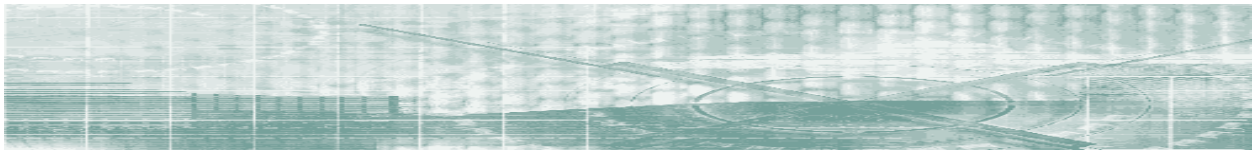

Transaction Processor Restart Utility

Quick Start Guide

Windows Release 2.0
September 12, 2007

CLEO

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Overview

The purpose of the Transaction Processor Restart Utility (TP Restart Utility) is to prevent the Cleo Transaction Processor (TP) from becoming unresponsive due to JVM crashes. These known JVM issues are partly due to issues with the Cleo Transaction Processor's previous versions (i.e. version 4.1.5.1). Although many of these issues have been identified and eliminated in subsequent Transaction Processor versions, there is still potential for JVM issues in all versions.

To help alleviate some of the issues with JVM crashes, Cleo has developed a restart utility to bring the Transaction Processor up correctly after a JVM crash. Allowing the Window's Service to restart on its own can have unexpected results after a JVM crash. These unexpected results can include license exceptions, memory errors, or the service not being brought up at all.

The Transaction Processor Restart Utility follows this procedure for restarts:

1) Transaction Processor (TP) Restart Utility identifies (via transaction log parsing) that a JVM error has occurred
2) The TP Restart Utility creates a RESTART file in the transaction processor's log path. This indicates that a restart is about to occur and disables all subsequent scheduled restarts from running temporarily (to avoid restarting multiple times on the same JVM crash)
3) The TP's log file is backed up to a jvm_crash file located in the log directory. This crash file can help for debugging problems before the JVM crashed. The file will have the format of HH_MM_SS_transaction.log.jvm_crash, where HH_MM_SS is the time at which the error was detected (ex: 08_31_03_transaction.log.jvm_crash)
4) The TP is stopped by the Restart Utility by issuing native system commands
5) Once stopped, the TP Restart Utility kills any hung java processes that the TP may have left as a result of the JVM crash
6) The TP Restart Utility starts the TP
7) The TP begins a healthy startup
8) The RESTART file is deleted
9) The TP Restart Utility exits

In addition to detecting JVM crashes, the Transaction Processor Restart Utility can also be used to schedule restarts automatically. These restarts can take place at any interval (daily, every 3rd day, weekly, etc.). Restarts may be scheduled for many reasons, including mainframe batch processing that occurs nightly, or month-end processing where the Transaction Processor may need to be restarted afterwards, or a weekly mainframe restart that requires the Transaction Processor to restart.

The TP Restart Utility is designed to run silently as a Window's Scheduled Task. The frequency at which the TP Restart Utility runs is dependant on several factors, including how important a restart is to detect, CPU and memory resources, etc. It should be noted

however, that the TP Restart Utility will not run if a restart has already been detected, and as such can be run as frequently as desired. Cleo's recommended run rate is once every minute.

Although the TP Restart Utility was designed to accommodate known issues in previous versions of the TP, it can also be used with the newest versions of the Transaction Processor.

