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# TEAMCENTER SERVICE CAPACITY PLAN

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Version [2.0](#)

Effective Date: [07/12/2013](#)

Expiry Date: [07/12/2014](#)



# VERSION HISTORY

Version	Implemented By	Revision Date	Approved By	Approval Date	Reason
0.1	<i>Ray Pasetes</i>	<i>03/22/2011</i>	<i>&lt;name&gt;</i>	<i>&lt;mm/dd/yy&gt;</i>	<i>Initial Draft</i>
0.2	Ray Pasetes	09/27/2012			Modified to more clearly reflect sections that were in questionnaire
0.3	Rob Kennedy	10/3/2012			Update per feedback
1.5	Rob Kennedy	10/17/2012			Re-order per feedback
2.0	David Lowell	05/06/2013	Robert Harris	07/12/13	Initial Teamcenter Plan

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# **1 INTRODUCTION**

## **1.1 PURPOSE OF CAPACITY PLAN**

This capacity plan provides an analysis of existing service capabilities and best-estimate funding requirements for the year. The analysis is based on trends of the existing support resources, current and expected SLA requirements, and currently understood plans for improvement from the service owners and Service Level Management.

In the initial stages however, this capacity plan will provide metrics and near-term (3-6 month) funding requirements until the enough data is available to understand and be able to predict consumption of service resources.

## **1.2 SERVICE OVERVIEW**

The Teamcenter service is an engineering database management system (EDMS) that consists of CAD and engineering software applications that have integrations to Teamcenter (EDMS database) and is currently designed to support up to 200 users by FY14-15. The service was created to address a DOE Corrective Action Plan (CAP) requiring the lab provide an EDMS system to manage engineering documents. The Teamcenter service is fully described by the Teamcenter Service Level Agreement (SLA) available at:

[Teamcenter Service Level Agreement \(SLA\)](#)

## **1.3 ASSUMPTIONS/CONSTRAINTS**

This Capacity Plan assumes that the service will be implemented and operate as is for the coming year. Unless otherwise stated, this plan assumes no significant changes in service implementation, no significant changes in user demand, over this period of time.

This Capacity Plan assumes there are sufficient infrastructure resources, such as Facilities.

This Capacity Plan treats marginal costs, the costs to add or remove capacity to an existing service, unless otherwise noted. Neither maintenance and operations costs for the service, nor the costs to research potential changes to the service, are considered in this plan.

## 2 PLAN SUMMARY

### 2.1 CAPACITY MANAGEMENT SUMMARY

The following table summarizes the capacity plan for this service:

Area/Item Monitored	Capacity Requirement(s)	Current Level	Predicted Growth + Timescale	Capacity Threshold(s)	Threshold Response Strategy/Tuning (Action to Be Take Upon Reaching Threshold(s), includes any tuning or demand management strategies)
User Seat Licenses	200	35	20%/yr	80% (160)	Request additional funding to bring capacity usage to 70%. If insufficient funding exists and capacity increases beyond 90%, begin aggressively deactivating accounts that have been inactive > 1 month
Storage Capacity	1TB	100GB	50%/yr	80%	Request additional funding to bring capacity usage to 65%. If insufficient funding exists, notify service owner of possible breach of SLA.
Network Capacity	1Gb	<1Gb	20%/yr	80%	Request additional funding to bring capacity usage to 50%. If insufficient funding exists, notify service owner of possible breach of SLA.
Server Memory	48GB	10GB	5GB/year	80%	Request additional funding to increase memory in affected servers. If more memory cannot be added, request additional funding to add new server.
Server CPU	50% (4 CPUs)	10%	5%/yr	40% (4 CPUs)	Request additional funding to purchase 1 server for the server reaching threshold.
Web App Server (Weblogic)	500	35	20%/yr	80%	Request additional funding to increase memory in affected server. If CPU capacity reached, request additional funding to purchase 1 server.

The table contents are described in detail in Section 3 Capacity Analysis.

### 2.2 POTENTIAL RISKS

1. Server memory resources could be exhausted if we have too many users logged into Teamcenter at the same time.
2. Network resources could be exhausted if we have too many users retrieved large assemblies at the same time.

