RTO Software

TScale™

System Administrators Guide

Version 3.0

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Address correspondence to:

RTO Software

5400 Laurel Springs Parkway

Suite 108

Suwanee, GA 30024

Phone Number:

+1-678-455-5506

Web Site:

http://www.rtosoft.com

Email:

Sales@rtosoft.com

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TScale™

1. Welcome to TScale™

Thank you for purchasing TScale. This document guides you through the installation, setup, and use of TScale. RTO Software is dedicated to providing the best in scalability and performance enhancement products for Windows servers. We hope that you will get great value from the addition of TScale to your environment.

1.1. What to do if you have questions

RTO Software provides support for TScale through our online support forum. To access this forum go to www.RTOSoft.com/cgi-bin/ultimatebb.cgi. To access the support forums you will need to have your user ID and password. These should have been issued to you when RTO Software delivered your software to you. If you do not have your user ID and password, then please send email to support@RTOSoft.com. If you have questions about purchasing TScale please send email to sales@RTOSoft.com.

1.2. What is TScale?

TScale is an applications performance and server capacity expansion utility for Microsoft NT Terminal Services Edition, Microsoft Windows 2000 Terminal Services and Citrix® MetaFrame™ Servers. TScale provides multiple optimizations for Win32 applications running on terminal servers. These optimizations include:

1. Application Shaping™. Application Shaping consists of two component features that together allow you to prevent a runaway (or rogue) application from damaging the performance of your servers and the experience of your users. The features that comprise Application Shaping are:

   a. Application Affinity™. Affinity allows you to specify which of the n CPUs in your server all instances of a process will run on. So, if you have a dual processor machine and you frequently have cases of IE running away with your servers, you can use Affinity to keep all instances of IE to a CPU so that when rogue instances of IE occur, only one CPU is impacted.

   b. Application Priority™. Priority allows you to tell TScale to reduce the CPU priority of an application after it has used x% of the CPU for n minutes. So, if an instance of IE runs away with the CPU, you can have TScale reduce its priority after 1 minute. This will allow all other applications (including other instances of IE) to get the CPU resource that they need before the rogue instance of IE takes the rest.

2. Application Optimization. Application Optimization optimizes the performance of the applications running on your servers. This optimization enables those applications to execute more efficiently, so you can support more users per server, and your servers can handle peak load conditions with no degradation in end user experience.

   The features that comprise Application Optimization are:

   a. Reductions in the usage of Virtual Memory by your applications. These reductions cause the page file activity to be reduced so your server can support more users with better performance.

b. Improvements in Applications Performance. TScale improves the efficiency with which your applications execute. This has a noticeable effect upon application response time during periods of heavy user load, or high workload.

2. TScale Requirements

To run TScale on a server, the server must meet the following requirements:

- The server must be running Windows NT SP 6 or above, Windows 2000 Server SP3 or above, or Windows 2003 Server.

- The server must have Microsoft Management Console installed. Windows 2000 includes MMC. If you are running Windows NT, please check to see that you have MMC installed. If you do not, please download it from the RTOSOFT site or the Microsoft site. Installing MMC will require a reboot of your server. The download links for MMC are:

  http://www.rtosoft.com/pages/downloads_TS.asp

  http://support.microsoft.com/support/mmc/mmcdown.asp

3. Starting the Installation Program

TScale is delivered in a self-extracting compressed file. Follow the steps outlined below to install TScale.

