



Cisco Tidal Enterprise Scheduler – part #2

TES Engineering 7.06.2012

Rev 2.0



Agenda

Agenda

- Engineering Sessions
 - Revisit a feature/function question from last week
 - Deliver a series of engineering sessions to discuss
 - Technical/architectural changes with TES 6
 - Upgrade process – primary focus at high level, not step by step
 - Performance optimization for TES 6
 - Focus primarily of system components and architecture versus feature / function.
 - Aim for an interactive session – Chat questions to the moderator and panelist will review and elaborate as appropriate.
 - Dedicate 50% of the time for Q/A



TES 6.x Release Schedule

Cisco TES Releases

(*Subject to Change)



Self-Service
Big Data / Hadoop
Cloud Agents/Storage
Mobile Client



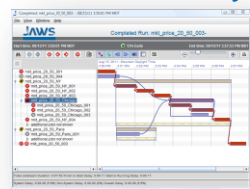
*6.1

6.0.3

REST Adapter
Job-Based Timezones
Resource Constraints

JAWS
for
Cisco®
TES

Predictive Analytics
Historical Analytics



6.0.2

JDBC
VMware
JDE

6.0.1

BO
PSFT
COGNOS
Informatica

6.0

Web based client
SOAP/REST API, Agentless Scheduling, JMS,
FTP, SFTP, SAP, EBSO, Oracle DB, MS SQL, etc.

Note: Bridge-based adapters supported





Last week's feature/function question

TES 6 – Deriving the runtime users for a job 1/2

Run time users*

- Associated to the OWNER of the job – will change based on current job owner.
- Simplest form, if the job is owned by a specific user, then the runtime users list is based on the runtime users associated with that user.
- If the job is owned by a TES workgroup, then the runtime users list is based on all the runtime users that are available to the “collection” of runtime users available to all members of the TES workgroup.

1a

2a

Examples

- If the job is owned by UserX, then the runtime user available is “Jane”.
- If the job is owned by the TES workgroup Finance, then the runtime users list is: Jane, Suzy, Sally, Matt, Mark – essentially a collection of the runtime users from the various members of the TES workgroup

1b

2b

TES Workgroup: Finance

Interactive Users: UserX, UserY, UserZ

UserX

Runtime user: Jane

UserY

Runtime user: Suzy, Sally

UserZ

Runtime user: Matt, Mark

**NOTE: as in 5.3.1, the current user is also a viable runtime user*

TES 6 – Deriving the runtime users for a job 2/2

Run time users*

- Associated to the OWNER of the job – will change based on current job owner.
- If the job is owned by a LDAP group then the runtime users list is based on the runtime users associated with that LDAP group.
- If the job is owned by a member of the LDAP group, then the runtime users list is based on all the runtime users that are available to that user.

3a

4a

Examples

- If the job is owned by PSTeam, then the runtime user available include “Ralph, Rudy, Randy”
- If the job is owned Juan, then the runtime users list is: “Suzy, Sally”

