



**PTC Windchill® Enterprise
Systems Integration
Administration Guide - SAP®**
PTC Windchill 10.2 M010

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About This Guide

This guide serves as a reference guide for Windchill ESI and ERP Connector 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 and ERP Connector are supported with Windchill PDMLink, this guide assumes that you have installed this product and have read and are acquainted with its features.

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

Windchill ESI and ERP Connector can also be used to publish manufacturing objects. To publish manufacturing objects you must have Windchill MPMLink installed.

Related Documentation

The following documentation makes up the Windchill ESI and ERP Connector documentation set:

-
- *PTC Windchill Enterprise Systems Integration Administration Guide - Oracle Applications*
 - *PTC Windchill Enterprise Systems Integration Administration Guide - SAP*
 - *PTC Windchill Enterprise Systems Integration Customizer's Guide - Oracle Applications*
 - *PTC Windchill Enterprise Systems Integration Customizer's Guide - SAP*
 - *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP*
 - *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - Oracle Applications*
 - *PTC Windchill Enterprise Systems Integration Implementation Guide - Oracle Applications*
 - *PTC Windchill Enterprise Systems Integration Implementation Guide - SAP*
 - *Windchill Enterprise Systems Integration Open Application Programming Interface Guide*
 - *ERP Connector Administration Guide*

Technical Support

Contact PTC Technical Support through the PTC website, or by phone, email, or fax if you encounter problems using this product or the product documentation. The PTC eSupport portal provides the resources and tools to support your PTC Windchill implementation:

<https://www.ptc.com/appserver/cs/portal/>


For complete details, see the *PTC Customer Support Guide*:

<http://www.ptc.com/appserver/support/csguide/csguide.jsp>

You must have a Service Contract Number (SCN) before you can receive technical support. If you do not know your SCN, see “Preparing to contact TS” on the **Processes** tab of the *PTC Customer Support Guide* for information about how to locate it.

Documentation for PTC Products

You can access PTC documentation using the following resources:

- **PTC Windchill Help Center**—The PTC Windchill Help Center includes all PTC Windchill documentation. You can browse the entire documentation set, or use the search capability to perform a keyword search. To access the PTC Windchill Help Center, you can:
 - Click any help icon  in PTC Windchill

-
- Select **Help ► Windchill Help Center** from the **Quick Links** menu at the top right of any PTC Windchill page
 - Use the following link to access all PTC help centers:
<https://www.ptc.com/appserver/cs/help/help.jsp>
 - **Reference Documents** website—The Reference Documents website is a library of all PTC guides:
<http://www.ptc.com/appserver/cs/doc/refdoc.jsp>


A Service Contract Number (SCN) is required to access the PTC documentation from the Reference Documents website. If you do not know your SCN, see “Preparing to contact TS” on the **Processes** tab of the *PTC Customer Support Guide* for information about how to locate it:

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- Click the feedback icon  in the PTC Windchill Help Center toolbar and complete the feedback form. The title of the help topic you were viewing when you clicked the icon is automatically included with your feedback.

Introduction to Windchill ESI

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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 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 PDMLink and distribution targets. It also supports and enables the transfer and mapping of business objects, such as parts, Bills of Material (BOMs), Change Notices (CNs), documents and CAD document structures, and manufacturing objects from Windchill PDMLink to the distribution targets.

The following lists specific publishing actions that users can accomplish:

- Create parts, bills of material (BOMs), documents associated to parts, standalone documents, CAD document structures, and change notices (CNs) in the distribution target from Windchill PDMLink.
- Change parts, bills of material (BOMs), documents associated to parts, standalone documents, and CAD document structures in the distribution target from Windchill PDMLink.
- Capture the publication history for all parts, BOMs, documents, CAD document structures, CNs and promotion requests in Windchill PDMLink.

With Windchill MPMLink installed these publishing actions can be accomplished on the following objects:

- Process plans, including operations and sequences
- Control characteristics associated to parts, process plans and operations

-
- Resources, including process materials, skills and tooling
 - Documents associated with manufacturing objects, such as operations and resources

 **Note**

Some ERP systems do not support all of these functions. Check with your administrator to verify the capabilities of your ERP system. For example:

- While a document, a CAD document or its structure that is released from Windchill may be sent with the ESI response, none of these would be published to Oracle Applications. Also, control characteristics associated to parts (or to manufacturing objects) may be sent with the ESI response, but are not published to Oracle Applications either.
 - A CAD document structure that is released from Windchill PDMLink may be sent with the ESI response, but only the documents that make up the structure (and not their interrelationships) would be published to SAP.
-

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 PDMLink communicates with the TIBCO EAI software through the Windchill Open API. The Windchill Open API enables the product data within Windchill PDMLink to be shared with the rest of the enterprise using industry

standards such as Simple Object Access Protocol (SOAP), Java Messaging Service (JMS), and extensible Markup Language (XML). The services are independent of the EAI software and can be used to enable other middleware applications to communicate with 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 PDMLink is the system of record for all parts, BOMs, documents, CAD document structures and their associated attributes authored in and if Windchill MPMLink is installed manufacturing objects as well.

Windchill ESI Features

The following are some of the key features provided by Windchill ESI:

- Enables Windchill PDMLink users to publish various business objects to SAP.
- Supports publishing from a Windchill PDMLink instance to one or more SAP instances.
- Allows users to create or change parts, BOMs, documents associated to parts, operations and certain types of manufacturing resources, process plans and resources, standalone documents in SAP from Windchill PDMLink.
- Allows users to create or change manufacturing objects such as process plans, operations, sequences, resources and control characteristics in SAP from Windchill PDMLink.
- Allows users to create Change Notices (CNs) in SAP from Windchill PDMLink.
- Captures the publishing history for all parts, BOMs, documents, options sets, CAD document structures, promotion requests and CNs in Windchill PDMLink.
- Captures the publishing history for manufacturing objects (process plans, operations, sequences, resources and control characteristics) in Windchill PDMLink.
- Provides an architectural foundation that can be extended and enhanced for a greater scope of functionality.

The provided default features allow you to:

- Publish new and changed parts, BOMs, documents associated to parts, manufacturing objects and resources, standalone documents, process plans and resources, and new Change Notices (CNs).

 **Note**

Manufacturing operations and sequences cannot be published as standalone objects.

- Publish new and changed process plans (including operations and sequences) and manufacturing resources such as process materials, skills and tooling.

 **Note**

Skills are sent with the Windchill ESI response, but are not published to SAP.

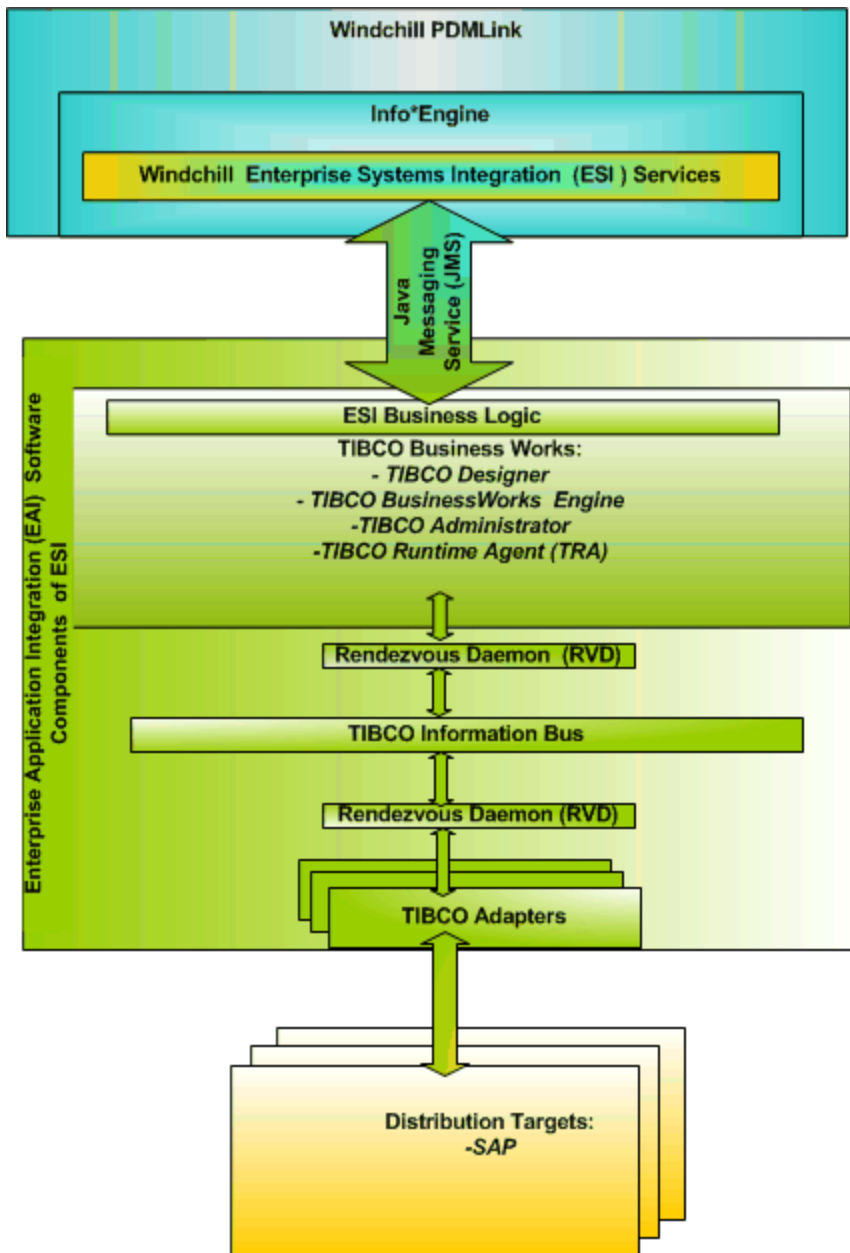
A change of state is considered a change in the object, which allows you to republish an object even if it has the same iteration number.