### 2.3 RECOMMENDATIONS TO MITIGATE POTENTIAL RISK

1. Add more memory to the server as a short term solution. Add additional Pool Manager Server(s) for increased capacity long term.
2. Configure and connect existing network ports already in server if network capacity exceeds 80%.

### 2.4 DECISIONS

We currently have purchased (FY12 and FY13) 8 TB of disk space in reserve when required; we currently have access to 1 TB of this disk space.

No other short term purchases of equipment or disk space are required at this time.

### 2.5 NEXT REVIEW DATE

The next Capacity Plan review date will be tentatively scheduled for July 2014

### 3 CAPACITY ANALYSIS

#### 3.1 CAPACITY METRICS AND PROCESSES

This service has distinct technical infrastructure which is managed via the following metrics:

- User Seat License – Number of user licenses allowed for creating or modifying engineering documents
- Storage Capacity – Overall disk space allocated for engineering documents and temporary work space
- Network Capacity – Total network bandwidth needed for service
- Server Memory – Amount of server memory required for service
- Server CPU – Total processing power required for service
- Web App Server – Number of users accessing the Teamcenter service

This service also relies on the capacity management processes and plans of the following services:

- Networking
  - <https://cd-docdb.fnal.gov:440/cgi-bin/ShowDocument?docid=4312>
- IT Server Hosting
  - <https://cd-docdb.fnal.gov:440/cgi-bin/ShowDocument?docid=4316>
- Networked Storage Services
  - <https://cd-docdb.fnal.gov:440/cgi-bin/ShowDocument?docid=4311>

In addition, staffing resources need to be considered for the capacity planning for this service. Staffing levels will be reviewed, reported, and updated yearly in the information systems tactical plan for Engineering Support Services located here:

[Engineering Support Services Tactical Plan](#)

#### 3.2 CAPACITY AND PERFORMANCE REQUIREMENTS

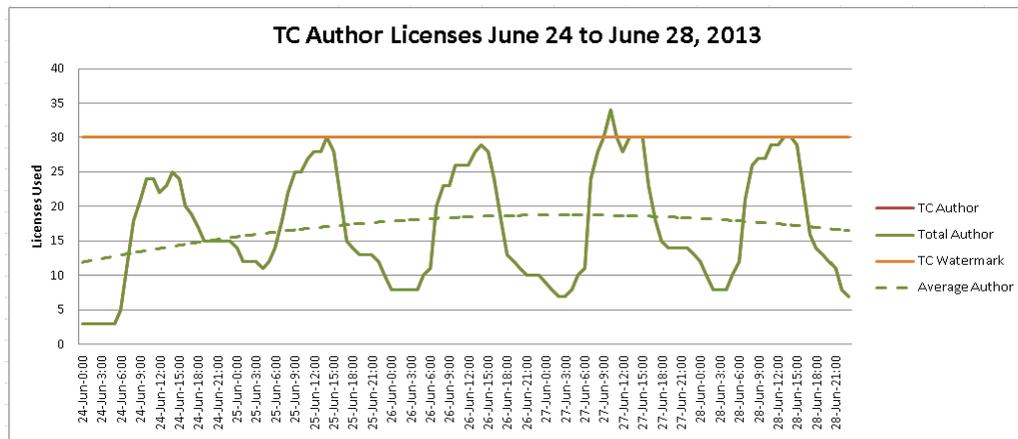
- The User Seat License requirement is the total number of users able to use the Teamcenter service at one time and is driven by the number of Fermilab users as well as external collaborators anticipated to be creating/modifying engineering documents and users participating in review and approval workflows. We have currently purchased 1800 author and consumer licenses; the maximum limit for this requirement is set to 200 as a result of existing server capacity.
- The Storage Capacity requirement is the overall disk space required to store engineering documents using this service and is based on the estimated disk space required for created and migrated legacy engineering documents planned for the next three year time period. We currently have purchased 8 TB of disk space with a current allocation of 1 TB.
- The Network Capacity is network bandwidth required to run this service and is based on total network bandwidth needed for the service derived from vendor recommendations. The current capacity is 1GB

- The Server memory is the total amount of memory on application server and is derived by amount of server memory required for service based on application requirements. The current amount of memory on our existing application server is 48GB.
- The Server CPU requirement is the number of server CPU's required to run this service and is a resultant of total processing power required for the service based on application requirements. The total number of CPU's running our application server is four.
- The Web App Server requirement is a middleware software product that allows users to access the Teamcenter service and is based on the number of users accessing the Teamcenter service at the same time. We have currently purchased 1800 author and consumer licenses; the maximum limit for this requirement is set to 500 as a result of existing server capacity.