3b

4b

LDAP group: PSTeam

LDAP Members: Patti, Juan
Runtime Users: Ralph, Rudy, Randy

Patti

Runtime user: Jane

Juan

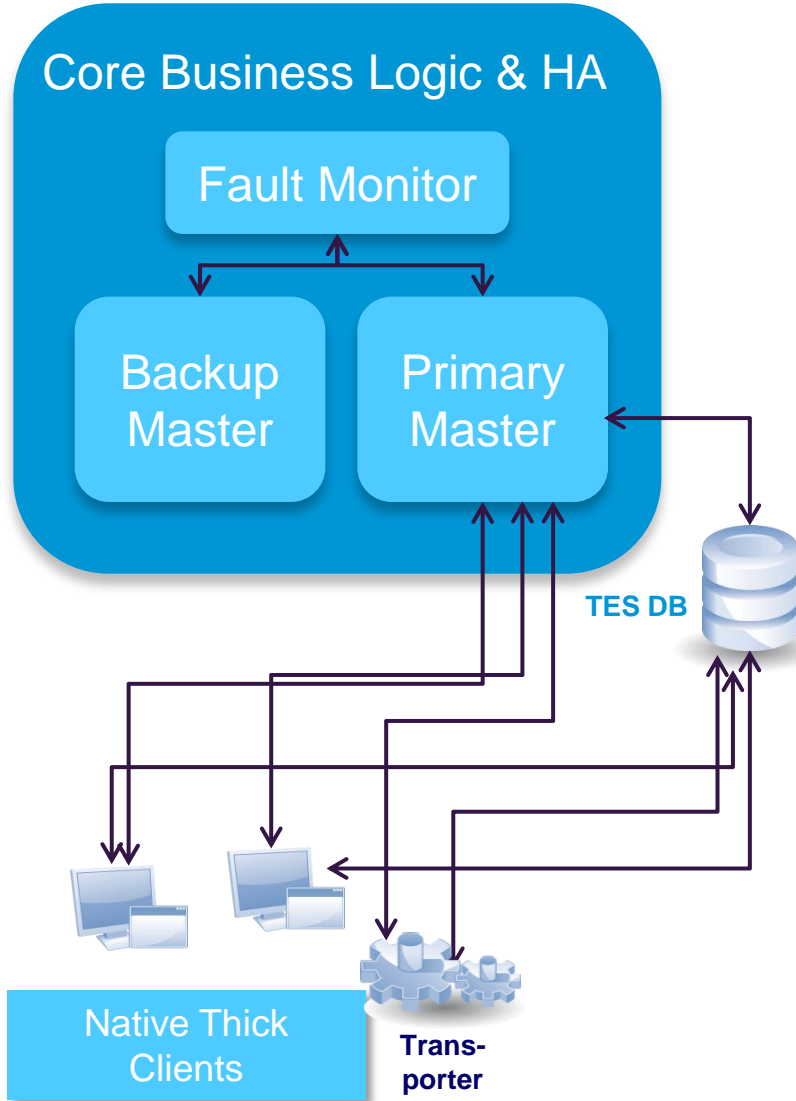
Runtime user: Suzy, Sally

**NOTE: as in 5.3.1, the current user is also a viable runtime user*

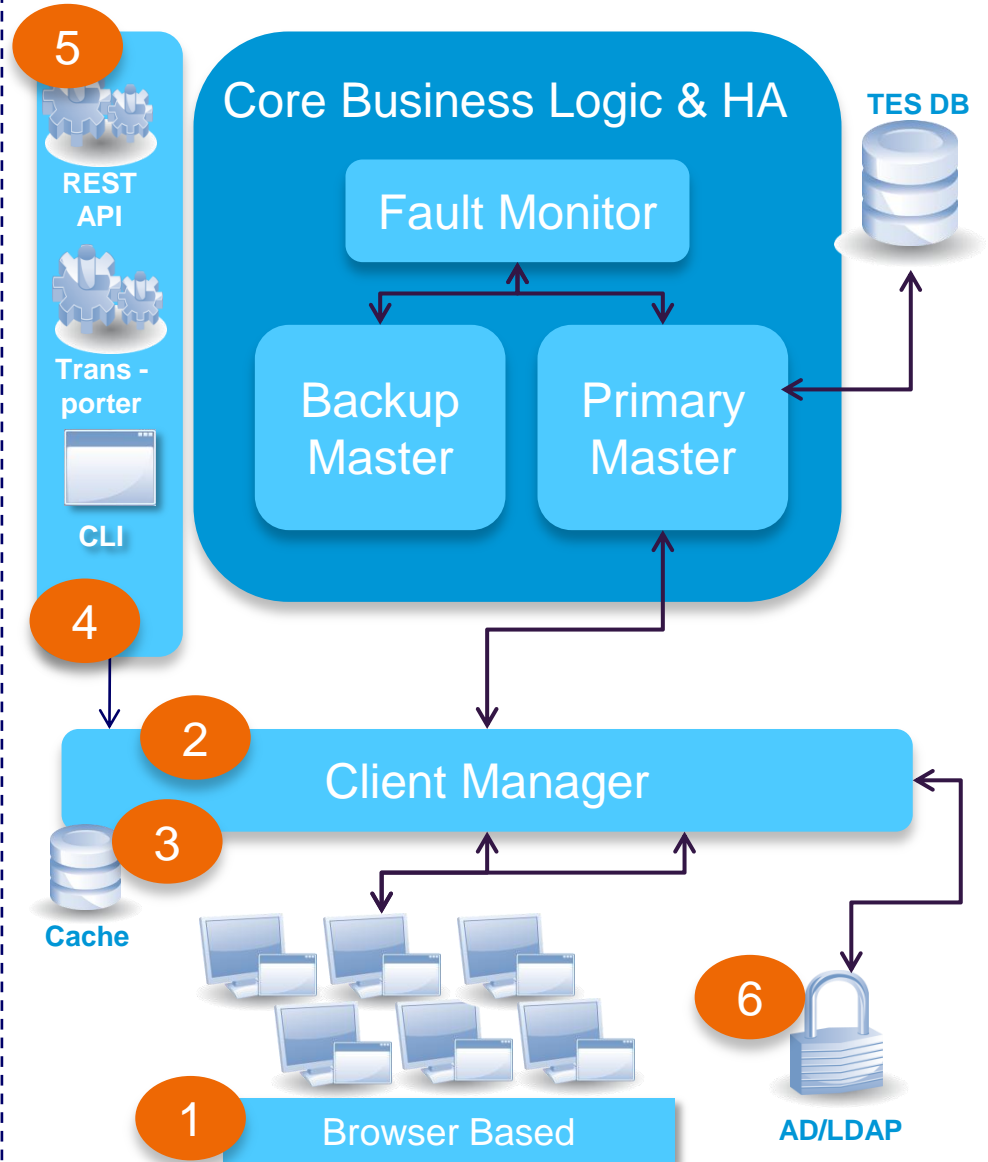
TES 5.3.1 -> 6.x

Mini re-cap from last week

TES 5.3.1



TES 6



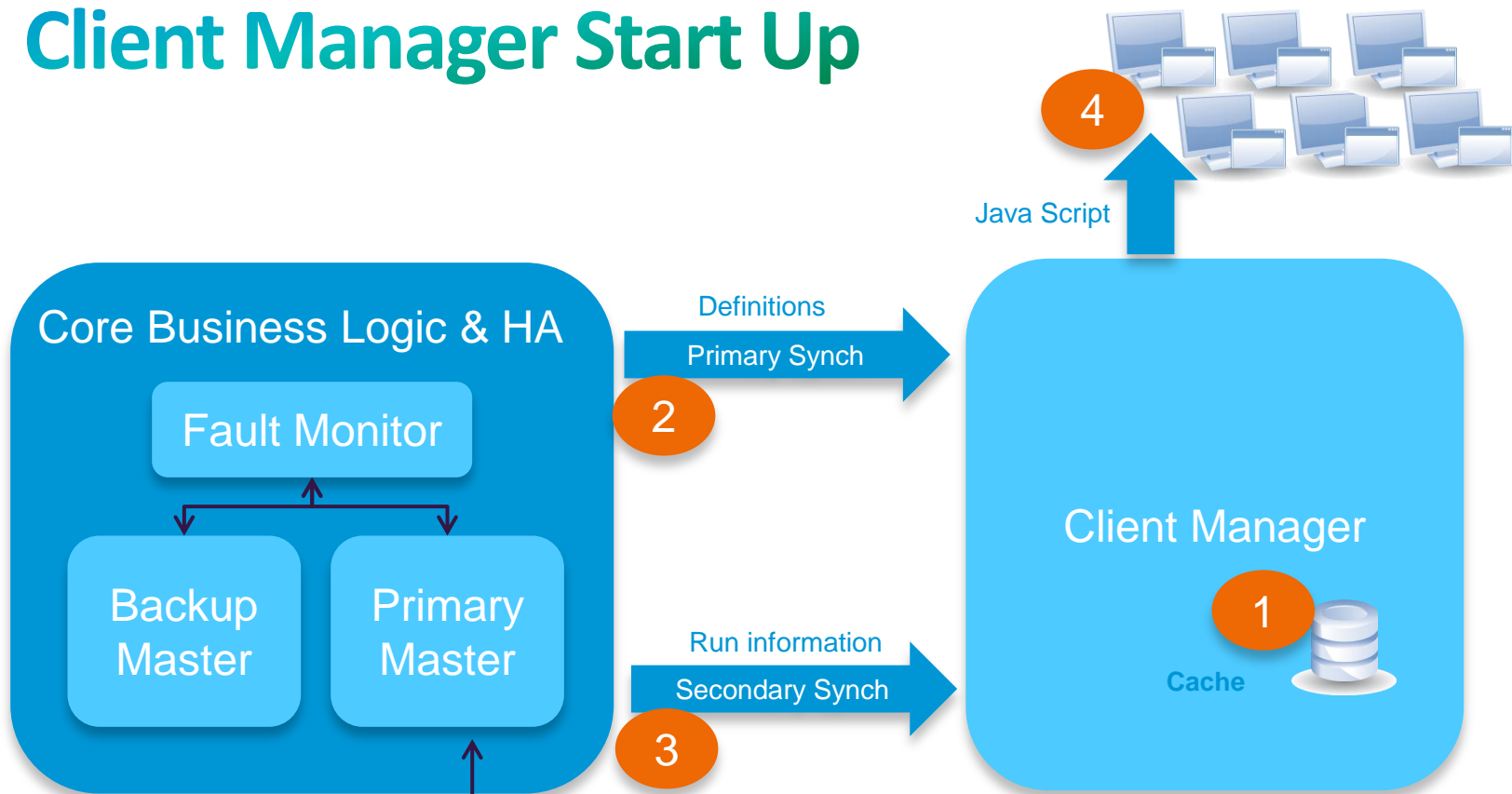
Reminders

- Must be on TES 5.3.1 before TES 6x upgrade
- Upgrade all TES agents – must be TES 3 agent for TES 6x
- Engage TAC/Support to learn of any hotfixes/patches of interest
- Do the upgrade in a non-production environment first
- Limit your history retention – expect the synchronization process to take time – Best Practice 30 days limit
- Evaluate early in the process if you want to externalize the Client Manager database
- Do not add additional client managers unless required by your business
- IE 9 has proven to be much faster than IE 7/8 (consider using FF if IE9 is not an option)
- Know the system requirements of the various components – don't cut corners on memory requirements; know the system and software version requirements
- Engage directory services team for AD/LDAP information
- Make backups of all systems/databases/etc
- Engage services to assist in the process
- **IMPORTANT NOTE:** Currency of platform & application support will be done on the latest version of TES 6; If you are considering app/platform upgrades and are running TES 5.3.1 – please contact support to confirm support