- Publish new and changed control characteristics associated to parts, process plans and operations.
- Publish objects from within Windchill PDMLink using the following methods:
 - Sample workflow
 - Customized workflow
 - Custom calls to various functions available in Windchill PDMLink
 - Ad hoc operations from a menu option in the object information page

 **Note**

Although a CAD document structure that is released from Windchill PDMLink may be sent with the ESI response, only the documents that make up the structure (and not their interrelationships) that would be published to SAP.

Technical Overview of ESI



Technical Overview of Windchill ESI

The following outlines the functions of the key components of a Windchill ESI or ERP Connector system.

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

Windchill ESI services produce output from 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 PDMLink is in XML format; it is transported to the EAI software through XML messages that are delivered using a JMS provider such as TIBCO Enterprise Message Service (EMS).

While the response message (that represents the data being published) is in plain XML, the result response message (that holds information on whether or not the overall and subtransaction statuses could be updated in Windchill successfully) is an XML message that is SOAP encoded

This messaging architecture supports bidirectional communication, guarantees message delivery, and provides a common interface to different EAI applications. JMS enables 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 JMS communication is between two systems: Windchill PDMLink and EAI components, Windchill ESI uses JMS point-to-point communication via JMS queues. JMS 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 may differ from others 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 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 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 default ERP adapters for major ERP vendors to enable seamless data translation. The EAI software components use these adapters to integrate Windchill PDMLink applications with the distribution targets.

**Note**

While ERP Connector does not make use of TIBCO it does make use of the Windchill capabilities available in Windchill ESI.

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Administering Windchill ESI and ERP Connector

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As a Windchill ESI or ERP Connector administrator, you have the responsibility for maintaining Windchill ESI and ERP Connector deployments in production environments. We recommend you are involved from the very beginning of the implementation of these products 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 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 their 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, EMS, and Adapter software components.

For more information, see the following guides:

- *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - Oracle Applications*
- *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP*

These guides provide:

- An in-depth description of Windchill ESI architectural concepts.
- Information on types and location of relevant TIBCO documentation.



Note

Implementation teams may determine any additional skill sets you might require such as Windchill PDMLink administration, 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 PDMLink Administrators 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.

 **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 Windchill 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 Administration UI, accessed through the Site or Organization Utilities page in Windchill PDMLink.• Able to view task assignments via email notification and when logging into Windchill PDMLink. <p> Note</p> <p>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. For detailed information on this group refer to the Windchill Business Administrator's Guide.</p>
ESI Authors	Engineers	Able to view task assignments via email notification and when logging into 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 PDMLink	Operating system access
TIBCO EMS	Server administrator account
TIBCO BusinessWorks	<ul style="list-style-type: none">• Administration domain account• Operating system access
SAP	<ul style="list-style-type: none">• User account for the following transaction codes:<ul style="list-style-type: none">○ <i>Create, Change, View Material</i> MM01, MM02, MM03○ <i>Create, Change, View Material BOM</i> CS01, CS02, CS03○ <i>Create, Change, View Document</i> CV01N, CV02N, CV03N○ <i>Create, Change, View Change Master</i> CC01, CC02, CC03○ <i>Create, Material Revision Level</i> CC11○ <i>Create, Change, View Routing</i> CA01, CA02, CA03○ <i>Create, Change, View Work Center</i> CR01, CR02, CR03○ <i>Create, Change, View Reference Operation Set</i> CA11, CA12, CA13○ <i>Create, Change, View Equipment</i> IE01, IE02, IE03○ Operating system access
Windchill MPMLink	Operating system access

Administering Security

Since security is an important aspect of Windchill ESI administration, you 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 System Administrator's Guide for security information related to 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 documentation for further details.

The following sections discuss security considerations for the following:

- SAP user account for Windchill ESI
- TIBCO EMS

SAP User Account for Windchill ESI

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

This user name is the name that is typically recorded in the created by field in the SAP distribution target for the affected business objects for example, CNs, BOMs, parts, and documents. This account should not be configured as a GUI-enabled dialog-type user. For security reasons, an SAP system should not allow end-users to log onto the account through the SAP GUI.

You should be familiar with the security authorization profile of this account, and may want to configure alerts and notification in case of invalid logon attempts, password expiration, or a locked account in an SAP 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 *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP* for details on setting up this account.

TIBCO EMS

The TIBCO EMS queues are secured via:

- A server administrator user account
- Client user accounts for both Windchill PDMLink and the ESI BusinessWorks application.
- Required authentication to access the queues

The user account credentials are not obfuscated. Refer to the *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP* 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 notifications 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:

- Check pointing (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 *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP* for details on traversing Wide Area Networks (WANs) and firewalls with TIBCO EMS and Rendezvous.

Administering Windchill ESI

Administering Windchill ESI involves configuring and modifying some or all of the following:

- Windchill ESI Preferences
- Distribution Target Attributes
- Windchill Remote Procedure Call (RPC) Definitions
- TIBCO Components

As a Windchill ESI administrator, you can perform the above using the administration utilities described below:

Preference Management Utility

The **Preference Management** utility allows users to view and set preferences, such as display and search options, to enhance their Windchill experience, and allows administrators to view and set preferences for various application contexts, such as projects, products or organizations.

Windchill ESI preferences fall into the following two general categories:

- Preferences that are configurable. These include preferences that are used with the standard Windchill ESI product without being modified.
- Preferences that are used in the customization of Windchill ESI. These include preferences 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 suit the varying list of different business needs. For more information refer to the following guides:
 - *PTC Windchill Enterprise Systems Integration Customizer's Guide - Oracle Applications*
 - *PTC Windchill Enterprise Systems Integration Customizer's Guide - SAP*
 - *ERP Connector Customizer's Guide*

For information on using the **Preference Management** utility, refer to the online help.

Manage Distribution

This utility allows you to create or edit a distribution target (which is essentially an ESITarget object) in Windchill. For more information about the Distribution Target Attributes, see the following guides:

- *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP*
- *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - Oracle Applications*

Windchill Delegate Administration Utility

The standard Windchill ESI Remote Procedure Call (RPC) definitions are created at the time of installing Windchill ESI services. 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 Administration utility or an LDAP browser. For more information on how to customize Windchill ESI, see the following guides:

- *PTC Windchill Enterprise Systems Integration Customizer's Guide - Oracle Applications*
- *PTC Windchill Enterprise Systems Integration Customizer's Guide - SAP*
- *ERP Connector Customizer's Guide*

TIBCO Utilities

The following table lists the utilities provided with the TIBCO software that are used to perform various administrative tasks. For more information on these utilities refer to the following guides:

- *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP*
- *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - Oracle Applications*

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• A web-based TIBCO Administrator graphical user interface (GUI) to deploy or un-deploy the default ESI EAR and customized EAR and after deployment to start or stop the process archive and adapter services for the deployed application.
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

Customizing Windchill ESI and ERP Connector

The following guides describe how to customize the out-of-the-box implementation of Windchill Enterprise Systems Integration (Windchill ESI) and ERP Connector. They are intended for developers who are familiar with Windchill, TIBCO and Windchill ESI.

