforms. If this occurs while TIBCO Designer is running, deployment configurations and TIBCO Designer may behave strangely, for example:

- Server-based repositories do not appear in the project pull-down list for the current domain when opening projects
- Deployment components are displayed as new, even though the deployment history show they had been deployed
- The deploy and undeploy options are unavailable for deployed, changed, or even new deployment components

If any of these symptoms occur, reboot the Solaris machine, restart the TRA and TIBCO Administrator, and then restart Designer.

Finding and Killing TIBCO Processes on UNIX platforms

Occasionally, as part of resolving problems you may need to kill all running TIBCO processes.

On UNIX platforms, you can use the UNIX command **ps** to list all the processes that are running. However, the standard **all** flag, **-a**, does not necessarily work to list low-level TIBCO processes such as TIBCO Rendezvous. To view such processes, you can execute the following command:

```
# ps -ef | grep <filter>
```

For example:

```
# ps -ef | grep tibco
```

Which results in several lines that look like this:

```
root 5559 1 0 09:10:02 pts/1 0:18
/opt/tibco/administrator/2.0/bin/tibcoadmin --propfile /opt/
```

You can force-kill the processes listed by using the **kill** command with the flag **-9** and the process ID (the second column from your **ps -ef** command)

```
# kill -9 5559
```

Using the **-9** flag ensures that the process is really dead. Generally speaking, to ensure all TIBCO processes are dead, you should run

```
ps -ef | grep tibco
```

and

```
ps -ef | grep rv
```

and verify that no running processes are found.

Configuring E-Mail Alerts

As mentioned earlier, Windchill ESI can be configured to send you email alert messages when the Windchill ESI business logic experiences an error:

- Sending an ESIPostResult message to Windchill Foundation & PDM or Windchill PDMLink
- Waiting for an ESIResultResponse message from Windchill Foundation & PDM or Windchill PDMLink
- Parsing the ESIResultResponse message

This configuration is performed through the following global variables:

- ESIMailToAddress
- ESIMailFromAddress
- ESIMailCCAddress
- ESIMailBCCAddress

The server is configured using the global variable: ESIMailSMTPHostServer.

Refer to the *Windchill ESI Installation and Configuration Guide - SAP R/3* for details on how to configure the global variables.

The Windchill ESI business logic attempts to retry any EMS-related actions the number of times specified by the TIBCO BusinessWorks global variable, ESIEMSRetryCount. Therefore, you may receive multiple email messages for the same issue. After a final unsuccessful attempt, the Windchill ESI business logic

suspends the associated BusinessWorks process, allowing you to examine the errors described in the email alert messages, fix the underlying problems, and resume or kill the BusinessWorks process using TIBCO Administrator. Refer to the *TIBCO Administrator User's Guide* for details on how to use this interface.

Resolving Specific Problems

The following section lists specific problems, provides possible causes, and suggests solutions to resolve them.

<p>The following message appears in the adapter log file (located in the /adapter/adr3/4.2/logs directory) when Windchill ESI logs on to the SAP R/3 via the TIBCO Adapter for R/3:</p> <pre>SAPAdapter.PartConfiguration Error [Application] AER3- 000183 RFC error; Group : 104, Key : Name or password is incorrect. P, Message : Name or password is incorrect. Please re-enter</pre> <p>In addition, the following text appears in the <i>dev_rfc.trc</i> file (located in the /adapter/adr3/4.2/bin directory:</p> <pre>T:1756 =====> User not authorized. Session terminated T:1756 <* RfcReceive [1] : returns 3:RFC_SYS_EXCEPTION >TS> Fri Jan 24 11:41:57 2003 T:1780 =====> Name or password is incorrect. Please re-enter T:1780 <* RfcReceive [2] : returns 3:RFC_SYS_EXCEPTION T:1780 RfcGetAttributes: Invalid handle [1]T:2288 RfcGetAttributes: Invalid handle [1]T:1756 RfcGetAttributes: Invalid handle [1]T:1764 RfcGetAttributes: Invalid handle [1]>TS> Fri Jan 24 11:42:46 2003 T:2648 <* RfcCall [1] : returns 18:RFC_INVALID_HANDLE</pre>	<p>Invalid SAP R/3 user name and password is being used.</p>	<p>Provide the correct user name and password in the adapter configuration. Refer to the <i>Windchill ESI Installation and Configuration Guide - SAP R/3</i> for details.</p>
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<p>The log file for the Adapter for R/3 displays the following message just as the adapter is starting:</p> <pre>SAPAdapter.PartConfiguration Error [Application] AER3- 000183 RFC error; Group : 104, Key : User is locked. Please notify th, Message : User is locked. Please notify the person responsible</pre> <p>The adapter appears as if the start-up was successful. The following success message appears in the adapter log:</p> <pre>SAPAdapter.PartConfiguration Info [Adapter] AER3-000082 Successful initialization of Adapter</pre> <p>However, when Windchill ESI issues a call to the adapter, the following error message appears in the adapter log file:</p> <pre>SAPAdapter.PartConfiguration Error [Application] AER3- 000072 Client connection PartConfigurationInboundConne ction0Client0 is invalid</pre> <p>In addition, the following text appears in the <i>dev_rfc.trc</i> file:</p> <pre>T:1256 =====> User is locked. Please notify the person responsible T:1256 <* RfcReceive [1] : returns 3:RFC_SYS_EXCEPTION T:1256 <* RfcReceive [4] : returns 3:RFC_SYS_EXCEPTION T:1256 RfcGetAttributes: Invalid handle [3]</pre>	<p>SAP R/3 user name and password has become locked.</p>	<p>The SAP R/3 administrator would have to unlock the account and you would need to verify the user name and password that is specified in the adapter configuration. Refer to the <i>Windchill ESI Installation and Configuration Guide - SAP R/3</i> for details.</p>
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Problem