Step 1 – Upgrading the master from 5.3.1

- Read the upgrade docs for some additional sys/db admin tasks (else the upgrade will fail)
- The TES 6x master database has a different data model than 5.3.1
- After the new 6x software is installed, you can start the TES master
- The TES master will update the 5.3.1 database to be 6x compliant upon initial master startup
- The time required for data model update will vary based on the size/type of data encountered – 20 minutes is not uncommon - (best practice: eliminate non critical data and limit your data retention to 30 days)
- Job definitions should not require manually modification (unless the integration technology has changed – such as bridge solution connector to TES adapter)

Client Manager Start Up



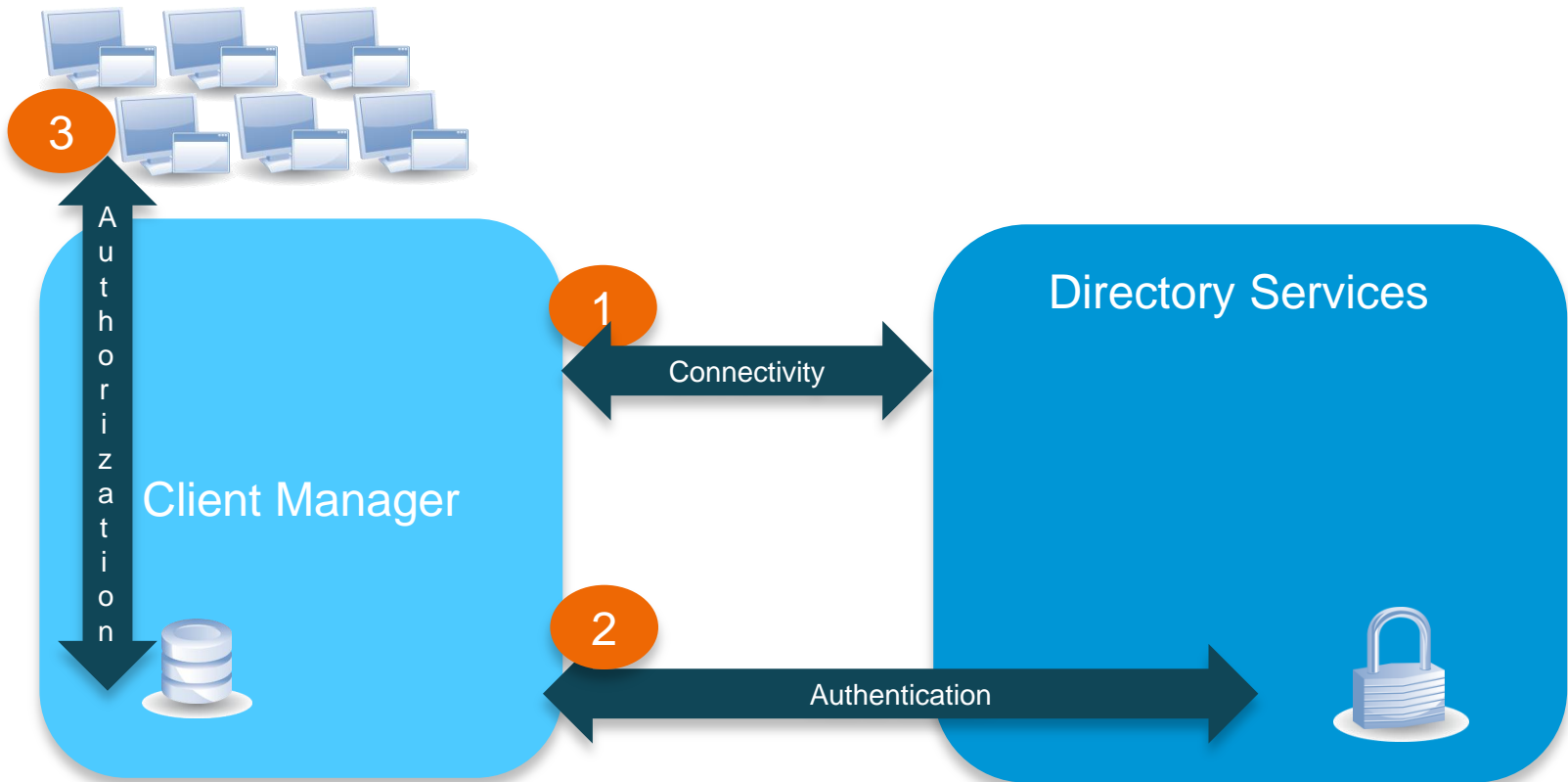
- 1. Should take seconds for the Derby DB to be created
- 2. Should take minutes for object definitions to be transferred
- 3. Can take 1-2 hours depending on data size
- 4. This takes place only at initial startup or if the browser cache is cleared

Step 2 – Installing & Starting the client manager – what can I expect

- Read the docs and confirm system configuration/etc
- Derby cache creation. Assuming the internal Derby database (cache) is used, the Derby database will be automatically created within the client manager server at initial startup. The approximate time required to create the cache is very fast (likely seconds).
- The primary synchronization will now take place. This step will move the “definition” data from the TES master database to the cache. The approximate time will vary based on the number of object/job definitions. Even on large number of job definitions, this should be 5-10 minutes. You will not be able to log into the client until this completes. The log file will have “*..primary objects synchronized..*”, “*..adapters initialized..*”, “*..client initialized..*” message logged when complete.
- The secondary synchronization will take place after the primary synchronization completes. This step will generally take more time and varies based on the history retention of your TES master. You can estimate the time required by inspecting your TES master database and applying a rule of 300 data rows per second. The rows would include: msglog, job runs, job output, event triggers.
- The completion of the secondary synch can be determined by log message of “*.. Secondary objects synchronized..*”
- NOTE: externalizing the cache via SQL or Oracle resulted in secondary synch of 1/3 of the time compared to Derby