- *PTC Windchill Enterprise Systems Integration Customizer's Guide - Oracle Applications*
- *PTC Windchill Enterprise Systems Integration Customizer's Guide - SAP*
- *ERP Connector Customizer's Guide*
- *Windchill Enterprise Systems Integration Open Application Programming Interface Guide*

These guides can be found on PTC's Document Reference web site:

- [Document Reference Site](#)

These documents provide high-level guidance to those considering customizing Windchill ESI and ERP Connector. They are not intended to be prescriptive or extensive. Customization should not be undertaken lightly. Customization can have a major impact on technical support, maintenance, and future upgrades. The costs and benefits of a customization should be carefully analyzed with an experienced systems integrator prior to moving forward. Also, you should discuss the Windchill ESI product roadmap with your PTC representative to determine if future product releases will include the desired functionality. Customizing Windchill ESI or ERP Connector must be viewed from an end-to-end system perspective. Windchill ESI consists of many components organized in a layered architecture. Customizations generally cannot be confined to a single component or module, due to the many interrelationships and dependencies between components. In other words, you should carefully consider the downstream effects of any modifications to the standard Windchill ESI product.

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Administration Tasks

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

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

Installing and Enabling Windchill ESI

The PTC Solution Installer now handles all of the necessary steps to enable Windchill ESI.

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

Property Name	Default Value	Description
wt.services. service.1160 wt.services. service.1161	com.ptc.windchill.esi.svc. ESIService/com.ptc.wind chill.esi.svc.StandardESI Service com.ptc.windchill. esi.svc. ESISvrService/com.ptc. windchill.esi.svc .StandardESIService	Enables the standard Windchill ESI services. This property is located in the wt. properties file.
wt.federation.task. startup	com/ptc/windchill/esi/Sub scribeQueues.xml	Ensures that the I*E task having the name that this property is set to is executed when bringing up the MethodServer. The default I*E task establishes Info*Engine as a listener on the JMS queue meant for Result messages - viz., the queue named com.ptc. windchill.esi.Result. This property is located in the wt. properties file.
Windchill. Enterprise SystemsIntegration	true	Enables Windchill ESI user interface features. This property is located in the installed.properties file.
Windchill. ESIVersion ERPConnector	true	Enables ERP Connector user interface features. This property is located in the installed.properties file.

Property Name	Default Value	Description
Windchill. ESIVersionSAP	true	Enables Windchill ESI user interface features for integration with SAP. This property is located in the installed.properties file.
Windchill. ESIVersionOracle	true	Enables Windchill ESI user interface features for integration with Oracle Applications. This property is located in the installed.properties file.

Managing 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 Windchill ESI targets. Once the Windchill ESI targets are created, they can be associated to various Windchill objects. This association allows Windchill ESI to determine which distribution targets the Windchill PDMLink objects are being published to.

In addition to associating various 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.

Distribution Target Identifiers

The Destination parameter of an SAP distribution target is of the form <System ID>.<Client>, where the placeholders have the usual meanings for an SAP system. This information is sent via the XML element <Destination>, which occurs as a child element within the XML element <Transaction> in the ESI response.

The Target Identifier parameter of an SAP distribution target is of the form <Number>:<Plant Name>, where <Number> is the number attribute of the distribution target in Windchill and <Plant Name> is the name of the plant in SAP that the target represents. This information is sent via the XML element <TargetID> in the ESI response.

Note

The Destination and Target Identifier parameters together define the distribution target that Windchill ESI would publish data to. For more information on distribution target attributes, see the PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP and the PTC Windchill Enterprise Systems Integration Implementation Guide - SAP.

Creating, Editing and Deleting Distribution Targets

To create, edit and manage distribution targets see the online help.

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. For more information, see the Windchill Business Administrator's Guide.

A second approach to creating distribution targets is to use the Windchill Loader. You can use this to create many distribution targets in the database. To achieve this, perform the following steps:

1. Edit the file <Windchill>/loadFiles/esi/esiCust/DistributionTargets.xml on your installation by following the comments in the file.
2. Open the Windchill Shell and execute the following command:

```
java wt.load.LoadFromFile -d  
%WT_HOME%\loadfiles\esi\esiCust\DistributionTargets.xml
```

Using a Loader to Assign Distribution Targets

A commonly used approach to assigning distribution targets is to use the Associate Distribution Targets option. However, it may sometimes be necessary to use the Windchill Loader to perform the assignments, especially when distribution targets are to be assigned in bulk to a large number of business objects, or to legacy data.

Use the following procedure to assign distribution targets using a loader:

1. Create a load file similar to the sample xml file provided in the following location:

<WT_HOME>\loadFiles\esi\esiCust\ESITargetAssignmentLink.xml

 **Note**

This file can be created from a .csv file. For more information refer to the PTC Windchill Data Loading Reference and Best Practices Guide.

2. Open a Windchill shell and run the following command:

```
java wt.load.LoadFromFile -d %WT_HOME%\loadFiles\esi\esiCust\
ESITargetAssignmentLink.xml -CONT_PATH
/wt.inf.container.OrgContainer=Demo
```

 **Tip**

To ignore assignment errors use the **Preference Management** utility to set the Ignore Invalid Records preference to **Yes**.

Defining Distribution Target Assignment Strategy

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

- Top-level target assignment
- Explicit target assignment
- Default target assignment

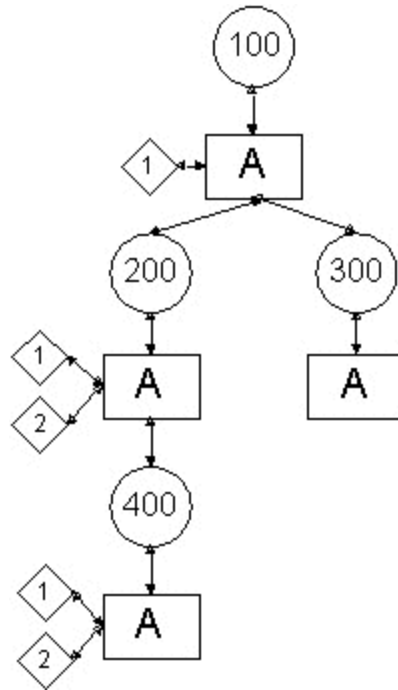
 **Note**

The target assignment strategy used by Windchill ESI is controlled by the preference Distribution Target Finder. It is important to understand the differences between the above listed 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 targets, 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.

Distribution Target Assignment on a Multi-Level Product Structure



Using an example product structure, the following sections describe the top-level and explicit assignment strategies and the objects they would publish.

Note

In the preceding figure, circles represent 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. Only those targets of the top level assembly that are not already explicitly assigned to a child object will be inherited. Thus, if both the top level assembly and a child object have the same set of targets assigned to them, no inheritance of targets will occur from the parent assembly to the child.

For example, when we apply this assignment 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
- Parts 200-A and 400-A are published to Windchill ESI distribution target 1 and Windchill ESI distribution target 2 because of explicit assignment
- Part 300-A is published to Windchill ESI distribution target 1 because of inheritance
- 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**

Once a child object in a product structure is published to an implicitly assigned distribution target, the implicit assignment will be persisted and will appear in the UI as an explicit assignment for the object. Also, based on the organization that the object belongs to, an object can have a default distribution target assignment upon triggering its publication.

An underlying assumption in the above example is that both the distribution targets 1 and 2 belong to the same ERP instance.

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 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 assignment 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 1 by a previous publishing activity, the request fails in the distribution target when attempting to create BOM 100-A. Part 300 is not created for the Windchill ESI distribution target 1. As a general rule, every component of an assembly must be assigned to all of the Windchill ESI distribution targets that are assigned to the assembly. The components may also be assigned to additional Windchill ESI targets; however, in order to publish a successful component part, such targets should belong in the same ERP instance(s) as those that are assigned to the parent assembly. Also, based on the organization that the object belongs to, an object can have default distribution target assignments upon triggering its publication.

Changing the Default Distribution Target Assignment Strategy

Windchill ESI is initially configured to use the explicit distribution target assignment strategy. To change the distribution target assignment strategy, you need to use the **Preference Management** utility to change the following preference values:

Preference Name	Description and Values
Distribution Target Finder	<p>Defines the type of target assignment strategy to be used.</p> <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>

Preference Name	Description and Values
	<ul style="list-style-type: none"> This is the default value and selects explicit target assignment strategy. <p>com.ptc.windchill.esi.tgt.ESIRootInheritTargetFinder</p> <ul style="list-style-type: none"> Selects top-level target assignment strategy.

Note

From an ESI services perspective, the distribution assignment strategies described above are applicable not only to product structures, but also to CAD document structures. By using the **Default for Context** option, when creating or editing a distribution target you can designate the specified target as the default distribution target for all business or manufacturing objects residing in the target's context. The object in the context will be automatically assigned to the default target upon triggering its publication. Automatic assignment of default distribution targets to a part however depends on the value set for the Windchill ESI preference View To Distribution Target Mappings. See the **Preference Management** utility for a description of this preference. For more information on how the value of this preference may impact automatic association of distribution targets, see the online help and the following guides:

- PTC Windchill Enterprise Systems Integration Customizer's Guide - Oracle Applications
- PTC Windchill Enterprise Systems Integration Customizer's Guide - SAP
- ERP Connector Customizer's Guide

Adding Users in Windchill PDMLink

The following is an overview of how to add users Windchill ESI groups. The user interfaces used in the following steps are accessed through the **Site ► Utilities** page. For more information, see the *Windchill Business Administrator's Guide*.