Introduction

Related Components

- Cleo Transaction Processor

Related Documents

- Cleo Transaction Processor "Admin Guide"

Installation

Software Requirements

- ❑ OS (Windows 2000 Professional, Windows Server 2000, Windows Server 2003, or Windows XP Professional)
- ❑ Cleo Transaction Processor (any version) properly installed and configured

Hardware Requirements

- ❑ PC

Pre-Installation Checklist

Before installing the Transaction Processor Restart Utility, locate the following:

- ❑ Cleo-TP-Restart Quick Start Guide (this document)

Install the Cleo Transaction Processor Restart Utility

1. Turn on the PC
2. Logon to Windows as an administrator
3. Launch the installer by double clicking on **tprstrt.exe**
   Follow the instructions that are displayed on screen.
   NOTE: You will be prompted with an optional JRE install. You can choose to use a JRE already installed on your PC, or use the JRE provided with the TP Restart Utility (recommended). This will create a JRE under the TP Restart Utility's install directory. This JRE will only be used for the Transaction Processor Restart Utility, and will not affect any JRE installed on the PC
4. Once installed, an informational message dialog will appear, indicating that some configuration changes were made to the Transaction Processor's configuration files that are necessary for the restart utility to function correctly. You must restart the Transaction Processor for these changes to take effect:
   - These additions are automatically made to your wrapper.conf file in (by default) C:\Program Files\CleoTP\conf directory:
     i. wrapper.java.pidfile=../logs/java.pid
     ii. wrapper.restart.delay=300
   - NOTE: The wrapper.conf file is backed up when these changes are made. The backup file is in the same directory, and the file name is wrapper.conf.backup
   - When the restart utility is uninstalled, the lines mentioned above are commented out in the wrapper.conf file

Start the Cleo Transaction Processor Restart Utility as a Windows Scheduled Task

1. From the **Start** menu, go to **Control Panel**, and then **Scheduled Tasks**
2. Double click **Add Scheduled Task**
3. A **Scheduled Task Wizard** will appear
4. Click **Next**
5. A dialog will appear asking you for which executable you would like to run
    a. Click **Browse...**
    b. Navigate to the install directory for Transaction Processor Restart Utility (default is C:\Program Files\CleoTP Restart\) and use "TP Restart.exe"
6. Select any name for the name of the task, and select "**Daily**" for **Perform this task:** and click **Next**

    NOTE: You WILL be able to schedule this task to run more often than daily (continue to step 10 below)
7. Select 12:01AM for the "**Start Time"**, leave the default of "**Every Day**" and the current date as the "**Start Date**" and click **Next**
8. To have this service run even if no user is logged in, you must supply an administrator user name and password for the utility to run under. Enter that information in the dialog and click **Next**
9. Check the check box "**Open advanced properties for this task when I click Finish**" and click **Finish**
10. Click the **Schedule** tab
11. Click the **Advanced…** button
12. Check the "**Repeat task**" check box
13. Set the "**Every:**" field to an appropriate value (recommended value of every 1 minute)
14. Set the "**Until:**" field to "**Duration:**", and set the duration field to 24 hours.
15. Click **OK**
16. Click **Apply** on the **Schedule** tab
17. Click the **Settings** tab
18. Make sure that "**Wake the computer to run this task**" is checked, if not, check it
    a. **NOTE**: If "**Wake the computer to run this task**" is not an available checkbox, no action is required
19. Click **OK**

Licensing

There is no licensing necessary for the Cleo Transaction Processor Restart Utility.

Configuration

The Transaction Processor Restart Utility is preconfigured to run with the following configuration settings:

- Default install directory for Cleo Transaction Processor (C:\Program Files\CleoTP\) [**transaction.processer.root.log.file**]
- The Transaction Processor Restart Utility will look through the first 10 log files (transaction.log, transaction.log.1, …, transaction.log.9) for any JVM crashes or hung JVM processes **[restart.look.at.logs]**
- The number of sessions is defaulted to 40 transaction.processor.sessions **[transaction.processor.sessions]**
- Whether to check for abrupt restarts (If the JVM crashes in a certain way, the TP Service will automatically restart before the Restart Utility can clean up the proper resources). This setting will shutdown and then properly restart after the abrupt restart has occurred. **[tprestart.immediate.restart]**
- The Transaction Processor Restart Utility can also restart the Transaction Processor via a scheduled restart. **[tprestart.scheduled.restart]**
- The Transaction Processor Restart Utility will keep logs of all runs. The number of logs to keep is defined in the configuration file. **[restart.num.logs]**
- The size of each log that the Transaction Processor Restart Utility keeps is defined in megs in the configuration file. **[restart.size.logs]**

These configuration settings can be overridden by editing the restart.conf file located in: %INSTALL_DIR%/conf/restart.conf. The changes made in the restart configuration file will be used on the next run of the Transaction Processor Restart Utility.