Logging On

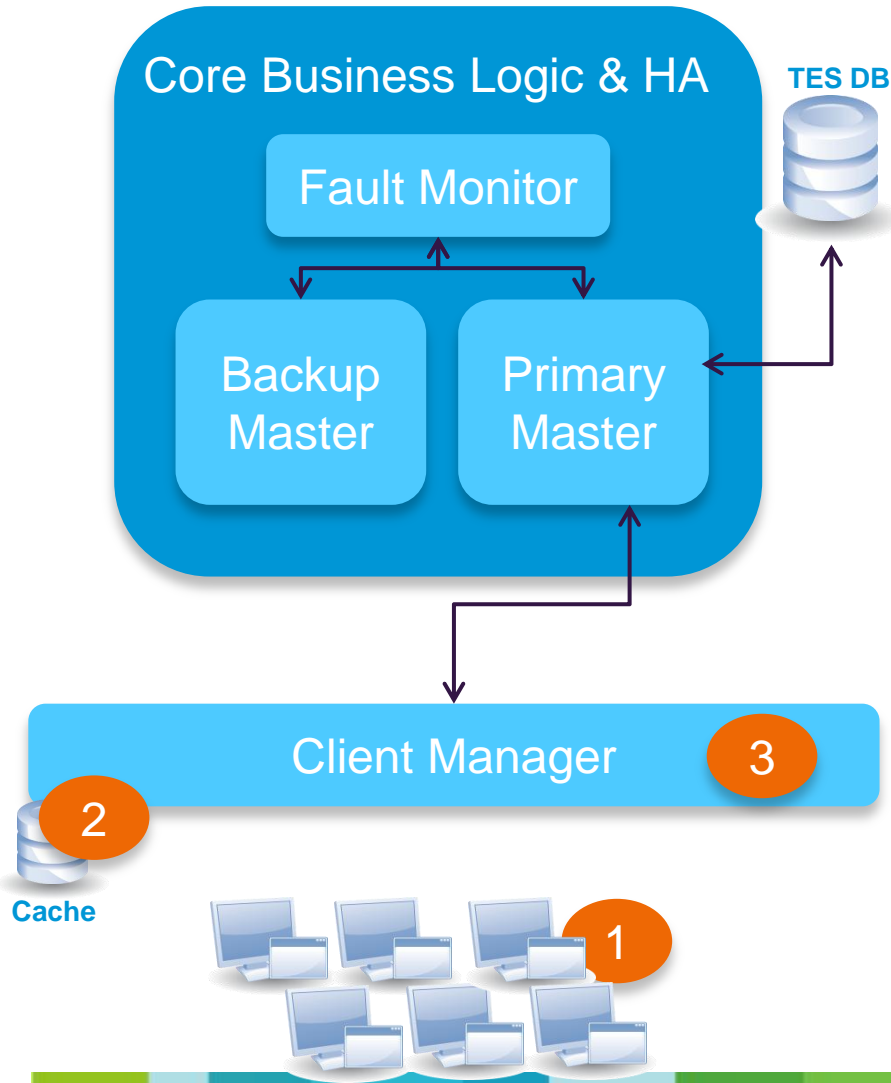
1. Connectivity – Client Manager connectivity with AD/LDAP
2. Authentication – Can AD/LDAP authenticate the user
3. Authorization – Is the user authorized to use TES



Step 3 – Logging onto the Client Manager

- TES 6 uses AD/LDAP
- There are 3 things to keep in mind: Connectivity to AD/LDAP, Authentication and Authorization
- Connectivity Issue: If user is prompted for credentials but client appears to “wait forever” – this might be due to mis-configured AD/LDAP information. Client manager log file should note *an error connecting or query to AD/LDAP server*.
- Authentication Issue: Authentication is performed to verify that the user is a configured user in AD/LDAP and that the proper password is entered. If the user receives “*..a username and password are being requested..*” dialog box, then the cause might be an invalid user or mis-configured domain during client manager installation.
- Authorization Issue: This step is done by the Client Manager to confirm that the user is a valid TES user. If the user receives “*..sorry you do not have permissions..*” dialog box, then the cause is likely that the user is not configured within TES.

Performance & Optimization



What is the issue?

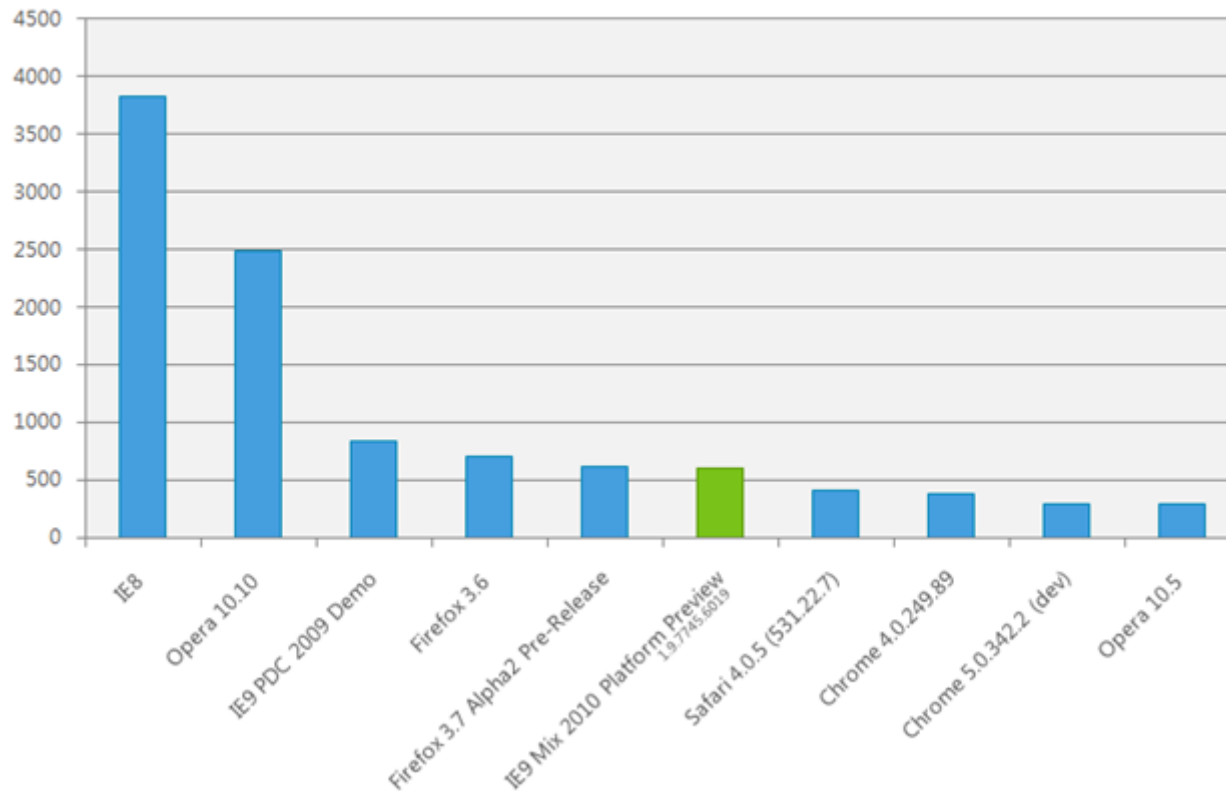
- Isolating the opportunity – very first step
- Components of interest
 - Browser or user system
 - Database cache
 - Client manager tuning
- If the user is experiencing a slow TES client regardless of activity – including starting a dialog of create a brand new job – There could be issue with the Browser or the client system. Likely not client manager or DB related.
- If the user experiences a slow refresh on “query” type of actions, such as “filter” operations in the JAC, then it is possible that the Derby DB may be the limit – consider switching to SQL or Oracle. For certain filter actions, we’ve seen many-fold improvement with SQL/Oracle.
- If the user experiences general slowness when opening an existing job definition, if the cache is external, one test is to query the DB and assess the DB performance. Also check the latency between the DB and the client manager.
- If you believe the client manager needs tuning... see the next slides

Browsers

<http://blogs.msdn.com/b/ie/archive/2010/03/18/the-new-javascript-engine-in-internet-explorer-9.aspx>

