

# Teamcenter® Operational Best Practices



## White Paper

**This document is intended to provide best practices, general information, and references with respect to Teamcenter Operational items.**

This document is focused on understanding the operational practices required to achieve the best Teamcenter best performance. The goal is to clearly communicate to customers the value of implementing operational best practices to achieve the best performance possible.

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**CONTRIBUTORS**

<b><i>Name</i></b>	<b><i>Name</i></b>	<b><i>Name</i></b>
J. Enzweiler	G. Guru	G. Herran
W. Hull	S. Kuppa	R. Reich
S. Schweyher	D. Scobey	G. Tchamkoriyski
J. Viersen	T. Goerd	

**REVIEWERS**

<b><i>Name</i></b>	<b><i>Name</i></b>	<b><i>Name</i></b>
W. Hull	D. Scobey	E. Danielson
T. Goerd		

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# 1 Introduction

This document contains general information, best practices, and references to additional documentation to assist you in managing Teamcenter environments. The document provides an overview of operational activities associated with Teamcenter environments. The document can serve as a general reference. In some cases, customization will be required in order for the information to be used within your environment. The information provided must be tested in a test or development environment before it is implemented in a Production environment.

The processes and scripts included in this document can be used as a starting point for operating your Teamcenter environment. Please be aware that Siemens Product Lifecycle Management (SPLM) Software does not provide support for the processes and scripts included in this document. Rather, they are presented as examples of how the processes and scripts may be used in Teamcenter environments.

This document does not include detailed installation, upgrade, performance or tuning information because this information is already available with the product release or within other documents. This guide will not be addressing best practices or administration tasks with respect to the usage of Teamcenter applications. Instead this guide is addressing the operational needs of the server environment where the Teamcenter server applications are being hosted.

## 1.1 Audience

This document is intended for Information Technology (IT) application and database server administrators responsible for installing and supporting Teamcenter server components.

## 1.2 Assumptions

This document assumes the following:

- The administrator is familiar with their data center environment and associated processes.
- The administrator understands general computer terminology, Microsoft Windows Operating Systems (OS), and has experience with Microsoft Office products. If the environment is non-Windows (for ex: Linux) based then they must understand that environment.
- The sample scripts are Windows based and if used (ported) then they will need to be modified and tested in your environment.
- Teamcenter11.2.2 is the Teamcenter software installed, but in general the information presented in this document applies to other versions of Teamcenter. Note: some of references (ex. 2014 and 2015 PLM Connection) are associated with older Teamcenter releases.
- If you are using a Windows based OS (for ex: Windows 2008R2 Server SP1 or Windows Server 2012 R2) then it is assumed that all commands are being executed as “**Run as Administrator**” or within an “**Administrator Command Window**”.

### **1.3 Pre-Requisites**

- Obtain a WebKey Account for access to Global Technical Access Center (GTAC). GTAC is where you go for software, documentation, solutions to problems and help. For additional details see section [6.5 How do I get a WebKey account for access to GTAC?](#)
- Sign up as a member of the PLM Software Users Group on PLM Connection. For additional details see section [6.13 How do I find papers, presentations and other Teamcenter information on PLM Connection?](#)
- Sign up for Software Field Bulletins (SFBs) from GTAC. For additional details see section [6.10 How can I subscribe to E-mail Subscriptions and Distribution Services?](#) How do I find papers, presentations and other Teamcenter information on PLM Connection?
- Attended the GTAC New Customer Webinar. For additional details see section [6.6 Where can I take the GTAC New Customer Webinar?](#)
- Obtain local copies of the key Teamcenter documents for your version of Teamcenter. Having local copies reduces the chance that you are not able to access the documents when needed. For additional details see section [6.3 Where can I find Teamcenter documentation?](#)



## **2.2 Teamcenter support policies for releases and operating systems**

This section briefly describes Teamcenter management support policies for releases and operating systems.

### **2.2.1 Release Support**

Siemens PLM Software encourages customers to stay reasonably current with new releases of Teamcenter products. This upgrade strategy ensures that users obtain the most current announcements and information about new features in a timely manner. It also allows Siemens PLM Software's support of its products to be consistent with that of our dependent technology partners (that is, operating systems, databases, and embedded software products).

### **2.2.2 Teamcenter and Compatible Third-Party Software Versions**

The Siemens PLM Software's Hardware and Software Certifications section within the Global Technical Access Center (GTAC) web site, documents versions of operating systems, databases, compilers, Web browsers, and other third-party software certified for use with Teamcenter. Teamcenter releases do not coincide with releases of compatible third-party software. It is possible that Teamcenter customers may acquire and install later versions of third-party software before Siemens PLM Software is able to certify it.

Siemens PLM Software's standard policy with respect to later versions of operating systems and other third-party software relies on manufacturers' guarantees. If a manufacturer guarantees that a later version of its product is binary-compatible with the preceding version, Siemens PLM Software expects our products to function properly with the later version. Our experience shows few problems are encountered when executing Teamcenter with a third-party version newer than the version we certified.

Siemens PLM Software makes a reasonable effort to support Teamcenter on newer software versions and to work with you to resolve any difficulty that may arise but will not, in most cases, test adequately to certify the later version.

Teamcenter compatibility with operating systems and compilers involves these two considerations:

- Compatibility for run time
- Compatibility for relinking customizations and paths

Typically, operating system manufacturers assure run-time binary compatibility between successive versions of their operating systems. We make a reasonable effort to support Teamcenter running on a newer version of an operating system. Some operating system manufacturers assure compatibility when relinking or rebuilding executables and libraries with later versions of compilers. If newer versions of compilers are not compatible with earlier versions, you must link all Teamcenter customizations using the compiler version certified for the Teamcenter release. This also applies to installation of Teamcenter patches.

To reiterate, Teamcenter may run on a newer version of an operating system, but customizations and patches may need to be compiled and linked on an earlier version.

Although Teamcenter may run using an older software version, we strongly discourage running older versions, and we do not provide support for doing so.

For information about the older versions of software with which to run Teamcenter, that is, versions of software certified for use with Teamcenter, see the Siemens PLM Software Hardware and Software Certification section within the GTAC web site:

[http://www.plm.automation.siemens.com/en\\_us/support/gtac/certifications.shtml](http://www.plm.automation.siemens.com/en_us/support/gtac/certifications.shtml)

#### Note

If Siemens PLM Software discovers incompatible versions of third-party software, we will post bulletins on GTAC. This information is also available from your Teamcenter provider.

### 2.2.3 Teamcenter Platform Support Statement

**Document ID:** SFB-Teamcenter-5172

**Issue Date:** Feb-22-2010

**Product:** Teamcenter

**Revision Date:** Feb-22-2010

**Responsible Group:** Teamcenter

**Affected Software:** Teamcenter

**Scope:** All supported platforms

Siemens PLM Software publishes the supported platforms for each of Teamcenter's unified architecture release on our GTAC website:

[http://support.ugs.com/online\\_library/certification/](http://support.ugs.com/online_library/certification/)

The term "Platforms" used by Teamcenter in deployment covers the operating system, the database, and other run time software prerequisites. Examples of platforms covered by this statement include:

Operating Systems (e.g., Microsoft Windows or Linux SuSE)

Database Management Systems (e.g., Oracle, DB2 or Microsoft SQL)

Run Time Environments (e.g., Java and .NET).

In addition to the certified versions listed on GTAC, Teamcenter supports newer minor and patch releases of the operating systems and third party software if and only if the third party vendor certifies their binary compatibility with the versions listed in the GTAC certification web site.

We recommend that customers work with the third party vendor to determine which versions are binary compatible.

This statement does not apply to Application Web Servers (e.g., BEA WebLogic), Third Party embedded software such as search engines (Autonomy Idol) or report writers (e.g., eQube) Virtualization Software (e.g., VMWare, VirtualPC)

Siemens PLM Software server-based products base their support on operating systems, not specific hardware configurations or environments. Siemens PLM

Software does not test or certify our products in a virtualized environment or make any specific recommendations regarding virtualization products such as VMware or specific virtualized environment configurations.

If any questions arise regarding this field bulletin, please contact the Global Technical Access Center in your local region or area.

You can find a list of global phone numbers on our GTAC support page at <http://www.siemens.com/gtac> listed under Resources.

## 2.3 Overview of Teamcenter Applications and Usage

This section provides an overview of available applications and overall capabilities of Teamcenter to give administrators a sense of what Teamcenter will be used for.

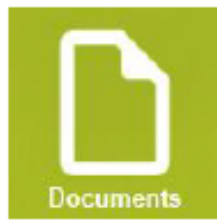
The following was copied from “Teamcenter 11.2 **Getting Started with Teamcenter**” guide: [https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US/tdocExt/pdf/getting\\_started\\_teamcenter.pdf#nameddest=plm00002](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US/tdocExt/pdf/getting_started_teamcenter.pdf#nameddest=plm00002). Reference this guide for additional details on each area as well as information on the platform.

Teamcenter is a virtual gateway to your company's product information connecting all who need to collaborate with product and process knowledge. Teamcenter enables you to digitally manage your product and manufacturing data in the context of the product life cycle.

Start by managing and and sharing product designs, documents, BOMs, and data in Teamcenter. Use standardized workflows and change processes to streamline efficiency throughout your organization.



Product data control



Product document control



Product structure control



Process control

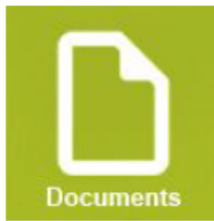
### Working with product designs



You locate, open, interrogate, and mark up engineering designs created by multiple CAD, CAM, and CAE systems.

Powered by the industry-standard JT file format, Teamcenter lifecycle visualization provides your entire organization with the ability to view design data typically stored in CAD-data formats. This lets you explore and validate product innovations and issues in a collaborative environment.

## Working with product documents



Product documents support all aspects of a product from product documentation, product planning, and testing results.

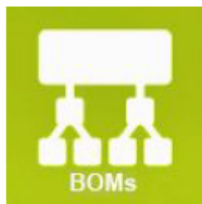
You can manage Teamcenter documents in real time through Microsoft Office Word, Excel, PowerPoint, and Outlook.

Using the Microsoft work environment allows more people throughout the extended enterprise, including partners and suppliers, to participate in product life cycle processes.

A custom **Teamcenter** tab appears on the ribbon in Word, Excel, and PowerPoint. In Outlook, each open message contains the **Teamcenter** tab on the ribbon. You manage Teamcenter documents in Microsoft Office.

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## Working with product structure



Teamcenter enables you to define a single generic product structure from which an entire range of product variants can be derived.

You can use variant conditions, constraints, and revision rules to configure your product structure.

- *Variant conditions* enable you to define the components that can be configured to create specific product variants.
- *Constraints* enable you to reduce the number of variants that your platform can support on a temporary or permanent basis. In addition, option compatibility constraints can be used to specify that certain combinations of option values are not offered.
- *Revision rules* enable you to manage changes to the structure resulting from new revisions of subassemblies and components. For example, you can define revision rules that configure the structure based on a specific effective date or based on the release status of the components.



## Participating in business processes



*Workflow* is the automation of business processes to accomplish an objective.

A workflow process is initiated by a user by submitting an item to the workflow.

Workflow tasks, such as approvals (signoffs), reviews, and assignments to complete work, are assigned to users.

In a simple workflow, as shown in the following diagram, the start step leads to an work assignment task. The work assignment task leads to a review task that returns to the work assignment task if the work is not approved. When the work is approved, it is released and then progresses to a finish step.



All tasks in a workflow are automatically sent to the inbox of the responsible participant.

Also see “Teamcenter 11.2 Frequently Asked Questions for Teamcenter”

[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US/tdocExt/pdf/faq\\_teamcenter.pdf#nameddest=plm00125](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US/tdocExt/pdf/faq_teamcenter.pdf#nameddest=plm00125)



## 3 Teamcenter Operational Best Practices

### 3.1 General Operations Best Practices

The following address Best Practices associated with general operational items associated with a Teamcenter environment. Specific best practices are addressed in later sections.

- Never assume that someone else will report an issue. Report issues to GTAC with as much detail as possible. They may already have a fix or work-around for your issue; if not then the issue can be addressed by SPLM.
- Maintain multiple environments such as Development, Test/QA, User Acceptance Test (UAT), Training and Production. One of the environments such as Test/QA should be sized to handle a copy of Production so that tests can be run using production data. This is especially important when trying to get a feel for how long some process will take. The Test environment may need to be standalone from QA when using a development model where developers work in their own development environments and then have their items merged with other developer items in the Test environment for integration testing. Depending on your needs additional environments may also be needed such as Sandbox, Migration, etc.
- Test new items and changes in a Test/QA environment before applying them to Production. This includes 3<sup>rd</sup> party (for example: Java) items as well as Operating System and .net items. The best practice is to test in each environment before deploying to Production. For example: Dev then Test/QA and finally release to Production once tests are completed in the non-Production environments.
- Based on your environment, determine which items discussed in this document to apply to your environment. Be sure to fully test items in Dev/Test/QA environments before using them in production.
- Verify that the Teamcenter 2/4-tier client works correctly with the version of Java and/or .net that the IT infrastructure team plans to deploy to all end user systems. In a few cases a new Java or .net release will cause the client to fail which may require the usage of an older Java or .net release until the issue is addressed. IT infrastructure team will need to work with Teamcenter local support team on this.
- Use timing baselines, captured while running batch processes (for example, backups, indexing, integration), to compare before and after changes to ensure the system is working as expected. Baselines can also assist in determining if other factors in the environment are impacting Teamcenter related items.
- Have champion End Users develop a list of common tasks that most users will do and get timing for the set (use case baseline). Compare the timings when (major) changes are made or when users are reporting performance issues.

- If possible, automate the defined set of use cases to aid in doing baseline comparisons. Being able to run an automated process from time to time has been found to help identify possible future performance issues.
- Before switching between Teamcenter environments (for example: PROD to TEST or TEST to PROD), in the same browser, preform a ‘Deep Cache Clean’.
  - For Chrome and Firefox: ‘Deep Clean’
    - “**Ctrl + Shift + Delete**” invokes the clear cache dialog.
    - “**Ctrl + Shift + R**” = Hard Refresh
  - Internet Explorer and Alternative on Chrome
    - **F12** = Open Development Tools
      - Chrome – While Dev Tools is open, click and hold on the refresh button to see ‘Soft Refresh, Hard Refresh, Clear Cache and Hard Refresh’ use the latter with clear cache
      - IE – While Dev Tools is open, click use ‘**CTRL R**’ to clear cache
    - **F12** to close the Development Tools

Note: you may need to restart Chrome and IE to get the best results after the clear cache.

- Develop scripts to give repeatability where possible. Use a configuration file so that scripts can be used in all environments without having to make changes to the tested script when moving between environments.
- The environment needs to be monitored and adjustments made from time to time, especially when the number of end users increases and/or additional projects are using the Teamcenter environment.
- In a number of cases performance issues have been traced to the environment (network, disk array, host VM system load, memory usage, CPU usage, cache usage) that may be due to other applications running in the same environment.
- During Teamcenter install/patch/update activities the error "Cannot find the path specified" usually maps to some incorrect setting in an environment variable.

## ***3.2 Business Continuity, Disaster Recovery, and High Availability Best Practices***

The following items address Best Practices associated with Business Continuity (BC), Disaster Recovery (DR), and High Availability (HA) items associated with a Teamcenter environment.

### **3.2.1 Backups**

- PLM Connection 2015 presentation - **Back up Process and Best Practices**  
 "This presentation will cover the recommended strategy and methods for Teamcenter data backup." <http://www.plmworld.org/p/do/sd/topic=946&sid=6477>

### 3.2.2 Business Continuity

*Additional information planned for future release of this document.*

### 3.2.3 Disaster Recovery

- PLM Connection 2015 presentation - **High Availability and Disaster Recovery**  
"A highly available Teamcenter deployment requires careful consideration of the architecture and infrastructure design. This presentation will highlight high availability options for the different tiers in addition to recommendations for disaster recovery."  
<http://www.plmworld.org/p/do/sd/topic=946&sid=6478>

### 3.2.4 High Availability

- PLM Connection 2015 presentation - **High Availability and Disaster Recovery** (see Disaster Recovery above)
- For Active Workspace HA Indexing: use multiple zookeepers (<https://zookeeper.apache.org/> <https://cwiki.apache.org/confluence/display/ZOOKEEPER/Index>)
- PLM Connection 2014 presentation - **Dispatcher in a High Demand Environment**  
"Dispatcher services offer several configuration options for utilizing multiple modules touching many aspects of Teamcenter and Teamcenter integrations. With such configurations, large backlogs of data can be created tying up resources and delaying high priority actions.

Some of our lessons learned will be discussed in this presentation. Use in a high demand environment and how to overcome roadblocks of having it implemented as a linear process. This session will cover the Implementation of multiple Schedulers, Clients and Modules across different system and platforms supporting a high level of request with little or no user involvement, minimizing backlog and allowing high priority tasks to be processed real-time. Overall highlights to include configuration and implementation of modules for NX to JT, Schedule Manager, FMS Transfer, ToZip and a Custom Module based on NX Clone."  
<http://www.plmworld.org/p/do/sd/topic=882&sid=5090>

## 3.3 Client Best Practices

The following items address Best Practices associated with client items associated with a Teamcenter environment.