Starting a TIBCO BusinessWorks process engine causes error messages such as the following:

```
-2003 Feb 19 18:46:04:163 GMT -5 Engine Error [] PE-Error process
initialization failed for
ProcessDefinitions/DataProcessing/EMS_ESIEvent_TransactionRelease_
End_PD

--Initialization error in
[ProcessDefinitions/DataProcessing/EMS_ESIEvent_TransactionRelease
_End_PD/EMSReceiver_Event_ESIEvent]

--Could not establish connection or session with EMS provider.
```

```
--javax.naming.NoInitialContextException: Cannot instantiate class:  
com.tibco.tibems.naming.TibemsInitialContextFactory. Root  
exception is java.lang.ClassNotFoundException:  
com.tibco.tibems.naming.TibemsInitialContextFactory
```

Possible Cause

Invalid EMS classpath

Solution

Confirm that the EMS classpath is added in the Extra Classpath field of the Java tab as described in the *Windchill ESI Installation and Configuration Guide - SAP R/3*.

Problem

TIBCO BusinessWorks returns error messages such as the following:

```
-2003 Feb 19 13:27:12:294 GMT -5 Engine Error [] PE-Error  
process initialization failed for  
ProcessDefinitions/Services/WCResult_Service  
  
--Initialization error in  
[ProcessDefinitions/Services/WCResult_Service/EMSRepeatUntilTru  
e_ESIPostResult_Result/EMSSender_ESIResult_PostResult]  
  
--javax.naming.ServiceUnavailableException: Failed to query  
JNDI: Failed to connect to the server at tcp://localhost:7222.  
Root exception is javax.ems.EMSEException: Failed to connect to  
the server at tcp://localhost:7222
```

Possible Cause

EMS server name is invalid

Solution

Confirm that ESIEMSJNDIContextURL global variable, in the deployment configuration of the process engine, matches the value in the QueueConnectionFactory URL, in the factories.conf file located in /tibco/ems/bin.

The ESIEMSJNDIContextURL global variable should be set to:

```
tibemsnaming://<machinename>:<port>
```

and the QueueConnectionFactory URL should be set to:

```
tcp://<machine name>:<port>.
```

The machine name and port values should match.

For example, if ESIEMSJNDIContextURL is set to tibemsnaming://mymachine.mycompany.com:7222, then the QueueConnectionFactory URL should be set to tcp://mymachine.mycompany.com:7222.

Refer to "Global Variables for Process Engines" the *Windchill ESI Installation and Configuration Guide - SAP R/3* for details on this variable.

Problem

BusinessWorks returns error messages such as the following:

```
-2003 Feb 19 18:57:29:051 GMT -5 Engine Error [] PE-Error process
initialization failed for
ProcessDefinitions/DataProcessing/EMS_ESIEvent_TransactionRelease_
End_PD

--Initialization error in
[ProcessDefinitions/DataProcessing/EMS_ESIEvent_TransactionRelease_
_End_PD/EMSReceiver_Event_ESIEvent]

--Could not establish connection or session with EMS provider.

--javax.naming.AuthenticationException: Not permitted: invalid name
or password. Root exception is javax.ems.EMSSecurityException:
invalid name or password
```

Possible Cause

User name and password for the EMS server is invalid

Solution

Confirm that the ESIEMUsername and ESIEMSPassword global variables in the deployment configuration of the process engine matches the values of the username and password specified on the EMS server for the queues.

The username and password values set for the EMS server is in the users.conf file which is located in the /tibco/ems/bin directory. Refer to "Global Variables for Process Engines" in the *Windchill ESI Installation and Configuration Guide - SAP R/3* for details on this variable.

The passwords are obfuscated if they were set using the EMS Administration tool. If you do not remember the passwords you had set, you would have to reset them.

Problem

Upon starting a TIBCO component on UNIX, you receive the following errors:

```
/usr/lib/dld.sl: Call to mmap() failed - TEXT (UNIX path)

/usr/lib/dld.sl: Permission denied
```

For example,

```
/usr/lib/dld.sl: Call to mmap() failed - TEXT
/opt/tibco/tra/1.0/lib/libmaverick41.sl

/usr/lib/dld.sl: Permission denied
```

Possible Cause

Permissions for the file have not been set properly

Solution

Use the command chmod 555 on the file listed after TEXT. For example,

```
# chmod 555 /opt/tibco/tra/1.0/lib/libmaverick41.sl
```

Problem

BusinessWorks, Windchill ESI, or both are failing to connect to EMS.

Possible Cause

EMS server is not configured properly. When you specify the name of the EMS server as localhost, that server is only recognized on the box that it is running on. No other machine can connect to it. An application that is set to localhost will attempt to find the EMS server running on the same machine. If it is not found, it will error. When you specify a machine name as your server name, other machines can connect to your EMS server.