Testing the Install

To ensure all components are installed properly, enter a fake hung message to the Cleo Transaction Processor that will kick off the restart utility (either by manually running the utility, or the scheduled task).

To test the install:

1. Start the Cleo Transaction Processor
2. Wait for the Transaction Processor to have all sessions in a "Parked" state (this should take between 1-5 minutes, depending on the number of enabled sessions)
3. Open the transaction.log file under C:\Program Files\CleoTP\logs\
4. At the end of this file, add the following as a new line: "JVM appears hung:" and save and close the file
5. Double click the "TP Restart.exe" under C:\Program Files\CleoTP Restart\

   By double clicking the executable, the Transaction Processor Restart Utility will begin to run. Since this utility is meant to run silently, there will be no indication that it is running. To determine if the restart utility is running (or has run), continue with the following steps:
6. Navigate to the transaction log directory in Windows Explorer (C:\Program Files\CleoTP\logs)
7. A RESTART file should be present. This indicates that the Transaction Processor Restart Utility is currently running. If this file is not present, one of the following may have occurred:
   - **a.** The Transaction Processor Restart Utility has already finished running
   - **b.** The Transaction Processor Restart Utility did not find the string "JVM appears hung:" in the transaction log. See steps 3 and 4 to add a hung message to the transaction log
8. At some point during the restart process, the Transaction Processor Restart Utility will create a jvm_crash file. This file will begin with the time the restart occurred (HH_MM_SS). If this file is present, a restart took place at that time. This log can also be used to review the state of the Transaction Processor before a restart. These files will not be rolled over like the normal Transaction Processor logs
9. At some point during the restart, the Transaction Processor will be shut down. This can be seen through the Transaction Processor Admin page
10. Once the Transaction Processor has been completely shut down, the Transaction Processor Restart Utility will bring the Transaction Processor back up. The RESTART file will be deleted from the Transaction Processor log directory
11. The restart utility has been run successfully. Verify that the transaction processor is restarted, and the jvm_crash file was created

Enabling Scheduled Restarts

To enable scheduled restarts, the restart.conf configuration file as well as the scheduledRestart.conf configuration file will be altered.

To enable scheduled restarts:

1. Edit the restart.conf file found in the %TP_RESTART_HOME%\conf directory.
    a. Change **tprestart.scheduled.restart=N** to **tprestart.scheduled.restart=Y**
    b. Save and close the file
2. Edit the scheduledRestart.conf file found in the %TP_RESTART_HOME%\conf directory.
    a. Change the frequency, date and time as appropriate for your restarts

Restart Conditions

A restart will occur at any time when all of the following conditions are met:

1. The Transaction Processor Restart Utility is run
2. The **tprestart.scheduled.restart** configuration setting is "Y" in the restart.conf file
3. The first non-commented parameter in the scheduledRestart.conf file is either "D" or "W".
4. The date and time specified in the scheduledRestart.conf file is before the current system date and time.

Scheduled Restart Configuration File Format

The scheduledRestart.conf file has the following format:

1. {N/D/W}{#} MM DD YYYY HH MM SS
    a. N/D/W – N = Do Not Run, D = Daily, W = Weekly
    b. # - the frequency to run. Ex: D2 would mean every two days, restart. W3 would mean every three weeks, restart. This parameter is optional but must have no spaces between the D or W.
    c. MM – the month to run the restart. 1 = January, 12 = December
    d. DD – the day to run the restart. Note that dates that are larger than the month they are to run in will wrap. EX: W 2 31 2007 12 0 0 (February 31st, 2007 at 12:00:00) will result in March 3rd, 2007 at 12:00:00. Restarts are scheduled *literally* (exactly 30 days later, for example), not a calendar month.
    e. YYYY – Year to run the restart
    f. HH – The hour to run the restart, 00 – 23. The 23 value is the last hour of the day. So, 00:00 is the first hour/minute of the day, and 23:59 is the last hour/minute of the day. This is an important distinction. If midnight restarts are required, the easiest way to schedule these would be at 23:59 of the day you want to restart.
    g. MM – The minute to run the restart, 00-59. The 59 value is the last minute of the day (23:59).
    h. SS – The second to run the restart, 00-59. The 59 value is the last second of the day (23:59:59).
2. Examples
    a. D 9 22 2007 9 19 09
    b. D2 11 30 2007 15 13 19
    c. W 1 12 2009 8 46 17
    d. W3 3 25 2014 23 59 59
    e. N 4 1 2007 4 12 19 (NOTE: This will not run, as D or W is not used)

Differences between Daily and Weekly Restarts

There is a fundamental difference between a weekly restart and a daily restart. Daily restarts are rescheduled the day after they occur. This is true for D2 (every 2 days), D5, etc. The time is preserved for the daily restart, but the date is dependant only on the current date when the restart actually occurs.

Weekly restarts are handled slightly different. A weekly restart will be rescheduled on the same day of the week as was scheduled. So, if you schedule a restart for Sunday at 23:59:00, your next restart will happen on the next Sunday at 23:59:00, regardless of what day the restart actually occurs.

EX:

1. A time of: W 9 9 2007 23 59 59
    a. This is equivalent to saying "Perform the next scheduled restart at or after September 9th, 2007 at 23:59:59, then schedule the next restart for the next Sunday at the same time."
2. Transaction Processor Restart Utility (TPRU) is set to run every 5 minutes
3. TPRU executes at 9/9/2007 23:59:00, finishes executing at 00:00:20 (no restart)
    a. Since this is before the specified time, the scheduled restart will not run
4. TPRU executes at 9/10/2007 00:04:00, finishes executing at 00:07:00 (restart)
    a. Since this is after the specified time, the schedule restart runs
    b. Transaction Processor is restarted
    c. Next scheduled restart is calculated
        i. Based on the weekly restart frequency, the next date is scheduled
        ii. W 9 16 2007 23 59 59
        iii. Even though the restart actually occurred on 9/10, the next scheduled restart will still occur on the next Sunday

Weekly restarts will always schedule on the same day of the week as the date specified in the scheduledRestart config file. This ensures consistency from week to week, regardless of when the restarts actually occur. The only caution with this is that if the scheduled date is ever before the current date, a restart will run regardless of the date. If the Transaction Processor Restart Utility is running at a consistent interval (every minute), this should not be an issue.

If weekly restarts are necessary, regardless of the day of the week, simply use D7 or a multiple thereof (for two weeks, D14, etc.). This setting will ensure that restarts are preformed 7 days after the previous restart.

Rescheduling

Rescheduling is done when after a scheduled restart occurs. The date is changed by the specified amount (D/W), either daily or weekly. There is an additional number that can be specified for how many days or weeks.

EX:

1. **D3 9 12 2007 9 7 5** => Rescheduled to => **D1 9 15 2007 9 7 5**
2. **W3 9 12 2007 9 7 5** => Rescheduled to => **W3 10 3 2007 9 7 5**
3. **D 9 12 2007 9 7 5** => Rescheduled to => **D 9 13 2007 9 7 5**

Rescheduling will maintain the TIME of the restart, but the DATE will be subject to the date that the restart actually occurs for daily restarts, weekly restarts will be scheduled for the same day of the week as the previous scheduled restart.

TIME – Whatever time is set for the scheduled restart (as specified in the configuration file) will be maintained, regardless of when the restart actually runs or completes. This is so that scheduling a midnight restart that takes 2-3 minutes will not slowly skew the time you have set, adding 2 or 3 minutes onto the time each run. This could lead to unwanted restarts and would not provide a consistent restart time.