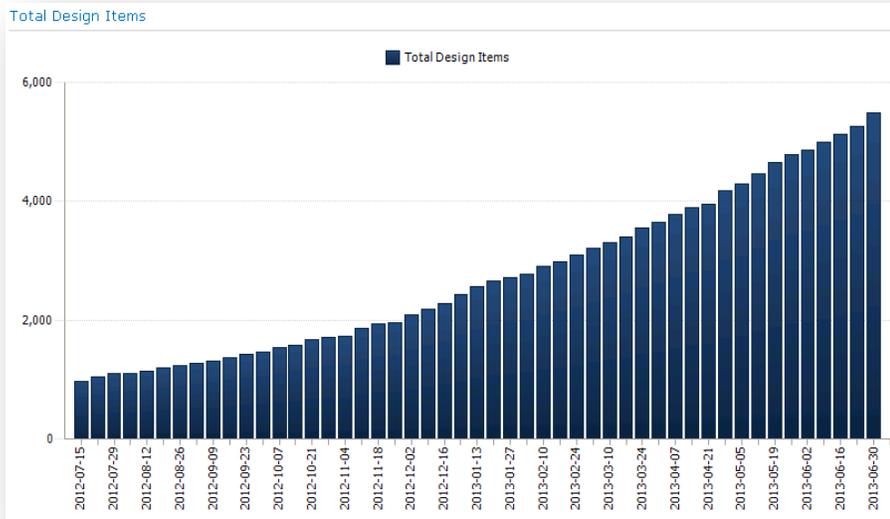
### 3.3 TRENDING AND PREDICTIVE ANALYSIS

All of the metrics defined in section 3.1 are primarily predicated on number Teamcenter users using the service at the same time; the increase in users equates to an increase capacity consumed; it is important for this service to monitor average user daily usage and evaluate trending data to predict potential capacity issues over time. We currently use tools OpenLM and FermiDash to generate graphical analyses that are used for trending purposes:

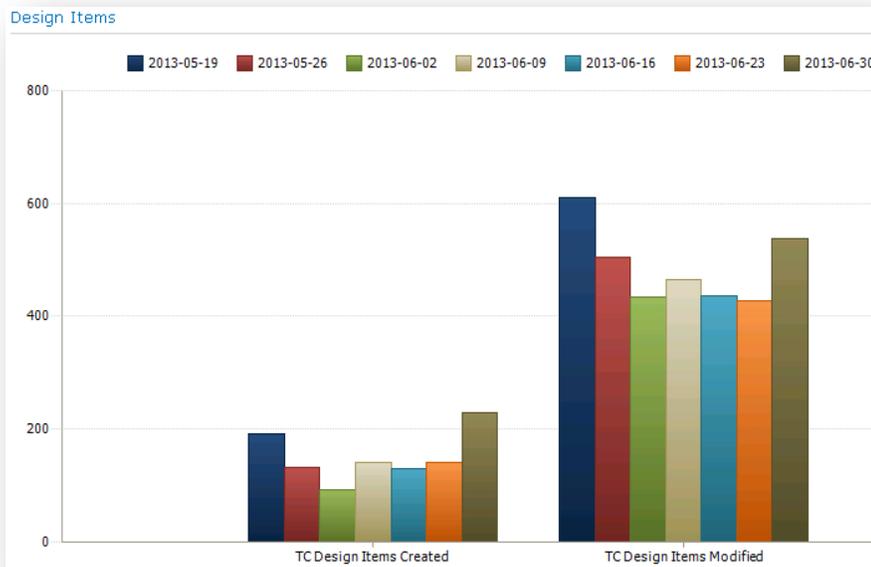
Total users on system each hour per week:



Total number of items created in Teamcenter over the last year:



8 week moving average of created and modified engineering documents



Current versions of this data are located here:

[FermiDash --> Engineering --> Teamcenter Data](#)

[FermiDash --> Engineering --> Teamcenter Licensing](#)

### **3.4 IMPACT OF NEW TECHNOLOGY/TECHNIQUES/UPGRADES**

We are currently in the planning process to upgrade Teamcenter by the end of CY2013; we will review our capacity plans as part of this upgrade.