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 participant	[/]Site/User/Unaffiliated
ESI Authors	Engineer role participant	[/]Site/User/Unaffiliated

2. If needed, create new users to add to the Windchill ESI groups. Set appropriate values such as usernames, full names, passwords, and 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 Administrators 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 CN team.
8. If required, add other users or groups to the CN 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: Full Control (ALL) ESITransaction: Full Control (ALL) ESIRelease: Full Control (ALL)

ESI Authors

Domain	State	Object and Permissions
Site	All	ESITarget: Read ESITransaction: Read ESIRelease: Read

Configuring and Administering JMS Queues

Windchill ESI services subscribe to and use JMS queues to communicate with Windchill EAI software components. The only queue that Windchill ESI services subscribe to is the one that the middleware uses for sending Result messages to Windchill. This is named `com.ptc.windchill.esi.Result` by default.

Note

The other JMS queue used by Windchill ESI is named `com.ptc.windchill.esi.DataResponse.<SystemID>.<Client>` by default. ESI services place the ESI response messages on this queue.

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

Windchill ESI Services Tasks:

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

Windchill EAI Software Components Tasks:

Note

Refer to the following chapters in the TIBCO Enterprise Message Service User Guide for detailed information on the following tasks:

- Running the EMS Server
 - Using the EMS Administration Tool
-

These sections provide detailed information on how to:

- Start and connect to the JMS server
- Administer and configure JMS queues
- Set administrator password
- Create the JMS queues
- Enable authentication
- Secure JMS queues
- Create an ESI user

-
- Create a Windchill user
 - Set permissions
 - Set QueueConnectionFactory
 - Enable JMS message logging

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

Subscribing to JMS Queues

Windchill ESI services subscribe to the JMS queue named `com.ptc.windchill.esi`. Result by invoking an Info*Engine task when the Windchill Method Server is started.

Authenticating the JMS Queues

The JMS queues used by Windchill ESI services are defined by certain Windchill ESI preferences. Each queue is identified by a name, a username and a password. If any of these do not match the parameters used for configuring the JMS server, Windchill ESI will not be able to communicate correctly with the EAI software components. The following table lists the default settings for the queue `com.ptc.windchill.esi.Result`. Use the **Preference Management** utility to change any of these defaults

Note

In addition to the queue listed in the following table, Windchill ESI uses a queue called `com.ptc.windchill.esi.DataResponse.<DSN>` and a temporary queue created by TIBCO. These are used for sending the Windchill ESI response and result response messages to the middleware respectively. 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.Result Queue

Preference Name	Default	Description
Result Queue Name	com.ptc.windchill.esi.Result	Defines the name of the JMS queue where Result RPC requests are to be accepted
Result Queue User Name	WCESI	Defines the user name to supply when connecting to secure JMS queues to accept Result RPC requests.
Result Queue Password	WCESI	Defines the password to supply when connecting to secure JMS queues to accept Result RPC requests.

Configuring JMS Queue Performance

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

The recommended approach is to modify the preferences incrementally and observe the performance effects. You can experiment with different values until 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 these preferences. Use the **Preference Management** utility to change any of these defaults.

Preference Name	Default	Description
JMS Queue Subscription Attempts Count	12	Defines the number of times the task helper should wait for the interval (specified by the preference Wait Time for JMS Queue Subscription) after a failed test to see if the Windchill Method Server is ready to process Windchill ESI RPCs.
Wait Time for JMS Queue Subscription	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.
Collection Size Multiplier	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 preference.

Administering the TIBCO EMS Server

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

1. Start the EMS server

 **Note**

On Unix platforms:

- EMS server v6.0.1 has to be started using following command:

```
./tibemsd64.sh
```
- EMS server v5.1.4 has to be started using following command:

```
./tibemsd64 -config ../tibco/cfgmgmt/ems/data/tibemsd.conf"
```
- EMS server prior to v5.1.4 has to be started using following command:

```
./tibemsd64
```

Refer to the following chapters in the TIBCO Enterprise Message Service User Guide for more information:

- Running 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, an error message appears because there is no server to connect to.

You can then configure TIBCO 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 (tibemsd.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 EMS. For more information, see the TIBCO Enterprise Message Service User's Guide.

Enable JMS Message Logging

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





Note

Shutdown the JMS 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_Home>/ems/<version>/tibco/cfgmgmt/ems/data` 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 JMS log file.	C:\tibco\jms\jms.log
logfile_max_size	Specifies the 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: 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 a — in front of the property.</p>	<p>log_trace= DEFAULT,-LIMITS, -ACL,+SSL,+ROUTE,+ROUTE_DEBUG</p> <p>The above setting provides for default logging 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 a 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_Home>/ems/<version>/tibco/cfgmgmt/ems/data 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 DataResponse queue, you would have the following line in your queues.conf file: SAP <code>com.ptc.windchill.esi.DataResponse. <ESISAPAdapter/SystemID>. <ESISAPAdapter/Client>secure,trace</code> Oracle <code>com.ptc.windchill.esi.DataResponse. <DSN> secure,trace</code>
trace=body	Logs everything that the trace property logs, but also the actual content of the JMS message.	Tracing the DataResponse queue and collecting the actual content of the JMS message, you would have the following line in your queues.conf file: SAP <code>com.ptc.windchill.esi. DataResponse.<ESISAPAdapter/SystemID>. <ESISAPAdapter/Client>,trace=body</code> Oracle <code>com.ptc.windchill.esi.DataResponse. <DSN> ,trace=body</code>

3. Restart your EMS server.

 **Note**

You can also use the EMS Administration tool to perform these steps. For more information, see the TIBCO Enterprise Message Service User's Guide. To get more information about each command, you can also type “help” in the Administration tool.

Auditing Changes to ESITarget Object

Changes to the ESITarget object such as create, delete and update can be audited by modifying the following file:

<Windchill>/conf/auditing/configAudit.xml

Add the following lines:

```
<ConfigEntry class="com.ptc.windchill.esi.tgt.ESITarget" enabled="true">
<KeyedEventEntry eventKey="*/wt.events.summary.CreateSummaryEvent/"
enabled="true" handler="wt.audit.configaudit.DefaultAuditEventRecorder"/>
<KeyedEventEntry eventKey="*/wt.events.summary.DeleteSummaryEvent/"
enabled="true" handler="wt.audit.configaudit.DefaultAuditEventRecorder"/>
<KeyedEventEntry eventKey="*/wt.events.summary.ModifySummaryEvent/"
enabled="true" handler="wt.audit.configaudit.DefaultAuditEventRecorder"/>
</ConfigEntry>
```

Then restart the Windchill server.

Auditing can be stopped by setting enabled to false for individual events. Restart the server after making these modifications to the file.

For more information on the Auditing framework refer to the *Windchill Business Administrator's Guide*.

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Windchill ESI Logging

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Message logs can be viewed from the Windchill ESI services components as well as from Windchill EAI components.

Windchill ESI services log various kinds of messages by using Windchill's log4j based logging capabilities.

To enable Windchill ESI services to write messages to the Windchill MethodServer logs, use the following procedure:

1. Navigate to and modify the following file:

<wt_home>/codebase/WEB-INF/log4jMethodServer.properties

2. To enable logging of debug messages for all classes of ESI services add the following entry:

log4j.logger.com.ptc.windchill.esi=DEBUG

To enable logging for all types of messages for all classes of ESI services add the following entry file:

log4j.logger.com.ptc.windchill.esi=ALL

Logs can also be enabled for specific packages or classes. For example, to enable logging for debug messages for all classes in the package *com.ptc.windchill.esi.txn* you would enter the following:

log4j.logger.com.ptc.windchill.esi.txn=DEBUG

To enable logging of all types of messages (for example, Debug, Info, Warn, Trace) for the class *com.ptc.windchill.esi.svc.StandardESIService* you would enter the following:

log4j.logger.com.ptc.windchill.esi.svc.StandardESIService=ALL

Note

To turn off logging completely set the relevant property to OFF. For example, to do this for all classes in the package `com.ptc.windchill.esi.txn`, you would enter the following:

```
log4j.logger.com.ptc.windchill.esi.txn=OFF
```

To enable or disable logging in a running method server instance use the following procedure:

- From a Windchill shell run the following commands:
 - To enable: `windchill wt.util.jmx.SetLogLevel -ms com.ptc.windchill.esi DEBUG`
 - To disable: `windchill wt.util.jmx.SetLogLevel -ms com.ptc.windchill.esi`

Note

For more information on logging see [Managing Windchill Logging](#).