1. To launch the setup program, double-click on TScale.EXE file. The following dialog box will appear.
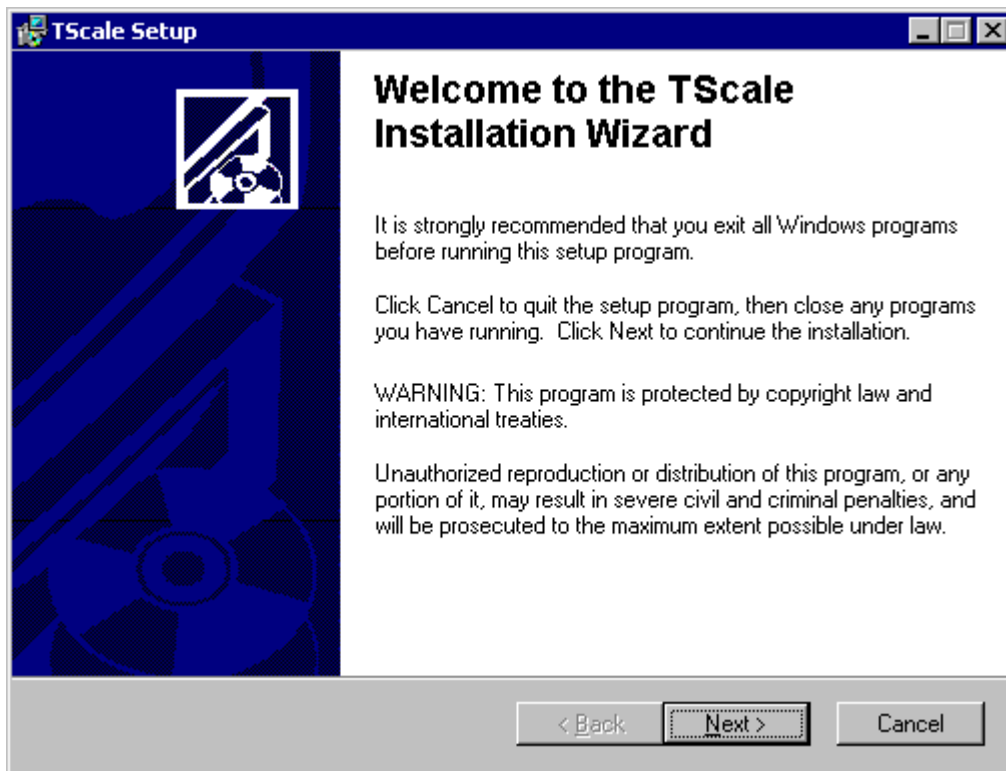
2. Click "Next" to start the installation process.
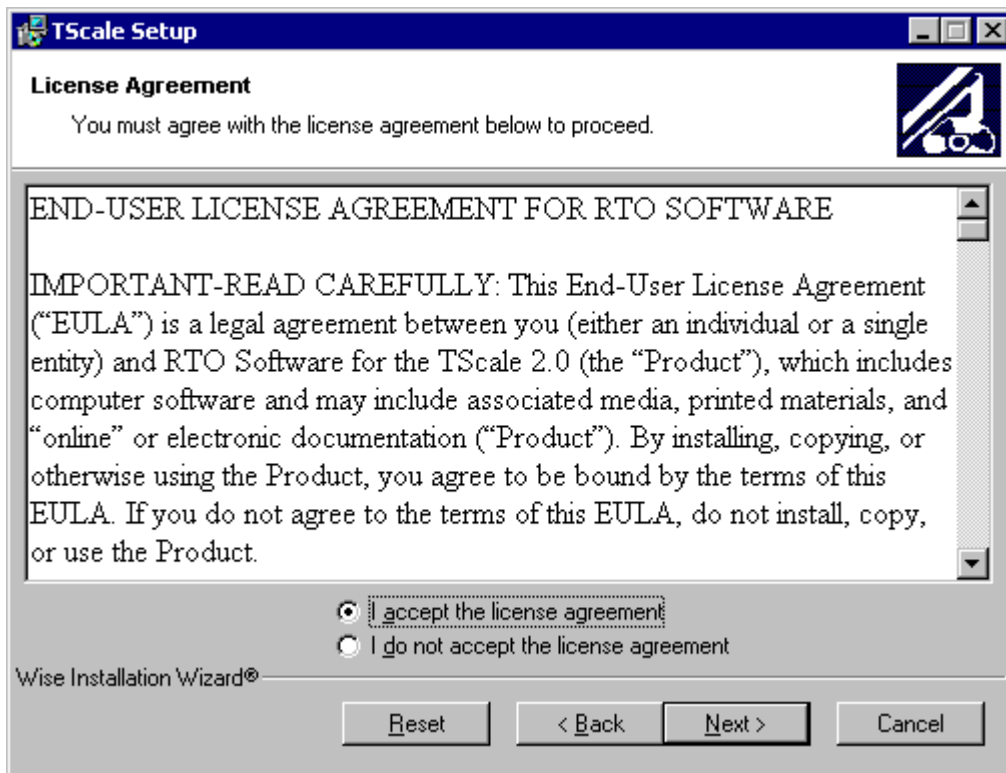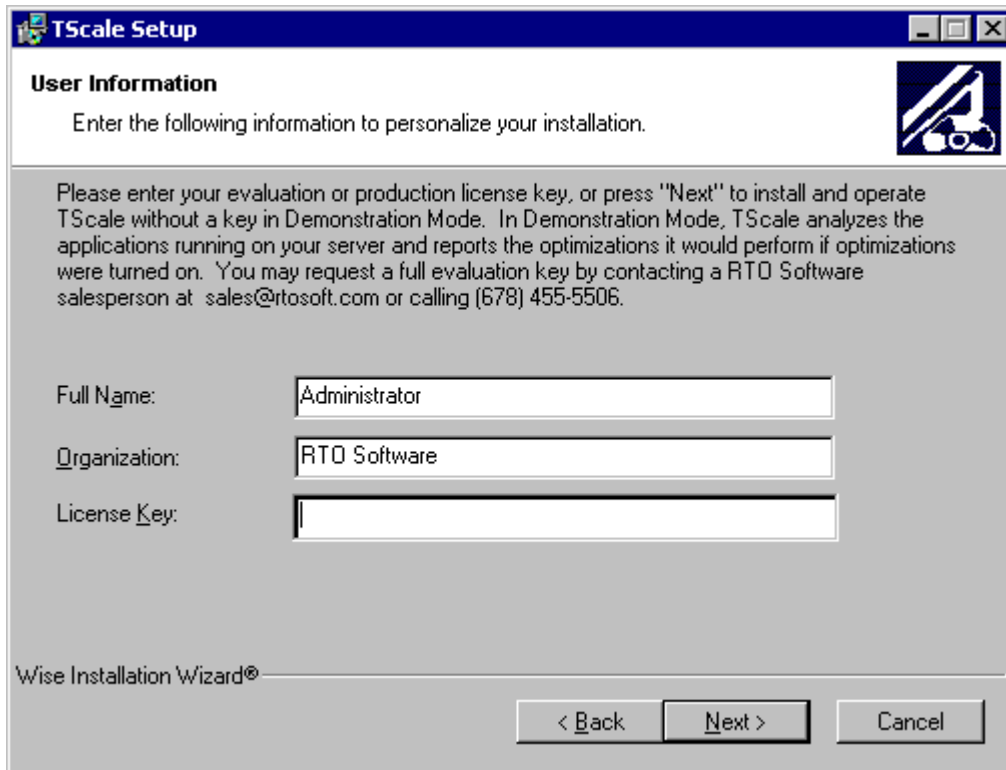
3. Accept the TScale End User License Agreement, then click "Next."