Solution

Check that the QueueConnectionFactory value located in the /tibco/ems/bin/factories.conf file and the global variable ESIEMSJNDIContextURL in the deployment of the Process Engine are set accordingly.

- QueueConnectionFactory in factories.conf file = tcp://<machinename>:7222
Where machine name is the machine where the EMS server is running.

- Set the global variable ESIEMSJNDIContextURL in BW Engine = tibemsnaming://<machinename of where EMS server is running>:7222

It does not matter where this EMS server resides. It can reside on the same machine as Windchill PDM or Windchill PDMLink, same machine as the TIBCO process engine, or a different machine altogether. As long as the above values described are set appropriately (and the machines are on the same network), Windchill ESI and EAI components are able to connect to the correct EMS server.

To determine which machine and username is connected to a EMS server, type the following command in the TIBCO EMS administration tool:

```
>show connections
```

This gives you a list of which users are connected and from which machine.

Problem

Transaction remains in pending state

Possible Cause

EMS server queues are not subscribed to as described in [Subscribing to EMS Queues](#).

Common root causes are the EMS server is not running when the Windchill method server starts, misconfigurations in the EMS properties of the Windchill adapter, or misconfigurations in the EMS server.

Solution

When Windchill ESI services are successful in subscribing to EMS queues, the following information is included in the Windchill Foundation & PDM or Windchill PDMLink method server log:

```
Thread-10: subscription to queue "com.ptc.windchill.esi.  
DataRequest" successful
```

```
Thread-10: subscription to queue "com.ptc.windchill.esi.  
Result" successful
```

If this information does not appear in the log, it means the EMS queues were not successfully subscribed. In this case, all Windchill ESI transactions are left in a pending state. The transactions are processed once the queues are subscribed successfully.

Normally, when Windchill ESI services are unable to subscribe to queues because the EMS server is unavailable, Info*Engine receives an exception. Windchill ESI services logs this exception in the Windchill Adapter transaction log. If TIBCO Enterprise for EMS is the EMS provider, the message contains the following text:

```
javax.ems.EMSException: Failed to connect to the server at tcp
```

As a detection measure, you may consider configuring your monitoring software to look for this or similar text. To resolve the issue, make sure the EMS server is up before the method server, and resolve any issues with the Windchill adapter EMS configuration and the EMS server configuration.

Problem

The TIBCO BusinessWorks process engine does not connect to the TIBCO Enterprise for EMS server.

Possible Cause

The BusinessWorks engine was started *before* the EMS server.

Solution

Always start the EMS server before the BusinessWorks engine. For further information on detecting this problem, refer to the [EMS Problems](#) section.

Problem

When attempting to redeploy or undeploy a previously-deployed repository, the status of the components appear as "New" in TIBCO Designer as if they have not been deployed.

Possible Cause

The TIBCO Runtime Agent (TRA) is not responding - due to it crashing or being killed explicitly. The icon next to the machine name in the Deployment window indicates that the TRA is not responding, as follows:

- If the TRA is functioning, TIBCO Designer displays an icon of a monitor.
- If the TRA is not responding, TIBCO Designer displays a warning symbol (a yellow triangle with exclamation point, on the monitor icon).

Solution

Restart the TRA. Wait for the TRA to start fully and then redeploy the components. If the issue still occurs, close TIBCO Designer, stop the TIBCO Administration Server, restart the TRA and Administration Server, re-open TIBCO Designer, and redeploy the components. If the issue still occurs, check for a network communication issue. As a last resort, reinstall the TRA.

Problem

ESI fails to publish any business objects to the distribution target system. Errors include overall business object failures, "missing a required field" errors, etc. In addition, the TIBCO BusinessWorks Process engine log does not contain any Windchill ESI message text, as shown in the following example:

```
2003 Aug 11 18:55:31:722 GMT -4 Engine ESI [] PE-ESI Job-15000
[ProcessDefinitions/Services/Logging_Service/WriteLog_ESIMaster
]: ,98,,3,1,0,40012,,,, 2003 Aug 11 18:55:32:563 GMT -4 Engine
ESI [] PE-ESI Job-15000
[ProcessDefinitions/Services/Logging_Service/WriteLog_ESIMaster
]: ,98,,3,1,0,40013,,,, 2003 Aug 11 18:55:32:864 GMT -4 Engine
ESI [] PE-ESI Job-15000
[ProcessDefinitions/Services/Logging_Service/WriteLog_ESIMaster
]: ,98,,3,1,0,40016,,,,
```

Possible Cause

These symptoms usually indicate that, when starting up, the TIBCO BusinessWorks process engine could not load the Windchill ESI business logic properties files. These properties files contain the cross-reference and default values used in data mapping, texts used in logging, etc. There are several possible causes for this issue:

1. The properties files are not properly installed in the \<TIBCO HOME>\esi directory.
2. The FilesToRead.properties file specifies an invalid value for the Path variable. The Path variable must point to the place where the files are located. This value must contain a slash at the end of the path name. For example: C:/tibco/esi/ (Windows) or /opt/tibco/esi/ (UNIX).
3. The TIBCO BusinessWorks process engine does not have the proper class paths specified. This is done in TIBCO Designer during process engine deployment in the Extra Classpath field on the Java tab. The specified class paths should also point to the location of the properties files. For example: Windows (if TIBCO software is installed on the C: drive:) C:\tibco\ems\clients\java;C:\tibco\esi UNIX (if TIBCO software is installed in the default directory) /usr/tibco/ems/clients/java:/opt/tibco/esi/