Enabling Windchill ESI Middleware to Write Messages to Debug Logs

Note

This section applies to SAP systems only.

Message logs can be viewed from the Windchill ESI middleware components.

The following log4j based loggers are available:

- - `com.ptc.esi.middleware`
 - `com.ptc.esi.middleware.Part`
 - `com.ptc.esi.middleware.BOM`
 - `com.ptc.esi.middleware.ChangeNotice`
 - `com.ptc.esi.middleware.Document`
 - `com.ptc.esi.middleware.ProcessPlan`
 - `com.ptc.esi.middleware.Tooling`
 - `com.ptc.esi.middleware.ProcessMaterial`

-
- com.ptc.esi.middleware.ControlCharacteristic
 - com.ptc.esi.middleware.Option
 - com.ptc.esi.middleware.OptionSet
 - com.ptc.esi.middleware.Dependency

To enable Windchill ESI middleware to write messages to the logs, use the following procedure:

1. Navigate to and modify the following file:
`<wt_home>/codebase/WEB-INF/log4jMethodServer.properties`
2. From a Windchill shell run the following commands:
 - To enable logs:

```
windchill wt.util.jmx.SetLogLevel -ms com.ptc.esi.middleware ALL
```
 - To disable logs:

```
windchill wt.util.jmx.SetLogLevel -ms com.ptc.esi.middleware
```
3. Navigate to **Site ► Utilities** and open the **Preference Management** utility.
4. Navigate to the **Client Customization** preference and set it to **Yes**.
5. Navigate to the newly created **Customization** tab, and select **Tools**. Then select **log4j**.
6. Select the **Method Server** option, enter the logger as com.ptc.esi.middleware and select **DEBUG**.

 **Note**

For more information on logging see [Managing Windchill Logging](#).

EAI Logging Process

For more information on this topic refer to the *PTC Windchill Enterprise Systems Integration Implementation Guide - SAP* or the *PTC Windchill Enterprise Systems Integration Implementation Guide - Oracle Applications*.

5

Guidelines for Monitoring, Diagnosing, and Resolving Problems

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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 resolutions.

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 emails 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 Administrator is used by the Windchill ESI Error Handling process to monitor the Windchill EAI software components and to handle system problems. TIBCO Administrator provides you with a Graphical User Interface and microagents to monitor and maintain hardware and software components within TIBCO 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 Administrator 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
- JMS 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 that occurs subsequent to the second failure and performs an action.

Suggested Deployment Configuration

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

- Any Failure: Raise an alert to the administrator
- First Failure: Restart the engine
- Second 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.

1. Navigate down through the TIBCO Administrator GUI:
 - Application Management > <Application Name> > Configuration > Process Archive.par:
2. Click the **Monitoring** tab:
3. Click the **Add** button under **Events**. The **Add Event** screen will appear:
4. Select the type of event you would like to monitor. For example, when a JMS queue fails, a process becomes suspended. You may configure an alert to monitor for a process suspension:

A systems administrator has the ability to restart the engine using TIBCO BusinessWorks Administrator. For more information, see the [JMS Problems on page 56](#) section.

Adapter Problems

The adapter's distribution target system needs 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 that occurs subsequent to the second failure and performs an action.

JMS Problems

An 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 an 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 can do one of the following:

- *No suspend*: When a JMS 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 JMS activity. You could configure a log event in TIBCO Administrator to monitor the log for this and raise an alert.
- *Suspend*: When a JMS 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 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 JMS queue failure to continue after restarting the EMS server.

Special Guidelines for EMS Server Problems

Windchill PDMLink allows a single JMS provider at a time. Therefore, the TIBCO EMS server becomes an integral part of the Windchill ESI architecture, and 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 JMS 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 JMS 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 JMS 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 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 EMS to configure TIBCO BusinessWorks to issue alerts in the event that the EMS server is suspended or requires to be restarted. For more information, see [Configuring E-Mail Alerts on page 69](#).

SAP Problems

The TIBCO Adapter for SAP log files can report problems such as an invalid or locked SAP ESI user account. These situations generally occur because of problems such as typographical errors made during installation or 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 section [Logs and Error Handling Codes on page 65](#).

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, 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, a functional issue such as invalid data, or a technical issue such as a server being down?
- Is the problem associated with Windchill PDMLink, TIBCO, or the distribution target ERP system?
- If it is a problem related to TIBCO, is it associated with TIBCO EMS, BusinessWorks, or Adapter for SAP?
- 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 *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP* 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. 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:
 - EMS
 - BusinessWorks
 - Adapter for SAP
- Problems originating from the 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 the Windchill server and application are running
- Verify that the Windchill JMS client is connecting to the TIBCO EMS server
- Verify that the Windchill ESI user account for the EMS server is correctly configured
- Verify all other JMS-related configurations
- Scan for error messages in the Windchill administrative logs
- Validate the distribution targets and their attributes for the given release
- Verify correct operation of the Windchill Enterprise Integration Access Remote Procedure Calls (RPCs)
- Verify the correctness of the values set for the various Windchill ESI preferences

TIBCO Problems

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

EMS Problems

- Verify that the EMS server is running
- Verify that the EMS server is correctly configured

-
- Ensure that the required Windchill ESI JMS 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 Administrator <version> (Domain name)
 - TIBCO HAWK Agent (Domain name)
- 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_SAP.properties
- Verify that the BusinessWorks JMS client is connecting to the TIBCO 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.

- 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)
 - ◆ Stop the administration server service
 - ◆ Delete the contents of <Tibco_Home>/tra/domain/<Domain_Name>/application/<Application_Name>/working folder
 - ◆ Restart the administration server service



Note

The meaning of <Application_Name> in the above referenced path may be understood from the fact that the deployment name of an application is of the form <Domain_Name>-<Application_Name>.

- Isolate any issues with internationalization or locale configuration settings. Check out the following:
 - *com_infoengine_locale* attribute in the JMS header of Windchill ESI messages
 - *ESISAPAdapter/Locale* global variable
 - Default and cross-referencing lookup file entries used in data mapping

Adapter for SAP Problems

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

- Verify that the adapter instance is deployed and running
- Validate adapter deployment configuration settings
- Validate the SAP system connection parameters defined by the global variables Group *ESISAPAdapter*.

Note

Adapter timeout errors may be caused by a mismatch between parameters in the adapter configuration and the attributes on the ESITarget object created in Windchill. These values are case-sensitive. Some values, such as `ESISAPAdapter/SystemID` and `ESISAPAdapter/Locale`, are not used by the adapter to log on to the SAP system. The adapter does not immediately produce a direct error, but the BusinessWorks process engine will not be able to communicate with the adapter, so a timeout error is likely to occur. If the other values, such as `ESISAPAdapter/ApplicationServer`, `ESISAPAdapter/SystemNumber`, `ESISAPAdapter/Client`, `ESISAPAdapter/Username`, or `ESISAPAdapter/Password` are incorrect, the adapter is not able to log on to the SAP system and an error message appears in the TIBCO Adapter for SAP logs.

In addition, if the `ESIFlags/isMultiplePE` variable is set to true the adapter will ignore the `Transaction/Destination` value from the `ESIResponse` and will call the default adapter in the application. If there are dedicated Process Archives per ERP instance, this variable should be set to true.

The structure of `ESIJMS/DataResponseQueue` should be `com.ptc.windchill.esi.DataResponse.<ESISAPAdapter/SystemID>.<ESISAPAdapter/Client>`

- Validate that the Windchill ESI distribution target (ESITarget attributes) sent from Windchill PDMLink are consistent with the SAP 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 user name and password (on the Custom tab of the adapter deployment configuration) are correct and that the account is not locked in SAP
- Isolate any problems with Internationalization or locale configuration settings
 - Within each adapter deployment configuration, the *ESISAPAdapter/Locale* global variable value (on the Custom tab) must be consistent with the Locale Encoding parameter value (on the Advanced tab).



Note

The *ESISAPAdapter/Locale* global variable value is used in Rendezvous message subject names to identify the correct target adapter.

- All locale parameter values must be valid (For example, 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 system configuration.

Other Configuration Problems

Verify following settings while manually deploying the EAR:

- DataResponse Queue name: Should have the <SystemID>.<Client> (like PT3.800) appended to it.
- JMS URL in ESIJMS and ESISAPAdapter group: Should have the hostname and not localhost.
- Java Max Heap Size and Java Thread Stack Size settings: These should be more than 512 MB and 512 KB respectively.
- Set **TIBCO Administrator GUI ▶ Application Management ▶ <ApplicationName> ▶ Configuration ▶ ESISAPAdapterConfiguration.aar ▶ Advanced ▶ adr3.maxconnections** to a higher value (for example, 6) and set **adr3.locale** to UTF8.