### 3.3.1 Overview AWC vs 2-tier vs 4-tier vs thin client vs Client for Office

See Active Workspace deployment guide for information

[https://docs.plm.automation.siemens.com/data\\_services/resources/aw/3.4/aw\\_admin\\_pdf\\_collection/t doc/en\\_US/pdf/Deployment.pdf](https://docs.plm.automation.siemens.com/data_services/resources/aw/3.4/aw_admin_pdf_collection/t doc/en_US/pdf/Deployment.pdf)

Or

<https://www.plm.automation.siemens.com/en/docs/aw/3.shtml>

### 3.3.2 Client Deployment items

- The 2/4-tier client can be deployed so that it can talk with multiple environments. This works as long as all environments are running the same Teamcenter version/patch level, have the same features and templates installed. Where you can get into trouble is trying to setup the same 2/4-tier client to talk to for example Test/QA and Prod and you want to test a new patch or template or feature in Test/QA which is not ready to be installed into Production. The best practice is to avoid having the same 2/4-tier client talking to different environments that are not the same. (Active Workspace is not impacted since everything comes from the server that is accessed at the time of the request).
- Installing the 2/4-tier client requires Administrator rights. Customers that do not allow end users to have administrator rights will need to develop a process that supports deploying the client using the normal IT software deployment process that runs with administrator rights. (Active Workspace has an advantage since no install is required; you only need a supported web browser). Note: for accessing Microsoft Office products from Active Workspace then MS Office integration items need to be installed on the users' system.
- If the end user will be using other products that need to integrate with Teamcenter on the client then those products need to be installed before installing the 2/4-tier client. For example, NX needs to be installed before the Teamcenter 2/4-tier client.
- The 2/4-tier client depends on Java, so a supported version of Java must exist before the 2/4-tier client can be installed.
- PLM Connection 2014 presentation - **Teamcenter Client Deployments in a Global Environment**

“Managing your Teamcenter client deployments can be a very time consuming and labor-intensive process, requiring multiple resources and considerable user downtime. We will be discussing the use of TEM and customized scripts to create a distributable MSI package for Teamcenter local clients, negating the need to run TEM on each client box, also touching on how to customize a silent NX and VisMockup installation for clients. This presentation will discuss using script automation to facilitate the distribution, installation and patching of PLM software for local client use, across multiple remote sites. Utilizing MSI packaging and custom scripts for installation of the core client and use of OTW (Over the Web) services to patch the installation. Also to be discussed is configuring OTW for use on multiple servers across your infrastructure, to increase redundancy and reduce server / WAN load.”

<http://www.plmworld.org/p/do/sd/topic=882&sid=5089>

### 3.3.3 External Reference for Client Related Items

- **Optimizing Teamcenter Client Performance –**  
<https://support.industrysoftware.automation.siemens.com/docs/teamcenter/>

### 3.4 Deployment Best Practices

The following items address Best Practices associated with deployment items associated with a Teamcenter environment.

- Conduct walk-throughs, dry-runs, and test the deployment plan before implementing the deployment.

#### 3.4.1 Prerequisites for Search Deployment

- An understanding TcFTSIndexer architecture.
- A general understanding of the TcFTSIndexer and its available configurations. Look at configurations in the TC\_ROOT\TcFTSIndexer\conf directory.
- An understanding of all options provided by the runTcFTSIndexer -? command.
- Knowledge of Solr shards (<https://cwiki.apache.org/confluence/display/Solr/SolrCloud>).
- Ensure the Teamcenter database is properly tuned and does not have slow SQL call messages in the syslog files.
- Ensure the Teamcenter database is on a dedicated machine.
- Ensure Solr is installed on a secure machine and is only accessible through the Teamcenter server.

#### 3.4.2 External References for Deployment Related Items

##### 3.4.2.1 Teamcenter Deployment Guide

[https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide\\_TcUA\\_11.2ab.pdf](https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide_TcUA_11.2ab.pdf)

##### 3.4.2.2 PLM Connection 2016 presentation - Teamcenter Deployment Options for Global Collaboration

“This presentation discusses the various Teamcenter deployment options available (i.e. 4 Tier, VDI, Active Workspace, etc.). Guidance on typical network resource requirements is also provided.”

<http://www.plmworld.org/p/do/sd/sid=7510>

##### 3.4.2.3 PLM Connection 2016 presentation - Deploying and Managing your Active Workspace Environment

“The focus of this presentation is on the ability to install and maintain your Active Workspace deployment. We will be going over the overall deployment and administrative configuration. This session will also cover configuring Solr to run in a failover and load balanced mode, index administration such optimizing extraction queries and others.”

<http://www.plmworld.org/p/do/sd/sid=7572>

#### **3.4.2.4 PLM Connection 2014 presentation - Production Readiness for Teamcenter Deployments**

“The Production Readiness for Teamcenter presentation focuses on the key areas that need to be reviewed and completed to ensure a successful Teamcenter Deployment prior to enabling the go-live status for a Production environment.

The focus areas for consideration will include Deployment Architecture, Infrastructure, Applications, Test Results, Administration, IR/PR/ER reviews, Backup & Recovery, Support, Security, License validation, Deployment Communication and Rollback.”

<http://www.plmworld.org/p/do/sd/topic=882&sid=5414>

#### **3.4.2.5 PLM Connection 2014 presentation - Best Practices for Teamcenter Deployments in UTF-8**

“With emergence of globalization, organizations are faced with increasing need to interact and exchange information in multiple languages. This requires Teamcenter to support complete localization of User Interface and data storage for multiple languages that span across character sets in a single deployment. Teamcenter recommends deployments based on UTF-8 encoding, one of the widely popular character set encodings that can support characters from all locales, to support this need.

This session covers guidelines and best practices on how to configure Teamcenter for UTF-8 for new installations and for upgrading of existing environments. It details the strategies to migrate data in existing installations to operate in UTF-8 mode using same database system or between different database systems. In addition, it provides coding practices to be followed to correctly handle character data across the tiers, while developing customizations to work with Teamcenter running in UTF-8 mode.”

<http://www.plmworld.org/p/do/sd/topic=882&sid=5213>

#### **3.4.2.6 PLM Connection 2014 presentation - Teamcenter in Very Large Database Memory Deployments**

“The presentation discusses the issues and benefits of deploying Teamcenter tiers and database on server with very large memory (e.g. 1 TB). The availability of very large memory systems has brought the potential to grow system vertically back into play. The merits of vertical and horizontal scaling will be discussed. The recent availability of In-Memory databases and their potential use with Teamcenter will be discussed. Advanced server networking - Teaming NICs and InfiniBand will also be included.”

<http://www.plmworld.org/p/do/sd/topic=882&sid=5176>

#### **3.4.2.7 PLM Connection 2014 presentation - Tools that Make Managing Deployments Easier**

“Managing your Teamcenter environments can be a formidable task for administrators. For example when you set up a test environment do your users want to have the latest data from production in the test environment so that your users can test with real data. When you upgrade do you have to perform it in two steps such that you perform the upgrade and then install a patch on top of the upgrade. When you deploy BMIDE template updates do you wish you could automate it with a script instead of having to perform manual steps with

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TEM? When you deploy a custom software update do you wish you had a tool that could change attributes values on data during the deployment? New tools have been introduced that makes these tasks much easier and less costly than before. Come check out these new features so you can get your job done faster and easier.”

<http://www.plmworld.org/p/do/sd/topic=882&sid=5216>

### 3.4.2.8 PLM Connection 2018 presentation - The evolution of Visualization in Active Workspace

Walking you through the evolution of Active Workspace from initial release to today's best practices.

<http://www.plmworld.org/p/do/sd/sid=9908>

### 3.4.3 Cloud Deployment Best Practices

- Teamcenter **Deployment Guide** – See section “**Managing Teamcenter Cloud Deployments**”

[https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide\\_TcUA\\_11.2.1ab.pdf](https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide_TcUA_11.2.1ab.pdf)

### 3.4.4 Multi-Site Deployments

- Teamcenter Deployment Guide – See section “**Managing Classic Multi-site Deployments**”  
[https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide\\_TcUA\\_11.2.1ab.pdf](https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide_TcUA_11.2.1ab.pdf)

## 3.5 Common Applications Best Practices

The following items address Best Practices associated with applications associated with a Teamcenter environment.

### 3.5.1 Application Server (Web server, Web Tier)

- Best Practices associated with JBoss 7.1 - **JBoss 7.1.0 Installation and Tuning Guide v2.**  
<https://support.industrysoftware.automation.siemens.com/docs/teamcenter/>
- Best Practices associated with Tomcat – *GUIDE UNDER DEVELOPMENT as of September 2016*  
<https://support.industrysoftware.automation.siemens.com/docs/teamcenter/>
- Teamcenter Deployment Guide – See section “**Managing Web Server Deployments**”  
[https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide\\_TcUA\\_11.2.1ab.pdf](https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide_TcUA_11.2.1ab.pdf)

### 3.5.2 [Active Workspace] Index server

- Ensure that the Teamcenter user defined by the tc.user setting in the %TC\_ROOT%\TcFTSIndexer\conf\TcFtsIndexer.properties file can log in to the Teamcenter



instance and has at least read access to all objects that need to be indexed. For example: infodba abilities)

- When to re-index
  - The business objects or properties to be indexed are modified in the Business Modeler IDE (BMIDE) and the template is redeployed.
  - A new template is added
  - An existing template that affects indexing is updated.
  - Data is imported using Teamcenter XML utilities
  - A change is made to the Start Of Week preference. You can change this preference in the rich client by choosing Edit -> Options -> Calendar -> Start of Week
  - A classification attribute is added or removed from search index
  - A classification attribute filter property is set to facetable
  - When Alternative IDs are created on existing objects
  - Change to ACL on objects being indexed.
  - Solr is upgraded to a new version
- Always do a transform (transfer the solr\_schema\_files and run them through TcSchemaToSolrSchemaTransform.bat/sh) before running a full reindex.
- If using the dispatcher to currently handle some of your indexing items then plan to move away from Dispatcher usage for indexing in the future. With the performance improvements made to the indexing process in the later Active Workspaces releases the need for doing indexing via the dispatcher no longer exist so in a future release dispatcher support for indexing will be dropped.

### 3.5.3 [Active Workspace] Visualization server

- The Visualization Data Server should be deployed on a high speed LAN near the Visualization Server Manager if not on the same host.
- The Visualization Data Server (VDS) should be on or near the system hosting the FSC cache or FSC volumes. If the VDS is located close to end users but remote from the FSC volume server then we need to deploy an FSC cache near or on the VDS host system.
- Attempt to have the Visualization Data Server as close to end users as reasonable. The network latency should be less than 85ms otherwise the visual images will not rotate cleanly and users will most likely complain.

### 3.5.4 Database Best Practices

- A quick way to determine if the database is available from the tcserver (Business Logic Server) is to open a Teamcenter Command shell and enter “**install -ayt**”. You should be able to execute the same command on any Teamcenter server that should have database access. What you are looking for is a message that tells you that Teamcenter is already installed.
- Active databases should have at least daily backups and weekly maintenance utilities performed unless a daily maintenance utility run is an option. When determining backup



needs you must consider business needs since you may find that a backup once a day is not enough, especially as the number of users increase. In addition, FMS (volume data) backups need to be coordinated with database backup. Since the database contains meta-data (pointers) to files within the FMS.

- Verify that database backups are good at least quarterly (maybe monthly). One approach is to update the Test/QA environment with a copy of production at least quarterly (maybe monthly). The update is made by restoring a recent backup of production into the Test/QA environment.
- The character set being used by Teamcenter must match the character set being used by the database. If character sets do not match then the tcserver may get truncated data from the database.
- Verify that server (system) level backups are actually backing up the correct backup files. Server level backups should NOT backup up the active database files since the backup may not be complete based on state of database files at time of backup. Instead the server (system) level backups should be backing up the backup file that was created by using the database vendor's backup utility which is designed to backup an active database. If the database is not active (database application is not running) then a server level backup should be OK.
- Follow best practices to support Teamcenter Oracle database efficiently for best performance
  - Set up Oracle database on dedicated physical server or on dedicated RAC nodes.
  - Ensure that Oracle database server is not swapping SGA from memory to disk.
  - Ensure that I/O in Oracle database is less than 5msec/block in all files.
  - Ensure that network latency between Oracle database and Pool servers is less than 2 msec on LAN.
  - Collect full statistics on TC schema using dbms\_stats package on daily basis.
  - Ensure that all indexes are present that are created by out of box install using index\_verifier utility.
  - Coalesce indexes in TC schema using alter index commands.
  - Drop temporary tables that are not in use for over a month.
  - Detect slow running SQL statements in the syslog and tune them.

Refer to “Teamcenter Oracle Database Maintenance Best Practices White Paper”

- Teamcenter Deployment Guide – See section “**Managing Database Server Deployments**”  
[https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide\\_TcUA\\_11.2.1y.pdf](https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide_TcUA_11.2.1y.pdf)

### 3.5.5 Dispatcher Best Practices

- Teamcenter 11.2 **Dispatcher Server Installation**  
[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US//tdoc/Ext/pdf/dispatcher\\_server\\_installation.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US//tdoc/Ext/pdf/dispatcher_server_installation.pdf)
- Teamcenter 11.2 **Dispatcher Server Translator Reference**  
[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US//tdoc/Ext/pdf/dispatcher\\_server\\_translation\\_ref.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US//tdoc/Ext/pdf/dispatcher_server_translation_ref.pdf)
- Teamcenter 11.2 **Getting Started with Dispatcher (Translation Management)**  
[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US//tdoc/Ext/pdf/getting\\_started\\_dispatcher\\_translation\\_mgmt.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US//tdoc/Ext/pdf/getting_started_dispatcher_translation_mgmt.pdf)

### 3.5.6 Documentation Server Best Practices

- To check if documentation server is working access the URL for the documentation server via a web browser first on the system where the Document server is installed and then from a remote system. If you can access the document server locally but not remotely then check the firewall settings on the document server system. If a cloud solution is in use then check Firewall and VPN access rules. For example: <http://localhost:8181/tdoc/tc/11.2.1/help/>
- More than one version of Teamcenter software documentation can be hosted on the same documentation server. In addition, NX documentation can also be hosted on the same documentation server along with Teamcenter documentation.
- Once the documentation server is installed you must set the Teamcenter preferences: “WEB\_core\_help\_server” and “WEB\_help\_server” to reference the documentation server.

### 3.5.7 Enterprise Server Best Practices (Business Logical Server, pool manager, tcserver)

- Teamcenter **Deployment Guide** – See section “Managing Enterprise Server Deployments”  
[https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide\\_TcUA\\_11.2.1ab.pdf](https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide_TcUA_11.2.1ab.pdf)

### 3.5.8 File Management System Best Practices (Caching server, FMS, Volume server)

- Steps for checking if FCC/FMS is working correctly from Teamcenter client
  - Login to a Teamcenter client.
  - Create a new text dataset.
  - Edit the dataset, save and close the editor. Make sure that Teamcenter saved the update.
  - Attempt to open that document to verify that the client can read from the FMS.
- Steps for checking if FCC/FMS is working correctly from Teamcenter server (tcserver), Visualization server, desktop.

- \$FMS\_HOME/bin/fccstat –status
- Teamcenter 11.2 Frequently Asked Questions – See section “**Managing FMS**”  
[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US/tdocExt/pdf/faq\\_teamcenter.pdf#nameddest=plm00125](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US/tdocExt/pdf/faq_teamcenter.pdf#nameddest=plm00125)
- If you make any changes to the FMS master then you need to stop and start the FMS service.
- If changes were made to the FMS master then you need to stop and start remote FSC and FCC's.
- Using an on-going file sync process has been found to be a faster way to keep a copy of Prod FMS volume data up to date in another environment (for example: backup, Test/QA, Business Continuity (BC), Disaster Recovery (DR), and High Availability (HA) once the number and size of the files becomes large.
- If using a sync process to keep Test/QA volumes synced with PROD then you may need at least twice the disk space. Since you should maintain a mirror of the PROD volume data and the active Test/QA volumes on the same system. (Mirror volume data is stored local with the active Test/QA volume data and is used when you want to make the Test/QA volumes match Prod at the time you restore a copy of the Prod database into the Test/QA environment database).
- Use file sync utilities to keep additional copies of Volume data synchronized between environments (could be for backup/ Business Continuity (BC), Disaster Recovery (DR), High Availability (HA) or for Test/QA). For example: FreeFileSync (<http://www.freefilesync.org/>) is an open source software package that can be used to synchronize Teamcenter volumes (folders and files) between environments including Windows and Linux. (See section **3.6 Creating Test/QA environment from Prod environment items** for additional information on “freefilesync” usage). “Rsync” may also be an option in your environment. Depending on your host environment there may also be other options for keeps systems include data within the systems in sync.
- Teamcenter Deployment Guide – See section “**Managing FMS & Volume Server Deployments**”  
[https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide\\_TcUA\\_11.2.1ab.pdf](https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide_TcUA_11.2.1ab.pdf)
- PLM Connection 2016 presentation - **Teamcenter File Volumes Management**  
 “This presentation discusses Teamcenter file management and volume organization in a modern datacenter, including backup strategies and Hazard Analysis (HA) issues. A detailed discussion of FMS configuration is not part of this presentation.”  
<http://www.plmworld.org/p/do/sd/sid=7612>
- PLM Connection 2016 presentation - **Teamcenter FMS Advanced Concepts and Utilities**  
 “Teamcenter File Management System has many configurable options that can control dataflow, enhance performance and provide monitoring. Session covered several utilities for manipulating and monitoring data and will drill down to show what benefits these may bring. Topics include File Content Verification, File Manipulation, Working between multiple

environments, Data Loss Prevention, Cache Sizing Tool and more. Whether you have one site or multiple sites, taking advantage of these features will increase performance and make the Teamcenter experience better for you and your users.”

<http://www.plmworld.org/p/do/sd/sid=7617>

### 3.5.9 License Server Best Practices

- License server must be installed before starting a Teamcenter install via the Teamcenter Environment Manager (TEM), since TEM will check if you have a license.
- Consider using Redundant SPLM License servers (three license server processes on three different systems) for HA – two servers must be working at all times in order to have licenses made available to end users. Another option is to install the License server on a single VM server that is configured for High Availability.
- If using a firewall then limit the ports that the license server will use and make sure firewall rule(s) exist to allow license server ports to be accessed. To control what port the license server responds on add PORT= to the vender line with the license file.
- Teamcenter 2-tier, 4-tier and Active Workspace clients do not need access to the license server, but other SPLM products may. For example: FiberSim, LMS and NX.
- How do I generate the composite ID I need to get a Teamcenter license?