WebKit SunSpider JavaScript Benchmark Results

Version 0.9.0, Results Generated March 11th 2010



Small Deployment

8GB Memory, 2 Core, 5-10 concurrent users, < 4GB database

tes-6.0.0.0.dsp

```
CacheSynchronizer.NumThreads=2
DataCache.ReadConnectionsMin=5
DataCache.ReadConnectionsMax=10
DataCache.WriteConnectionsMin=5
DataCache.WriteConnectionsMax=10
DataCache.PageCacheSize=16384
DataCache.ConnectionPoolMinSize=5
DataCache.ConnectionPoolMaxSize=10
DataCache.StatementCacheSize=750
ClientNode.MinSessionPoolSize=5
ClientNode.MaxSessionPoolSize=10
ClientNode.MaxConcurrentMessages=10
```

clientmgr.props

```
JVMARGS=-Xms4096m -Xmx4096m -
XX:PermSize=128m -XX:MaxPermSize=128m
```

```
ClientSession.MinSessionPoolSize=5
ClientSession.MaxSessionPoolSize=10
ClientSession.MaxConcurrentMessages=10
DataSource.MinSessionPoolSize=5
DataSource.MaxSessionPoolSize=10
DataSource.MaxConcurrentMessages=10
```

master.props

```
MessageBroker.MemoryLimit=256
MessageBroker.StoreLimit=4096
ClientConnection.MinSessionPoolSize=5
ClientConnection.MaxSessionPoolSize=10
ClientConnection.MaxConcurrentMessages=1
0
```

Medium Deployment

16GB Memory, 4 Core, 10-20 concurrent users, < 16GB database

tes-6.0.0.0.dsp

CacheSynchronizer.NumThreads=4
DataCache.ReadConnectionsMin=10
DataCache.ReadConnectionsMax=20
DataCache.WriteConnectionsMin=10
DataCache.WriteConnectionsMax=20
DataCache.PageCacheSize=131072
DataCache.ConnectionPoolMinSize=10
DataCache.ConnectionPoolMaxSize=20
DataCache.StatementCacheSize=1500
ClientNode.MinSessionPoolSize=10
ClientNode.MaxSessionPoolSize=20
ClientNode.MaxConcurrentMessages=10

clientmgr.props

JVMARGS=-Xms8192m -Xmx8192m -
XX:PermSize=256m -XX:MaxPermSize=256m

ClientSession.MinSessionPoolSize=10
ClientSession.MaxSessionPoolSize=20
ClientSession.MaxConcurrentMessages=10
DataSource.MinSessionPoolSize=10
DataSource.MaxSessionPoolSize=20
DataSource.MaxConcurrentMessages=10

master.props

MessageBroker.MemoryLimit=512
MessageBroker.StoreLimit=16384
ClientConnection.MinSessionPoolSize=10
ClientConnection.MaxSessionPoolSize=20
ClientConnection.MaxConcurrentMessages=10

Large Deployment

32GB Memory, 8 Core, 50-100 concurrent users, > 32GB database

tes-6.0.0.0.dsp

CacheSynchronizer.NumThreads=8
DataCache.ReadConnectionsMin=50
DataCache.ReadConnectionsMax=100
DataCache.WriteConnectionsMin=50
DataCache.WriteConnectionsMax=100
DataCache.PageCacheSize=1048576
DataCache.ConnectionPoolMinSize=20
DataCache.ConnectionPoolMaxSize=40
DataCache.StatementCacheSize=7500
ClientNode.MinSessionPoolSize=50
ClientNode.MaxSessionPoolSize=100
ClientNode.MaxConcurrentMessages=10

clientmgr.props

JVMARGS=-Xms24576m -Xmx24576m -
XX:PermSize=512m -XX:MaxPermSize=512m

ClientSession.MinSessionPoolSize=50
ClientSession.MaxSessionPoolSize=100
ClientSession.MaxConcurrentMessages=10
DataSource.MinSessionPoolSize=50
DataSource.MaxSessionPoolSize=100
DataSource.MaxConcurrentMessages=10

master.props

MessageBroker.MemoryLimit=1024
MessageBroker.StoreLimit=65536
ClientConnection.MinSessionPoolSize=50
ClientConnection.MaxSessionPoolSize=100
ClientConnection.MaxConcurrentMessages=10

Other Settings

SyncCache=Y

If “N” then the cache will not be sync’d on startup.

CacheSynchronizer.Purge=Y

If “N” then phantom records in the cache will not be purged. Phantom records are left in cache if corresponding records were deleted on the Master while the Master and CM were disconnected.

CacheSynchronizer.StreamCommitSize=1000

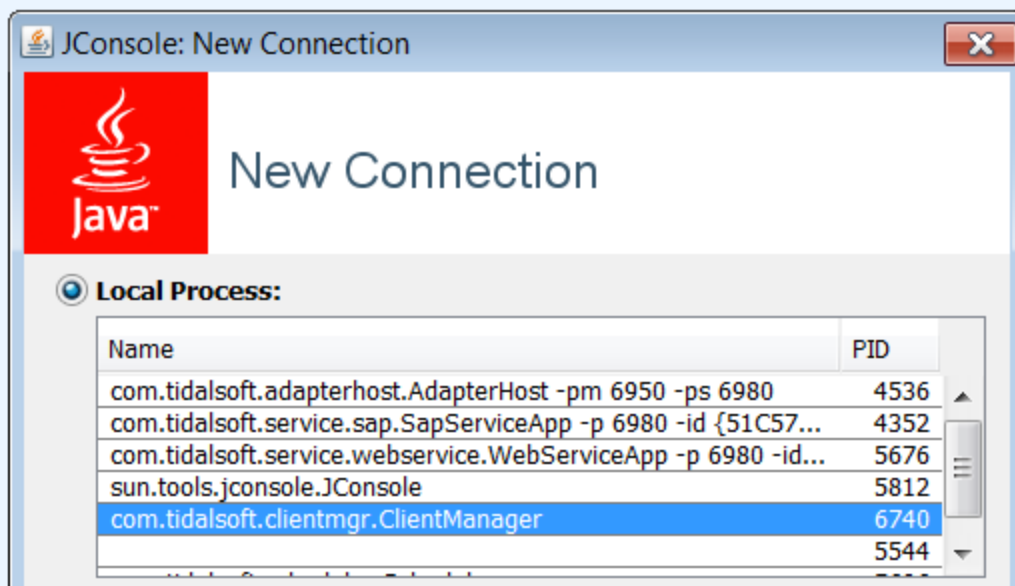
Controls how many records are written to the cache in one batch. Don’t need to tweak this usually.

JConsole - Connecting

Before connecting JConsole to the CM/Master, make sure the following property is set in clientmgr.props/master.props.

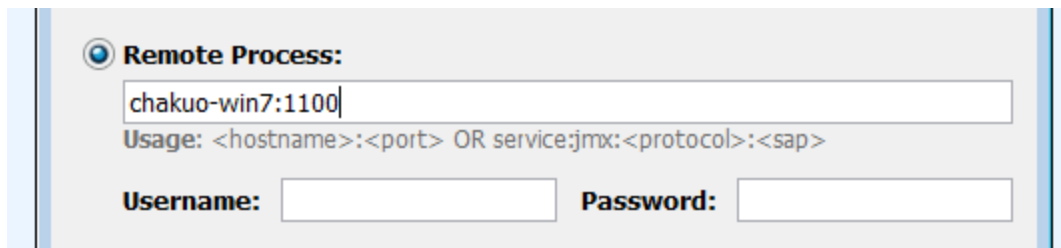
JmxOn=N

If you are running JConsole on the same machine as the JVM, the JVM will be listed as a connection in JConsole.