4. The properties files' security authorizations do not allow read access to the TIBCO BusinessWorks process engine

Solution

1. If the properties files are not properly installed in the /<TIBCO HOME>/esi directory, copy them from the \esi\app\bin directory on the Windchill 8.0 ESI Business Logic for SAP R/3 (CD1) to your \<TIBCO HOME>\esi directory. You must restart the TIBCO BusinessWorks process engine after copying the files.
2. If the FilesToRead.properties file specifies an invalid value for the Path variable, enter in the correct value, save the file, and then restart the TIBCO BusinessWorks process engine.
3. If the TIBCO BusinessWorks process engine does not have the proper class paths specified, shut down all deployed adapter instances and process engines, correct the Extra Classpath value (making sure that the location of the properties files is included), then restart the deployed process engine and adapter instances.
4. If the properties files have restricted read access, grant this access to the TIBCO BusinessWorks process engine. See the Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP R/3 for further details on configuring the Windchill ESI business logic properties files and specifying class paths during deployment.

Problem

TIBCO Administrator fails with an "Apache/Tomcat 404" Web browser error

Possible Cause

You may be using an unsupported web browser version

Solution

Upgrade your web browser to Microsoft Internet Explorer version 6.0 SP1, or later

Problem

A certain server-based project does not appear in the **Project Name** drop-down list when attempting to open it in TIBCO BusinessWorks Designer.

Possible Cause

The project name may not be unique across the subnet (that is, a project of the same name is being managed by a different administration domain on the same subnet). It is also possible that someone moved the project DAT file or that the file is corrupt.

Solution

Determine which other administration domains exist on your subnet by clicking **Discover Domains** in the TIBCO BusinessWorks Designer **Open Project** window. By selecting each domain in turn, and clicking **Load Project List** for each, you can determine whether another project exists on your subnet with the same domain. If this is this case, you must rename your project to have a unique name.

A

Windchill ESI Configuration Properties

This appendix lists all the Windchill ESI properties that can be configured to meet your organization's needs. These properties are involved in normal configuration and administration activities and do not require Windchill ESI to be customized. These properties are located in the esi.properties file and are sorted alphabetically by name.

Note: For a complete list of Windchill ESI properties that can be changed through configuration as well as through customization, refer to the *Windchill ESI Installation and Configuration Guide - SAP R/3*. For details on properties that can be customized, refer to the *Windchill ESI Customization Guide - SAP R/3*.

Property	Default Value	Description
com.ptc.windchill.esi.BOM.component.mapFile	\$CODEBASE\$/bom/BOMComponent.map	Defines the name of the map file to use when mapping BOM components.

Property	Default Value	Description
com.ptc.windchill.esi.BOM. enableAlternateItemGroups	true	<p>Defines whether Windchill ESI should create alternate item groups. Alternate item groups are required to provide compatibility with SAP R/3 distribution targets. SAP R/3 manages BOM substitutes by assigning an alternate item group number to all BOM components which have substitutes. SAP R/3 determines that parts with the same alternate item group number.</p> <p>Note: If you use an ERP system other than SAP R/3, set this property to "false".</p>
com.ptc.windchill.esi.BOM. enforceLineNumbers	false	<p>Defines whether Windchill ESI should throw an exception whenever a product structure is found that has no line number information. Standard Windchill PDM or Windchill PDMLink behavior is to allow both product structures with line numbers and product structures without line numbers. Any one product structure must have line numbers on all of its components or no line numbers on any of its components. The standard Windchill PDM or Windchill PDMLink behavior is the equivalent of setting the property to false. In cases where the distribution target cannot handle BOMs without line numbers, the property should be set to true.</p>

Property	Default Value	Description
com.ptc.windchill.esi.BOM.header.mapFile	\$CODEBASE\$/bomb/BOMHeader.map	Defines the name of the map file to use when mapping BOM headers.
com.ptc.windchill.esi.BOM.refDes.mapFile	\$CODEBASE\$/bom/RefDesignator.map	Defines the name of the map file to use when mapping BOM reference designators.
com.ptc.windchill.esi.BOM.requireComponentQuantity	true	Defines if Windchill ESI Services should or should not allow components with zero or unspecified quantities to be published.
com.ptc.windchill.esi.BOM.substitute.mapFile	\$CODEBASE\$/bom/Substitute.map	Defines the name of the map file to use when mapping BOM substitutes.
com.ptc.windchill.esi.BOM.treeQueryTask	com/ptc/windchill/esi/QueryTree.xml	Defines the Info*Engine task that is used to obtain multi-level BOM information.
com.ptc.windchill.esi.collectionSizeMultiplier	4	Some Windchill ESI java classes create collections that are intended to hold the results calculations of other collections. When the calculation is expected to create additional entries, the new collection is given an initial size using the following formula: new collection size = the original collection size * the value of this property.
com.ptc.windchill.esi.ECN.autoGenerate	false	Defines whether the event emitter should create an ECN and emit an event identifying the newly-created ECN whenever a component part or an assembly part (BOM) is published.
com.ptc.windchill.esi.ECN.changeHeader.mapFile	\$CODEBASE\$/ecn/ChangeHeader.map	Defines the name of the map file to use when mapping ECN headers.