Now deploy the application, but do not start the services.

EMS: Run following commands in a JMS Administration window to configure JMS. Replace <DataResponse>, <EAI User> and <WCESI User> with the applicable values; for example com.ptc.windchill.esi.DataResponse.PT2.800, ESISYS and WCESI.

- create queue <DataResponse>
- setprop queue <DataResponse> secure
- grant queue <DataResponse> <EAI User> receive
- grant queue <DataResponse> <WC ESI User> send
- setprop factory QueueConnectionFactory url=tcp://<JMSServer>:7222
- commit

Now start the services.

Service Startup Errors

Verify the following:

- <Tibco_Home>/tra/domain/<Domain_Name>/application/logs

If no logs are generated for service startup and process id shows "-1", try running the corresponding *.sh or *.cmd file from <Tibco_Home>/tra/domain/<Domain_Name>/application/<Application_Name> folder. This would indicate any dependency failures, which should be addressed before starting the service.


SAP Problems


The following lists how to deal with problems that may originate in an SAP distribution target. Refer to the *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP* for more details.

- Verify that all SAP application and database servers are running
- Verify that the SAP system is running a version that is supported.
- Verify that the SAP system meets the minimum Support Package levels assumed by Windchill ESI
- Verify that the SAP 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 *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP*.
- 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 user account used by the TIBCO Adapter for SAP 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 gateway connections are available to the TIBCO Adapter for SAP
- Confirm that table record locks are not blocking updates by Windchill ESI.
- Isolate any issues with Internationalization or locale configuration settings.

Logs and Error Handling Codes

To help diagnose problems, you need to be thoroughly familiar with the key Windchill ESI logs, described in the *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP*. You also need to be familiar with the EAI error-handling architecture, and the error codes. The following lists the available logs and how to access them:

Logs	How to Access
Windchill Enterprise Systems Transaction Log	Windchill PDMLink user interface
TIBCO BusinessWorks Process engine logs  Note Windchill ESI application messages appear with a role designation of ESI to distinguish them from the standard TIBCO product messages.	TIBCO Administrator tracing or <Tibco_Home>/tra/domain/<Domain_Name>/application/logs/<Application_Name>.Process_Archive.log[.sequence #]
TIBCO EMS logs	File name and path are determined by log file 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 SAP logs	TIBCO Administrator tracing or <Tibco_Home>/tra/domain/<Domain_Name>/application/logs/<Application_Name>.[Adapter Configuration].log[.sequence #]

Logs	How to Access
TIBCO Adapter for SAP gateway trace.	<p data-bbox="532 338 1235 369"><Tibco_Home>/adapter/adr3/<version>/bin/dev_rfc.trc</p> <p data-bbox="532 390 651 422"> Note</p> <p data-bbox="581 438 1281 695">When a TIBCO Adapter for SAP error occurs, TIBCO creates the gateway trace (dev_rfc.trc) file in the <Tibco_Home>/adapter/adr3/<version>/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_Home>/adapter/adr3/<version>/logs directory.</p>
SAP gateway and application server logs	<p data-bbox="532 709 1281 968">Consult your SAP Basis administrator. For Windchill ESI API call sequences that include CALO_INIT_API (that is, BOMs, CNs, and Part/Material Revisions), you may obtain additional logging information in the SAP application log (transaction SLG1). Refer to SAP online application help for further details on using this transaction.¹</p> <p data-bbox="532 989 1281 1262">You should also be familiar with the SAP distribution targets and the data objects and attributes impacted by Windchill ESI. You may have direct responsibility for viewing and manipulating data in SAP, or may simply have to coordinate these activities with SAP Basis administrators. To view the data that was transferred into SAP by Windchill ESI, the following transactions are particularly important:</p> <p data-bbox="532 1283 829 1314">MM03 (View Material)</p> <p data-bbox="532 1335 894 1367">CS03 (View Material BOM)</p> <p data-bbox="532 1388 862 1419">CV03N (View Document)</p> <p data-bbox="532 1440 894 1472">CC03 (View Change Master)</p> <p data-bbox="532 1493 862 1524">CA03 (View Process Plan)</p>

1. Windchill ESI uses CALO_INIT_API to activate logging to the SAP application log for subsequent API calls. This only occurs with the "CCAP" and "CSAP" APIs used for BOMs, CNs, and Part Revisions. SAP BAPIs, used for Parts and Documents, do not use the SAP 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 while troubleshooting, as well as a list of specific problems and 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 PDMLink administrators, SAP 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_Home>/tra/domain/<Domain_Name>/application/<Application_Name>/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

On various Unix platforms certain TIBCO components fail to launch because of unresolved library dependencies.

If there is any *.sh or *.csh files present in the bin directory of that particular component, they should be executed and then the 'ldd' command can be used to identify unresolved library dependencies.

All required library paths should be added to the `tibco.env.CUSTOM_EXT_PREPEND` variable found in the *.tra file.

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
```

The above results in several lines that look like this:

```
root 5559 1 0 09:10:02 pts/1 0:18
<Tibco_Home>/administrator/<version>/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 the process is really dead. Generally speaking, to ensure all TIBCO processes are dead, you should run

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

```
ps -ef | grep hawk
```

```
ps -ef | grep rvd
```

and verify that no running processes are found.

Configuring Email 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 PDMLink
- Waiting for an ESIResultResponse message from Windchill PDMLink
- Parsing the ESIResultResponse message

This configuration is performed through the following global variables:

- ESIMail/ToAddress
- ESIMail/FromAddress
- ESIMail/CCAddress
- ESIMail/BCCAddress

The server is configured using the global variable: ESIMail/SMTPHostServer.

Refer to the *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP* 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, ESIJMS/RetryCount. 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.

TIBCO Administrator shows status as unknown for BWengine or adapter processes

There are two possible causes for this issue:

- A particular service's microhawk agent is taking time to send its status to the Administrator; it should be resolved in a few minutes.
- A configuration change has not been picked up by the hawk service; restarting the hawk service will resolve this issue

Adapter fails to start with JMS transport

After installing TIBCO Runtime Agent <version> and TIBCO Runtime Agent <version>.1, TIBCO Adapter projects using Enterprise Message Service as transport will not start up from TIBCO Designer and give the following error:

```
Message "Code = AESDKC-0156, Category = JmsComm, Severity = errorRole, Description = could not open JMS shared library jms." displays
```

This could be due to incompatible Adapter SDK libraries. To resolve this issue:

- On Windows: Remove the libeay32.dll and ssleay32.dll files from the <TIBCO_HOME>/adapters/sdk/version/lib folder.
- On UNIX: Remove the libssl and libcrypto openssl libraries from the <TIBCO_HOME>/adapters/sdk/version/lib directory.

Adapter fails to start showing a status of "Starting up" in the Administrator

If the process ID "-1" is allocated to the Adapter process, then this indicates some error launching the Adapter. This error is generally a library dependency. The following are the known errors:

-
- Case 1: Error while loading shared libraries: librfccm.so: wrong ELF class: ELFCLASS64
 - Case 2: Error while loading shared libraries: librfccm.so: wrong ELF class: ELFCLASS32
 - Case 3: Similar issues have been observed for the following libraries
 - libresolv.so.2 sunw_2.2.2
 - libstdc++-libc6.2-2.so.3
 - libstdc++.so.5
 - Errors are sometimes observed due to missing dll files in the SysWOW64 folder of the Windows machine.
 - Case 4: Incorrect Java library settings

Unresolved library dependencies

The following solutions may fix this issue:

- You might have used 64 bit SAPJCo libraries. SAP Adapter is a 32 bit application on Windows X64 platforms. Using 32 bit libraries will resolve the issue.
- You might have used 32 bit SAPJCo libraries. SAP Adapter is a 64 bit application on certain platforms like HP-UX IA64, Linux x64, Solaris X64 and Solaris SPARC. Using 64 bit libraries will resolve the issue.
- Install compatibility packages to resolve the dependencies.
- If Java environmental variables are already set, ensure that the versions are compatible. TIBCO Applications also install JRE 1.5 and 1.6. Users can always remove any java settings they have and let the TIBCO application set the respective java variables.
- On HP-UX and Solaris machines if Java variables are set, ensure that the class path contains 64 bit Java libraries, as the SAP adapter is a 64 bit application.

TIBCO Adapter for SAP instance stops working and status shows "Error"

This issue occurs due to adapter stack overflow error. TIBCO support has accepted it as a known issue and suggested increasing a parameter `adr3.stacksize` (for example, to 512 KB).