A new Teamcenter module called advanced workspace allows access to Teamcenter via a browser; this will allow Teamcenter mobility access to Macintosh, IPAD and Android phone users; we will review this new capability and determine how it will affect capacity needs.

### **3.5 THRESHOLDS AND RESPONSES**

Each of capacity thresholds is described here along with its basis; please note that responses in the table (2.1) for exceeded thresholds should return each of these metrics within a normal range.

- User Seat License – 80% of 200 seats is based on industry recommendations from our vendor and current monitoring of existing production system
- Storage Capacity – 80% of 1TB is based on past experience with similar engineering database tools
- Network Capacity – 80% of 1GB is based on past experience with similar engineering database tools
- Server Memory – 80% of 48GB is based on industry recommendations from our vendor and current monitoring of existing production system
- Server CPU – 40% of 4 CPU's is an initial estimate to be revised based on future experience
- Web App Server – 80% of 500 seats is an initial estimate to be revised based on future experience

### **3.6 EXTERNALLY DRIVEN MANDATES**

At this time, there are no externally driven mandates for this service.

### **3.7 COST AND BUDGET**

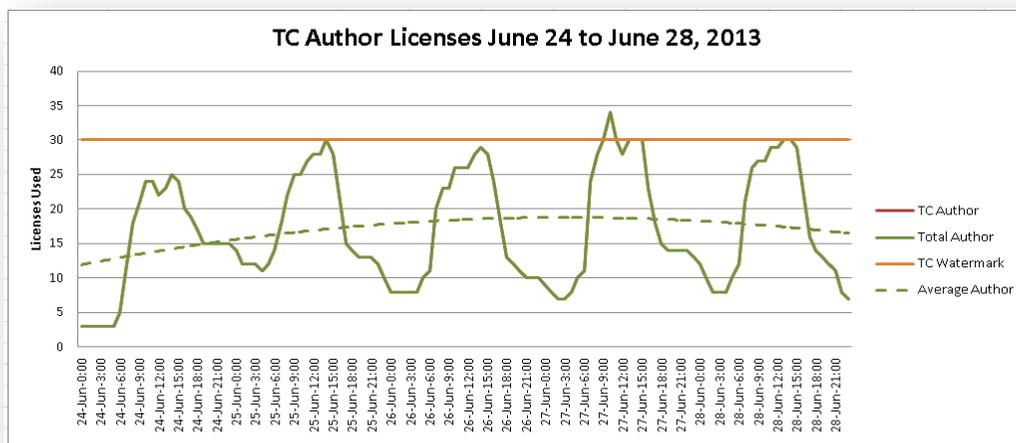
Budget to address the risks and perform the recommendations for this service are reflected in the tactical plans of this service and any of those services listed in Section 3.1.

### **3.8 PLANNING INTEGRATION**

Modifications to capacity requirements will be reflected in the tactical plan.

### 3.9 MONITORING AND REPORTING

- User Seat License – License usage is tracked hourly using OpenLM and FermiDash; metrics are reported weekly to the information systems department head and to the Teamcenter project sponsor.



- Storage Capacity – Teamcenter server disk space is monitored hourly on the server in addition to the volume file server (BlueArc) and the Teamcenter team receives emails if the capacity exceeds capacity threshold limits. Storage capacity is not reported unless a threshold has been exceeded. Here are example emails when a threshold has been exceeded:

Server disk space email:

-----Original Message-----

From: [DISKSPACE-MONITOR@fnal.gov](mailto:DISKSPACE-MONITOR@fnal.gov) [mailto:[DISKSPACE-MONITOR@fnal.gov](mailto:DISKSPACE-MONITOR@fnal.gov)]

Sent: Friday, May 03, 2013 11:11 AM

To: David Lowell

Subject: TCAPP01P Low Disk Space Alert

TCAPP01P Low Disk Space Alert

Drive: C:

Percent Free: 47.72

Free Space(GB): 65.23

Total Space(GB): 136.69

Volume file server disk space email:

Server Attributes:				
Server name	ITNAS-A\ITNAS-A-1			
Company	Fermilab			
Department	Backup Archival Storage Services			
Contact 1	First Name: Ray	Last Name: Pasetes	Phone: 630-840- 5250	Email: <a href="mailto:rayp@fnal.gov">rayp@fnal.gov</a>
Contact 2	First Name: Andy	Last Name: Romero	Phone: 630- 840-4733	Email: <a href="mailto:romero@fnal.gov">romero@fnal.gov</a>
Location	PO Box 500, Kirk Road and Wilson Street, Batavia, IL, 60510, US			
Description	Titan3200			
Software version	8.2.2374.11 (built 2012-09-04 14:48:40+01:00)			
Hardware version	Titan (TN1CHRS0825957)			
MAC ID	89-F5-BB-CA-34-83			
Quota warning threshold was reached. Usage=340 GB (limit=400 GB).				
Volume	cd-r5sas-1			
VVol	CAD			

- Network Capacity – We monitor network capacity using a manual procedure performed by the Teamcenter administrator once a month or if users report any type of performance issue. This metric is not reported unless a threshold has been exceeded; This manual procedure is located here: [Network Monitoring](#)
- Server Memory – Teamcenter server memory is monitored hourly on the server and the Teamcenter team gets an email if the capacity exceeds threshold limits. We do not report this metric unless a threshold has been exceeded. Here is an example email when a threshold is exceeded:

-----Original Message-----

From: [WSS-MEMORY-MONITOR@fnal.gov.com](mailto:WSS-MEMORY-MONITOR@fnal.gov.com) [<mailto:WSS-MEMORY-MONITOR@fnal.gov.com>]

Sent: Monday, May 13, 2013 10:52 AM

To: David Lowell; Tony Metz; Robert A Andree; eso-wss

Subject: TEST TEST TEST - Low Memory Warning for TCAPP01P

Low Memory Warning for TCAPP01P :

Free RAM for TCAPP01P is now at 80.37 %

Free RAM size = 40.44 GB

Total RAM size = 50.32 GB

- Server CPU – We monitor Server CPU capacity using a manual procedure performed by the Teamcenter administrator once a month or if users report any type of performance issue. This metric is not reported unless a threshold has been exceeded; This manual procedure is located here:  
[Server CPU Monitoring](#)
- Web App Server – We monitor Web App Server capacity using the same process used with the User Seat License metric. This metric is not reported unless a threshold has been exceeded; we also have a manual procedure that can be performed by the Teamcenter administrator if needed. This manual procedure is located here:  
[Pool Manager Monitoring](#)

## Appendix A: Capacity Plan Approval

The undersigned acknowledge they have reviewed the **Fermilab Capacity Plan** and agree with the approach it presents. Changes to this **Capacity Plan** will be coordinated with and approved by the undersigned or their designated representatives.

Signature: Robert M. Harris Date: July 12, 2013  
Print Name: Robert M. Harris  
Title: Scientist II  
Role: IT Capacity Manager

Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
Print Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Role: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
Print Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Role: \_\_\_\_\_

## APPENDIX B: Capacity Reports

The following table summarizes the documents referenced in this document.

<b>Document Name and Version</b>	<b>Description</b>	<b>Location</b>
<i>Weekly EAS Operations Report</i>	<i>Teamcenter and associated engineering applications report showing service availability, licensing metrics, user metrics, monthly SLA reporting and service requests / incident close out reporting.</i>	<a href="#"><u>EAS Operations Folder</u></a>
<i>FermiDash Metrics</i>	<i>Teamcenter metrics located on the FermiDash web site</i>	<a href="#"><u>Teamcenter Data</u></a> <a href="#"><u>Teamcenter Licensing</u></a>
<i>Network Capacity Procedure</i>	<i>Document describing manual procedure to determine current network capacity</i>	<a href="#"><u>Network Monitoring</u></a>
<i>Server CPU Capacity Procedure</i>	<i>Document describing manual procedure to determine current server CPU utilization</i>	<a href="#"><u>Server CPU Monitoring</u></a>
<i>Web App Server Capacity procedure</i>	<i>Document describing manual procedure to determine current web app server capacity</i>	<a href="#"><u>Pool Manager Monitoring</u></a>