A composite host ID (CID) is a unique identifier used as the host ID on the SERVER line of the license file. It is distinguished from the default FlexNet host ID by the COMPOSITE keyword. It is the host ID that associates a permanent license file with a specific server. When the CID is used as the license server host ID, the SERVER line reads as follows:  
SERVER serverA COMPOSITE=37B5ED1AC61D 28000

To obtain a composite host ID for your license server, run the getcid utility on your license server host. Download this utility from GTAC:

1. Open the GTAC Web site: [http://www.plm.automation.siemens.com/en\\_us/support/gtac/](http://www.plm.automation.siemens.com/en_us/support/gtac/)
2. Select “License Management” → “Common Licensing Toolkit”

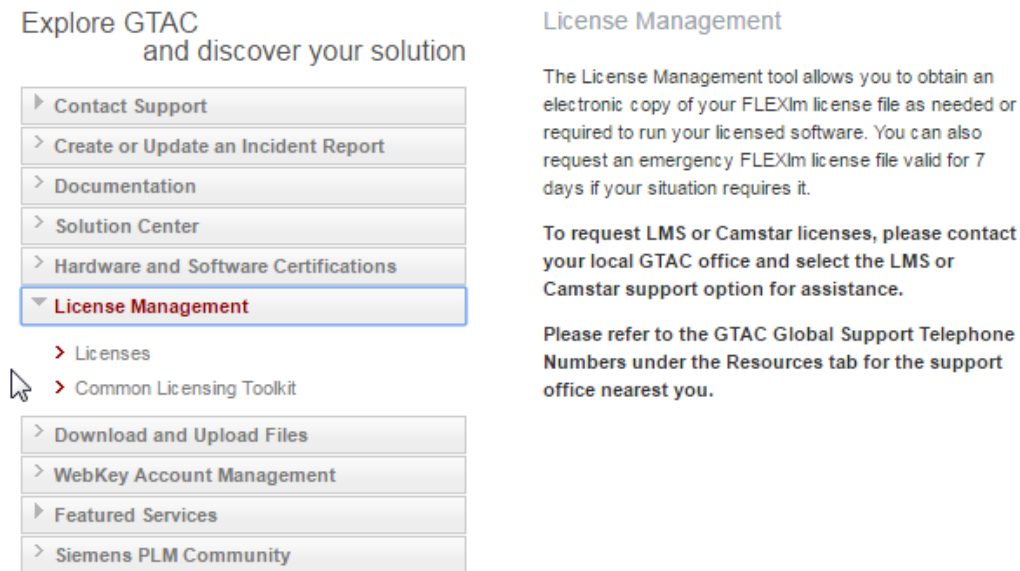


Figure 2 – GTAC – License Management

#### 4. (Related links on right) “Download CID Utility for NX and other Products”

Home > Maintenance, Enhancements and Support > GTAC > Common Licensing Toolkit

##### Common Licensing Toolkit

Siemens PLM Software has developed a common licensing toolkit with the intent of incorporating this technology into many of our products. Siemens PLM Software developed the licensing toolkit based on FLEXlm from Flexera Software in an effort to consolidate the advanced licensing capabilities needed for all Siemens PLM Software products. This web site will help you understand our licensing plans and how it will affect your installation.

##### Toolkit Features

The common licensing toolkit was initially released in 2007 and continues to be updated and enhanced to meet the needs of our products and stay current with new releases of the Flexera software. The following is a summary of changes and capabilities that are offered by adopting this toolkit.

- New “ugslnmd” daemon.** All products adopting the toolkit will share this daemon. This will allow Siemens PLM Software to provide a combined license file for products using the new toolkit.
- Utilizes port 28000 for licensing communications.** Siemens PLM Software has registered and reserved this port for our licensing plans. This should eliminate conflicts with other packages using FLEXlm.
- Enhanced license files.** Siemens PLM Software will be incorporating the TRL (Tamper Resistant License) capability of FLEXlm. License files will be slightly larger due to the longer signatures on feature lines.
- Composite HostIDs.** The current license server hostID is being replaced by a composite hostID. This capability was added to support license servers on virtual machines. Obtaining the composite hostID(CID) requires running a Siemens PLM Software provided utility on the license server.
- NX Dongle Support Change.** The use of the Composite HostID is not compatible with



##### Related Links

- Register your Composite Host ID (CID)
- Download CID Utility for Solid Edge
- Download CID Utility for NX and other Products
- COMOS License HostID At Customer
- COMOS Walkinside License HostID At Customer
- Request a WebKey Account
- Search Solution Center

Figure 3 – GTAC – Common Licensing Toolkit

5. Select the directory corresponding to the platform type of your license server, for example, wntx64.

6. On the resulting page, download the getcid.exe utility (Windows systems) or the getcid utility (UNIX/Linux systems).

You must run the utility on the target license server (or on all three servers in a redundant configuration). The output is a 12-digit hexadecimal number that is the CID for that system. For example:

```
$ getcid.exe
```

The Siemens PLM Software licensing composite hostid is:  
"COMPOSITE=37B5ED1AC61D"

After obtaining the CID, enter it into your customer record to generate a permanent license file. Enter the CID using either your WebKey account or by calling your customer server representative. After the CID is entered into your customer record, you are sent a permanent license file to install on your license server.

After you install the Siemens PLM License Server, the getcid utility is available in your license server directory.

- Where do I find instructions on how to install and run the licensing for Teamcenter?

The Siemens PLM Software Common Licensing Server daemon, ugsld, enforces license usage.

For information about installing the Siemens PLM Software Common Licensing Server daemon, see the appropriate server installation guide (for Windows or UNIX/Linux) or Teamcenter Upgrade.

Teamcenter 11.2 employs named user licensing, which ties each user in the system to an available license and ensures the total number of active licenses of each type in the system is always less than or equal to the number of licenses purchased.

For information about administering Teamcenter licensing, see the "[Siemens PLM Licensing User Guide](#)"

[https://support.industrysoftware.automation.siemens.com/docs/common\\_license/SPLMLicensing\\_user\\_guide.pdf](https://support.industrysoftware.automation.siemens.com/docs/common_license/SPLMLicensing_user_guide.pdf)

For Information about installing the Siemens PLM Software Common Licensing Server, see the "[Installing Siemens PLM License Server](#)"

[https://support.industrysoftware.automation.siemens.com/docs/common\\_license/](https://support.industrysoftware.automation.siemens.com/docs/common_license/)

- Where can I find additional information about the license server?

Teamcenter **System Administration** Users Guide has a section addressing License items [https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US//tdoc/Ext/pdf/system\\_admin.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US//tdoc/Ext/pdf/system_admin.pdf)

Areas discussed include:

- Teamcenter licenses
- Named user licensing
- Common licensing server
- Managing licenses
- Using the convert\_license\_log utility
- License usage information
- Generate license usage reports
- Using the LicenseUsageAuditTool tool
- Change Manager licensing
- Admin licensing level

- Assigning license servers
- How license usage is calculated

### **3.6 Creating Test/QA environment from Prod environment items**

A standard best practice is to test any changes planned for implementation into a Production environment in a Test/QA environment beforehand. The Test/QA environment should be as close to the real environment as possible in terms of data, hardware and software.

This environment is needed to make sure that a change will not negatively impact the environment and to verify that processes, scripts, utilities, schedules, etc. are working as planned. It is also needed to obtain timings so you know how long processes will take.

Extreme care needs to be taken in copying data from production into a Test/QA environment. If the process is not executed correctly it is possible to be working in the Test/QA environment but actually making changes in the Production environment. In addition to following a proven process, it is highly recommended that you have backups of Production before creating or updating the Test/QA environment with Production data.

See the Teamcenter Upgrade guide sub-section “**Create an upgrade testing environment**” for ways to create a test environment that contains production data.

[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US//tdocExt/pdf/upgrade\\_guide.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US//tdocExt/pdf/upgrade_guide.pdf) (If you get an error access this link using Chrome or Firefox then try IE; Otherwise access the GTAC web site, Documentation sub section and then do a search for “upgrade guide” and select one of the 11.2 documents).

#### **NOTES:**

- DO NOT MOVE volumes from PROD to Test/QA you only want to COPY volume data. Using a directory / file sync process is one way to copy the volume data from PROD to Test/QA. Depending on how often you plan to upgrade the Test/QA environment with a copy of PROD data you may want to use a sync process more often maybe even daily depending on the number and size of the volumes.
- On Windows systems you can use the windows xcopy command to create the volume directories and sub-directories without copying the actual data.

If you want to have PROD data for testing in your Test/QA environment, which is recommended, then you need to copy the file data also which may best be done via something like robocopy (windows), freefilesync (Linux, Windows, Mac OS X), rsync (Linux, windows), cwRsync (windows - <https://www.itefix.net/cwrsync>), etc. If security is a concern then check out freefilesync using SSH File Transfer Protocol (SFTP) (<http://www.freefilesync.org/>) or rsync over Secure Shell (SSH) <http://www.backupsecrets.com/articles/displayarticle/id/354>

### **3.7 Environment related Best Practices**

The following items address Best Practices associated with environment related items associated with a Teamcenter environment.



### 3.7.1 Environment variables

- Teamcenter 11.2 **Preferences and Environment Variables Reference**  
[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US//tdocExt/pdf/preferences\\_environment\\_variables\\_reference.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US//tdocExt/pdf/preferences_environment_variables_reference.pdf)

### 3.7.2 Processes

#### System Administration Guide

[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US//tdocExt/pdf/system\\_admin.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US//tdocExt/pdf/system_admin.pdf)

##### Process daemons section

- Introduction to process daemons
- ODS and IDSM daemons
- Encrypt a password file for use by daemons

### 3.7.3 Configuration files

A few of the Teamcenter configuration files that you may need to work with:

- %TC\_ROOT%\install\configuration.xml
- %TC\_ROOT%\portal\plugins\configuration\_11000.2.0\client\_specific.properties
- %TC\_ROOT%\portal\plugins\configuration\_11000.2.0\site\_specific.properties
- %TC\_DATA%\logger.properties
- %TC\_ROOT%\TcFTSIndexer\conf\log4j.properties
- %TC\_ROOT%\TcFTSIndexer\conf\TcFtsIndexer.properties
- %TC\_DATA%\tc\_profilevars.bat (\$TC\_DATA/tc\_profilevars)
- %TC\_ROOT%\VisDataServer\etc\VisDataServer.properties
- %TC\_ROOT%\vispoolmanager\jetty\jettyservice.properties
- Web Application server configuration files (for example: server.xml, web.xml)

### 3.7.4 Log files

See **Teamcenter Utilities Reference Guide**, Section "Getting started with Teamcenter utilities", sub-section "Log File produced by Teamcenter", "System log files", "Application log files", "Preferences and variables used to control application logging"

The Utilities Reference guide is located in Product Area "Administering Teamcenter" for the version of Teamcenter you are using:

Common document reference:

<https://support.industrysoftware.automation.siemens.com/docs/teamcenter/>

Teamcenter 11.2.2:

[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US//tdocExt/pdf/utilities\\_reference.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US//tdocExt/pdf/utilities_reference.pdf)

Teamcenter 10.1.6:

[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/10.1.6/PDF/en\\_US//tdocExt/pdf/utilities\\_reference.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/10.1.6/PDF/en_US//tdocExt/pdf/utilities_reference.pdf)



**Application log files** (copied from Tc 11.2.2 Utilities Reference 1-4, 1-5)

“Each set of application log files consists of a journal file, monitor file, object log file and a syslog file. The **TC\_Application\_Logging** preference controls the logging of journal files. Syslog files are always created and cannot be suppressed.

Each application log file name is a concatenation of the application name, OS process ID (PID), and a descriptive file extension. This ensures application log file names are unique for each session and prevents overwriting valuable troubleshooting information. The following is an example of Structure Manager log file names:

PSEPID.jnl

PSEPID.log

PSEPID.syslog

The following application log files are used by Siemens PLM Software support and development to troubleshoot and debug Teamcenter:

- Journal files (.jnl)  
Contains diagnostic information and is intended for Siemens PLM Software use only.
- Syslog files (.syslog)  
Contains diagnostic information and is intended for Siemens PLM Software use only.
- Object log files (.log)  
Contains a record of Teamcenter objects (users, groups, volumes, and so on) created, modified, or deleted during the application session.”

**Preferences and variables used to control application logging** (copied from Tc 11.2.2 Utilities Reference 1-6)

The following preferences and environment variables control application logging:

- TC\_Application\_Logging preference  
Enables or suppresses application logging. This command can also be set in the rich client interface using the Edit→Options command.  
This preference only enables or suppresses application logging for journal and monitor files; syslog files are always created and cannot be suppressed.
- TC\_Journalling preference  
Globally enables or suppresses creation of all journal files independently of monitor and syslog files. This command can also be set in the rich client interface using the Edit→Options command.
- CLASSPATH environment variable  
Defines the directory for storing the rich client object log (.log) files when the java.io.tmpdir key is defined in the Java Virtual Machine CLASSPATH variable, as follows:  
-Djavaio.tmpdir=path-to-temp-directory

**Active Workspace Indexer related logs**

- %TC\_ROOT%\TcFTSIndexer\logs\TcFTSIndexer.log - contains all the log messages. This is useful to understand the overall status, service and framework related generic messages.
- %TEMP%\tcserver.exe.syslog
- %TEMP%\tcserver.exe.comlog

- The following log files will be available in TcFtsIndexer\logs directory by default starting with Active Workspace 3.1.1
  - TcFtsIndexer\_objdata.log – contains only objdata specific messages.
  - TcFtsIndexer\_structure.log – contains only structure specific messages.

#### **Install related logs**

- %TC\_ROOT%\logs
- Log files found in the %TC\_ROOT%\install directory

### **3.7.5 Java version items**

- Always test new Java releases in a Development or Test environment before they are deployed. In most cases new Java patch releases do not impact Teamcenter client or server applications, but in a few cases, they do impact Teamcenter applications. In some cases, a fix is required from Oracle in other cases a fix is required from Siemens PLM Software and in a few cases from both.
- Java 1.8.0\_91 – causes issues for the Teamcenter documentation server
- Be sure and check the comments within the Hardware and Software certification matrix to determine what versions of Java are supported. NOTE: in some cases, a specific Teamcenter patch level is required for support of a specific Java version.
- The release notes for a Teamcenter release may contain Java or other 3<sup>rd</sup> party requirements and/or recommendations. Always review release notes and Readme files for Teamcenter release items.
- Tc11.2, Teamcenter Management Console does not support Java 1.8 due to third party software limitation that does not support Java 1.8 (as of May 2016). Workaround: Install Teamcenter Manager Console feature on system using Java 1.7. This support was added in TC 11.2.2.

### **3.7.6 Teamcenter server-based items to backup**

Database related items, such as Oracle, MS SQL, and DB2 (for example: dmp (oracle) bak (sql))

- Data files
- Control files
- Online redo logs
- Archived logs
- Software Installation items

Teamcenter related items

- All FMS volumes (including “store and forward”)
- The TC\_DATA directory
- The TC\_ROOT\install directory, which stores configuration data
- The TC\_ROOT\bmide directory, which can contain database templates and custom templates under project folders
- All local Business Modeler IDE project folders, including project folders within source control management (SCM) systems
- All custom scripts and processes that are used in the environment
- Task Scheduler/Cron related items

- Software Installation items

Web Application Server related items

- Deployed File(s)
- Modified configuration files
- Scripts developed to start, stop, status, monitor
- Software Installation items

See the Teamcenter **System Administration** Guide, sub-section “**Backing up and recovering files**” for additional details.

### **3.8 Integration Best Practices**

The following items address Best Practices associated with integrations associated with a Teamcenter environment.

#### **3.8.1 Email**

- You may need to have your corporate mail team configure your corporate mail server(s) to allow connections from the different Teamcenter servers in your environment. As a security measure many mail servers default to not allowing un-authenticated SMTP connections from unknown systems.
- Currently (Teamcenter 11.2.1 and 10.1.5 and before) do not support interfacing with a SMTP Secure (SMTPS - <https://en.wikipedia.org/wiki/SMTPS>) based mail server. The ability to send email from Teamcenter via SMTP secure has been requested for a future release of Teamcenter in order to support the move towards secure email (especially cloud based). The workaround until Teamcenter supports SMTP Secure is to setup an internal SMTP mail server which interfaces between Teamcenter and your SMTP secure mail server.

#### **3.8.2 Other applications (SAP, CAD ...)**

- Best Practices for Teamcenter / Creo-ProE / IPDM  
PLM Connection 2015 presentation - **Best Practices for Teamcenter / Creo-ProE Integration**  
“This presentation provides best practices for smooth interface between Teamcenter and Creo-Pro/E. From environment variables, file configurations, attribute mapping and load options to Access Manager Rule Tree additions, preferences, save options, JT creation and BMIDE; everything you need to know to have a seamless user interface.”

<http://www.plmworld.org/p/do/sd/topic=943&sid=6514>

### **3.9 Installation Best Practices**

The following items address Best Practices associated with install items associated with a Teamcenter environment.

- Be sure you have all required software (refer to the certification matrix) and license keys before starting your install activities.

- Review items within the “**Deployment**” section above for additional information that may be of value when planning and executing a Teamcenter install.
- In Active Workspace 3.1, you need to add the server extension “NX for Active Workspace” to get “Open in NX” to work from inside NX.
- Product releases installation and updates packages are available for download from the GTAC web site in the **Download and Upload Files** selection.  
[http://www.plm.automation.siemens.com/en\\_us/support/gtac/](http://www.plm.automation.siemens.com/en_us/support/gtac/)

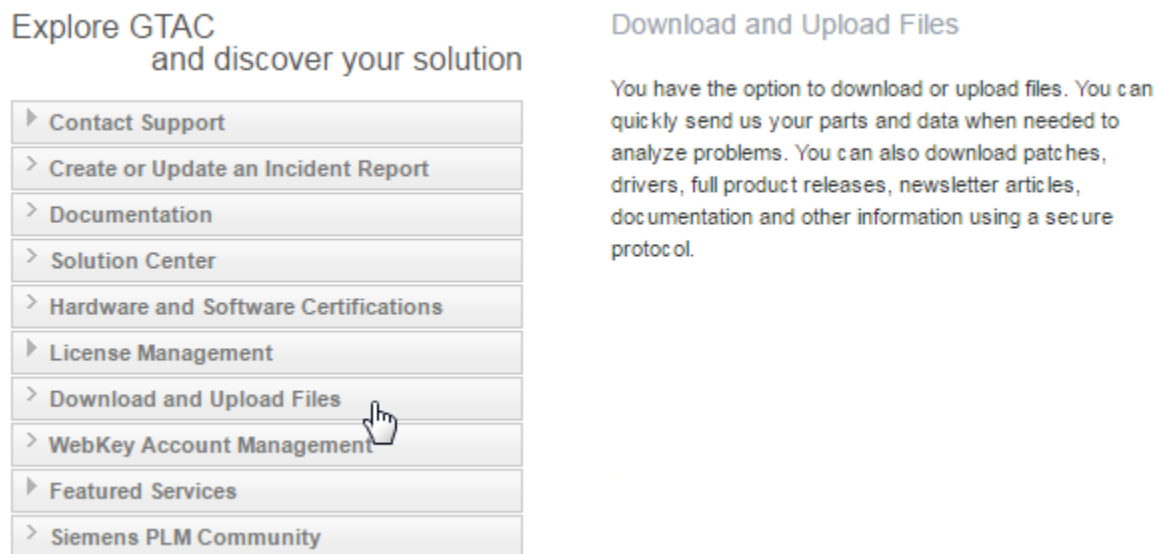


Figure 4 – GTAC – Download Software or upload IR related items

### 3.10 Maintenance Best Practices

The following items address Best Practices associated with maintenance items associated with a Teamcenter environment.