Property	Default Value	Description
com.ptc.windchill.esi.ECN.queryTask	com/ptc/windchill/esi/QueryObject.xml	Defines the name of the Info*Engine task to execute when obtaining ECN information from the Windchill Adapter.
com.ptc.windchill.esi.enableCheckIterations	false	Defines whether Windchill ESI renderers should determine that an object that has changed since it was last published if there is a new iteration, but not a new version.
com.ptc.windchill.esi.enforceChanges	true	Defines whether Windchill ESI renderers should throw an exception if they receive an RPC request for an object that has not changed since it was last published.
com.ptc.windchill.esi.esidoc.queryTask	com/ptc/windchill/esi/QueryObject.xml	Defines the name of the Info*Engine task to execute when obtaining document information from the Windchill PDM or Windchill PDMLink adapter.
com.ptc.windchill.esi.event.enforceNoPendingTxn	true	Defines if the event emitter should throw an exception if the object being published already has a pending transaction (an event has already been emitted for object, but event has not been processed).
com.ptc.windchill.esi.event.enforceOrgs	true	Defines if the event emitter should throw an exception if the object being published has no associated Windchill ESI distribution targets.
com.ptc.windchill.esi.event.queueName	com.ptc.windchill.esi.Event	Defines the name of the EMS queue where events are to be written.

Property	Default Value	Description
com.ptc.windchill.esi.event.queuePassword	WCESI	Defines the password to supply when connecting to secure EMS queues to write Windchill ESI events.
com.ptc.windchill.esi.event.queueTask	com/ptc/windchill/esi/EmitSoapEvent.xml	Defines the name of the task to execute when writing events to the EMS queue.
com.ptc.windchill.esi.event.queueUser	WCESI	Defines the user name to supply when connecting to secure EMS queues to write Windchill ESI events.
com.ptc.windchill.esi.gw	wtcore/jsp/com/ptc/core/ca/web/gw/gw.jsp	Defines the URI used to invoke the DCA user interface. Normally this property is not changed.
com.ptc.windchill.esi.part.addAltlinkName	AddedAlternateLinks	Defines the name of the Windchill Info*Engine group that is to contain added alternate links.
com.ptc.windchill.esi.part.addPartName	AddedParts	Defines the name of the Info*Engine Group that is to contain added parts.
com.ptc.windchill.esi.part.alternateLinkMapFile	\$CODEBASE\$/esipart/ESIAAlternateLink.map	Defines the name of the map file to use when mapping part alternate links.
com.ptc.windchill.esi.part.changePartName	ChangedParts	Defines the name of the Info*Engine group that is to contain the changed parts.
com.ptc.windchill.esi.part.configSpec.state	RELEASED	Defines the life cycle state to pass to the configspec that is used to obtain the correct version of a part iteration for a given part master.
com.ptc.windchill.esi.part.deletedAltlinkName	DeletedAlternateLinks	Defines the name of the Info*Engine group that is to contain deleted alternate links.

Property	Default Value	Description
com.ptc.windchill.esi.part.deletedPartName	DeletedParts	Defines the name of the Info*Engine group that is to contain deleted parts.
com.ptc.windchill.esi.part.partMapFile	\$CODEBASE\$/esipart/ESIPart.map	Defines the name of the map file to use when mapping parts.
com.ptc.windchill.esi.part.partReleaseClass	com.ptc.windchill.esi.Part	Defines the value of the <Class> element of an RPC that identifies a part (as opposed to a BOM).
com.ptc.windchill.esi.part.queryAlternateTask	com/ptc/windchill/esi/QueryObject.xml	Defines the name of the Info*Engine task to invoke when obtaining part alternate information from the Windchill PDM or Windchill PDMLink adapter.
com.ptc.windchill.esi.part.queryPartTask	com/ptc/windchill/esi/QueryIterationAndMaster.xml	Defines the name of the Info*Engine task to invoke when obtaining part information from the Windchill PDM or Windchill PDMLink adapter.
com.ptc.windchill.esi.part.unchangedPartName	UnchangedParts	Defines the name of the Info*Engine group that is to contain unchanged parts.
com.ptc.windchill.esi.request.queueName	com.ptc.windchill.esi.DataRequest	Defines the name of the EMS queue where RPC requests are to be accepted.
com.ptc.windchill.esi.request.queuePassword	WCESI	Defines the password to supply when connecting to secure EMS queues to accept RPC requests.
com.ptc.windchill.esi.request.queueUser	WCESI	Defines the user name to supply when connecting to secure EMS queues to accept RPC requests.