JConsole - Connecting

If connecting JConsole to a JVM running on another machine, type in the remote machine host name and port (CM default port is 1100).

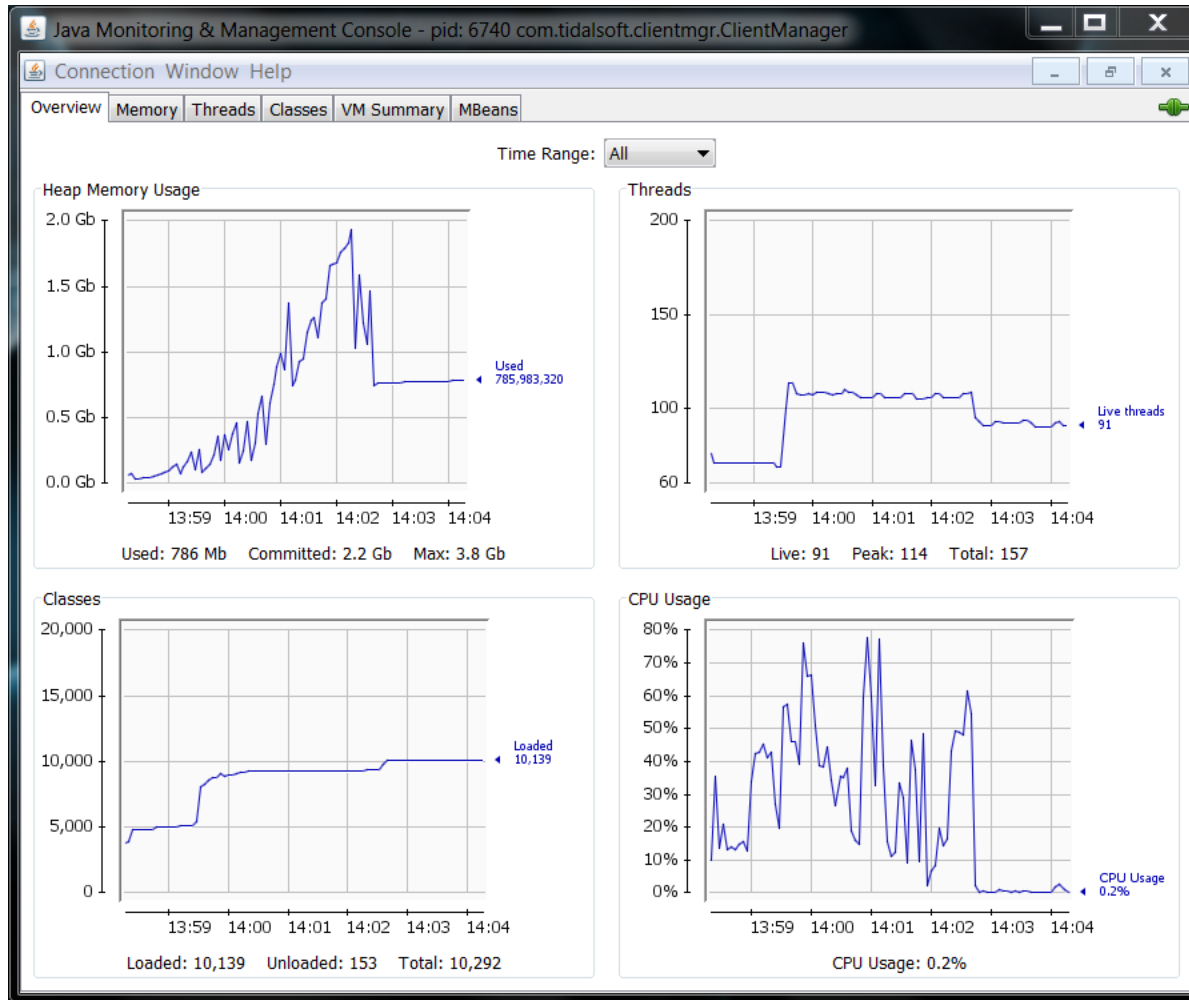


The screenshot shows the 'Remote Process' dialog box in JConsole. It features a radio button selected next to the 'Remote Process:' label. Below this is a text input field containing 'chakuo-win7:1100'. Underneath the input field is the usage instruction: 'Usage: <hostname>:<port> OR service:jmx:<protocol>:<sap>'. At the bottom, there are two input fields labeled 'Username:' and 'Password:'.

You can change the default JMX port for the JVM by setting the following property in clientmgr.props/master.props.