- Consider system resource usage when scheduling maintenance tasks such as backups and Teamcenter maintenance utilities. It is recommended to schedule the backup and maintenance utilities processes sequentially to reduce resource needs and to run during low activity times.
- Ensure database maintenance is done nightly, weekly, monthly
- Manage space on Volumes disk drives, Log directories, Temp directories
- Run index\_verifier monthly and after patching a Teamcenter environment or completing a Teamcenter upgrade. (See section **4 Common Commands/Utilities for Operational Support**, for some additional details).
- Make sure hardware drivers stay up to date (be sure to test new drivers before deployment into Production).
- See the Teamcenter **System Administration** Users Guide for additional details associated with Teamcenter maintenance.

[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US//tdoc/Ext/pdf/system\\_admin.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US//tdoc/Ext/pdf/system_admin.pdf)

Areas discussed include:

- System maintenance
- Maintaining Teamcenter
  - Daily maintenance
  - Weekly maintenance
  - Monthly maintenance
  - Useful administration tools
  - Application process monitoring
- Maintaining the database server
  - Maintaining the IBM DB2 server
  - Moving a DB2 database from Windows to Linux
  - Maintaining the Oracle database
  - Oracle Net implementation
  - Maintaining the Microsoft SQL Server database

### **3.11 Monitoring Best Practices**

The following items address Best Practices associated with monitoring items associated with a Teamcenter environment.

- Monitor at least: disk space, backups, maintenance utilities, and logs to make sure the system is working OK.
- Collect and Monitor metrics, which includes growth, for example:
  - Run time increases for backups and maintains
  - Reduction in disk space (backup file, database, log files)
  - CPU usage
  - Memory usage
  - Database stats
  - User performance experience doing a common set of tasks
  - Synthetic Tests results
- Mine the Teamcenter log files for errors (for example the tcserver syslog files)
  - Script a solution using your favor scripting language and utilities available on your system.
  - Examples of tools to assist in handling logs (NOTE: SPLM does not endorse these companies or products):
    - Chainsaw (<http://logging.apache.org/chainsaw/2.x/>)
    - Graylog (<https://www.graylog.org/>)

- Log Monitoring With Nagios (<https://www.nagios.com/solutions/log-monitoring/>)
- LOGalyze (<http://www.logalyze.com/>)
- Logrep (<https://sourceforge.net/projects/logrep>)
- Logstash (<https://www.elastic.co/products/logstash>)
- LOG Manager (<http://www.eventtracker.com/products/log-manager/>)
- Logwatch (<https://sourceforge.net/projects/logwatch/>)
- Octopussy (<http://www.8pussy.org/>)
- Simple Log Watcher (<https://sourceforge.net/projects/swatch/>)
- SPLUNK (<http://www.splunk.com/>)
- Zenoss Core (<https://sourceforge.net/projects/zenoss/>)
- Review the Teamcenter System Monitoring Automation (TSMA) offering from Siemens PLM Advanced Technical Services (ATS) group. This offering is designed to assist you in managing a stable production deployment of Teamcenter software. For additional details see section **6.14 What offerings does Advantedge Advanced Technical Services for PLM Architecture deliver?**
- Tc 11.2, Teamcenter Management Console feature is not available on IBM AIX platform (as of May 2016). Workaround: Install Teamcenter Management Console feature on Linux or other supported platforms and configure it to manage Server Manager Pool running on IBM AIX.
- PLM Connection 2015 presentation - **Continuous Monitoring of Your Teamcenter Deployment**  
 "Teamcenter health monitoring system can be used to track critical events and provide notifications through email or other means to System Administrators. Some of the system challenges are:
  - Detect a need for re-provisioning the server pool - Server Timeouts
  - Detect an attack/intrusion - Failed login attempts
  - Detect issues with database - Deadlocks/Long running queries
 In this presentation, we will go through real deployment scenarios, demonstrate how monitoring is done and discuss the benefits of getting it enabled for Teamcenter J2EE deployments." <http://www.plmworld.org/p/do/sd/topic=940&sid=6524>
- PLM Connection 2014 presentation - **Managing and Monitoring Your Teamcenter Services**  
 "Managing and monitoring your Teamcenter services can be a very time consuming and tedious process especially as you expand the Teamcenter foundation and capabilities as you fully realize your PLM solution, increasing the Teamcenter system availability and reducing user downtime.  
 This presentation will discuss techniques and the benefits in using Siemens and customized tools to monitor and manage Teamcenter services, across multiple platforms and remote

sites. This will include monitoring of the various services and availability of the services for the installed solutions. The various services of Teamcenter will include, but not limited to FMS, Multisite, Tc Volume usage, Dispatcher and OTW services."

<http://www.plmworld.org/p/do/sd/topic=882&sid=5088>

### 3.11.1 Teamcenter System Monitoring Automation (TSMA) / Nagios

TSMA is built on top of the Nagios monitoring product (<https://www.nagios.org/>) and is able to monitor the following Teamcenter items (as of March 2018):

Web Application Metrics J2EE Only	
Metric Name	Description
AbandonedServers	The web tier was unable to connect to the tcserver that the tree cache indicates is assigned to the session. Alert if number of abandoned servers exceeds this limit for time period (Default: 600 seconds).
FailedLoginAttempts	Excessive failed login attempts have been detected. Alert if number of failed login attempts exceeds this limit during time period (Default: 600 seconds).
LongRunningRequests	The number of long running requests. The web tier has been waiting for a tcserver response for the stated time period. The threshold value (by default: 17 seconds) define how long a request can run before it is considered to have run longer than expected. Threshold period define how often the active requests are examined to see if any are running long (default: 33 seconds). Based on customer system performance and expectation, threshold value and threshold period should be tuned firstly.
NoServerAvailable	The server pool was unable to assign a tcserver. Alert if number of no server available exceeds this limit during time period during time period (Default: 600 seconds).
ServerCommFailure	A tcserver has closed a connection without providing a response to the web tier. Alert if number of server COMM_FAILUREs exceeds this limit during time period (Default: 600 seconds).
Threading	Monitor thread count in pool manager JVM



Java Pool Heap Memory Usage	Heap Memory used by the Java virtual machine supporting the Teamcenter web application.
Number of Pending Requests	The number of requests sent by the web tier to tcserver with pending replies has been above the configured threshold for the configured time period. Each of these requests consumes a web tier thread. If all the threads are busy, users might experience slow response times or rejected connection attempts.
<b>Pool Server Metrics (* available for .net)</b>	
<b>Metric Name</b>	<b>Description</b>
Number of Servers	The total number of server processes currently in this server pool
<b>Number of Assigned Servers*</b>	The number of assigned server processes currently in this server pool
Servers in Stateless Mode	The number of assigned servers in stateless mode. Stateless timeouts apply to these servers.
Servers in Read Mode	The number of assigned servers in read mode. Read timeouts apply to these servers.
Servers in Edit Mode	The number of assigned servers in edit mode. Edit timeouts apply to these servers.
<b>Number of Warm Servers*</b>	The number of to-be-assigned server processes currently in this server pool.
<b>Number of Warming Up Servers*</b>	The number of server processes that are currently initializing in this server pool.
Number of Cold Servers	The total number of server processes that were launched but never reported back to the server manager within the configured time period (Default: 5 mins) after being started.
EditModeTimeouts	Edit mode timeouts may result in lost user data. If number of timeouts exceeds this limit in the time window defined by the threshold period (default: 600 seconds), notify the administrator.
GraveEvents	Something very bad has happened causing the server manager to malfunction.
Authentication Time	Average time taken for user to login through the server manager to the server during recent time period. If average time of the login request exceeds this limit in the time window defined by the threshold period (default: 600 seconds), notify the administrator.



PoolCapacityTimeouts	Servers are being terminated by the manager before their normal timeout period due to insufficient capacity in the server pool. If number of timeouts exceeds this limit in the time window defined by the threshold period (default: 600 seconds), notify the administrator.
ReadModeTimeouts	Read mode timeouts may force Rich Client users to restart their client sessions. If number of timeouts exceeds this limit in the time window defined by the threshold period (default: 600 seconds), notify the administrator.
StatelessModeTimeouts	Stateless mode timeouts generally have low impact on users and are a good way to control resource consumption in the server pool. However, an excessive rate might lead to high CPU consumption due to continually starting new servers. If number of timeouts exceeds this limit in the time window defined by the threshold period (default: 600 seconds), notify the administrator.
TcServerCrashes	Number of tcserver instances that have crashed for any reason. If number of crashes exceeds this limit in the time window defined by the threshold period (default: 600 seconds), notify the administrator.
Threading	Monitor thread count in pool manager JVM
Java Pool Heap Memory Usage	Heap Memory used by the Java virtual machine supporting the pool manager
<b>FSC Metrics</b>	
<b>Metric Name</b>	<b>Description</b>
AllRoutesFailed	All Routes to resources in FMS Network topology is down. Something very bad has happened causing the FSC process to malfunction.
ClientClosedConnection	Client has prematurely closed the connection with FSC Server while data was being transferred. If number of occurrence exceeds this limit in the time window defined by the threshold period (default: 6000 seconds), notify the administrator.
ExpiredTicket	FSC Server encountered an expired ticket. If number of occurrence exceeds this limit in the time window defined by the threshold period (default: 6000 seconds), notify the administrator.
GenericError	A general error was thrown from FSC Server. If number of occurrence exceeds this limit in the time window defined by the threshold period (default: 6000 seconds), notify the administrator.

InvalidTicket	FSC Server encountered a invalid ticket. f number of occurence exceeds this limit in the time window defined by the threshold period (default: 6000 seconds), notify the administrator.
LocalAdminRead-FMSWebHandlerRoot	The moving average time (in millionseconds) for local administrative reads by this FSC process. It return the value of attribute FilterTimeAvg. By default, the maximum time span of Moving Average filter is 60,000 ms.
LocalReadPartialFile-FMSWebHandlerRoot	The moving average time (in millionseconds) for partila file read operations by this FSC process. It return the value of attribute FilterTimeAvg. By default, the maximum time span of Moving Average filter is 60,000 ms.
LocalReadWholeFile-FMSWebHandlerRoot	The moving average time (in millionseconds) for whole file read operations by this FSC process. It return the value of attribute FilterTimeAvg. By default, the maximum time span of Moving Average filter is 60,000 ms.
LocalTransfer-FMSWebHandlerRoot	The moving average time (in millionseconds) for file transfer operations by this FSC process. It return the value of attribute FilterTimeAvg. By default, the maximum time span of Moving Average filter is 60,000 ms.
LocalWrite-FMSWebHandlerRoot	The moving average time (in millionseconds) for file write operations by this FSC process. It return the value of attribute FilterTimeAvg. By default, the maximum time span of Moving Average filter is 60,000 ms.
Java Pool Heap Memory Usage	Heap Memory used by the Java virtual machine supporting the FSC
FSC No Route Error	Client or FCC is connected to wrong FSC Server process.
FSC Timeout Error	FSC Server has encountered a time out issue
Write Cache Hits	FMS found the file requested in the write cache
Write Cache Misses	FMS did not find the file requested in the write cache
Write Cache Miss Pct	Percentage of Write cache misses to hits
Read Cache Hits	FMS found the file requested in the read cache
Read Cache Misses	FMS did not find the file requested in the read cache
Read Cache Miss Pct	Percentage of read cache misses to hits
Whole File Cache Hits	FMS found the file requested in the whole file cache
Whole File Cache Misses	FMS did not find the file requested in the whole file cache
Whole File Cache Miss Pct	Percentage of whole file cache misses to hits
<b>Dispatcher Metrics</b>	
<b>Metric Name</b>	<b>Description</b>
QueueTotal	The number of total taskes in queue.
TotalTasksSubmitted	The number of total submitted tasks for translation.
NumOfActiveTranslation	The number of active translation tasks.

NumOfLoading	The number of client loading.
NumOfExtraction	The number of client extraction.
Dispatcher Client Java Pool Heap Memory Usage	Heap Memory used by the Java virtual machine supporting the Dispatcher Client.
Dispatcher Module Java Pool Heap Memory Usage	Heap Memory used by the Java virtual machine supporting the Dispatcher Module.
Dispatcher Scheduler Java Pool Heap Memory Usage	Heap Memory used by the Java virtual machine supporting the Dispatcher Scheduler.
Dispatcher Translation State Counts	Number of jobs from the past 24 hours in the Initial, Scheduled, Translating, Complete, and Terminal states.

### Visualization Pool Manager Metrics

Metric Name	Description
Load	A single ratio that represents how much of the computer's capacity is currently in use. When this ratio is greater than or equal to 1.0, the system is completely full and new clients are rejected.
Assigned Vis Servers	The number of Visualization Server processes in use or recently in use by client users.
Cold Vis Servers	The number of Visualization Server processes in the process of starting up, although not yet ready for use.
Number of Vis Servers	The total number of Visualization Server processes (cold, warm, and assigned).
Warm Vis Servers	The number of Visualization Server processes ready for use by new client users.
Server too Full Exceptions	How many clients were refused visualization services.

### Visualization Pool Assigner Metrics

Metric Name	Description
Load	A single ratio that represents how much of the computer's capacity is currently in use. When this ratio is greater than or equal to 1.0, the system is completely full and new clients are rejected.
Server too Full Exceptions	How many clients were refused visualization services.
Number of Pools Connected to Assigner	The number of Visualization Server Managers that this Visualization Pool Assigner is currently connected to.

### SOLR Full Text Search Metrics

Metric Name	Description
Full Text Search Average Query Duration	Average Active Workspace search duration
Full Text Search Average Querys Per Second	Average number Active Workspace searches per second

Full Text Search objdata query timeouts	Active Workspace search timeout
Full Text Search objdata Query Errors	Active Workspace search error
SOLR Java Pool Heap Memory Usage	Heap Memory used by the Java virtual machine supporting Solr.
<b>T4X Metrics</b>	
<b>Base Server Module</b>	
Metric Name	Description
memuse	Memory usage in MB
calls	application calls per minute
ecalls	application error calls per minute
wcmd	application calls waiting in queue
<b>Log Server Module</b>	
Metric Name	Description
pkg	packets per minute
epkg	error packets per minute
<b>Batch Server Module</b>	
Metric Name	Description
poolsz	batch pool size in %
ready	number of ready jobs
running	number of running jobs
waiting	number of waiting jobs
apperror	number of jobs in application error state
rterror	number of jobs in runtime error state
finish	number of jobs finished

### 3.11.2 Some additional Nagios related items

The following Nagios related items may be of interest to you if you are using (plan to use) Nagios as part of your monitoring solution.

- For monitoring the database software (Oracle, DB2, SQLServer), there are several off-the-shelf plugins available from the Database vendor or technology community. Here are the links into the Nagios Exchange site where customer can find these plugins:
  - Oracle: <http://exchange.nagios.org/directory/Plugins/Databases/Oracle>
  - SQL Server: <http://exchange.nagios.org/directory/Plugins/Databases/SQLServer>
  - DB2: <http://exchange.nagios.org/directory/Plugins/Databases/DB2>

- There are a few off-the-shelf plugins available for monitoring the FlexLM license server. Here is the link to the FlexLM-specific plugins:  
<http://exchange.nagios.org/directory/Plugins/License-Management#/>

For additional details on the TSMA offering see [What offerings does Advantedge Advanced Technical Services for PLM Architecture deliver?](#)

### 3.11.3 Some external references related to monitoring

- PLM Connection 2016 presentation - **Manage and Monitor Teamcenter Server Components** “Efficiently Teamcenter Management Console offer better security, improved UI and single console to manage Server Manager, Web Tier, Teamcenter Servers. This session will cover how you can use Teamcenter Management Console to efficiently manage and monitor server components in your Teamcenter Deployment.”  
<http://www.plmworld.org/p/do/sd/topic=1057&sid=8170>
- PLM Connection 2016 presentation - **Monitoring Teamcenter Application Health and Performance**  
"Teamcenter provides various application metrics through Java Management Extensions (JMX) that can promote the health of the Teamcenter application. These application metrics can be extracted and displayed into a GUI dashboard through system monitoring applications such as Nagios. This presentation provides information about the metrics, the Teamcenter System Monitoring Automation offering and a demonstration of the GUI-based dashboard."  
<http://www.plmworld.org/p/do/sd/sid=7564>
- 4 Good Open Source Log Monitoring and Management Tools for Linux -  
<http://www.tecmint.com/best-linux-log-monitoring-and-management-tools/>
- Nagios - <https://www.nagios.org/> (application and system monitoring tool)
- vRealize Hyperic (Monitors Software Across All Environments, VMWare)  
<http://www.vmware.com/products/vrealize-hyperic.html>
- Zenoss - <https://en.wikipedia.org/wiki/Zenoss> (application, network, server management platform)

## 3.12 Performance Best Practices

The following items address Best Practices associated with performance items associated with a Teamcenter environment.

### 3.12.1 General

- For additional reference items see section [6.14 What offerings does Advantedge Advanced Technical Services for PLM Architecture deliver?](#)
- If addressing a performance issue then review the contents of the “Troubleshooting” section later in this document.
- To improve performance, in general, out of the box (OOTB) database collection and analysis tools can assist in this effort along with the SPLM Journal Workbench.

- If running in Virtual Environment then be sure that the Virtual environment has been sized including the host environment to support the demands for CPU, I/O and Memory with dedicated resources. NOTE: in some cases, over sizing a Virtual environment can actually have a negative impact on overall performance. Use VM tools to determine if your VM's have been sized correctly.
- When considering performance related items, it is best to think of who, what, when, where to help determine where to spend efforts. For example: Who, which person or application/process, is having the performance problem? What type of performance problem is being seen? When does the performance problem happen? Where is the performance problem happening?