Property	Default Value	Description
com.ptc.windchill.esi.result.logFailSubTran	true	Defines if Windchill ESI services should create ReleaseActivity objects when the status of the request indicates a failure. This property is provided if you wish to provide your own transaction user interface. Setting the property to false causes Windchill ESI to ignore PostResult RPC request for failed subtransactions.
com.ptc.windchill.esi.result.logSucessSubTran	true	Defines if Windchill ESI services should create ReleaseActivity objects when the status of the request is successful. This property is provided if you wish to provide your own ESI Windchill ESI release tracking. Setting the property to false causes Windchill ESI to ignore PostResult RPC request for successful subtransactions. Caution: This should only be done with extreme caution, since it causes the Windchill ESI RPCs GetPart, GetBOM, and GetECN to always decide that objects have not been previously published.
com.ptc.windchill.esi.result.queueName	com.ptc.windchill.esi.Result	Defines the name of the EMS queue where Result RPC request are to be accepted.
com.ptc.windchill.esi.result.queuePassword	WCESI	Defines the password to supply when connecting to secure EMS queues to accept Result RPC requests.

Property	Default Value	Description
com.ptc.windchill.esi.result.queueUser	WCESI	Defines the user name to supply when connecting to secure EMS queues to accept Result RPC requests.
com.ptc.windchill.esi.rnd.class.Effectivity	wt.effectivity.WTDatedEffectivity	Declares the name of the class that defines the effectivity that is supported by Windchill ESI renderers.
com.ptc.windchill.esi.rnd.effectivityFormat	yyyy-MM-dd HH:mm:ss	Specifies the format template used by a DateFormat object used when generating output for effectivity dates.
com.ptc.windchill.esi.rnd.EndEffectivity	EndEffectivity	Defines the XML element name that contains effectivity end date.
com.ptc.windchill.esi.rnd.StartEffectivity	StartEffectivity	Defines the XML element name that contains effectivity start date.
com.ptc.windchill.esi.subscribe.tries	12	Defines the number of times the task helper should wait for the interval (specified by com.ptc.windchill.esi.subscribe.wait) after a failed test to see if the Windchill PDM or Windchill PDMLink method server is ready to process the Windchill ESI RPCs.
com.ptc.windchill.esi.subscribe.wait	10000	Defines the amount of time (in milliseconds) the task helper should wait after a failed test to see if the Windchill PDM or Windchill PDMLink method server is ready to process Windchill ESI RPCs.
com.ptc.windchill.esi.tgt.allowDelete. ESITargetAssignmentLink	false	Defines if ESITarget objects that have associated target assignments should be deleted.

Property	Default Value	Description
com.ptc.windchill.esi.tgt. allowDelete. ESITargetOrganizationLink	false	Defines if ESITarget objects that have associated WTOrganization objects should be deleted.
com.ptc.windchill.esi.tgt.class. ESITargetFinder	com.ptc.windchill.esi.tgt. ESISimplePartTargetFinder	Defines the type of target assignment strategy to be used.
com.ptc.windchill.esi.tgt. mapFile	\$CODEBASE\$/tgt/ ESITarget.map	Defines the name of the map file to use when displaying ESITarget objects.
com.ptc.windchill.esi.tx.alias	com.ptc.windchill.esi:single. transaction	Defines how to build the transaction ID argument when invoking DCA URI. Used in conjunction with the com.ptc.windchill.esi.gw to display a transaction in the DCA user interface. Note: Normally this property is not changed.
com.ptc.windchill.esi.txn. allowPartDelete.ESITransaction	false	Defines if WTPart objects that have associated ESITransaction objects should be deleted.
com.ptc.windchill.esi.txn. allowPartDelete.ReleaseActivity	false	Defines if ESITarget objects that have associated release history (associated ReleaseActivity objects) should be deleted.
com.ptc.windchill.esi.txn. allowTargetDelete. ReleaseActivity	false	Defines if ESITarget objects that have associated release history (associated ReleaseActivity objects) should be deleted.

Property	Default Value	Description
com.ptc.windchill.esi.txn.class.BOM	com.ptc.windchill.esi.BOMHeader	Defines the ReleaseActivity releaseClass attribute value that identifies a BOM. This value is required because a single Windchill PDM or Windchill PDMLink part can be published twice to the same Windchill ESI target. The first publishing defines a part. The second publishing defines a BOM. Some Windchill ESI APIs are required to distinguish between the two types of publishing activities. This property tells those APIs what to look for.
com.ptc.windchill.esi.txn.truncateExcessLengthMessage	true	Defines if a PostResult RPC request should have messages with a length greater than the allowable size of 4000 bytes or if the message should be truncated. If the property is true, the first 4000 bytes are saved in the database. If the property is false, and if a message of more than 4000 bytes is received, an exception is thrown and the RPC request is rejected.
com.ptc.windchill.esi.utl.UfidSeparator		Defines the delimiter to use when finding a single UFID within a string of concatenated UFIDs.