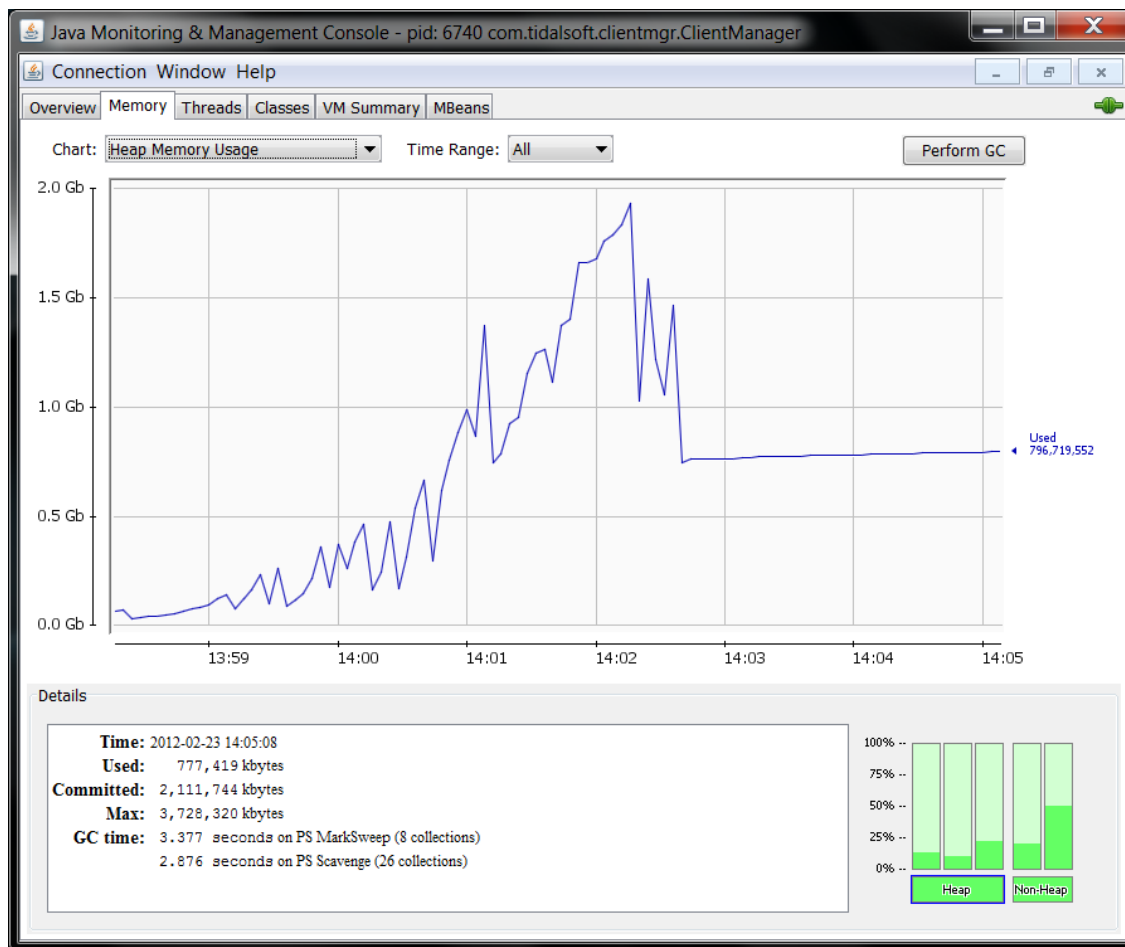
JmxRmiPort=1200

JConsole – VM Summary



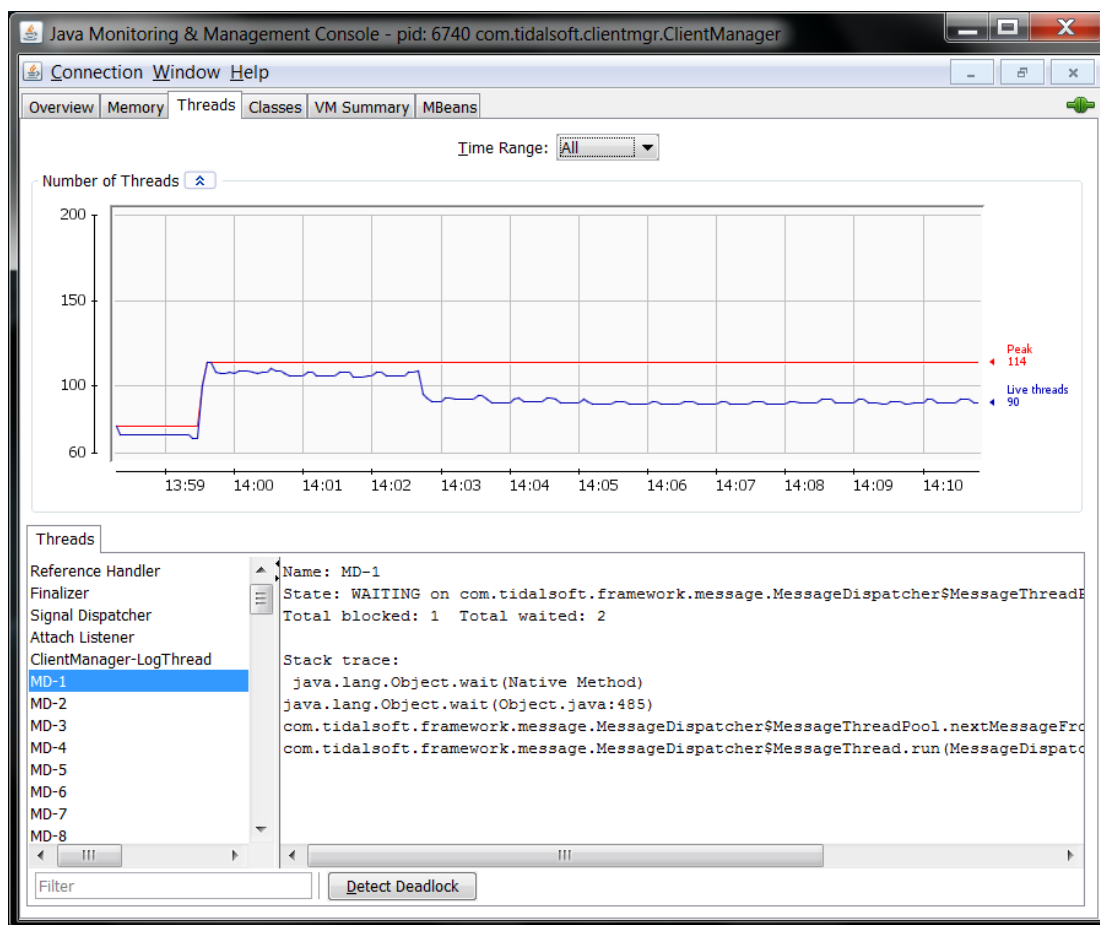
JConsole – Memory

Nominal memory usage should grow, recover and stabilize.



JConsole - Threading

The threads tab provides stack traces for every thread in the JVM and a function to automatically detect deadlocks.





Backup Slides

Master Status - Versions

Check that the Master and Plugin versions agree with the current release or patch.

The screenshot displays the Tidal Web Client interface in a Mozilla Firefox browser window. The browser address bar shows the URL `http://localhost:8080/client/console.html?locale=en`. The application header includes a navigation menu (File, View, Activities, Reports, Help) and a status bar with the following information: `chakuo-win7`, `0 wait`, `0 active`, `100% overall`, `ckuo`, and `Sep 22, 2010 11:38 AM`. The **ENTERPRISE SCHEDULER** logo is visible in the top right corner.

The left sidebar contains a tree view of the application's structure, including sections for **Operations** (Job Activity, Event Activity, Alerts, Logs, Schedules, Master Status), **Definitions** (Jobs, Calendars, Actions, Events, Job Classes, Variables, Agent Lists), **Queues**, **Resources**, **Fiscal Calendars**, and **Administration** (Connections, Interactive Users, Runtime Users, LDAP Groups, Workgroups, Security Policies, Adapters).

The main content area is titled **Master Status - version W.X.Y.Z** and **Plugin(production) - version W.X.Y.Z**. It features a tabbed interface with **Overview**, **Queue**, **Connections**, and **Messages**. The **Overview** tab is active, displaying a table of job activity:

Description	Value	Time	Activity
Start Time	09/22/2010 11:43:43	09/22/2010 10:43:43	chakuo-win7[2339] connected.
Last Poll	09/22/2010 11:43:43	09/22/2010 10:43:43	chakuo-win7[2339] connected.
Production Date	09/22/2010 11:43:43	09/21/2010 15:35:29	chakuo-win7[2339] connected.
Scheduled Jobs	1	09/21/2010 15:35:29	chakuo-win7[2339] connected.
Adhoc Jobs	0	09/21/2010 11:42:12	chakuo-win7[2339] connected.
Jobs Carried Forward	0	09/21/2010 11:42:12	chakuo-win7[2339] connected.
Carried Forwards To Go	0	09/20/2010 12:02:44	chakuo-win7[2339] connected.
Reruns	0	09/20/2010 12:02:44	chakuo-win7[2339] connected.
Total Jobs	1	09/22/2010 10:43:44	Compile 25% complete.
Jobs Done	1	09/22/2010 10:43:45	Compile 50% complete.
Jobs To Go	0	09/22/2010 10:43:46	Compile 75% complete.
Jobs Cancelled	0	09/22/2010 10:43:46	Compile complete.
		09/22/2010 10:43:45	Compiling full day schedule.
		09/22/2010 10:43:56	Job sleepy[23125] completed status [Completed Normally].
		09/21/2010 11:42:24	Job sleepy[23125] completed status [Completed Normally].
		09/20/2010 12:02:58	Job sleepy[23125] completed status [Completed Normally].
		09/20/2010 12:02:49	Launching job sleepy[368273].
		09/21/2010 11:42:18	Launching job sleepy[368274].
		09/22/2010 10:43:48	Launching job sleepy[368275].