The copy of TScale that you have received can be run in three different modes:

a. If you install TScale with no key, you will run in Demo mode. In Demo mode TScale will find the applications on your server that it can optimize, but it will not implement any optimizations.

b. If you install TScale with an evaluation license key, TScale will operate as a full production product (all features enabled) for 30 days. You will be able to create Shaping Rules to mange the Priority and Affinity of your Rogue Applications, and have TScale optimize the performance of your applications. After 30 days, the Shaping Rules will become inactive and the optimizations will be turned off – you server will be in the exact state that it was before you installed TScale. If you do not wish to lose the optimizations that have been performed during the evaluation period please purchase a production license key from your authorized TScale reseller before the 30-day evaluation period ends. You can convert an evaluation version of TScale into a production version simply by apply a production license key.

c. If you install TScale with a production key, you will have a fully functional installation of TScale that will continuously and automatically optimize the applications on your server and give you better performance and more capacity as the applications on your server change and evolve.

4. Enter your name, your company or organization name and the license key in the boxes provided in the dialog box below.

Once you have installed TScale, you can always go to the TScale Console and by selecting the TScale Support menu item enter a license key. This allows you to convert an installation running in Demo Mode to a full Evaluation, and also allows you to convert an Evaluation Mode installation into a full production mode installation.