EX:

1. A time of: D 9 12 2007 9 7 5
    a. This is equivalent to saying "Perform the next scheduled restart at or after September 12th, 2007 at 9:07:05, then schedule the next restart a day later."
2. Transaction Processor Restart Utility (TPRU) is set to run every 5 minutes
3. TPRU executes at 9/12/2007 9:07:00, finishes executing at 9:07:20 (no restart)
    a. Since this is before the specified time, the scheduled restart will not run
4. TPRU executes at 9/12/2007 9:12:00, finishes executing at 9:14:00 (restart)
    a. Since this is after the specified time, the schedule restart runs
    b. Transaction Processor is restarted
    c. Next scheduled restart is calculated
        i. Based on the daily restart frequency, the next date is scheduled
        ii. D 9 13 2007 9 7 5
    d. Note that even though the TPRU ran at 9:12:00 and finished at 9:14:00, the next restart will still occur at 9:07:05, ensuring a consistent restart schedule

DATE – The date specified in the scheduled restart configuration file is not used to generate the next restart date for daily restarts, the current date is used. For weekly restarts, this date is used to determine the day of the week, and then the next occurrence of the day of the week after the current date is used.

EX:

1. A time of: D 4 1 2006 9 7 5
    a. This is equivalent to saying "Perform the next scheduled restart at or after April 1st, 2006 at 9:07:05, then schedule the next restart a day later."
2. Transaction Processor Restart Utility (TPRU) is installed on 9/12/2007, and is set to run every 5 minutes
3. TPRU executes at 9/12/2007 9:07:00, finishes executing at 9:09:00 (restart)
    a. Since 4/1/2006 is well before the current date, the scheduled restart is run
    b. Transaction Processor is restarted
    c. Next scheduled restart is calculated
        i. Based on the daily restart frequency, the next date is scheduled
        ii. D 9 13 2007 9 7 5
        iii. Note that even though the scheduled date was 4/1/2006, the current date was used to schedule the next restart (9/12/2007). This ensures that scheduled restarts really do occur a day apart (assuming the Transaction Processor Restart Utility is running at a scheduled frequency).

For an example with weekly restarts, see the "*Differences between Daily and Weekly Restarts*" section.

Scheduling Guidelines

Unless necessary, always schedule the first restart in the future. This will prevent an unexpected restart when the Transaction Processor Restart Utility (TPRU) first executes with scheduled restarts enabled.

So, if the TPRU is installed on 9/12/2007, and a weekly restart is required on Sundays, choose the next Sunday for the scheduled restart date (9/16), with the appropriate time. If a Sunday prior to 9/12 is used, then the next restart will occur as soon as the TPRU is run, which may not be desired.

Logging

Logging was introduced to the Transaction Processor Restart Utility with version 2.0. Logs are saved under the logs directory in the installed path (EX: C:\Program Files\TP Restart\logs).

Logging is similar to the Transaction Processor, in that you can specify the quantity of logs retained, as well as their size. Logs are cyclical (meaning they overwrite themselves when full, with the oldest being overwritten first).

Logging can be helpful for debugging purposes, as well as verifying that JVM crashes are being checked, and scheduled restarts are scheduled.

Shown below is a sample log for the scheduled restart portion when a restart is not required (with the dates and times removed for formatting):

==> Executing Check: Scheduled Restart ********************************

Scheduled Restart | Scheduled Restart is enabled
Scheduled Restart | Checking to see if restart is already in progress
Scheduled Restart | Checking to see if restart is required
Scheduled Restart | No restart is required, next restart at: 11/11/2007 09:07:05

********************************** Check: Scheduled Restart Completed**

Note that this will show the next scheduled date and time formatted.

