



Teamcenter Focus: File Management System Advanced Topics

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Presentation Topics



- ▶ FAQ
 - ▶ Sizing caches
 - ▶ Deployment
 - ▶ Configuring for SSL
- ▶ Troubleshooting
 - ▶ File access
 - ▶ Transient Volume
- ▶ Deployment Planning
- ▶ Feature Review and Plans
- ▶ Questions



FAQ: Sizing the caches



- ▶ Depends on the customer's size and change rate of the data
- ▶ Caches should be deployed to solve a problem, usually a WAN problem, or similar data concentration issue
- ▶ Make an initial guess, and then watch the hit rate to determine if more disk is needed.
 - ▶ Teamcenter 2005 default max fcc read cache size is 10MB
 - ▶ If the cache is too small, the file gets immediately generated – PR being resolved in 2005 SR1

- ▶ Test immediately by updating the cache size in fcc.ml
 - ▶ Simply uncomment....

```
<!-- <property name="FCC_MaxReadCacheSize" value="1G" overridable="true"/> -->
```
 - ▶ So it would be

```
<property name="FCC_MaxReadCacheSize" value="1G" overridable="true"/>
```
- ▶ Change settings in fmsmaster.xml for all clients to have same size



FAQ: Constraints on Deploying FSCs



- ▶ You can deploy FSCs on any of the supported platforms, and intermix them as needed without any constraint
 - ▶ You could have a Solaris volume server, a Windows cache server and a Linux client.
- ▶ The only constraint is that the FSC cache file ***must*** be on the ***same/local box***.
- ▶ You ***cannot*** NFS mount the cache directory.
- ▶ The volumes ***can*** be NFS mounted.



FAQ: Default Install setup



- ▶ Teamcenter Enterprise
 - ▶ Nothing as it is optional with 2005
 - ▶ Changing in future releases
- ▶ Teamcenter Engineering
 - ▶ Server setups a FSC for the default volume – “starter” configuration
 - ▶ No adjustment needed unless you want SSL support or have a complex environment
 - ▶ WAN environments would require additional FSCs to take advantage of caches
 - ▶ All clients are connected to the single FSC.
 - ▶ If upgrading, only the volumes on the host you are upgrading from are in FSC mount table. Others would be added manually
 - ▶ TcEng 2005 SR1 – this is simplified by TEM maintenance screens
- ▶ Both products have programs (like TcEng backup xml) that can be used to generate the volume/mount statements for the fmsmaster.xml file



FAQ: Updating fmsmaster.xml



- ▶ Manual update of fmsmaster.xml file required if...
 - ▶ TcEnterprise
 - ▶ Created the volume from TcEng Rich Client
 - ▶ From TcEng Rich Client will have a pop message reminder with text to cut/paste into file
 - ▶ From command line, only documentation tells you need to update fmsmaster.xml for any additional volumes
 - ▶ Upgrading TcEng with volumes on multiple hosts
 - ▶ If volume not accessible (or not on same host as the upgrade was performed), manual step to update
 - ▶ For TcEng 2005 SR1, new maintenance screens to help define other volumes/FSC



FAQ: FSC Resource Requirements



- ▶ Server resource requirements are primarily limited by the network bandwidth primarily, and secondarily by the disk.
- ▶ As a general rule, a 2.5GH+ windows box is sufficient for a 100MB LAN at saturation.
- ▶ One CPU on a Sun 440 box is generally sufficient on a 1+GB LAN at saturation.
- ▶ SSL and Wan acceleration function will increase the FSC resource requirements.
- ▶ FSC volume servers use very little memory.
- ▶ An FSC cache server generally will use 1GB of memory in 4 or more virtual mapped segment files, but can be configured at a few MB at a performance loss.



FAQ: HTTPS Support



- ▶ Documentation missing in TcEng 2005 but being added to TcEng 2005 SR1
- ▶ Configuration changes to support specifying the protocol in fmsmaster.xml
 - ▶ The FSC can also be configured to only use https:

```
<fsc id="myfsc2" address="https://myhost:4433">
```
 - ▶ Both protocols can be supported with an additional connection element:

```
<fsc id="myfsc3" address="myhost:4445">  
  <connection id="ssl" protocol="https" port="4433"/>
```
- ▶ Implementation changes to FSC, FSC proxy and FCC to use the HTTPS protocol (and specific port number used for HTTPS) when contacting an FSC
 - ▶ A list of URLs “http://host:port”, “https” is valid
 - ▶ Have to be concerned with FCC to FSC connections and whether protocols match else experience multiple hops