5. Click "Next."
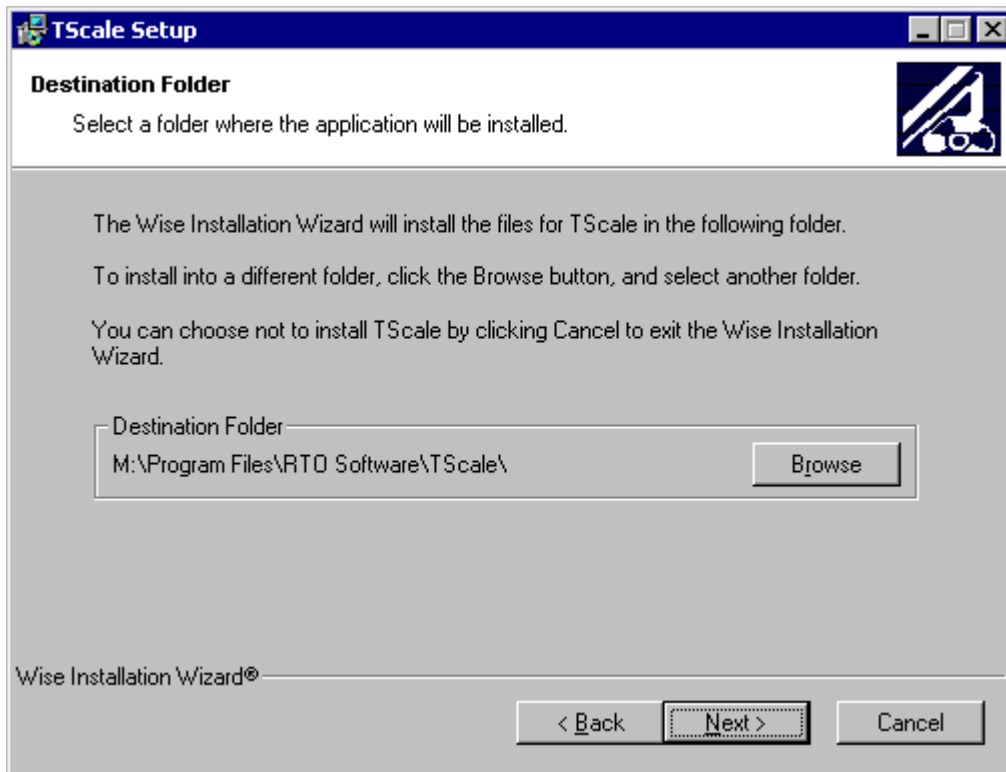
6. Choose a location on your hard disk for the TScale software to reside.

7. Click "Next."
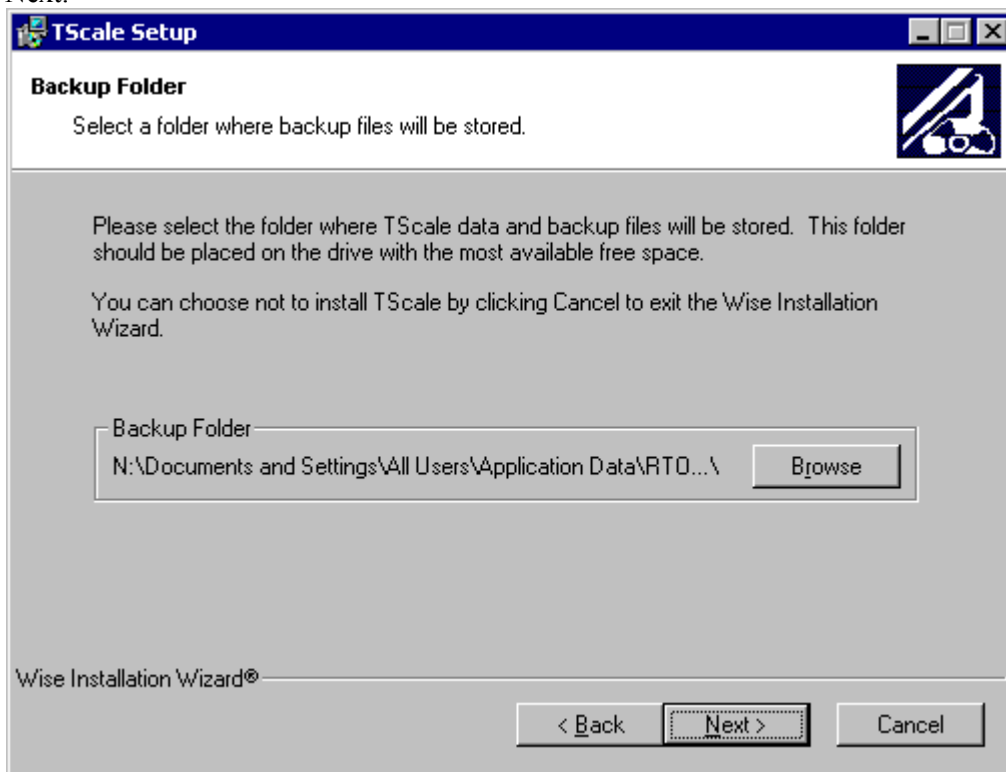
8. Choose a location for TScale to place its applications data and backup files. It is very important that you choose a location for which the Local System and System accounts have full read and write permissions, and that you choose a location where any user who logs onto the server to perform manual optimizations will have write permissions. It is also important that you choose a location that has at least 200MB of free disk space available.