Shown below is a sample log for the scheduled restart portion when a restart is required:

==> Executing Check: Scheduled Restart ********************************

Scheduled Restart | Scheduled Restart is enabled
Scheduled Restart | Checking to see if restart is already in progress
Scheduled Restart | Checking to see if restart is required
Scheduled Restart | Created lock file, proceeding with scheduled restart
Scheduled Restart |
Scheduled Restart | ****RESTART STARTED****
Scheduled Restart | Frequency: Weekly
Scheduled Restart | Scheduled Time: 9/9/2007 09:07:05
Scheduled Restart | ****RESTART COMPLETED****
Scheduled Restart |
Scheduled Restart | Scheduling next restart on: 9/16/2007 09:07:05
Scheduled Restart | Successfully removed lock file

********************************** Check: Scheduled Restart Completed**

When a restart is required, the scheduled date and time is recorded in the logs, as well as the next scheduled restart.

See below for a JVM crash portion of the log, where a JVM crash was not detected:

==> Executing Check: Restart Check *********************************

JVM Restart Check | Root log file: D:\Program Files\CleoTP\logs\transaction.log
JVM Restart Check | Sessions: 40
JVM Restart Check | Number of logs to look at: 10
JVM Restart Check | Immediately restart after a triggered restart disabled
JVM Restart Check | Checking lock file
JVM Restart Check | Copying Java pid file
JVM Restart Check | Creating log file list to search
JVM Restart Check | Searching for crash in logs
JVM Restart Check | No JVM crashes detected

*************************************** Check: Restart Check Completed**

Note that the configuration is preserved in the logs for each run.

Shown below is a sample JVM crash portion of the log, where a JVM crash was detected:

==> Executing Check: Restart Check *********************************

JVM Restart Check | Root log file: D:\Program Files\CleoTP\logs\transaction.log
JVM Restart Check | Sessions: 40
JVM Restart Check | Number of logs to look at: 10
JVM Restart Check | Immmediately restart after a triggered restart disabled
JVM Restart Check | Checking lock file
JVM Restart Check | Copying Java pid file
JVM Restart Check | Creating log file list to search
JVM Restart Check | Searching for crash in logs
JVM Restart Check | JVM Crash detected!
JVM Restart Check | Creating lock file
JVM Restart Check | Wrapper Stopped detected, the TP is down, restarting
JVM Restart Check | Copying crash file
JVM Restart Check | Restarting the TP
JVM Restart Check | Removed unlock file successfully

*************************************** Check: Restart Check Completed**

General Use

The Transaction Processor Restart Utility requires very little in terms of maintenance. As a scheduled task, each invocation is a fresh run of the program, and as such does not run into issues with memory leaks, etc.

Performing Normal Restarts with the Restart Utility Enabled

There should be no issues with normally restarting, stopping and starting the Transaction Processor with the Restart Utility running. The Transaction Processor Restart Utility looks for specific errors in the transaction logs, and can distinguish a normal shutdown or restart from a JVM crash.

There should be no issues with normal Transaction Processor operation or maintenance with the Restart Utility enabled.

If the Restart Utility is already restarting the Transaction Processor and an administrator attempts to stop or start the service, a dialog box will be shown, indicating that the service is already stopping or starting (depending on the operation).

If the Transaction Processor is stopped when a scheduled restart is required, the Transaction Processor will not be started, but the restart will be rescheduled according to the information specified in the scheduled restart configuration file.

Windows shutdown and startup

Windows' shutdown and startup should have no impact on the Transaction Processor Restart Utility.

Note that if scheduled restarts are enabled, and the server is down during the scheduled restart, the Transaction Processor Restart Utility will restart the Transaction Processor the next time it runs. To avoid this, disable the scheduled restarts in the configuration file prior to the system shutdown.