### 3.12.2 Active Workspace Client Performance

- Initially Active Workspace defaulted the **AWC\_search\_automatic\_wildcard** preference to 3 (add wildcards as prefix and suffix) but later we found that this can create performance issues when there are a number of items. So, the recommendation at this time is to set the **AWC\_search\_automatic\_wildcard** preference value to 2 (add wildcard as a suffix). If the user really wants to have a prefix wildcard then they can manually add it when they enter the value to search for. So instead of enter **part** in the search field they would enter **\*part**
- Some AW users have reported improved performance by setting a new AWC preference "**AWC\_Solr\_Facet\_Method**" to the value of "**fc**"

### 3.12.3 Active Workspace Index Performance

#### Slow Query speeds then modify:

- Query Slice
- Query Span

#### Slow Extract speeds then modify:

- Export batch size
- Tc max connections
- Connection reuse

#### Slow Transform speeds then modify

- Number of CPU cores
- Amount of Memory

#### Slow Load speeds then modify:

- Solr file storage

### 3.12.4 Anti-virus Exclusions for Teamcenter Performance

- SFB 5315 (Rich Client Login Performance)  
[https://solutions.industrysoftware.automation.siemens.com/view.php?sort=desc&p=1&q=sfb+5315&file\\_type=text&i=sfb-teamcenter-5315&k=3&o=0](https://solutions.industrysoftware.automation.siemens.com/view.php?sort=desc&p=1&q=sfb+5315&file_type=text&i=sfb-teamcenter-5315&k=3&o=0)

- **Optimizing Teamcenter Client Performance Guide** – Section 3  
<https://support.industrysoftware.automation.siemens.com/docs/teamcenter/>
- Virus Scanning – MS SQL Example Exclusions

SQL Server data files

These files usually have one of the following file-name extensions: .mdf .ldf .ndf

SQL Server backup files

These files frequently have one of the following file-name extensions: .bak .trn

Full-Text catalog files

Default instance: Program Files\Microsoft SQL Server\MSSQL\FTDATA

Named instance: Program Files\Microsoft SQL Server\MSSQL\$instance\FTDATA

SQL Server 2012

[https://msdn.microsoft.com/en-us/library/ms143547\(v=sql.110\).aspx](https://msdn.microsoft.com/en-us/library/ms143547(v=sql.110).aspx)

SQL Server 2008 R2

[http://msdn.microsoft.com/en-us/library/ms143547\(v=sql.105\).aspx](http://msdn.microsoft.com/en-us/library/ms143547(v=sql.105).aspx)

SQL Server 2005

[http://msdn.microsoft.com/en-us/library/ms143547\(SQL.90\).aspx](http://msdn.microsoft.com/en-us/library/ms143547(SQL.90).aspx)

How to choose antivirus software to run on computers that are running SQL Server:

<http://support.microsoft.com/kb/309422>

### 3.12.5 Database Performance

- Utilize the tools available to determine what the Database wants – it will tell you!
- Database is the heart of your system!
- Memory, SGA, Temp Size, Disk Latency, NIC, etc...
- OEM, ADDM, AWR, MS SQL Server Management Studio, Stats Pack, etc...
- Biggest problem seen in the field:
  - Database memory starvation
  - Stale Statistics and Indexes
  - Not giving your database what it needs/wants
  - Not asking your database what it wants, frequently
- Do not set it and forget it, database setting need to be adjusted from time to time especially as the database size and number of users increases.
- Persistence makes a difference
- MS SQL Optimization
  - Auto Create Statistics = True
  - Auto Update Statistics = True
  - Auto Close = False
  - Auto Shrink = False
  - Parametrization – forced
  - Backup mode = simple
  - Monitor index fragmentation and defrag when necessary



- Periodically check database integrity (saved jobs)

### 3.12.6 Hardware Related Performance

- Input / Output (IO) performance can impact overall performance of the Teamcenter application / solution. We have seen cases where moving to Solid State Disk (SSD) for the database have giving major performance improvement. Understand IO performance for each server / component of the Teamcenter solution in each environment (for example hard disk drive RPM: 5400/ 7200/ 10K/ 15K or SSD; NOTE: not all SSD are the same)
- Network performance between the different Teamcenter servers can have a major impact on overall performance, faster is normally better and tying Network Interface Cards (NICs) together to improve throughput has been found to be helpful for servers with high network load. Understand the network performance of the Teamcenter servers and use the fastest options available for your environment (for example: 10MB/100MB/1GB/10GB) Note: in some cases, you may need to update your data center network to support the network needs. Also review network activity to see if multiple networks are needed per server, for example a network for user related traffic, a network for server to server related traffic and a network for backup related traffic. Reference “Network Performance Tuning” white paper available on the GTAC documentation site:  
<https://support.industrysoftware.automation.siemens.com/docs/teamcenter/>
- CPU: Newer Processors give the best performance
- RAM: Faster is better
- RAID: Generally, RAID 10 for Databases
  - Per vendor recommendation
- Optimize hardware to take full advantage of what resources you do have!
  - Disable power saving modes!
- Turn off un-needed or un-necessary devices and services to free up resources.
- Plan ahead for those “busy times”.
- Steady state should allow for high performance during “high water marks”
- The key to successful installation, migration, upgrade, etc., is using proper server sizing methodology.

### 3.12.7 Network Related Performance

- Use DNS aliases for web application server since this reduces the need for your users to have to make any changes when you need to change servers or split the load across multiple systems (in this case alias is changed to point to the load balancer)
- Review and implement the recommendations from the Teamcenter Network Optimization and Tuning Guide.
- Evaluate network utilization, capacity, and latency
- Understand your topology (WAN Routing)
  - Ensure your FMS configuration makes sense



- Understand the needs and demands of your users (i.e. CAD)
- If you upgrade the network hardware ensure the cable infrastructure can support the newer speeds.

### 3.12.8 System Sizing Related Performance

- When considering system resources, be sure to include supporting tasks in the overall calculation. For example: Operating System and associated processes, external import/exports, backup, command line import/e
- xports, and middleware software used by Teamcenter all use system resources (CPU, Disk, Memory). With respect to memory the goal is to have enough physical memory so that the Operating System never has to swap an active process to disk due to not enough physical memory to run everything.

### 3.12.9 VM related Performance

- **Best Practices for Performance Tuning of Latency-Sensitive Workloads in vSphere VMs:**  
<http://www.vmware.com/files/pdf/techpaper/VMW-Tuning-Latency-Sensitive-Workloads.pdf>
- **Enterprise Java Applications on VMWare Best Practices Guide:**  
<http://www.vmware.com/files/pdf/techpaper/Enterprise-Java-Applications-on-VMware-Best-Practices-Guide.pdf>
- BIOS Settings – Power management: Any kind of power management adds latency where an idle system responds to a request
- NUMA – Non-Uniform Memory Access: Typically, the best performance of latency-sensitive applications all vCPUs should be scheduled on the same NUMA mode
- Choice of Guest OS – newer is better: Linux 6 “tickless” kernel and Windows Server 2008 do not rely on high frequency timer interrupts
- Physical NIC Settings: interrupt moderation or interrupt throttling
- Virtual NIC Settings – VMXNET 3: the latest generation of paravirtualized NIC’s
- Proper Hardware Drivers: Is your hardware supported
  - VMware produces versions of ESXi installation media with some vendor specific hardware support, always use the supported hardware media if available.

### 3.12.10 External References for Performance Items

- **Optimizing Teamcenter Client Performance**  
<https://support.industrysoftware.automation.siemens.com/docs/teamcenter/>
- **Teamcenter Virtual Server Configuration and Performance** document -  
[https://support.industrysoftware.automation.siemens.com/docs/teamcenter/Teamcenter-Virtual\\_Server\\_Configuration\\_and\\_Performance-3.1.pdf](https://support.industrysoftware.automation.siemens.com/docs/teamcenter/Teamcenter-Virtual_Server_Configuration_and_Performance-3.1.pdf)
- **Teamcenter Deployment Guide** – see section “**Improving Teamcenter Performance**”

[https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide\\_TcUA\\_11.2.1y.pdf](https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide_TcUA_11.2.1y.pdf)

- PLM Connection 2016 presentation - **Active Workspace Indexing**  
“Discusses indexing features of Active Workspace and how to optimize performance of the different components as well as plan for future growth; includes a section on index sizing.”  
<http://www.plmworld.org/p/do/sd/sid=7534>
- PLM Connection 2016 presentation - **Teamcenter Performance Optimization & Benchmark Results**  
“The presentation will focus on implementing “Best Practices” for improving Teamcenter performance through optimization of the system environment and presenting benchmark results for that optimization. The area of focus will include optimizing Teamcenter OOTB settings to improve performance, network speed and tuning. Additional topics include client system configuration, causes of overt performance impacts, Siemens SFB’s and a review of Teamcenter benchmark data from test scenarios.”  
<http://www.plmworld.org/p/do/sd/sid=7568>
- PLM Connection 2016 presentation - **Active Workspace Visualization Performance and Scalability**  
“You plan on deploying Active Workspace, but you are not quite sure what you need in order to meet the Visualization requirements of your enterprise. Moreover, you want your Visualization servers to perform at max capacity and performance. Attend this session to find out the tips and tricks of the Visualization Server world.”  
<http://www.plmworld.org/p/do/sd/sid=7535>
- PLM Connection 2016 presentation - **Infrastructure Sizing and Large Scale Active Workspace Deployments**  
“Sizing Teamcenter Infrastructure for a large-scale Active Workspace deployment on top of an existing large-scale Teamcenter deployment is a challenge. This presentation discusses the factors in Active Workspace sizing: characterizing the workloads, identifying the scale of data for indexing, architecting to minimize impact on Teamcenter, and sizing considerations for infrastructure, all for a performing, resilient Active Workspace deployment.”  
<http://www.plmworld.org/p/do/sd/sid=7532>
- PLM Connection 2013 presentation - **Infrastructure and Performance Alignment for Teamcenter Deployments**  
“Deploying and maintaining Teamcenter performance across a globally distributed user base requires a systematic method to design, configure, troubleshoot and analyze all aspects of the infrastructure and applications. Siemens PLM Software provides specific offerings to assist Teamcenter customers at various stages of the deployment from initial infrastructure design, testing, production health check to performance analysis. This presentation provides an overview of these offerings describing the engagement process, methodology and deliverables.”

<http://www.plmworld.org/p/do/sd/topic=678&sid=4104>

### 3.13 Batch Job Scheduling Best Practices

If using cron/crontab (UNIX/Linux) to schedule tasks involving Teamcenter processes then it is recommended that you be login or have sudo'd to the account that owns the Teamcenter items so that the processes started by cron will execute as that user.

As a general rule, avoid having scheduled batch items that use the database running at the same time since each item requires system resources (CPU, Memory, and IO). If possible run items in sequence to reduce load on database unless you must run the items in parallel to fit within a specified time window.

If using the Windows Task Scheduler then a few items to consider:

- Start the task scheduler with the “run as administrator” option when you want to schedule tasks.
- If scheduling tasks that involve Teamcenter processes it is recommended that you use the account that owns the Teamcenter items so that the processes started by windows task scheduler will execute as that user.
- On the “General” tab be sure that “Run whether user is logged on or not” and “Run with highest privileges” are both selected.
- If you find that having the command window output stored in a file as useful, then you may want to consider something like the example script logExecution.cmd. This script is executed by the Task Scheduler and then executes the specified task but logs the output of the specified task to a log file that contains the date and time as part of the log file name.
- On the “Settings” tab you may want to “Allow task to be run on demand” and specify that if the task is already running then do not start a new instance of the task.
- May want to define one or more tasks to be executed on system start command (see Example scripts) which is done by defining a trigger of “Begin the task” “At Startup” instead of “On a schedule” which would be the normal trigger used. NOTE: you may want to use the delay option to delay the actual execution until some period of time has passed. Doing so will allow time for other items to be started before this task executes.

### 3.14 Security Best Practices

The following items address Best Practices associated with security items associated with a Teamcenter environment.

#### 3.14.1 Overview of Teamcenter Login security

Teamcenter Provides Authentication Functionality Natively

Teamcenter Password Parameters:

- PASSWORD\_minimum\_characters (default=0)
- PASSWORD\_mixed\_case\_required (default=false)
- PASSWORD\_minimum\_alpha (default=0)
- PASSWORD\_minimum\_digits (default=0)

- PASSWORD\_minimum\_special\_chars (default=0)
- PASSWORD\_special\_characters (default is unset)

**Best Practice** - Change the above Password defaults if using native authentication

Warning - when doing Teamcenter install/upgrade activities via TEM you may need to change the special character value since issues have been reported when special characters are used in the Enterprise Admin (normally infodba) account password. The work around was to change the special character value, change the password on Enterprise account to not include special characters, implement install/upgrade, change special character default, change Enterprise account password to include special characters again.

**Or, Use Non-Teamcenter System to Manage Authentication (Requires: Teamcenter Security Services (TcSS))**

- Corporate LDAP
- Active Directory
- Kerberos
- Third Party Authentication System

### 3.14.2 Teamcenter Security Services –

**Consists of Two Web Applications (.war)**

- Identity Service
  - Authenticate the users via Identity Provider
  - Default Implementation of Identity Provider: LDAPIdentityProvider
  - Generate Tokens
  - Validate Tokens
- Login Service
  - Front End of TcSS
  - Interacts with Teamcenter Client Applications
    - Challenges User with Login Prompt
    - Collects Results and Sends On to Identity Service
    - Returns TcSS Application Token to Client
    - Holds Session State for Single Sign-On
  - Applet Based Mode
    - Requires Java Browser Plugin On Clients - This Has Security Implications
  - Applet-Free Mode
    - Cannot Do Forms-based Authentication, must be HTTP 401-based
    - When Using TcSS with SSO for Active Workspace, Must Have Applet-Free Mode Working

**Supports Single Sign-On for Teamcenter Applications**

Run in J2EE Web App Server

- JBoss is Common - Has Version Quirks, Depending on What You're Trying to do (especially with Kerberos)
- Tomcat Works
- Light Load, Small Footprint
- Generally Not a Performance Bottleneck

For additional information about Teamcenter Security Service (TcSS) see:

- **Teamcenter 10.1 Security Services** (TSS00001) -  
[https://support.industrysoftware.siemens.com/docs/teamcenter/10.1.4/security\\_services\\_install\\_customization.pdf](https://support.industrysoftware.siemens.com/docs/teamcenter/10.1.4/security_services_install_customization.pdf)
- **Teamcenter 11.2 Security Services** (TSS00001) -  
[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2/PDF/en\\_US//tdocExt/pdf/security\\_services\\_install\\_customization.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2/PDF/en_US//tdocExt/pdf/security_services_install_customization.pdf)
- PLM Connection 2016 presentation - **Authentication in Teamcenter**  
"Teamcenter can be configured to authenticate users via several means. This presentation discusses Teamcenter authentication, including Teamcenter Security Services, and the various approaches that have been taken by customers. Key software components, configuration points, and pros and cons of each are discussed."  
<http://www.plmworld.org/p/do/sd/sid=7614>

### 3.14.3 Password management (changing)

The following was copied from the Teamcenter 11.2 **Utilities Reference** Chapter 1

[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US//tdocExt/pdf/utilities\\_reference.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US//tdocExt/pdf/utilities_reference.pdf)

"Manage password files

To provide the best password security, you can store an encrypted password in a designated file and directory location on a local disk. You create the file containing the encrypted password using Teamcenter Environment Manager (TEM) or the install utility. An environment variable contains the password string to be encrypted. The variable is designated in TEM or by an install utility argument.

The environment variable is not maintained, it is used only during the encryption process to ensure the clear text password is not persisted.

For more information about password encryption, see the install utility.

Note

You can update the encrypted Teamcenter user password using TEM or the install utility. However, this does not change the password in the Teamcenter database. This must be done manually.

The encryption process uses an AES 256-bit encryption key.

For information about managing the encryption key, see System Administration.

The -pf argument provides enhanced password security by allowing you to place a password (encrypted or unencrypted) in a text file and secure the file using operating system-level security. This is stronger security than is provided by the -p argument, in which passwords are placed on the utility program command line, allowing a user to run ps -ef to display all running utilities and gain access to the utilities' passwords.

The file must contain only the password (encrypted or unencrypted). Do not include user names or other text. The password must be one line; new lines and carriage returns are considered a terminator. The password must also be in character encoding consistent with the processes reading it.

You must place the file on a local disk to ensure that access control is managed securely by the operating system representing the file.

- To prepare the password file on UNIX, run `chmod 400 file-name`.
- To prepare the password file on Windows, right-click the file and choose Properties, and then click the Security tab and ensure that Administrators is the only group with read access on the local machine.”