9. Click "Next."
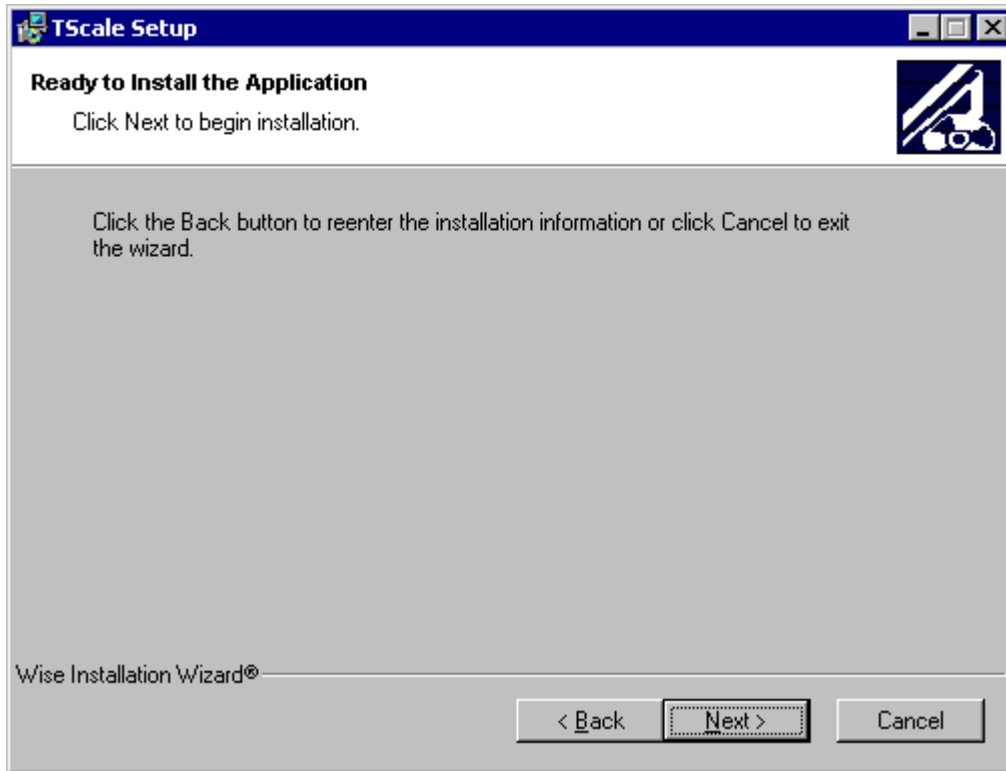
10. Press the "Next" button to start the installation of TScale.
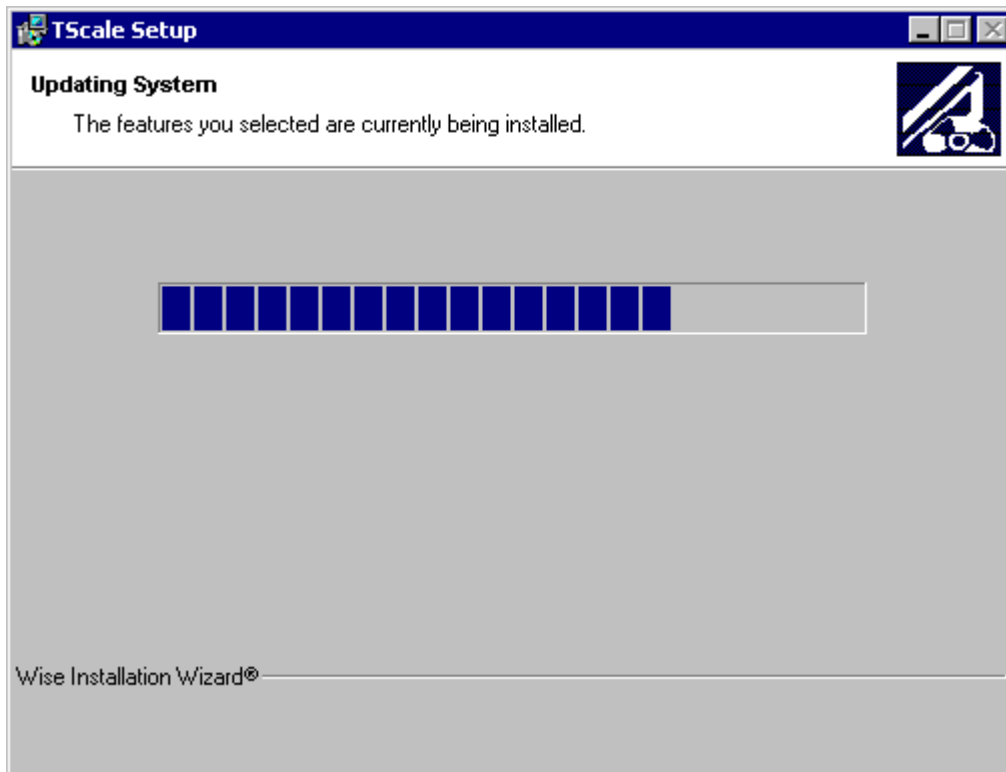
11. Once the actual installation has completed, you will be prompted to schedule the time at which the TScale optimization task is to run.
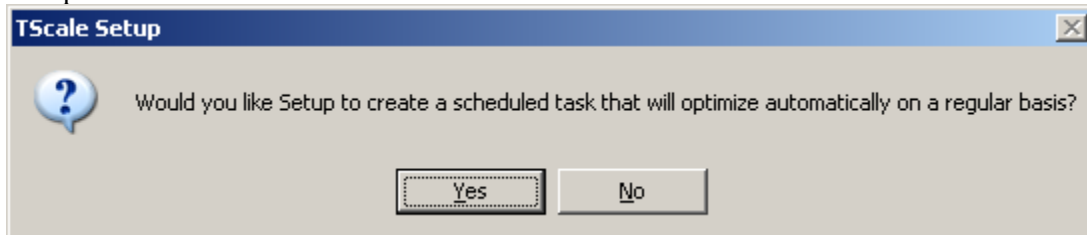
12. Press Yes in the dialog box above to launch Windows Scheduled Tasks. The name of the scheduled task is TscaleBace – optimize. Check the box at the bottom of the dialog to enable regular scheduled optimizations.
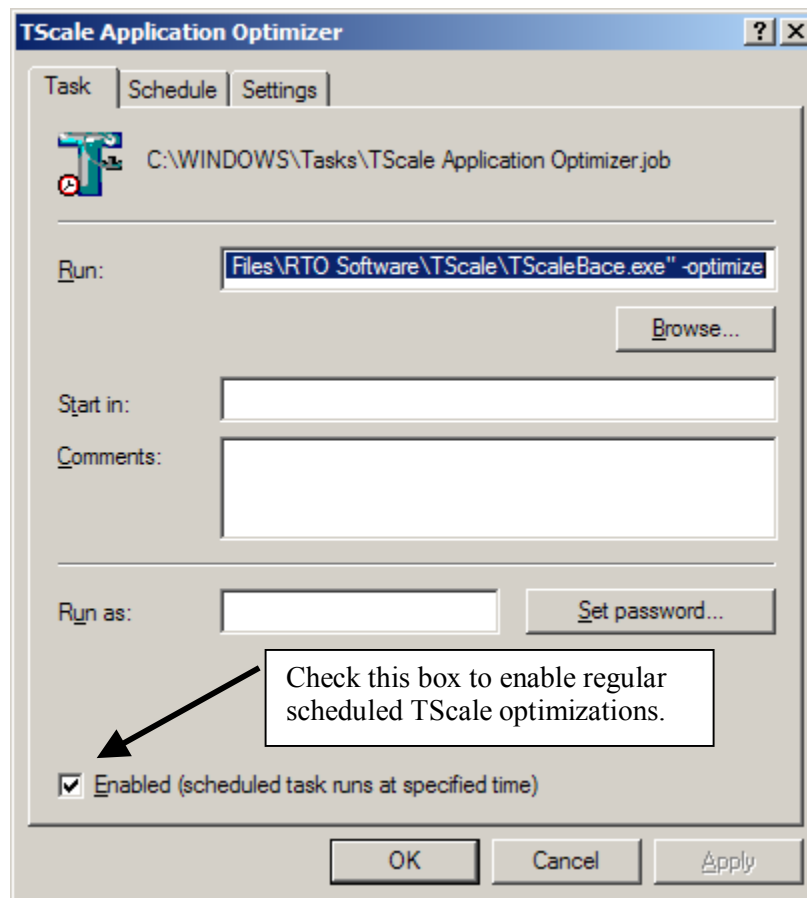
13. If you do not have the Windows Task Scheduler loaded on your server, you will get a message saying that the scheduler could not be found. If this occurs, please use the task scheduler of your choice to schedule the optimization task. Please follow the instructions in the next step to schedule the optimization task.