Patching the Client

1. Stop ClientManager service.
2. Copy **tes-6.0.0.0.jar** and **tes-6.0.0.0.war** to **cache/tes-6.0.0.0**.
3. Copy **client.war** to **webapps**.
4. Delete contents of **webapps** except for **client.war**.
5. Delete contents of **plugins** if you need to destroy the cache.
6. Restart ClientManager service.
7. Delete the browser cache.
8. Connect browser to CM once CM completes secondary sync.

Unique TES 6.x Features and Their Importance

- TES workgroup security -- Users that are joined to a TES workgroup can be assigned a specific security policy for their specific needs
- Job Based Time Zones
 - In previous versions of TES, jobs located in a specific timezone that were affected by a master located in a different timezone had to be manually modified to reflect the timezone change.
 - The 6.0.3 Job-based timezone enhancement allows for the scheduling of a job, or job group, based on an alternative, user-defined timezone instead of the master timezone.
 - You can define a scheduled time window across worldwide or nationwide environments located in different timezones. For example, if the Master associated with your job is based in the PST timezone and you want the job to run in an alternative timezone, such as AMERICA/NEW_YORK, you can select a timezone specifically for a given job. The Master internal process will self-adjust the scheduled job times as the Master or job-specific timezones adjust.
- System Resource Based Scheduling
 - This enhancement allows job administrators to specify additional real-time system resource criteria before a job is launched.
 - For example, a job can be constrained to run only if a certain percentage of CPU is free and/or an amount of system memory is available.
 - Custom resources can be defined that run user-specified commands to return resource values from the agent.

Potential speed bumps - suggestions

- Must be on TES 5.3.1 before TES 6x upgrade
- Upgrade all TES agents – must be TES 3 agent for TES 6x
- Engage TAC/Support to learn of any hotfixes/patches of interest
- Do the upgrade in a non-production environment first
- Limit your history retention – expect the synchronization process to take time (will vary based on historical data retention)
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TES 3.0

Agent for Windows

Performance Metrics

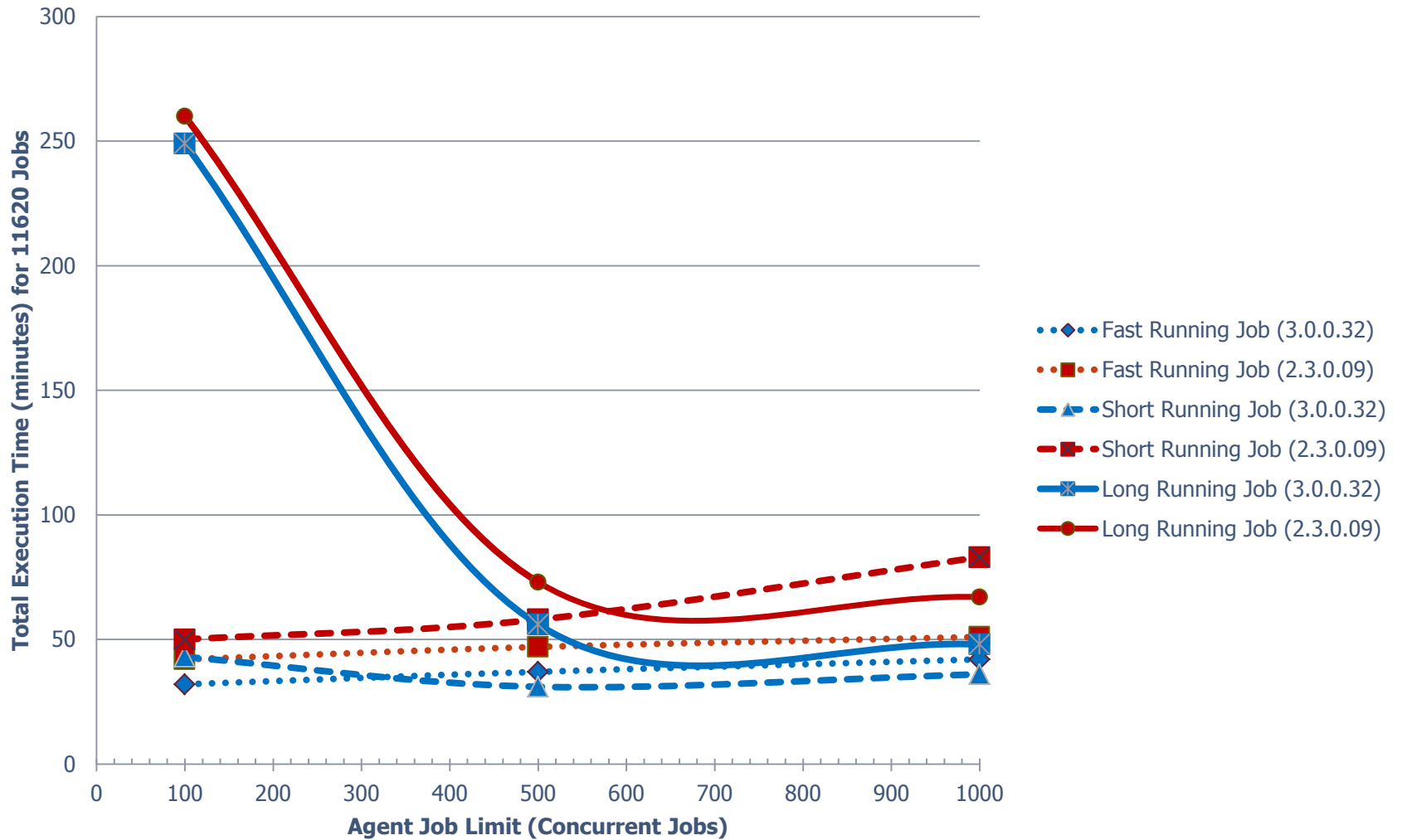
TES Windows Agent Performance (Improvements)

Job Execution Time Improvement			
Agent Job Limit (Concurrent Jobs)	Fast Running Jobs (sub-sec.)	Short Running Job (10 sec.)	Long Running Job (2 min.)
100	24%	14%	4%
500	21%	47%	23%
1000	18%	57%	28%

Agent Process Handle Count Improvement						
Agent Job Limit (Concurrent Jobs)	Fast Running Jobs (sub-sec.)		Short Running Job (10 sec.)		Long Running Job (2 min.)	
	MAX.	AVG.	MAX.	AVG.	MAX.	AVG.
100	23%	19%	49%	43%	96%	96%
500	12%	3%	67%	83%	87%	80%
1000	43%	20%	76%	91%	87%	89%

TES Windows Agent Performance

Summary on Execution Time (3.0.0.32 Vs 2.3.0.09)



TES Windows Agent Performance

Execution Time Improvement (%) (3.0.0.32 Vs 2.3.0.09)