To set `adr3.stacksize` navigate to **TIBCO Administrator GUI ► Application Management ► <ApplicationName> ► Configuration ► ESISAPAdapterConfiguration.aar ► Advanced.**

'Coyote connector has not been started' error appears in TIBCO BusinessWorks Engine Logs

This could be due to incorrect values for ESIOthers/WSHost and ESIOthers/WSPort variables. Providing the proper values should resolve this issue.

"Input data invalid" message in ETL

This error indicates a schema validation failure in the 'Invoke an adapter request response service' activity. A detailed description and stack trace are logged into the Process Archive logs. The logs will indicate the exact reason of the schema mismatch.

For example:

```
validation error: data "xs:string('Hinge, Right Hand, Male, Removable,
  0.187 Dia Pin, SS') "length must be at most xs:int('40') CHARACTERS
({com.tibco.xml.validation}SIMPLE_E_LENGTH_TOO_LONG) at /aeRequestInputType[1]/
{http://www.tibco.com/xmlns/ae2xsd/2002/05/ae/700/basic/functionModules}
__caret_request_caret_BAPI__MATERIAL__SAVEREPLICA_caret_BAPI__MATERIAL__SAVEREPLICA[1]
/MATERIALDESCRIPTION[1]/item[2]/MATL__DESC[1]com.tibco.xml.validation.exception.k: data
"xs:string('Hinge, Right Hand, Male, Removable, 0.187 Dia Pin, SS') "
length must be at most xs:int('40') CHARACTERS
```

This could be due to a schema validation failure.

To resolve this issue rename the highlighted object and publish the transaction.

All EMS Server configurations disappear after the EMS server is started manually

This could be because the command to start the EMS server has been changed in the 5.1.4 version. In EMS version 4.x the command to start EMS was `"/tibemsd"`. In EMS v5.1.4 the command is `"/tibemsd64 -config ../tibco/cfgmgmt/ems/data/tibemsd.conf"`. The command uses a relative path and it should be executed from `"<TIBCO_HOME>\ems\<version>\bin"`.

To resolve this problem stop the process started by the command:

```
"/tibemsd"
```

and start the EMS server with the correct command:

```
"/tibemsd64 -config ../tibco/cfgmgmt/ems/data/tibemsd.conf"
```

Deployment of Applications using the TIBCO Administrator GUI displays a Failure message

This could happen if any previous deployment or undeployment might accidentally have acquired a lock, and has not released it.

Run the AppManage command from command prompt to diagnose and resolve the problem accordingly:

1. Browse to:

- <Tibco_Home>\tra\<version>\bin

2. Run the following command:

```
AppManage deploy <Application name> -user <username> -pw <password>
-domain <Domain_Name>
```

For example:

```
AppManage -'deploy -app SAP_ESI_Solution -user admin -pw admin -domain I4590
```

For more information refer to the <Tibco_Home>\tra\domain\<Domain_Name>\logs\ApplicationManagement.log file.

Cannot create a .dat file using the Repoconvert command

This happens when the value of tibco.class.path.extended property is missing the following entry in the RepoConvert.tra file:

- %TPCL_HOME%/tomcat/server/lib

Add the missing entry to the tibco.class.path extended property.

1. Open the RepoConvert.tra file, located in the following directory:

- <TIBCO_HOME>\tra\<version>\bin

2. Look for tibco.class.path.extended and append the path <TIBCO_HOME>/tpcl/<version>/tomcat/server/lib
3. Save the RepoConvert.tra file.

The Distribution Targets table is not displayed in the properties page of custom parts like 'wt.wadm.FADProduct' after the targets are created in the database

The default version of the file <Windchill>\codebase\netmarkets\jsp\tgt\distributionList.jsp is not designed to display the distribution targets table for custom parts.

To enable the Distribution Targets table for custom parts such as wt.wadm.FADProduct.

1. Open the file: <Windchill>\codebase\netmarkets\jsp\tgt\distributionList.jsp
2. Modify the if statement as follows, by adding the custom part type.

For example, if the object type is wt.wadm.FADProducts modify the if statement as follows:

```
if (oid.indexOf("wt.doc") != -1 ||
oid.indexOf("wt.epm") != -1 ||
```

```

oid.indexOf("wt.part") != -1 ||
oid.indexOf("com.ptc.windchill.mpml.processplan.MPMProcessPlan") != -1 ||
oid.indexOf("com.ptc.windchill.mpml.resource.MPMProcessMaterial") != -1
||
oid.indexOf("com.ptc.windchill.mpml.resource.MPMTooling") != -1 ||
oid.indexOf("com.ptc.windchill.mpml.resource.MPMSkill") != -1 ||
oid.indexOf("wt.wadm.FADProducts") != -1)

```

3. Save the file and restart servlet engine.

SAPAdapter.PartConfiguration Error [Application] Error Message

The following message appears in the adapter log file (located in the adapter/adr3/<version>/logs directory) when Windchill ESI logs on to the SAP via the TIBCO Adapter for SAP:

```

SAPAdapter.SAP-ESISAPAdapterConfiguration Error [Application] AER3-000183 RFC error;
Group : 104, Key : Name or password is incorrect. Please re-enter, Message :
Name or password incorrect. Please re-enter

```

In addition, the following text appears in the dev_rfc.trc file (located in the /adapter/adr3/<version>/bin directory):

```

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

```

This happens when an invalid SAP user name and password is being used.

To resolve this issue provide the correct user name and password in the adapter configuration. For more information, see the *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP*.

Adapter Log File Error Messages

The log file for the Adapter for SAP displays the following message just as the adapter is starting:

```

SAPAdapter.SAP-ESISAPAdapterConfiguration Error [Application] AER3-000183
RFC error; Group : 104, Key : User is locked. Please notify the person responsible,
Message : User is locked. Please notify the person responsible.

```

The adapter appears as if the start-up was successful. The following success message appears in the adapter log:

```
SAPAdapter.SAP-ESISAPAdapterConfiguration Info [Adapter] AER3-000082
Successful initialization of Adapter
```

However, when Windchill ESI issues a call to the adapter, the following error message appears in the adapter log file:

```
SAPAdapter.SAP-ESISAPAdapterConfiguration Error [Application] AER3-000072
Client connection SAP-ESISAPAdapterConfiguration InboundConnection0Client0 is
invalid
```

In addition, the following text appears in the dev_rfc.trc file:

```
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]
```

This happens when the SAP user name and password have become locked.

To resolve this issue an SAP 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. For more information, see the *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP*.

TIBCO BusinessWorks returns error messages

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/JMSRepeatUntilTrue
_ESIPostResult_Result/JMSSender_ESIResult_PostResult]

--javax.naming.ServiceUnavailableException: Failed to query
JNDI: Failed to connect to the server at tcp://localhost:7222.
Root exception is javax.jms.JMSEException: Failed to connect to
the server at tcp://localhost:7222
```

This happens when the EMS server name is invalid or the EMS server is not running.

To resolve this issue, start the EMS server if it is not running.

Or confirm that ESIJMS/JNDIContextURL 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_Home>/ems/<version>/tibco/cfgmgmt/ems/data.

The ESIJMS/JNDIContextURL global variable should be set to:

```
tibjmsnaming://<machine_name>:<port>
```

and the QueueConnectionFactory URL should be set to:

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

The machine name and port values should match.

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

Refer to "Process Engine Global Variable Groups" the *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP* for details on this variable.

Additional BusinessWorks error messages

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/JMS_ESIEvent_TransactionRelease_
End_PD

--Initialization error in
[ProcessDefinitions/DataProcessing/JMS_ESIEvent_TransactionRelease
_End_PD/JMSReceiver_Event_ESIEvent]

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

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

This happens when the user name or password for the JMS server is invalid.

Confirm that the ESIJMS/Username and ESIJMS/Password global variables in the deployment configuration of the process engine match 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 are in the users.conf file which is located in the <Tibco_Home>/ems/<version>/tibco/cfgmgmt/ems/data directory. Refer to "Process Engine Global Variable Groups" in the *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP* 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 set, you will have to reset them.

Starting a TIBCO component on UNIX causes errors

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
<Tibco_Home>/tra/<version>/lib/libmaverick50.sl

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

This happens when permissions for the file have not been set properly.

To resolve this issue use the command `chmod 555` on the file listed after TEXT. For example,

```
# chmod 555
<Tibco_Home>/tra/<version>/lib/libmaverick50.sl
```

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

The 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.

Check that the `QueueConnectionFactory` value located in the `<Tibco_Home>/ems/<version>/tibco/cfgmgmt/ems/data/factories.conf` file and the global variable `ESIJMS/JNDIContextURL` in the deployment of the Process Engine are set accordingly.

- `QueueConnectionFactory` in the `factories.conf` file should be set to `tcp://<machinename>:7222`, where machine name is the name of the machine where the EMS server is running.
- The global variable `ESIJMS/JNDIContextURL` in the BW Engine should be set to `tibjnsnaming://<machine name>` where `<machine name>` is the name of the machine where the EMS server is running.

It does not matter where this EMS server resides. It can reside on the same machine as 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 are connected to an 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.

Transaction remains in pending state

This could happen if the JMS server queues are not subscribed to as described in [Configuring and Administering JMS Queues on page 39](#).

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

When Windchill ESI services are successful in subscribing to the JMS queue meant for receiving result messages, the following information is included in the Windchill PDMLink method server log:

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

If this information does not appear in the log, it means Windchill was unable to subscribe to the said queue successfully. In this case, all Windchill ESI transactions are left in a pending state. The transactions are processed once Windchill is able to subscribe to the queue successfully.

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

```
javax.ems.JMSEException: 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 JMS configuration and the JMS server configuration.