- ▶ Implementation changes to FSC to act as an HTTPS server, including certificate issues
 - ▶ Procedure for loading a certificate into the keystore:
 - ▶ The JDK keytool utility can be used to generate a key pair and certificate directly into a keystore by using the following command:
`keytool -keystore keystorefilename -alias aliasname -genkey -keyalg RSA`
 - ▶ *keystorefilename* is the filename into which the key pair and certificate information will be placed. The FSC will specify this file on the call to the Jetty SSL listener's setKeystore method.
 - ▶ *aliasname* is an arbitrary string that will be used for generating a certificate signing request (CSR). A CSR is not needed for testing purposes but is required when obtaining a trusted certificate from a Certificate Authority (CA).
 - ▶ When running keytool, you will be prompted to supply a password to access the keystore. This password will need to be supplied to the FSC to specify this value when calling the Jetty SSL listener's setPassword method. We will use Java properties to record this value (see below for details).
 - ▶ The keytool utility will also prompt for additional information such as first and last name, organization, city, state, and country. Only the "first and last name" is mandatory.
 - ▶ The final keytool prompt will ask for a key password to protect the private key. This key password will also need to be supplied to the FSC to specify this value when calling the Jetty SSL listener's setKeyPassword method. We will use Java properties to record this value (see below for details).



Troubleshooting: FSC Startup



- ▶ Failure starting FSC as service on windows, without startup log files being generated in FMS_HOME
(these are `${FSC_ID}stderr.log` and `${FSC_ID}stdout.log`)
 - ▶ Service was installed with wrong FMS_HOME JAVA_HOME values
 - ▶ FMS_HOME or JAVA_HOME are pointing to a network share or mapped drive. (and the service userid does not have access to the network shares, or mapped drives at system bootup)
 - ▶ If the FSC service was installed using the installfsc script, the user login info must be updated via the service control panel
(else it runs as the SYSTEM account, and therefore has no, or very limited, network connectivity)

- ▶ Failure starting FSC as service on windows, with startup log files generated in FMS_HOME:
(these are `${FSC_ID}stderr.log` and `${FSC_ID}stdout.log`)
 - ▶ What are the errors indicated in the log files?
 - ▶ Bad xml? (due to hand edits)
 - ▶ Improper userid/login info (should be the same as the installing userid and TcFS)
 - ▶ Wrong volume paths? Volume root paths must exist, and have certain privileges. Could also be wrong directory permissions.
 - ▶ Invalid cache locations? (should be local)



Troubleshooting: Runtime



- ▶ No route to enterprise / volume:
 - ▶ Is the enterprise id the local one?
There has been an update to the volume without the appropriate changes to the fmsmaster.xml file (or the FSCs have not be cycled after the fmsmaster.xml changes)
 - ▶ The enterprise is not the local enterprise.
Add 'default' multisite info for the site to the fmsmaster.xml: (easier, and does not need updates every time a volume is added to the 'other' site)

```
<fmsworld>  
  <multisiteimport siteid="othersiteid">  
    <defaultfscimport fscid="myotherfsc" fscaddress="https://someserver:6666"/>  
  </multisiteimport>  
  <fmsenterprise id="localsiteid">
```

- ▶ Or add specific volume info: (much harder to maintain as it does not stay up-to-date as volumes are added to the 'other' site)

```
<fmsworld>  
  <multisiteimport siteid="othersiteid">  
    <fscimport fscid="myotherfsc" fscaddress="127.0.0.1:6666">  
      <volumeimport volumeid="myothervolid"/>  
      <transientvolumeimport volumeid="myothertransvalid"/>  
    </fscimport>  
  </multisiteimport>  
  <fmsenterprise id="localsiteid">
```



Troubleshooting: Runtime



- ▶ Other hard to diagnose FSC FCC connectivity issues:
 - ▶ Firewalls, firewalls, or firewalls. (even when you don't think you have a firewall)
 - ▶ 127.0.0.1 and localhost should never be used in fmsmaster.xml files.
(or clientmaps, excluding the 'catch all' mask="0.0.0.0")
 - ▶ FSCs on notebooks (where IPs change – FCCs or other FSCs do not know of changed IPs)
 - ▶ FCCs on notebooks (where IPs change – the fmsmaster.xml client maps must have mappings for all possible FCC IPs)



Troubleshooting: Runtime



- ▶ "no write access to any volume"
 - ▶ Technically, a tcfs error not FMS
 1. tcfs is not running
 2. there are no volumes configured
 3. the volumes that are configured do not allow access by the user that is logging in and trying to use them
- ▶ "No route available for enterprise"
 - ▶ The fmsmaster.xml file has either not been updated with the proper volume information or the FSC has not been stopped and restarted since updating the config file
- ▶ "java.lang.NoClassDefFoundError" when starting the client
 - ▶ Typically FMS_HOME is incorrect (or not even set)
 - ▶ Possibly FMS_HOME is pointing to the FMS directory for the FSC and not the one for the FCC (which should be in \$TC_ROOT/portal/fms)
- ▶ Error -2996
 - ▶ One possible reason for this error is that there is a firewall between the client and the server which is preventing the FCC from sending its request to the FSC