#### **3.14.4 SSO items**

- Teamcenter 11.2 **Security Services Installation/Customization**  
[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US//tdoc/Ext/pdf/security\\_services\\_install\\_customization.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US//tdoc/Ext/pdf/security_services_install_customization.pdf)

#### **3.14.5 Server Access through a Firewall -**

- common ports used
  - 25 - SMTP non-secure
  - 80 - http
  - 111 - port mapper utility
  - 443 - https
  - 465 - OLD SMTPS (secure SMTP) was replaced by 465 but some older systems still use 465 for SMTPS
  - 587 - Secure SMTP (SSL)
  - 993 - IMAP secure
  - 1095 - rmi.port (used by splm documentation server maybe more (see 1099))
  - 1099 - rmi.port (used by Teamcenter Integration Framework (TCIF) and initially splm documentation server maybe more (see 1095))
  - 1433 - default for SQL Server

- 1520-1530 default 1520 Oracle TNS listener (1525 - orasrv, 1527 - tllsrv, 1529 - coauthor)
- 1572 - 2-tier server connection port
- 1999 - Dispatcher module
- 2001 - Dispatcher scheduler & server port if using RMI
- 2099 - Dispatcher Client RMI Registry
- 3389 - (Microsoft default RDP port) don't use for Teamcenter items
- 4544 - FCC parent port (FSC URI port value)
- 8080 - default dispatcher port if not using RMI
- 8082 - pool server manager admin (jboss port for svr mgr)
- 8084 - TECS Admin port
- 8086 - Assignment Service port
- 8087 - multiplexing proxy
- 8088 - JMX RMI port
- 8090 - Vis Server manager
- 8123 to 8126 - configured SWIM communication ports (change ports in: %SWIM\_DIR%\swim.cfg)
- 8181 - default for the SPLM documentation Server (Jetty server)
- 8282 - old NX document server
- 8443 - default secure SPLM documentation Server (Jetty server)
- 8983 - solr search port
- 9990 - Vis Data server
- 15389 - Server manager ldap port (default)
- 17800 - treecache peer
- 17810 - treecache peer
- 28000 - default for FlexLM if firewall then need to specify a response port for example 28029
- 45566 Vis cluster
- 50000-59000 - Vis (peer=55566 Assigner local=55577)
- Teamcenter **Deployment Guide** – See section “**Teamcenter and Firewalls**”  
[https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide\\_TcUA\\_11.2.1y.pdf](https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide_TcUA_11.2.1y.pdf)

### 3.14.6 External References for security items

- PLM Connection 2016 presentation - **What's New in Teamcenter Security**  
 “In today’s world of cyber-threats, protecting your data both inside and outside your company is paramount. This presentation provides insight into the new capabilities introduced in the areas of Authorization, Authentication, Asset Protection and Auditing. It will cover capabilities such as Security Data Propagation, File Upload Security, Managing Security and Project Data Using Workflow, SAML 2.0 Based Authentication, Teamcenter



Management Console, TCCS for Two-tier, Multiplexing Proxy, Security Audit Logging and Password Policy Management.”

<http://www.plmworld.org/p/do/sd/sid=7618>

- **PLM Connection 2015 presentation - How Teamcenter Guards Against Security Threats**  
“Teamcenter provides sophisticated controls to protect both your intellectual property and the data center resources from misuse.  
This presentation discusses the security threats that organizations face and how Teamcenter is used to block those threats.  
We will consider threats such as data center intrusion, insider attacks, unauthorized access and manipulation of data and illegal export of protected data. Teamcenter features that address these threats include Network Security, Authentication controls, Password Management, FMS configuration, Audit, Access Manager (such as attribute and project level security), Digital Signature, Digital Sign, Advanced Data Access (ITAR controls) and DRM. These controls are important for large and small deployments both in the cloud deployments and in private data centers.”  
<http://www.plmworld.org/p/do/sd/sid=6523>
- How to restrict the use of certain cryptographic algorithms and protocols in Schannel.dll – Windows OS: <https://support.microsoft.com/en-us/kb/245030>
- How to Update Your Windows Server Cipher Suite for Better Security  
<http://www.howtogeek.com/221080/how-to-update-your-windows-server-cipher-suite-for-better-security/>
- "IIS Crypto is a free tool that gives administrators the ability to enable or disable protocols, ciphers, hashes and key exchange algorithms on Windows Server 2008, 2012 and 2016. It also lets you reorder SSL/TLS cipher suites offered by IIS, implement best practices with a single click, create custom templates and test your website."  
<https://www.nartac.com/Products/IISCrypto>

### 3.15 Troubleshooting Best Practices

The following items address Best Practices associated with troubleshooting associated with a Teamcenter environment.

#### 3.15.1 External References for Troubleshooting Items

- **PLM Connection 2016 presentation - Introduction to Journal Workbench - A Tool for Teamcenter Performance Analysis**  
“The Journal Workbench tool can be used to analyze Teamcenter transactional performance in the context of the different tiers present in the Teamcenter deployment. This session will provide an introduction to the tool, the performance journal files and how to interpret the files once they are loaded in the tool”.  
<http://www.plmworld.org/p/do/sd/sid=7591>  
“Key Points  
- Teamcenter end user performance analysis can be complicated  
- Performance Journal files gather performance information from client and server  
- Journal Workbench can be used to view Performance Journal files



- Journal Workbench with Performance Journal files make analyzing Teamcenter performance much easier”

- PLM Connection 2016 presentation - **Active Workspace Troubleshooting 101**  
"Active Workspace consists of several moving parts, and getting to the bottom of an error is not always straightforward. This session will go over typical troubleshooting procedure and will introduce the audience to the process they can use to get to the bottom of an error."  
<http://www.plmworld.org/p/do/sd/topic=1032&sid=7615>

### 3.16 Upgrade Best Practices

The following items address Best Practices associated with upgrade items associated with a Teamcenter environment.

- Be sure you have all required software (refer to the certification matrix) and license keys before starting any type of system changes. Also be sure that you have enough disk space available to support the process which might include multiple recovery point backups as well as second copy of the database.
- Product releases installation and updates packages are available for download from the GTAC web site in the Download and Upload Files section.

[http://www.plm.automation.siemens.com/en\\_us/support/gtac/](http://www.plm.automation.siemens.com/en_us/support/gtac/)

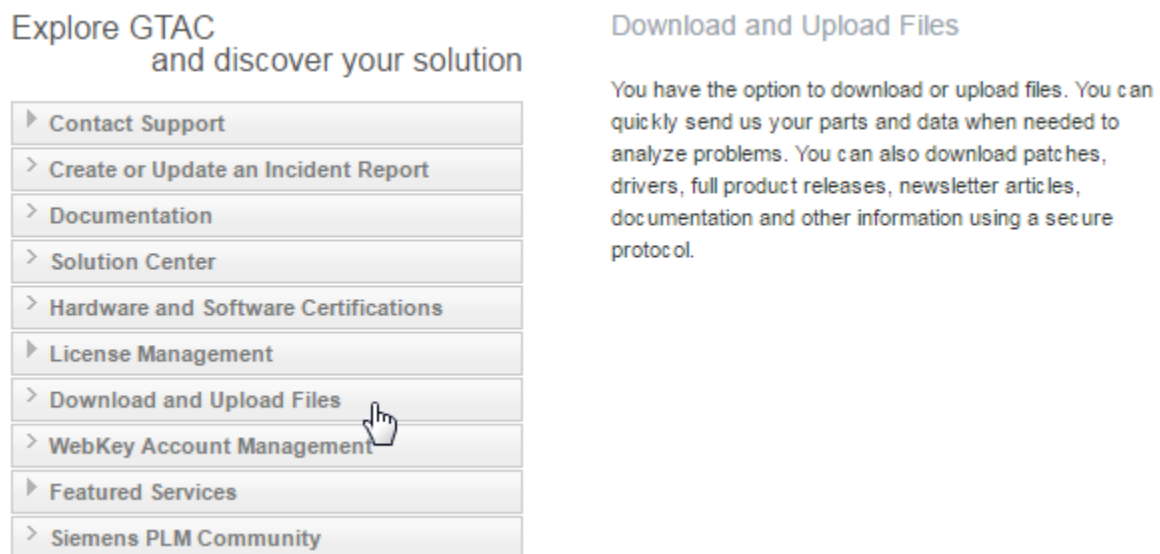


Figure 5 – GTAC – Download updates/upgrade items

- Use checklist (activity task list) when planning and executing a major Teamcenter environment upgrade. Start the development of the checklist before making any changes then make updates to the checklist while using it in each environment before production (for example: development then Test/QA)
- The Teamcenter Deployment Guide includes information for doing Teamcenter upgrades -

[https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide\\_TcUA\\_11.2.1ab.pdf](https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide_TcUA_11.2.1ab.pdf)

- Pre-upgrade activities normally include items like:
  - Review new features in the Teamcenter Help Library and the Teamcenter Release Bulletin.
  - Develop and test upgrade plan in Test/QA to verify process and get timings (may need to do this more than once).
  - Make sure all required software is available.
  - If changing Teamcenter release or systems then all required licenses are available.
  - Create precautionary backups of:
    - Executables and shared libraries (TC\_ROOT).
    - Data directory (TC\_DATA) and configuration files.
    - Volume directories. You can use the backup\_xmlinfo utility to get information about Teamcenter volume locations for the configured database.
    - Oracle, Microsoft SQL Server, or DB2 binaries and data/system tables.
    - Customizations, utilities, scripts, integrations with other systems, and specialized, site-specific applications.
    - Saving off key configuration items like: custom session timeout value from the web.xml file, web configuration page items for each application server instance, other custom settings or values being used within the Teamcenter environment.
  - Allow sufficient time to analyze, design, implement, test, and validate upgrade plan / process.
  - Making sure all services and scheduled tasks that need to be stopped / disabled while upgrades activities are underway have been identified.
  - Develop a back out or recovery plan in cases of issues during upgrade.
- Use the Test/QA environment to test items before they are applied to production. Especially new activators and schema changes.
- Normally schema updates to production should be executed over a weekend and a full database backup should be made before and after the schema change is complete.
- Make a “cold” backup of the database before making any changes that might affect the database. Normal on-line backups are classified as “warm” or “hot” backups.
- Stay up to date with releases since releases not only include new features and bug fixes but, in most cases, also include performance improvements.
- When developing your upgrade process, include steps to create recovery points (for example, making backup after a long running step completes) within the process. Making a backup after a long running step completes may seem like/be a waste of time if everything goes OK

with the remaining steps, but if something goes wrong then it could save you a lot of time due to not having to repeat a long running step.

- IF you think you will need a backup in a later step then do not spend time compressing the backup file until you are sure that it's not needed.
- When running tests of upgrade process (steps) in your Test/QA environment be sure and use a current copy of production data and time everything so you know how long steps will take. Since you will need to schedule your down windows. Don't forget to include time to restore to previous environment if something major goes wrong during an upgrade.
- Test just about everything before considering installing or using in Production and be sure that you have good backups before making any changes.

Review the **Teamcenter upgrade** guide for the release you want to move to:

[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US//tdocExt/pdf/upgrade\\_guide.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US//tdocExt/pdf/upgrade_guide.pdf)

Not all Teamcenter versions are compatible for upgrade. Some require a jump of more than one version. The compatibility matrix can be found on the GTAC website (Quick Links, lower right corner). **"Internal interoperability"**

Ensure that the hardware and software planned for the new Teamcenter environment is certified for the proposed Teamcenter version. The hardware certifications matrix can be found on the GTAC website (Quick Links, lower right corner). **"Hardware (Graphic Card) Certifications"**

Software certifications - For more information on certifications (database, Web Browser, Java Runtime Environment, Web Tier, Operating systems) check out the GTAC website (**Hardware and Software Certifications** link).

Identify any software that will be integrated into Teamcenter, either third party software or SPLM software. Make sure that this software is installed prior to performing the Teamcenter Upgrade. Verify the integration versions to be used are certified for the version of Teamcenter to be used. The integration matrix can be found on the GTAC website (Quick Links, lower right corner). **"Integration Matrix"**

Make sure to identify any known Teamcenter code-full or codeless customizations. Calls could be deprecated and need updating for the new Teamcenter installation.

Identify and document known command line utilities used in the Teamcenter implementation. Plan and address any updates that will need to be made to any of the utilities. Check the release bulletin for the applicable Teamcenter version to ensure any deprecated utilities will not adversely affect the upgrade.

Identify and correct any impact to client installations scripts.

Review Software field bulletins - to search for SFB's access:

<https://solutions.industrysoftware.automation.siemens.com/>

Search for "SFB-Teamcenter" then filter by document type "SFB" and date ranges enter range and may also determine you need to filter by selected product to reduce the number of responses.

#### **Checklist**

- ☐ Review the Applicable Upgrade Guide
- ☐ Verify Compatibility
- ☐ Teamcenter to Teamcenter
- ☐ Hardware
- ☐ Software
- ☐ Integrations
- ☐ Check Customizations
- ☐ Review the Release Bulletins
- ☐ Check Deprecated & Obsoleted Workflows and Preferences
- ☐ Check Deprecated & Obsoleted Utilities
- ☐ Review Client Deployment Plan
- ☐ Review and Sign Up for SFBs

Before you begin, be sure to do your homework, understand all the things that might be affected during the Teamcenter upgrade, have a check list.

Remember, Upgrades are not migrations and migrations are not upgrades. Patches are not upgrades and upgrades are not patches. Site consolidation is a site consolidation. Practice makes perfect.

Teamcenter SME needs to check out:

- Identify and document known workflow handlers that are deprecated or custom. Address and test any updates that will need to be made to the handlers.
- Identify and document known Teamcenter preferences that are deprecated, custom or new. Address and test any updates that will need to be made to the preferences.

### **3.16.1 External References for Upgrade Items**

- PLM Connection 2016 presentation - **Teamcenter Upgrades what you need to know**  
“This session will cover the basics on what you need to know to get ready for and execute a Teamcenter upgrade.”  
<http://www.plmworld.org/p/do/sd/sid=7552>

## **3.17 Virtualization Best Practices**

The following items address Best Practices associated with virtualization items associated with a Teamcenter environment.

### **3.17.1 General**

- For Teamcenter environments running within a Virtual machine be sure that the Teamcenter system have dedicated CPUs and Dedicated Memory since the Teamcenter

applications/utilities and especially database software can have major performance issues if dynamic memory is being used.

- **Teamcenter Virtual Server Configuration and Performance** document – <https://support.industrysoftware.automation.siemens.com/docs/teamcenter>
- PLM Connection 2016 presentation - **Teamcenter in a Virtual Environment**  
“This presentation reviews the deployment of Teamcenter on virtualized servers. Various real-life performance use cases are discussed along with basic tuning requirements. Each deployment tier will be covered, and a detailed discussion of database server requirements plus common pitfalls will be held.”  
<http://www.plmworld.org/p/do/sd/sid=7511>

### 3.17.2 Information on Virtual Machine Support

**Document ID:** SFB-Teamcenter-6622

**Issue Date:** Apr-04-2012

**Product:** Teamcenter

**Supersedes:** SFB-Teamcenter-6078

**Revision Date:** Apr-04-2012

**Responsible Group:** Teamcenter

Affected Software: Teamcenter

Teamcenter 8.3.1 (and higher) is certified for production use with VMware ESXi 4.x on Windows 64-bit Operating systems and SUSE Linux 64-bit operating systems for the web, enterprise and resource (database) tier.  
The client tier is not supported with VMWare.

UPDATE: With Teamcenter 8.3.3.2... Red Hat 64-bit versions (in SFB-Teamcenter-6581) are also now supported/certified using VMware 4.x for production use.

Certification means that Siemens PLM Software will accept IRs and PRs from customers who have deployed Teamcenter 8.3.1 and higher versions in a virtualized environment for usage with VMware ESXi 4.x. Teamcenter performance in a virtualized environment is not expected to be consistent with performance in a non-virtualized environment.

Siemens PLM Software offers a number of high performance graphical based applications that rely on direct access, via drivers, to the advanced capabilities of high-end graphics cards to display, render and manipulate the images on the screen.

Virtual environments emulate hardware functions, such as graphical APIs and do not offer access to the accelerated performance of advanced graphics systems. Due to the restriction inherent with a virtual environment, Siemens PLM Software does not test, certify or support any of our graphical applications in any virtual environment.

Teamcenter Visualization and related translators require accelerated graphics adapters to operate.

Use of Siemens PLM Software graphical applications in VMWARE environment is not recommended and subject to these restrictions and caveats:

- These products are not supported in a virtual environment and customers use them at their own risk.
- Performance will be poor at best and may be unacceptable. Functionality that is based on advanced graphics hardware may not work. Support calls for these issues cannot be solved or addressed in these virtual environments.
- Siemens PLM Software will attempt to address issues reported in this environment but they must be able to be reproduced on a supported workstation running in a non-virtual environment.

Many of our software and hardware partners also support VMware.

If any questions arise regarding this field bulletin, please contact the Global Technical Access Center in your local region or area.

You can find a list of global phone numbers on our GTAC support page listed under Resources at: <http://www.siemens.com/gtac>.

NOTE: for the latest virtual support information check certifications and search GTAC Solution Center: [http://www.plm.automation.siemens.com/en\\_us/support/gtac/certifications.shtml](http://www.plm.automation.siemens.com/en_us/support/gtac/certifications.shtml)  
<https://solutions.industrysoftware.automation.siemens.com/> Suggest searching for “**virtual environment**” and use date filter to limit search to last 2-4 years.

### 3.17.3 Teamcenter Suite and Citrix Support (VDI)

**Document ID:** SFB-Teamcenter-10051

**Issue Date:** Apr-26-2016

**Product:** Teamcenter

**Revision Date:** Apr-26-2016

**Responsible Group:** Teamcenter

Affected Software: Teamcenter, Teamcenter Visualization

Teamcenter suite based products base their support on operating systems, not specific hardware configurations or environments.

Teamcenter Development/Product Validation does NOT test or certify our products in a VDI environment or make any specific recommendations regarding VDI or VDI vendor configurations. Thus, this will not be listed in the Platform Support Matrix.

Support for our products that customers choose to operate in a VDI environment is subject to these guidelines:

- The VDI supports a set of certified operating systems and hardware. The customer and VDI vendor are responsible for any interactions and/or issues that arise at the hardware or operating system layer as a result of their use of VDI.

- All versions and configurations of applications and operating systems (kernels included) running in VDI environment must already be certified for the Teamcenter product version the customer is running.
- Teamcenter Development will attempt to address issues reported in this environment without requiring the customer to first recreate it on a non-virtual/ non-VDI environment. However, Siemens reserves the right to request customer assistance in problem determination, including recreating the problem on a non-VDI environment, if other diagnostic steps prove unsuccessful.
- The utilization of virtual desktop technology can impact performance and capacity with enterprise-class applications due to the overhead of managing multiple virtual environments, network issue etc. Customer issues related to performance of Teamcenter applications running in a VDI environment are not supported.
- Any Siemens PLM statement on expected product performance on a hardware platform cannot be interpreted to apply to a virtual desktop running on the same hardware platform.

If any questions arise regarding this field bulletin, please contact the Global Technical Access Center in your local region or area.

You can find a list of global phone numbers on our GTAC support page at <http://www.siemens.com/gtac> listed under Resources.”