Property	Default Value	Description
com.ptc.windchill.esi.verbose	true	<p>Controls the writing of Windchill ESI debug information to the Windchill log.</p> <p>If false, no debug output from Windchill ESI services is written to the Windchill debug log.</p> <p>If true, debug information from Windchill ESI services is written to the Windchill Foundation & PDM log, only if Windchill Foundation & PDM/Info*Engine have also activated debug logging.</p>
com.ptc.windchill.esi.wf.autoLaunch	true	<p>Defines whether a workflow is to be auto-launched when a specified object lifecycle state is reached. The state at which the auto-launch occurs is controlled by the property, com.ptc.windchill.esi.ECNCentric.state.</p>
com.ptc.windchill.esi.wf. Description		<p>Defines a value used to populate the Description attribute on the initiate workflow window.</p>
com.ptc.windchill.esi.wf. ECNCentric	true	<p>Defines the publishing model for Windchill ESI services to use.</p> <p>If the value is true, ECN-centric model is used.</p> <p>If the value of this property is false, part-centric model is used.</p> <p>The ECN-centric model is used when the distribution target demands enterprise change notices.</p>

Property	Default Value	Description
com.ptc.windchill.esi.wf. ECNCentric.state	COMPLETED	Defines the lifecycle state at which the workflow is auto-launched. This property is used when the com.ptc.windchill.esi.wf.autoLaunch is set to true.
com.ptc.windchill.esi.wf. ECNCentric.team	Change Team	Defines the value used to populate the team name on ECN-centric workflow processes. This value should match the team name that owns the ECN-centric workflow template. Normally this value is not modified.
com.ptc.windchill.esi.wf. PartCentric.team	ESI Team	Defines the value used to populate the team name on part-centric workflow processes. This value should match the team name that owns the part-centric workflow template. Normally this value is not modified.
com.ptc.windchill.esi.wf. ProcessPrefix	ESIRelease	Defines a value that is combined with an object ID and used to populate the workflow process name attribute.
com.ptc.windchill.esi.wf.Template	Release to Manufacturing	Defines the workflow template used for the release or publishing process.

Glossary

Adapter

Software that allows one software module or system to use the services of another module or system.

Alternate Part

In Windchill PDM or Windchill PDMLink, a form, fit, and function replacement for a part in every product structure usage. The replacement is global to a Windchill PDM or Windchill PDMLink implementation.

API Set

A collection of RPC definitions.

Application Architecture

See *System Architecture*.

Application Programming Interface (API)

A set of functions that can be invoked by other programs. An API provides a standard way to access the publicly-available services of a software system.

Architecture

A description of elements such as modules, components, subsystems, that comprise a software system. Architecture includes the relationships between the elements and the interfaces between elements.

Assembly Part

A part that can contain other parts or a product structure.

Bill of Materials (BOM)

A structured list of the parts, subassemblies, and raw materials that define a product.

Business Rules

The policies or procedures of an enterprise organization. Used to define various aspects, such as the relationships among the various business objects and entities, the actions to be taken on them, milestones, and work processes. Business rules also specify constraints imposed by the business. For example, published data cannot be modified, only team leads can approve an action.

Change

A modification to an approved or published object, such as a part, component, configuration, document or any other product definition information. Change causes version or revision levels of the affected object to be updated.

Common Business Object (CBO)

A data model adopted by the Windchill ESI business logic to represent the data for each object published from Windchill PDM or Windchill PDMLink. It uses concepts from the Open Application Group Interface Standard (OAGIS), which is a self-describing, XSD-based XML schema, specifically designed for communicating and passing data between ERP, CRM, and other enterprise-level systems.

Components

Elements that are necessary for system operations, such as hardware, operating systems, applications and databases. Includes supporting utilities, required operating system services, and configuration files or repositories.

Component Part

A part that cannot contain other parts.

Composite Transaction

A complex aggregate of other transactions. It could be comprised of atomic and/or molecular transactions.

Distribution Target

The systems to receive data in Windchill Enterprise Systems Integration implementations. Following are examples of distribution targets:

- For receiving product data, such as parts, documents, assemblies, and engineering change orders:
 - SAP R/3 ERP
 - Baan ERP
 - Oracle Applications ERP
 - J. D. Edwards ERP
- For receiving ERP organization data:
 - Windchill PDM or Windchill PDMLink

Enterprise Application Integration (EAI)

Method of providing unrestricted sharing of data and business processes throughout networked applications or data sources in an enterprise. Includes the plans, methods, and tools for consolidating and coordinating all the computer applications. EAI is responsible for:

- Determining destinations for messages and data
- Mapping data to the appropriate format for destinations
- Providing services (adapters) that deliver messages to destinations
- Ensuring that messages are delivered to destinations
- Reporting the response of the destination to the delivery

EAI Software Components

Software that facilitates EAI. In the Windchill ESI context, includes the following software components:

- The Windchill ESI business logic
- TIBCO's ActiveEnterprise product suite which provides the BusinessWorks integration services that include pre-built ERP adapters, an integrated graphical development environment, transaction management, administrative and monitoring facilities, and other functionality.

Enterprise Change Notice (ECN)

Formal documents informing selected personnel of proposed, pending, or accomplished changes. May be distributed through e-mail or through the distribution life cycle process.

Engineering Change Order (ECO)

See *Enterprise Change Notice*.

EMS (Enterprise Messaging Service)

A standard set of interfaces to message-oriented middleware, such as TIBCO. The standard was published by Sun Microsystems, Inc.

Enterprise Resource Planning (ERP)

Software that plans and tracks manufacturing activities.

Enterprise Systems Integration (ESI)

See *Windchill Enterprise Systems Integration*.

Info*Engine Adapter

An adapter that uses the services of Info*Engine. Info*Engine adapters are often written using PTC's Java Adapter Development Kit. Info*Engine adapters accept requests in the form of webjects.

Info*Engine ERP Adapter

An Info*Engine adapter that is designed to access and/or update objects in an Enterprise Resource Planning (ERP) system. These adapters accept requests in the form of webjects. They also support molecular transactions, such as Update BOM.