Troubleshooting: Transient volume



- ▶ The transient volume id is a hash based on the values of the Transient_Volume_RootDir, Transient_Volume_Installation_Location and siteID (the first two items being preferences residing in the database).
- ▶
- ▶ If any of these values change, then the ID of the transient volume will change.
- ▶ Must update fmsmaster.xml manually



Deployment Planning



- ▶ Process
- ▶ Requirements
- ▶ “Rules of Thumb”
- ▶ Continued Monitoring
- ▶ FSC Restrictions



Deployment Planning: Process



- ▶ FSC Deployment Planning
 - ▶ Driven by Complexity
 - ▶ Global Distribution, Number of Systems
 - ▶ Driven by Desired Performance and Reliability
 - ▶ *Construct Deployment Diagram*
- ▶ FSC Deployment
 - ▶ Deployment and Verification
- ▶ FSC Monitoring
 - ▶ FSC Load, Performance and Reliability
 - ▶ On Going FSC Monitoring Plan



Deployment Planning: Requirements



- ▶ Depends on the size/complexity of your deployments
- ▶ Issues
 - ▶ Geographic Distribution
 - ▶ LAN/WAN
 - ▶ Cache Servers
 - ▶ FSC Load
 - ▶ Number of Deployed Systems / Multi-Site
 - ▶ Reliability / Fail Over
 - ▶ Client Assignment to FSC Servers
 - ▶ FMS Configuration Management
 - ▶ 4-Tier vs 2-Tier Deployments
 - ▶ Firewall Requirements



Deployment Planning: “Rules of Thumb”



- ▶ Deploy FSCs that Mount all the Volumes
 - ▶ Deploy on Server Class Computers for Performance and Fail Over
- ▶ Deploy an FSC at Remote Sites
 - ▶ Wan Enabled
- ▶ Deploy a proxy FSC at the Firewall for Internet Access
 - ▶ Requires one Open Port
 - ▶ SSL Enabled Via FSC or Existing Hardware
- ▶ Configure Central LAN users for Direct FCC Access with Fail over
- ▶ Configure Web Users for Default FSC
- ▶ Configure Remote Users to Local Cache FSC
- ▶ 4-Tier - Deploy One FSC per Teamcenter Server Pool
 - ▶ Required for Vis and Web, Transient Server
- ▶ Configure Reliable FSC Configuration Server



Deployment Planning: “Rules of Thumb”



- ▶ Multi-Site Processes
 - ▶ Requires TcEng 2005 to TcEng 2005 Replication
 - ▶ “Import” FSC from Communicating Sites
- ▶ Multi-Site Clients
 - ▶ Rich & Thin Clients Can operate with same “Import” FSCs
 - ▶ Direct Connection Work Around
 - ▶ Restart FCC Using an FCC_CONFIG file for each Database



Deployment Planning: “Rules of Thumb”



- ▶ Client Configuration Download
 - ▶ Configure WEB Users Bootstrap With Preference
 - ▶ Configure Rich Client Users Bootstrap via fcc.xml
- ▶ Client Assignment
 - ▶ Assign Clients by IP Mask
 - ▶ Assign LAN Clients to Main FSC Volume Group
 - ▶ Direct Access to FSCs by Default
 - ▶ Assign Remote Users to the Local FSC Cache
 - ▶ Assign Web Users to Default FSC



Deployment Planning: Continued Monitoring



- ▶ FSCADMIN
 - ▶ Volume Server Statistics
 - ▶ Throughput Measures
 - ▶ Cache Server Statistics
 - ▶ Throughput Measures
 - ▶ Cache hits/misses
- ▶ Modify Configuration Based On Observed Statistics



Deployment Planning: FSC Restrictions



- ▶ FSC cache has to be on the same box
- ▶ Routing
 - ▶ Good Routing Within a Database Configuration
 - ▶ Minimal Routing Between Databases
- ▶ Cannot Route Directly to Volume Servers in Other Databases
 - ▶ Causes Double Hop
- ▶ All PR and will be addressed in future releases/MPs



What's new in Teamcenter 2005 SR1



▶ Core

- ▶ We did volume failover and we enabled large (terabyte) cache sizes.
- ▶ Behind the scenes, we added support for new platforms (Linux, Win64), we added common ticket libraries, we added the Native FCC, solved a bunch of v9 crises, and added a number of smaller items for GM. I don't think any of that is really worth advertising, though it shows we are moving forward. Native FCC is interesting to some, but it's not exposed until PLM1.