NOTE: a special SFB was issued for NX and TcVis: SFB-ALL-8000 on Apr-03-2014  
[https://solutions.industrysoftware.automation.siemens.com/view.php?sort=desc&dt=sfb&rows=100&file\\_type=html&q=Virtual+environment&file\\_type=text&i=sfb-all-8000&k=2&o=0](https://solutions.industrysoftware.automation.siemens.com/view.php?sort=desc&dt=sfb&rows=100&file_type=html&q=Virtual+environment&file_type=text&i=sfb-all-8000&k=2&o=0)

NOTE: for the latest virtual support information check certifications and search GTAC Solution Center: [http://www.plm.automation.siemens.com/en\\_us/support/gtac/certifications.shtml](http://www.plm.automation.siemens.com/en_us/support/gtac/certifications.shtml)  
<https://solutions.industrysoftware.automation.siemens.com/> Suggest searching for “**virtual environment**” and use date filter to limit search to last 2-4 years.

## 4 Common Commands/Utilities for Operational Support

Reference: Teamcenter On-Line help. **Utilities Reference** Guide. Before using ANY of these utilities it is important to read the reference manual for the usage types for the version of Teamcenter that is installed and in use.

<https://support.industrysoftware.automation.siemens.com/docs/teamcenter/>

Tc 11.2.2: [https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US/tdocExt/pdf/utilities\\_reference.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US/tdocExt/pdf/utilities_reference.pdf)

Utility	Function	Impact	Frequency	Notes
<b>backup_modes</b>	Allows Teamcenter to operate in 24 x 7 mode	High  If users are writing files to the volumes, they will be denied access and may experience extended wait times.	Weekly  During maintenance Hours	This utility administers hot backup so that Teamcenter need not be shut down for routine backup.  The <b>backup_modes</b> utility sets the Teamcenter volumes in different modes and sends appropriate messages to all current Teamcenter sessions. Third-party storage management systems can use this utility to obtain the hot backup of Oracle database and the file system.
<b>cleanup_recovery_table</b>	Locates and removes all recipe objects resulting from timeout sessions and client crashes.	Medium	Monthly	Teamcenter recipe objects are used to facilitate transparent recovery when a tcserver crashes. Typically, recipe objects are deleted when users log off. But during client crashes or session time-outs, recipe objects may remain in the database if the session or objects are not recovered. Run this utility periodically to clear the database of recipe objects. See the <i>Teamcenter System Administration Guide</i> for more information.
<b>clearlocks</b>	Clear application locks held by	Low	Weekly	Application locks can consume database resources and can affect user performance

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Unrestricted



Utility	Function	Impact	Frequency	Notes
	improperly terminated Teamcenter processes			
<b>list_users</b>	Create a list of users currently logged in and what node they are using.	None	As needed	Useful if there is a planned maintenance or to snapshot a user count for trending.
<b>dataset_cleanup</b>	Repairs corrupted datasets and removes orphaned revision anchors.	Medium	Weekly  Performed in the off hours.	A dataset is identified as corrupted if any of the following problems are found: - Dataset has no reference to a <b>TcFile</b> object. - Dataset has reference to a <b>TcFile</b> object, but the corresponding operating system file does not exist and the dataset is not archived. - Dataset is an orphan (that is, the dataset refers to the anchor but the anchor does not go to dataset). - Anchor refers to datasets that do not exist. - Anchor size = 0.
<b>index_verifier</b>	Detects missing indexes in a Teamcenter database.	Low  Can be run against the database at any time.	Monthly  or after a product change/ upgrade	The results of this utility can help to improve database performance. There are five types of indexes that can be detected using this utility: - Indexes on the primary key of each Teamcenter class - Indexes on variable length arrays (VLA). - Indexes created by Teamcenter - Functional indexes. This utility detects the necessary functional indexes required by the version of Teamcenter in use.

Utility	Function	Impact	Frequency	Notes
				- Indexes on system tables such as pom_backpointer, pom_m_lock, and the pm_process_list tables.
<b>purge_datasets</b>	Removes (purges) old versions of datasets from the database.	Medium	Weekly  during maintenance hours	Normally, Teamcenter stores a fixed number of dataset versions in the database. The maximum number of datasets retained is set using the <b>AE_dataset_default_keep_limit</b> preference. The purge_datasets utility can be run during normal working hours, with users logged in to the system and can process approximately 500 anchors per hour. A listing is produced that shows each dataset purged, along with the owning user and group.
<b>purge_volumes</b>	Removes (purges) operating system files that represent deleted Teamcenter objects.	Low	Weekly  during maintenance hours	During a Teamcenter session users delete objects. However, if the user deleting the object does not have the necessary operating system privileges to delete the associated operating system file along with the Teamcenter object, the file remains in the Teamcenter volume. The purge_volumes utility unlocks these files so that they can be deleted at the operating system level

Utility	Function	Impact	Frequency	Notes
<b>report_volume</b>	Lists the operating system path of all existing Teamcenter volumes.	None	Quarterly  Or after any version modifications or changes in user storage.	The path does not include the network node name.  Use this utility to report on the available volumes and as part of the general housekeeping. Use to create a checklist of volumes for the users.
<b>review_volumes</b>	Allows you to view detailed information about Teamcenter volumes and to remove unreferenced operating system files from these volumes.	Medium	Weekly  during maintenance hours	This utility can generate a report file describing volume usage by various groups and users, as well as reporting any unreferenced operating system files, missing operating system files, and unreferenced Teamcenter files.  Unreferenced operating system files can be deleted at the time a report file is generated or at a later time using a previously-generated report file as an input.  The report file format is plain text (ASCII) and can be manually edited in order to not delete certain files. Simply remove any file names that you do not want to delete before using the report file as input.  You can also save any deleted files to a ZIP format compressed file.

**Utility:** Name of the Utility that can be run from the command line or script

**Function:** What the utility does

**Impact:** What is the impact (risk) level to the users and data (None, Low, Medium, and High)?

- **None** - No impact, information reporting, can be run at any time
- **Low** - May take a short period of time to complete, modifies data
- **Medium** - Takes a longer period of time to complete, may affect user performance
- **High** - Should only be run when users are not active; DB maintenance and volume maintenance.

**Frequency:** How often it should be run or scheduled

**Notes:** Why you want to use the utility and possibly under what circumstances.

#### ***4.1 External References for Commands/Utilities***

- PLM Connection 2016 presentation - **Teamcenter Cleanup Utilities**

“This presentation provided an overview of some standard Teamcenter utilities that should be used to help keep an environment running smoothly.”

<http://www.plmworld.org/p/do/sd/sid=7565>

## 5 Operational Scripts

This section contains a discussion of some example operational scripts that help to automate some of the operational related items that a Teamcenter support person needs to perform. These scripts may be of use as is or with some modifications or used as a starting point for creating your own scripts to assist in the operation of your Environment. **These scripts do not come with support from Siemens PLM Software.** Instead they are present here as examples of scripts that are being used in the support of systems within the Teamcenter Services group. These scripts do not handle all activities that may be required. Some of the scripts send emails while others do not so if you need emails to be sent then that will need to be added in some cases.

In some cases, the example scripts will use utility programs that are Windows versions of common UNIX utilities. These utilities were obtained from:

- Unix Utilities for Windows - <http://unxutils.sourceforge.net>
- Windows CMDline SMTP mailer –  
non-AUTH: <http://www.beyondlogic.org/solutions/cmdlinemail/cmdlinemail.htm>

Supports AUTH: <http://www.blatt.net>

NOTE: On servers where Teamcenter is installed, another option is to use the Teamcenter email sending utility “**tc\_mail\_smtp**” to send SMTP mail. See the Teamcenter 11.2 Utilities

Reference

[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2/PDF/en\\_US/tdocExt/pdf/utilities\\_reference.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2/PDF/en_US/tdocExt/pdf/utilities_reference.pdf)

### 5.1 Considerations for Developing Scripts

- Use email to communicate status (good as well as bad) of the environment
- Status messages being created by scripts should contain keywords in the subject to let you know if everything is OK or if there is something that may need to be checked. (You may think that you only need to send emails when there is a problem but what we have found is that an email should be sent on some frequency so that you know that everything is working. In short, if for some reason the system stopped being able to send emails then you might miss an alert email. But if your environment is configured to send an email at least once a day, then when you do not receive that email you know something is wrong just like when you receive an alert email that tells you something is/may be wrong).
- Use email filters to help manage emails from systems, since this gives you a quick way to determine if things are going OK. For example, using keywords to filter emails allows you to isolate emails that require additional review, while seeing X number of emails in a folder per day can flag that everything is OK
- Use scripts as much as possible so that you get repeatability and once something has been tested in your Development and Test/QA environments you reduce the chance of any issues when moved to the Production environment.

- Do not assume a known environment when designing scripts. Instead use a configuration script to set up a required environment.
- Limit output by using utilities to filter results such as windows findstr command. For example: `sc stop "Siemens PLM License Server" | findstr "STATE"`
- Use a configuration file that all other scripts can source to obtain information about the environment in which they are executing. Using a configuration file to specify items that differ from system to system allows the same scripts to be used in all environments without modifications.
- Scripts that require information that is different for each system and/or environment in which they execute should obtain that information from a configuration file that is specific to the system and/or environment. For example, if the windows system name was "SVRNAME" then the configuration file on that server would be named "\_env\_cfg\_SVRNAME.bat" then each calling script would call the file named "\_env\_cfg\_%COMPUTERNAME%.bat" at the beginning of the script in order to obtain environment/system specific information. When the system executes the script the system will replace %COMPUTERNAME% with the name of the system which means the script will call the file "\_env\_cfg\_SVRNAME.bat" when it is executed. NOTE: for Linux a slightly different approach is used based on using hostname.
- [Windows] Do not assume that environment will be the same after calling some scripts. For example, a call to a script could redefine environment variables. If this is not the desired behavior then place the call to script between "@setlocal" and "@endlocal" commands will make sure that any environment items changed by the called script are returned to state before the call.
- [Windows] if UNC pathnames may be used by a script then script should not use the **cd** command but instead use the **pushd** command since **cd** command does not understand UNC pathnames while **pushd** command does understand UNC pathnames.
- Example directory structure:

**C:\apps\Scripts** - parent directory for scripts and the scripts environment configuration file

**C:\apps\Scripts\awk** – directory containing awk scripts that other scripts reference to complete some task. Besides/Instead of "awk" directory you may have other script items like Perl and Python that would need their own directory within Scripts

**C:\apps\Scripts\bin** – directory that contains utilities (normally exe) that are used by the scripts but are not part of Teamcenter. For example, the windows version of UNIX utilities such as: grep, sed, awk, gawk.

**C:\apps\Scripts\commonScripts** – directory containing scripts that are common across several other scripts. For example, a script used for management of log file that the calling script will create, if each script manages their log files.

**C:\apps\Scripts\taskScheduler** – directory containing task scheduler XML files used to define task to the task scheduler

- [Windows] using the extension “.cmd” to flag scripts that a user would execute while using the extension “.bat” to flag scripts that are executed via call from a user executed script. So in general a user would never directly execute a script that has a “.bat” extension.
- Add documentation to each script that defines: version, what it is used for, usage information, information on output created, any special items the user needs to know about the script (for example, programs, scripts and utilities used by the script).

## **5.2 On system start activities**

On each Teamcenter server it is recommended that you have a script(s) and / or services that is/are executed when the system starts. On windows the execution of a startup script can be handled by the task scheduler using the “At Startup” trigger. On UNIX/Linux the execution of a startup script can be handled via the “rc” process or Service Management Facility (SMF) (**svcadm**, **svcs**, etc.).

The tasks normally addressed in the startup script are:

- Start required Teamcenter services
- Start the Teamcenter utilities that need to run in a command window instead of as a service.
- Start supporting utilities that need to run in order to support Teamcenter components

See the example scripts for an example of a startup script for use on Windows.

## 6 Frequently Asked Questions

### 6.1 Where can I get Teamcenter training?

Teamcenter training courses that may be of interest to IT administrators include:

- Introduction to Teamcenter (TR25100)
- Using Teamcenter (TR25150)
- Installation Teamcenter (TR25350)
- Application and Data Model Administration (TR25460) (if doing application support)
- Customization (TR25540, TEAMCENTER 10.1) (if doing application support)

Training information: [http://www.plm.automation.siemens.com/en\\_us/training/index.shtml](http://www.plm.automation.siemens.com/en_us/training/index.shtml)

### 6.2 Where can I download the latest version of this document?

This best practice document will be continually updated as additional information becomes available. To get the latest version, please download from GTAC.

Steps for downloading the guide from GTAC:

- Go to <https://support.industrysoftware.automation.siemens.com/docs/teamcenter>
- Select the tab for the Teamcenter release which you are using.
- Download the file titled: “Teamcenter Operational Best Practices”

### 6.3 Where can I find Teamcenter documentation?

If the Siemens PLM Documentation server has been installed in your environment then documentation should be available via that server.

Teamcenter documentation is also available on the Global Technical Access Center (GTAC) web site: <https://support.industrysoftware.automation.siemens.com/docs/teamcenter>

Or in the documentation section, sub-section Teamcenter:

[http://www.plm.automation.siemens.com/en\\_us/support/gtac/](http://www.plm.automation.siemens.com/en_us/support/gtac/)

(Or a redirect link is available as: <http://www.siemens.com/gtac>)

You will need to use your WebKey Account to access most items on the Global Technical Access Center (GTAC) web site. If you do not have a WebKey then see:

<https://www2.industrysoftware.automation.siemens.com/webkey/>

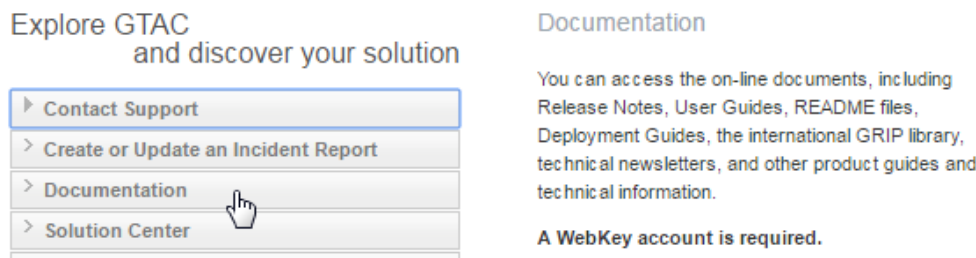


Figure 6 – Where to find documentation on GTAC web site



- Go to [http://www.plm.automation.siemens.com/en\\_us/support/gtac/](http://www.plm.automation.siemens.com/en_us/support/gtac/)
- Select the “Documentation” link.
- Select the “Teamcenter” link and login.
- Select the tab for the Teamcenter release which you are using.

## 6.4 Where can I get Teamcenter information and get help when needed?

Global Technical Access Center: <http://www.siemens.com/gtac>

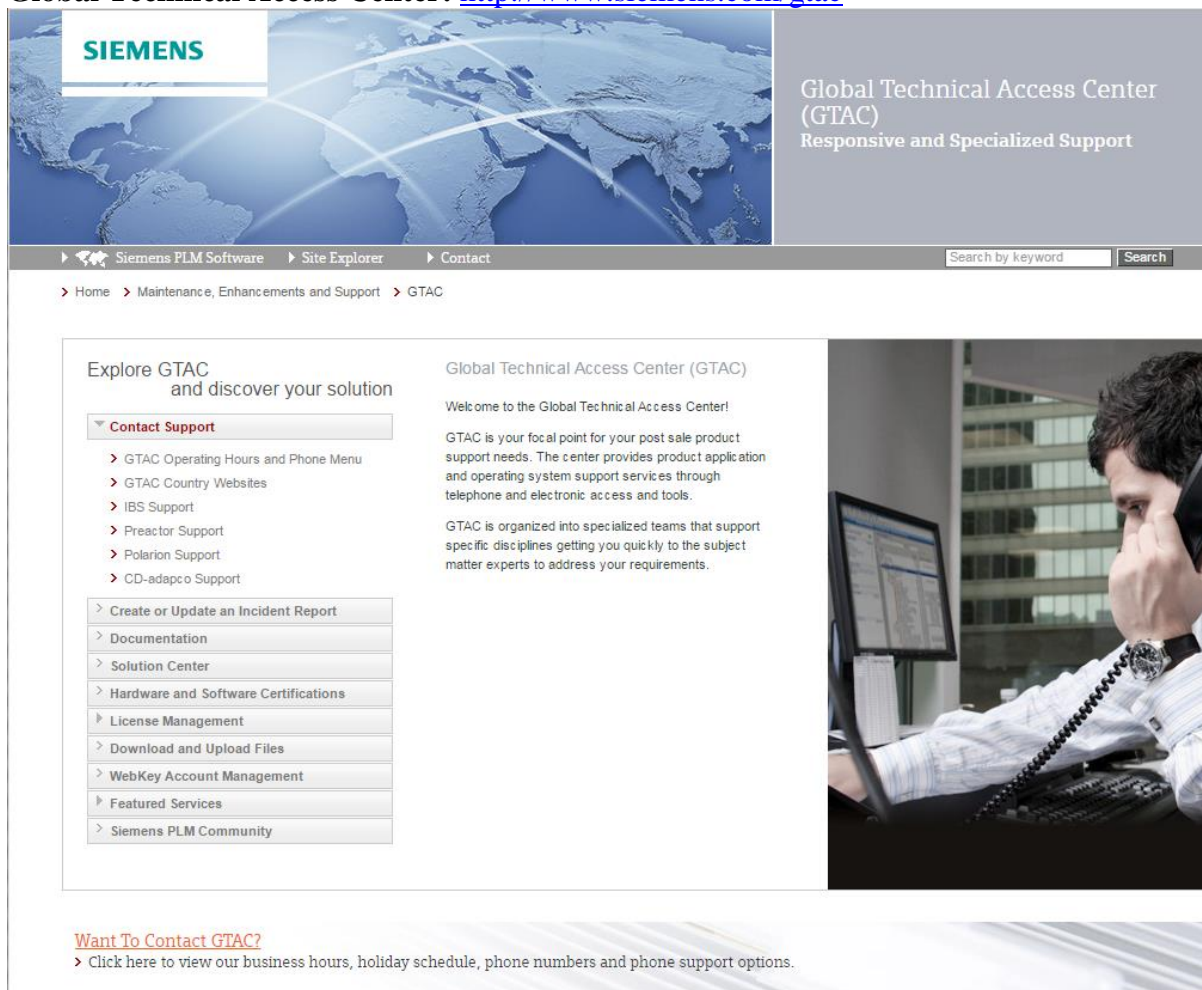


Figure 7 – Global Technical Access Center

“The Global Technical Access Center (GTAC) is your focal point for post sales product support. The center provides both your application and operating systems software support through telephone and electronic access.