Life cycle

Description of the distinct phases that a product goes through during its life. For example, life cycles could include phases such as requirement definition, design, production, operation, and maintenance.

Load Balancing

The act of distributing processing and communications activity evenly across a computer network so that no single device is overburdened.

Logical Architecture

A definition of the software processes that comprise a software system. Logical architecture operates one or more physical architectures.

Middleware

Software that connects two very different applications and passes data between them.

Middleware Installation and Configuration Utility (MICU)

Software that installs the middleware and enterprise messaging service.

Multilevel Part

An assembly that contains one or more assemblies.

Organization

A collection of related resources (such as persons, processes, or materials).

- In Windchill ESI, organizations are destinations where objects to be published are sent.

Note: (Non-ESI Windchill PDM or Windchill PDMLink components and several Windchill PDM or Windchill PDMLink solutions have their own definition of organization.)

- In SAP R/3, an organization equates to a plant.
- In Oracle Applications, an organization may be either a master organization or an inventory organization.
- In Baan, an organization equates to a company.
- In J. D. Edwards, an organization is the combination of a branch and a plant.

Physical Architecture

A definition of the computers, peripheral devices, and network connections that comprise a software system.

Publish

The act of sending a business object from Windchill PDM or Windchill PDMLink to a distribution target, such as SAP R/3.

Revision

A change made to any product data after that data is published.

Role

The responsibilities assigned to a specific type of job, such as project leader, designer, or reviewer.

Schema

See also XML Schema Definition (XSD).

Selection Rule

A process to determine which object types and which attributes of an object are published by Windchill ESI.

Server

The hardware that supports the software which processes data for client systems. Typically hosts database systems and applications software needed

to provide features and functions to end users who access the server through the client system.

SOAP (Simple Object Access Protocol)

A lightweight XML-based protocol for exchanging information in a decentralized, distributed environment. The SOAP 1.1 standard was published by the World Wide Web Consortium. Also see, *XML Schema Definition*.

SOAP RPC (SOAP Remote Procedure Call)

A SOAP-formatted request for information coupled with a SOAP-formatted response to the request. Refer to the SOAP 1.1 standard for more details about SOAP RPCs.

Source System

Identifies the systems to send data in Enterprise Systems Integration implementations. For Windchill Enterprise Systems Integration (ESI), the source systems are:

- Windchill PDM or Windchill PDMLink (for sending product data, such as parts, documents, assemblies, and engineering change orders)
- SAP R/3 (for sending ERP organizations)

Substitute Part

An approved part which can be used instead of the preferred part.

System Architecture

A definition of the software components that cooperate to deliver the services of a software system. Application architecture defines the way logical architecture processes are used in the system. Also known as *Application Architecture*.

System of Record

The process of determining which system is allowed to modify the data when data elements are shared between systems and when more than one system can create and modify the data. If only one system is allowed to modify the data, that system is the system of record for the data.

TCP/IP

A set of protocols developed to allow computers to share resources across a network.

TIBCO Adapter

An adapter that uses the services of TIBCO. These adapters are invoked using TIBCO messages, rather than webobjects. They do not support molecular or composite transactions. Instead, they support atomic transactions by exposing the individual APIs of the software for which the adapter is designed. While making the configuration of these adapters more complicated (low level), this architecture adds more flexibility by enabling implementers to compose molecular transactions from logically organized atomic transactions. Atomic transactions can be selected, then logic can be applied to configure the molecular transaction.

Transaction

The overall publishing of a business object and its related objects to a distribution target. For example, a typical distributed systems transaction, such as order processing. Does not imply Database Management System commit and rollback capability.

Transaction Management

A Windchill ESI services feature that manages and keeps track of each Windchill PDM or Windchill PDMLink business object that is published to a distribution target.

Trigger

A mechanism that detects a change or activity for a given object, resulting in a specific action.

UTF-8

The Unicode Transformation Format, 8-bit. A form of Unicode that is used to route data through systems that are not designed for Unicode, such as some e-mail servers and Web clients. UTF-8 is a way of storing multilingual data on the Internet, without requiring full Unicode compliance.

Version

Means of distinguishing changes made to objects as they evolve through their life cycle.

Windchill Adapter

An Info*Engine adapter that accesses and updates objects in Windchill PDM or Windchill PDMLink. Also known as *WTAdapter*.

Windchill Core

Windchill PDM or Windchill PDMLink functionality, including product structures, change processes, and workflows. Includes the Info*Engine as the communication vehicle for exchanging information with external distribution targets via EAI.

Windchill Enterprise Systems Integration Systems (ESI)

See *Windchill ESI*.

Windchill ESI

An information bridge between two enterprise systems. Currently, supports connecting Windchill PDM or Windchill PDMLink systems with distribution targets such as SAP R/3.

Workflow

A series of steps, tasks, or activities, from beginning to end, that are involved in completing a project.

Workgroup

Defines a group of people who are using the same computing resources.

WTAdapter

See *Windchill Adapter*.

XML (eXtended Markup Language)

A standard format for representing hierarchical data, published by the World Wide Web Consortium.

XML Schema Definition (XSD)

Defines the structure of an XML document (SOAP messages).