▶ Engineering

- ▶ Admin screens



FMS Feature Review and Plans



- ▶ Client Support
- ▶ Administration Support
- ▶ Volume Support
- ▶ Volume Management Support
- ▶ Routing Support
- ▶ Cache Control
- ▶ Configuration Control
- ▶ Background Process Infrastructure



- ▶ Teamcenter 2005
 - ▶ Uses Multi-Site Imports
 - ▶ Primary Database
 - ▶ Routes to Other Databases
- ▶ PLM/x
 - ▶ Direct Connect to Multiple Databases with Single FCC
 - ▶ Switch Rich Client Database Transparently
 - ▶ Direct Connect to Multiple Databases
 - ▶ Direct Access for File Object Stubs to Owning Databases



Administration Support



- ▶ Teamcenter 2005
 - ▶ Initial Install
 - ▶ Auto-Gen initial fsmaster.xml
 - ▶ TcEng 2005 SR1
 - ▶ New maintenance UI via TEM
 - ▶ File Stores Groups
 - ▶ Multisiteimport Statement automation
 - ▶ Volume and FSC creation and association
- ▶ PLM/x
 - ▶ Enhance TEM Capability
 - ▶ Edit FMS Configuration
 - ▶ Integrate with Teamcenter Volume UI
 - ▶ Auto-Add Volumes to fsmaster.xml
 - ▶ Coordinate Multiple Database fsmaster.xml files



Volume Support



- ▶ Teamcenter 2005
 - ▶ Streaming Download/Upload
- ▶ PLM/x
 - ▶ Staged Upload
 - ▶ To Local Temporary Volume
 - ▶ Later Delivery/Move file to End Volume



Volume Management Support



- ▶ Teamcenter 2005
 - ▶ Based on Standard Teamcenter Group / Defaults
- ▶ PLM/x
 - ▶ Volume Overflow Policies
 - ▶ Improved File Consolidation Support
 - ▶ Policy Based Volume Selection



Routing Support



- ▶ Teamcenter 2005
 - ▶ Single Database Capability
 - ▶ Limited Routing Control Between Databases
 - ▶ 2005 SR1
 - ▶ Failover Capability
 - ▶ Load Balancing Capability
- ▶ PLM/x
 - ▶ Multiple Database Capability
 - ▶ Shared FSC Servers
 - ▶ Dynamic Routing



Cache Control



- ▶ Teamcenter 2005
 - ▶ Controlled By Routing
 - ▶ Purge Entire Cache or Single GUID
- ▶ PLM/x
 - ▶ Cache by Wan Connection
 - ▶ Zero cache at Proxies
 - ▶ Pre-Populated Cache
 - ▶ Integrate with Teamcenter scheduler
 - ▶ Side Look to Pre-Populated Cache



Configuration Control



- ▶ Teamcenter 2005
 - ▶ Manual FSC Restart
 - ▶ Manual FCC Restart
- ▶ PLM/x
 - ▶ Triggered FSC Propagation
 - ▶ Automatic FCC Re-sync



Background Process Infrastructure



- ▶ Teamcenter 2005
 - ▶ FMS Provides Bootstrap, Configuration Management and Multi-Hop File Access
- ▶ PLM/x
 - ▶ Re-factor these Functions to Reusable Components
 - ▶ Centralized Configuration Manager
 - ▶ Distributed Log Manager
 - ▶ On Node Service Manager
 - ▶ Bootstrapping for all Services
 - ▶ Multi-Hop for All Services
 - ▶ Node Level Monitoring of cpu/memory/disk
 - ▶ Standardized Service Monitoring
 - ▶ Feedback for Teamcenter Scheduler for Load Balancing



Summary



- ▶ Walk away with answers to most frequently asked questions and trouble shooting tips
- ▶ See the improvements and future direction to FMS



For Additional Information...



On the Web at <http://www.ugs.com/>

The screenshot shows the UGS website homepage. At the top, there are links for 'Site Map', 'Contact Us', a search bar, and a 'Go' button. Below that is a 'Select a Country' dropdown menu set to 'United States'. A navigation bar contains 'About Us', 'Products & Solutions', 'Partners', and 'Training & Support'. The main content area features a large article titled 'Tecnomatix Proven Success at Mack Trucks:' with bullet points: 'Optimized plant layouts in record time' and 'Realized significant time and cost savings'. There are buttons for 'Proven Success: Mack Trucks' and 'More about Tecnomatix'. Below this is a section titled 'Our Approach to Product Lifecycle Management' with a circular diagram showing stages: 'INNOVATE & SPECIFY', 'PLAN', 'MANAGE & COLLABORATE', 'BUILD', 'PRODUCE & DELIVER', and 'SERVICE & SUSTAIN'. To the right are 'Top News' and 'Events & Promotions' sections with 'View All' links. The footer contains copyright information and links for 'Legal & Privacy' and 'Report Piracy'.

Product Lifecycle Management

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Question and Answer





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