Potential Issues

There are some considerations when enabling the Transaction Processor Restart Utility:

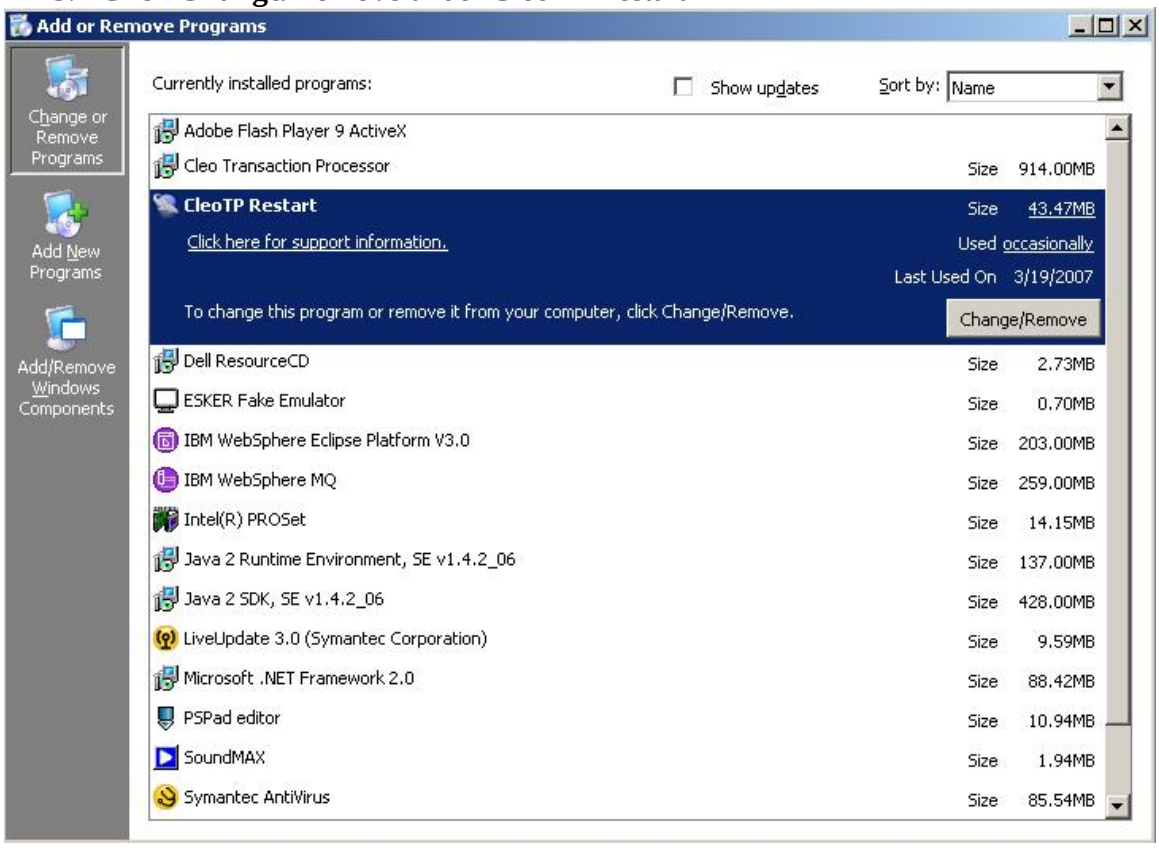
- The jvm_crash files are not rolled over
    - There is a potential disk issue with not rolling the jvm_crash files. These files will accumulate in the log directory until taken care of manually. This is done to provide troubleshooting logs for your convenience. Depending on the size of your transaction log files, these files may be large in nature.
- "Infinite" restarts
    - The Transaction Processor Restart Utility currently provides no mechanisms for determining failed starts. This means that if the Transaction Processor continually fails, the Restart Utility will continually attempt to bring it back up.

Removal

The Transaction Processor Restart Utility can be removed when it is no longer used.

To uninstall the Transaction Processor Restart Utility:

1. Disable (recommended) or delete any Scheduled Tasks that are currently scheduled to run that launch the Transaction Processor Restart Utility
2. Launch **Add/Remove Programs** in the Control Panel
3. Click **Change/Remove** under CleoTP Restart



4. Follow the instructions displayed on the screen