Only through the use of this service can your call be logged, tracked and followed until resolved. In some instances, the solution to your problem or answer to your question may already exist and can be readily provided.

GTAC is organized into specialized teams which support specific product disciplines. These teams are located in close proximity to their parallel product development groups, so they can quickly locate the path that will lead you to improved productivity.”

For more information, see the GTAC Support Services Guide available at:

[http://www.plm.automation.siemens.com/en\\_us/support/gtac/index.shtml#lightview%26url=/en\\_us/Images/Siemens-PLM-GTAC-North-America-Services-Guide\\_tcm1023-214013.pdf%26title=GTAC North America Support Services Guide%26description=A guide to support services and tools from the Global Technical Access Center \(GTAC\) for North American customers.%26docType=pdf](http://www.plm.automation.siemens.com/en_us/support/gtac/index.shtml#lightview%26url=/en_us/Images/Siemens-PLM-GTAC-North-America-Services-Guide_tcm1023-214013.pdf%26title=GTAC%20North%20America%20Support%20Services%20Guide%26description=A%20guide%20to%20support%20services%20and%20tools%20from%20the%20Global%20Technical%20Access%20Center%20(GTAC)%20for%20North%20American%20customers.%26docType=pdf)

Note: the URL <http://www.siemens.com/gtac> will redirect you to the complete URL for GTAC, for example: [http://www.plm.automation.siemens.com/en\\_us/support/gtac/](http://www.plm.automation.siemens.com/en_us/support/gtac/)

## **6.5 How do I get a WebKey account for access to GTAC?**

Your WebKey Account is your personal, single point of authentication that will allow you to access product information and associated support tools located within the GTAC web site. You can request your account via the URL:

<https://www2.industrysoftware.automation.siemens.com/webkey/>

## **6.6 Where can I take the GTAC New Customer Webinar?**

“This on-demand webinar introduces new customers and new system managers to the basic tools and services you can expect from GTAC support services. This webinar is an overview; a starting point guiding you to fully discover all the support services available to you. The webinar is less than 22 minutes in length. Listen and Discover!”

[https://www.plm.automation.siemens.com/en\\_us/about\\_us/events\\_webinars/webinar\\_replays/gtac-webinar.cfm?](https://www.plm.automation.siemens.com/en_us/about_us/events_webinars/webinar_replays/gtac-webinar.cfm?)

## **6.7 Where can I check GTAC for information and/or solutions to known problems?**

Information on the question or problem you are having might be available within GTAC’s Solution Center: <https://solutions.industrysoftware.automation.siemens.com/>

After accessing the above URL and entering your webkey information specify the information you would like to search for within the search field and then press “Search”

## 6.8 How do I upload data to GTAC?

See: [https://download.industrysoftware.automation.siemens.com/upload\\_user\\_guide.pdf](https://download.industrysoftware.automation.siemens.com/upload_user_guide.pdf)

## 6.9 Where can I find Hardware and Software Certifications?

See: [http://www.plm.automation.siemens.com/en\\_us/support/gtac/certifications.shtml](http://www.plm.automation.siemens.com/en_us/support/gtac/certifications.shtml)

## 6.10 How can I subscribe to E-mail Subscriptions and Distribution Services?

Subscribe to e-mail distribution services to keep informed of pertinent technical information automatically and in a timely manner using electronic mail. There are currently 3 electronic mail distributions available that are regularly updated and sent to all subscribers.

**Sfbmail** - all Software Field Bulletins (SFBs) are distributed as soon as they are posted in the Solution Center database to the SFB collection under the specific product the bulletin addresses. You will have the option to filter or select topics of interest thereby controlling the amount of information you receive.

**Summary** - a weekly summary list containing the document ID and a short description or title of new articles and a monthly summary of new SFBs. You can select any article title listed in the SUMMARY report with your mouse and your web browser should activate and bring up the contents of that article from our Solution Center database.

**Newsletter** - notification and links to all new technical newsletter articles submitted within the last month by our global support staff. Select the link in the message to display the article(s) of interest in your web browser.

To initiate your subscription to any or all of these 3 mailing lists, access our web interface to the mailing list utility.

[http://www.plm.automation.siemens.com/en\\_us/support/gtac/email-subscription.shtml](http://www.plm.automation.siemens.com/en_us/support/gtac/email-subscription.shtml)

Or you can subscribe to the mailing lists by sending an email message to the addresses shown below. You will need to send a separate message for each list. The message and subject line should be blank.

[newsletter-subscribe.plm@siemens.com](mailto:newsletter-subscribe.plm@siemens.com)

[sfbmail-subscribe.plm@siemens.com](mailto:sfbmail-subscribe.plm@siemens.com)

[summary-subscribe.plm@siemens.com](mailto:summary-subscribe.plm@siemens.com)

To remove your email address from the Sfbmail, Summary or Newsletter mailing list, you may access the web interface to our mailing lists, or send a blank email to one or more of the following mail addresses:

[newsletter-unsubscribe.plm@siemens.com](mailto:newsletter-unsubscribe.plm@siemens.com)

[sfbmail-unsubscribe.plm@siemens.com](mailto:sfbmail-unsubscribe.plm@siemens.com)

[summary-unsubscribe.plm@siemens.com](mailto:summary-unsubscribe.plm@siemens.com)

## 6.11 How can I access Siemens PLM Community for Teamcenter blogs, knowledge, user forums and administrator forums?

<http://www.siemens.com/plm/community/teamcenter>



Figure 8 – Teamcenter on Siemens PLM Community

Teamcenter Administrators Forum –

<http://community.plm.automation.siemens.com/t5/Teamcenter-Administrators-Forum/bd-p/Teamcenter-Administrators-Forum>

## 6.12 How do I contact a Siemens PLM Product or Services Expert

If you need to get additional information about a Siemens PLM Software Product or Services then you can submit your request via the “Contact Siemens PLM Software Service or Product Inquiry” web page:

[https://www.plm.automation.siemens.com/en\\_us/about\\_us/contact/product-inquiry.cfm](https://www.plm.automation.siemens.com/en_us/about_us/contact/product-inquiry.cfm)

## 6.13 How do I find papers, presentations and other Teamcenter information on PLM Connection?

<http://www.plmworld.org>

“PLM Connection” is an independent User Community focusing on the Siemens PLM Software product suite and complementary partner offerings. Our mission is to provide the industry leading collaborative network for exchanging ideas, information and best practices enabling customer success and influencing the future direction of software development.” (For additional information about PLM Connection see: <http://www.plmworld.org/p/cm/ld/fid=18> )

**Best Practice** - Use the search feature available for the PLM Connection site to find papers, presentations and other information of interest and use in supporting your Teamcenter environment. Start by going to **File Libraries**.



Figure 9 – PLM Connection – File Libraries

On the Files page, **More Options** on the right followed by **Search** (right center below Partners)



Figure 10 – PLM Connection – More options – Search

This should bring up the search page, where you specify your search information

 The image displays the search interface of the PLM Connection. At the top is a search input field with the placeholder text 'search'. Below it is an orange 'Q Go' button and a link to 'Advanced Options'. A row of radio buttons allows users to filter by: Site, Files (selected), Forums, Enhancements, Enhancement Comments, Blogs, Wikis, Pages, and Calendar Items. Below these are several filter fields: 'Classification' (text input), 'Tag' (text input), 'Time Constraints' (dropdown menu set to 'Any Time'), 'Author' (checkbox 'None Selected'), 'Communities' (two dropdown menus), 'Categories/Topics' (two dropdown menus), 'Document Type' (dropdown menu set to 'All'), 'Posting Group' (dropdown menu set to 'All'), 'Number of results to display' (dropdown menu set to '20'), 'Sort By' (dropdown menu set to 'Relevance'), and 'Output Format' (dropdown menu set to 'Full Text'). At the bottom is another orange 'Q Go' button.

Figure 11 – PLM Connection Search

## **6.14 What offerings does Advantedge Advanced Technical Services for PLM Architecture deliver?**

Advantedge Advanced Technical Services is a set of packaged technical services offerings for the system architecture domain in any PLM application deployment. Advantedge Advanced Technical Services focuses on the PLM architecture, infrastructure, system performance and security areas for Teamcenter deployment and is delivered with the highest quality by global Siemens PLM experts.

Whether you run PLM projects by yourself, with system integrators or alongside Siemens Professional Services, Advantedge Advanced Technical Services offerings represent speed, consistency and quality and have the fastest time to value.

Advantedge Advanced Technical Services deliver:

- Worldwide customer experience and product deployment best practices
- Predictable and repeatable delivery processes with technical templates and system-driven tools
- Direct link to Siemens PLM product development
- Unique Siemens PLM Software services delivered by qualified global experts
- Premium services endorsed by customer feedback and continuous satisfaction

Email: [ats.plm@siemens.com](mailto:ats.plm@siemens.com)

Web: [http://www.plm.automation.siemens.com/en\\_us/advantedge-services/technical-services/index.shtml?stc=wwia420185](http://www.plm.automation.siemens.com/en_us/advantedge-services/technical-services/index.shtml?stc=wwia420185)

Offerings:

- **Deployment Architecture Design -**  
“Deployment Architecture and Infrastructure Design delivers a comprehensive Teamcenter deployment architecture solution that defines the location of all application tiers and estimates the corresponding PLM infrastructure sizing requirements.”  
[http://www.plm.automation.siemens.com/en\\_us/advantedge-services/technical-services/deployment-architecture.shtml](http://www.plm.automation.siemens.com/en_us/advantedge-services/technical-services/deployment-architecture.shtml)
- **Deployment Infrastructure Review -**  
“Deployment Architecture and Infrastructure Review validates Teamcenter deployment architecture and infrastructure design developed by customers or system integrators to identify potential PLM architecture issues and make recommendations for improvement.”  
[http://www.plm.automation.siemens.com/en\\_us/advantedge-services/technical-services/infrastructure-review.shtml](http://www.plm.automation.siemens.com/en_us/advantedge-services/technical-services/infrastructure-review.shtml)
- **Teamcenter Performance Baseline -**  
“Teamcenter Performance Baseline guides you to generate a standard baseline against which you can measure all adjustments, tuning and upgrades. You can compare these baseline measurements with similar implementations to determine improvement actions.”  
[http://www.plm.automation.siemens.com/en\\_us/advantedge-services/technical-services/teamcenter-performance-baseline.shtml](http://www.plm.automation.siemens.com/en_us/advantedge-services/technical-services/teamcenter-performance-baseline.shtml)
- **Teamcenter Performance Analysis -**

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Unrestricted



“Teamcenter Performance Analysis is an in-depth technical analysis of Teamcenter deployment architecture, infrastructure and application configuration to address specific performance issues or concerns.”

[http://www.plm.automation.siemens.com/en\\_us/advantedge-services/technical-services/teamcenter-performance-analysis.shtml](http://www.plm.automation.siemens.com/en_us/advantedge-services/technical-services/teamcenter-performance-analysis.shtml)

- **Production Readiness Review -**

“Production Readiness Review checks production go-live preparation quality and recommends critical system changes for a successful Teamcenter deployment. The Production Readiness Review report helps you make a system go-live decision.”

[http://www.plm.automation.siemens.com/en\\_us/advantedge-services/technical-services/production-readiness-review.shtml](http://www.plm.automation.siemens.com/en_us/advantedge-services/technical-services/production-readiness-review.shtml)

- **Production Health Check Review -**

“Production Health Check Review is a systematic discovery and analysis process to evaluate the overall production health status of your Teamcenter implementation, make improvements and provide corrective recommendations.”

[http://www.plm.automation.siemens.com/en\\_us/advantedge-services/technical-services/production-healthcheck-review.shtml](http://www.plm.automation.siemens.com/en_us/advantedge-services/technical-services/production-healthcheck-review.shtml)

- **Security Solution Workshop -**

“Security Solution Workshop provides an overview of security features in authentication, authorization, audit, and asset protection and aligns requirements to Siemens PLM Software security solutions.”

[http://www.plm.automation.siemens.com/en\\_us/advantedge-services/technical-services/security-solution-workshop.shtml](http://www.plm.automation.siemens.com/en_us/advantedge-services/technical-services/security-solution-workshop.shtml)

- **Teamcenter Load Test Workshop -**

“Teamcenter Load Test Workshop:

- Introduces the load testing methodology for Teamcenter 4-tier clients
- Shares Teamcenter load testing experiences and techniques
- Prepares the load test plan draft
- Helps project teams properly plan and execute load testing”

[http://www.plm.automation.siemens.com/en\\_us/advantedge-services/technical-services/load-test-workshop.shtml](http://www.plm.automation.siemens.com/en_us/advantedge-services/technical-services/load-test-workshop.shtml)


- **Teamcenter System Monitoring Automation (TSMA) -**

“Teamcenter System Monitoring Automation assists you in quickly deploying a set of automated system monitoring functions and in learning necessary system monitoring operations.”

[http://www.plm.automation.siemens.com/en\\_us/advantedge-services/technical-services/teamcenter-system-monitoring.shtml](http://www.plm.automation.siemens.com/en_us/advantedge-services/technical-services/teamcenter-system-monitoring.shtml)

## **6.15 What is Teamcenter Environment Manager (TEM)?**

“Teamcenter Environment Manager (TEM) is an installation wizard that installs, upgrades, and updates Teamcenter configurations. For each installation step, TEM displays a panel requesting

information from the installer. Each panel provides online help that describes the content of the panel. To view the online help for a given panel, click the help button .

The TEM Help guide referenced below contains all online help displayed in the TEM user interface, organized for reference from the Teamcenter online help collection. Online help topics for TEM panels are organized by features (such as File Management System) and general configuration areas (such as Database configuration). Because of this organization, the sequence of TEM help topics differs from the sequence of panels displayed in TEM.

The guide contains TEM help topics included in the standard Teamcenter release. It does not include help for TEM panels added by Teamcenter products that are licensed and sold separately, such as Teamcenter product master management.

When you launch TEM from a Teamcenter software distribution image (disc or downloadable image), the first panel displayed is the Welcome to Teamcenter panel, in which you choose the product you want to install.

When you launch TEM from an installed Teamcenter home directory, the first panel displayed is the Maintenance panel.

You can also create a silent distribution, a Teamcenter configuration with preselected features you can install on other hosts with minimal user interaction, or a compact distribution, a Teamcenter installation package that contains only selected features and is therefore smaller and more easily distributed than a full Teamcenter software distribution image.”

The above information was copied from the “**Teamcenter Environment Manager (TEM) Help**” Guide. For additional information see:

[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.1/PDF/en\\_US/tdocExt/pdf/teamcenter\\_environment\\_manager\\_help.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.1/PDF/en_US/tdocExt/pdf/teamcenter_environment_manager_help.pdf)



## 7 Reference Links

- Teamcenter **Getting Started Guide**  
[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US/tdocExt/pdf/getting\\_started\\_teamcenter.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US/tdocExt/pdf/getting_started_teamcenter.pdf)
- Teamcenter 11.2 **documentation / help** -  
<https://docs.plm.automation.siemens.com/tdoc/tc/11.2/PDF/#uid:index>
- Teamcenter 11.2 **Frequently asked Questions (FAQs)** -  
[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2/PDF/en\\_US/tdocExt/pdf/faq\\_teamcenter.pdf#nameddest=plm00125](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2/PDF/en_US/tdocExt/pdf/faq_teamcenter.pdf#nameddest=plm00125)
- **Teamcenter Localization**  
[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US/tdocExt/pdf/localization\\_qd.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US/tdocExt/pdf/localization_qd.pdf)
- Teamcenter 11.2.2 **Release Bulletin** –  
[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US/tdocExtWeb/pdf/tc\\_11\\_2\\_release\\_bulletin.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US/tdocExtWeb/pdf/tc_11_2_release_bulletin.pdf)
- Teamcenter 11.2.2 **documentation / help** –  
<https://docs.plm.automation.siemens.com/tdoc/tc/11.2.2/PDF/#uid:index>
- Teamcenter 11.2.2 **Frequently Asked Questions (FAQs)** –  
[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US/tdocExt/pdf/faq\\_teamcenter.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US/tdocExt/pdf/faq_teamcenter.pdf)
- Teamcenter **Deployment Guide** –  
[https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide\\_TcUA\\_11.2.1ab.pdf](https://support.industrysoftware.automation.siemens.com/docs/teamcenter/11.2.1/TcDeploymentGuide_TcUA_11.2.1ab.pdf)
- Teamcenter 11.2.2 **UNIX and Linux Server Installation (PLM00011)** –  
[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US/tdocExt/pdf/installation\\_server\\_unix.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US/tdocExt/pdf/installation_server_unix.pdf)
- Teamcenter 11.2.2 **Windows Server Installation (PLM00013)** –  
[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.2/PDF/en\\_US/tdocExt/pdf/installation\\_server\\_windows.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.2/PDF/en_US/tdocExt/pdf/installation_server_windows.pdf)
- Teamcenter **Environment Manager (TEM) Help Guide** –  
[https://docs.plm.automation.siemens.com/data\\_services/resources/tc/11.2.1/PDF/en\\_US/tdocExt/pdf/teamcenter\\_environment\\_manager\\_help.pdf](https://docs.plm.automation.siemens.com/data_services/resources/tc/11.2.1/PDF/en_US/tdocExt/pdf/teamcenter_environment_manager_help.pdf)
- **Teamcenter [Lifecycle] Visualization documentation** –  
[https://support.industrysoftware.automation.siemens.com/docs/tc\\_vis/](https://support.industrysoftware.automation.siemens.com/docs/tc_vis/)

- **Optimizing Teamcenter Client Performance** –  
<https://support.industrysoftware.automation.siemens.com/docs/teamcenter/>
- **Teamcenter 10.1 Deployment Guide** –  
[https://support.industrysoftware.automation.siemens.com/docs/teamcenter/10.1/TcDeploymentGuide\\_TcUA\\_10.1x.pdf](https://support.industrysoftware.automation.siemens.com/docs/teamcenter/10.1/TcDeploymentGuide_TcUA_10.1x.pdf)
- **Teamcenter 10.1 Release Bulletin** –  
[http://support.industrysoftware.automation.siemens.com/docs/teamcenter/10.1/tc\\_10\\_1\\_release\\_bulletin.pdf](http://support.industrysoftware.automation.siemens.com/docs/teamcenter/10.1/tc_10_1_release_bulletin.pdf)