To avoid this issue, ensure the following:

- Only one WCESI user is connected to EMS server (can be viewed from EMS Administration Tool> Show connections)
- The number of ESISYS connections with ClientID (BW-ESIMaster_JMSConnection-queue-<Application Name>-Process_Archive) should be equal to the number of ERP instances configured (can be viewed from EMS Administration Tool> Show connections)
- All the connections are from either TIBCO or Windchill server in the current testing suite. There are no connections from a previous suite or from an alien machine (can be viewed from EMS Administration Tool> Show connections)
- Windchill and Process Archive connect to the same JMS Queue (can be viewed from EMS Administration Tool> Show queues)
- The queue com.ptc.windchill.esi.Result has only one receiver (can be viewed from EMS Administration Tool> Show queues)
- There should be no messages in any of the queues (can be viewed from EMS Administration Tool> Show queues)

- Windchill has subscribed to the DataResponse queue successfully. Connect to the JMS server and check if the DataResponse queue is created and the WCESI user is granted send rights on the DataResponse queue. If 'show queues' displays a * in front of the DataResponse queue name, it indicates that the queue is temporary and needs to be created. This issue is observed if the EAR is deployed manually. Run the following commands in the JMS Administration window to resolve the issue:
 - create queue <DataResponse>
 - setprop queue <DataResponse> secure
 - grant queue <DataResponse> <EAI User> receive
 - grant queue <DataResponse> <WC ESI User> send
 - setprop factory QueueConnectionFactory url=tcp://<JMSServer>:7222
 - commit
- The Process Archive is connected to the same DataResponse queue that Windchill has subscribed to. Check the JMS Administration window, to confirm that the DataResponse queue is subscribed to by the Process Archive. In case of manual deployment this step is missed sometimes. If the DataResponse queue is subscribed to, check TIBCO Administrator→ Application Management → Application Name → Configuration→>Deployment Name→ Advanced →ESIJMS/DataResponseQueue

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

This could happen if the BusinessWorks engine was started before the EMS server.

Always start the EMS server before the BusinessWorks engine.

TIBCO BusinessWorks Process engine logs error messages

TIBCO BusinessWorks Process engine log contains the following message text:

```
Job terminated:
Please check following
1) FilesToRead_SAP.properties exists at %TIBCO_HOME%\esi\bin
2) %TIBCO_HOME%\esi\bin exists in tibco.env.STD_EXT_CP path in %TIBCO_HOME%
\bw\<version>\bin\bwengine.tra
```

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\bin directory.
 2. The FilesToRead_SAP.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 properties files' security authorizations do not allow read access to the TIBCO BusinessWorks process engine.

To resolve this issue:

1. If the FilesToRead_SAP.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.
2. If the properties files have restricted read access, grant this access to the TIBCO BusinessWorks process engine. See the *PTC Windchill Enterprise Systems Integration Installation and Configuration Guide - SAP* for further details on configuring the Windchill ESI business logic properties files and specifying class paths during deployment.

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

You may be using an unsupported web browser version.

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

When starting an adapter instance or process engine in TIBCO Administrator, the status remains stuck on "Starting Up," and never changes to "Started."

This is a known issue with the TIBCO Adapter for SAP and the TIBCO Runtime Agent (TRA). It is possible that starting the TIBCO services automatically (as is the default on Windows systems) may cause them to sometimes start in the wrong sequence and prevent proper communication between the Administrator Server and TRA.

To resolve this issue check the component's log file to determine if it has, in fact, started successfully, despite the "Starting Up" status display. In most cases, it probably has. If not, try the following procedure:

-
1. Shut down the TIBCO Administrator application and all running TIBCO components and services.
 2. Start up the TIBCO services manually, in the following order:
 - a. TIBCO Administrator <version> (Domain Name)
 - b. TIBCO HAWK Agent (Domain Name)
 3. Restart the TIBCO Administrator application and try to start up the components again.

Multiple "Activity timed out" errors appear in the TIBCO BusinessWorks process engine log

Multiple "Activity timed out" errors appear in the TIBCO BusinessWorks process engine log; however, Windchill ESI reports a successful result in the Enterprise Systems Transaction Log Graphical User Interface.

This is an expected behavior. Windchill ESI automatically compensates for certain timeout events with subsequent SAP queries, and processing proceeds normally.

No action is required.

Multiple Release To Manufacturing workflows are created upon releasing a promotion request from Windchill PDMLink

This happens if the Windchill ESI preference *Publish Promotion Requests* has a value **No**. Set the preference to **Yes** in order that a single RTM workflow is created upon releasing a promotion request.

Note

With the Windchill ESI *Publish Promotion Requests* set to **No**, releasing a promotion request results in as many RTM workflows as there are promotables in the promotion request.

A document associated to a part (or to a manufacturing object) does not get published to certain distribution targets associated to it

This can occur if the document is associated to additional distribution targets as compared to the part (or the manufacturing object). In such a case, the document is published only to those distribution targets that are associated to the part (or to

the manufacturing object). This is only an expected behavior. In order that the document is published to the additional targets, release the document either as a standalone object or in association with a Change Notice or a promotion request.

Only the top-level document in a CAD document structure is published upon releasing a part associated to the structure

This is an expected behavior. A CAD document structure is published only if the structure was released as a standalone object, or in association with a Change Notice or a promotion request.

Only the top-level document in a CAD document structure is published upon releasing the structure

This can occur if any of the following is true:

- The distribution target attribute **Number of Levels to Publish when Publishing a CAD Document Structure** is set to 0 (zero), or to an empty string. It should be set to a number specifying the required number of levels instead.
- The document masters that represent the first level children in the structure are not resolvable to iterations using the distribution target attribute **Saved Filter to be used when Publishing a CAD Document Structure**.

Ensure that these distribution target attributes are set appropriately.

The distribution target attribute Saved Filter to be used when Publishing a Change Notice does not get used when publishing a CAD document structure in association with a Change Notice

This is an expected behavior. ESI services use the attribute **Saved Filter to be used when Publishing a CAD Document Structure** instead. Regardless of whether a CAD document structure is released as a standalone object, or in association with a Change Notice or a promotion request, ESI services use the distribution target attributes that appear under the **CAD Document Settings** section of the Create/Edit Distribution Target UI.

Control characteristics associated to a part are not published

This problem can occur if the distribution target attribute **Publish Control Characteristics when Publishing a Part** has a value **No**. Set the attribute to **Yes** in order for the associated control characteristics to be published

Control characteristics associated to a process plan are not published

This problem can occur if the distribution target attribute **Publish Control Characteristics when Publishing a Process Plan** has a value **No**. Set the attribute to **Yes** in order for the associated control characteristics to be published.

A control characteristic is published as an unchanged object upon modifying its description and republishing the holding part or process plan

This is an expected behavior. A control characteristic would be rendered as a changed object only if it was revised in Windchill.

A control characteristic associated to a part is published even when the distribution target attribute Publish Control Characteristics when Publishing a Part has a value No

This can occur if:

- the distribution target attribute **Publish Control Characteristics when Publishing a Process Plan** has a value **Yes**
- the control characteristic is associated to an operation
- the process plan holding the operation is published.

If you want ESI services to not process a certain control characteristic associated to a part, apart from turning off the attribute **Publish Control Characteristics when Publishing a Part**, make sure the control characteristic is not associated to an operation that resides in the process plan being published.

An attempt to publish a control characteristic results in a failure

This problem can occur if any of the following is true:

- The control characteristic is consumed by a process plan's operation but is no longer associated to its owner (part or process plan). Also, the Windchill ESI preference **Ignore Orphaned Control Characteristics** has a value **No**.
- The associated model item's EPM document is no longer associated to the control characteristic's owner.

In order for the control characteristic to be published successfully, ensure that the control characteristic and its model item's EPM document are both associated to the control characteristic's owner.