14. Select the "Schedule" tab on the Scheduled Tasks dialog box. TScale cannot optimize applications components that are in use, so optimization tasks should be run when the applications on the server are not being used or are being used as lightly as possible. Consider the following options for scheduling optimizations tasks:

- If you reboot your servers every night, simply select the "Run at system startup option." This will ensure that you will run an optimization session right after each reboot, which will allow TScale to catch components before they are loaded by applications and users.

- If you reboot your servers infrequently, then select a time when the servers are lightly used, AND the "Run at system startup option." This will allow TScale to optimize the majority of components when the system is lightly used, and optimize the remaining in use components upon system startup whenever you do reboot.

Left dialog:

TScale Application Optimizer

Task | Schedule | Settings

2. Run at system startup

New   Delete

Schedule Task: Start time:

At System Startup   Advanced...

Schedule an optimization session to occur at system restart so the optimization occurs before users load applications.

☑ Show multiple schedules.

OK   Cancel   Apply

Right dialog:

TScale Application Optimizer

Task | Schedule | Settings

1. At 03:00 every day, starting 01-Jan-01

New   Delete

Schedule Task: Start time:

Daily   03:00   Advanced...

Schedule Task Daily
Every 1 day(s)

Schedule an optimization session when the system is lightly used so that more components get optimized in each optimization session.

☑ Show multiple schedules.

OK   Cancel   Apply

15. Once you have set the schedules, click "OK."

16. Press the "Next" button to view the TScale ReadMe.

TScale Setup

Readme Information

Please read the following information regarding TScale

```
-------------------------------
RTO Software, Inc. (c)2001-2003
      TScale(tm) v3.0 Beta
-------------------------------


Thank you for choosing to beta test or evaluate TScale. This document
contains
the information that you absolutely must be aware of as you start to use
TScale.

1. Outstanding issues with this release:
```

Wise Installation Wizard®

< Back   Next >   Cancel

17. Click "Next."

18. Press the "Finish" button to complete the installation of TScale. If you leave the "Launch the TScale Console" box checked, the TScale Console will automatically start once the installation has completed.

3.1. Installing TScale with a Command Line Program

You can install TScale using a command line. This installation feature allows you to create a batch file that can not only be distributed along with the TScale.exe file to a large number of servers, but can also cause TScale to be installed in a fully automated manner. The command line to install TScale is:

```
TScale.exe /S /M="<parameter file>"
```

where `<parameter file>` specifies a path to a text file that has the following format:

```
MAINDIR=C:\TSPROGRAM

DATADIR=C:\TSDATA

SERIALNUMBER=12345678901234567890AAAAAA

SILENTMODE=1
```

Note that if you need to install TScale to a large number of servers, the RTO Performance Management Console provides an automated mechanism to both install TScale agents on *n* servers, and subsequently manage them from one management application.

4. Launching the TScale Console

After installing TScale, launch the "TScale Console" shortcut in the TScale start menu group.
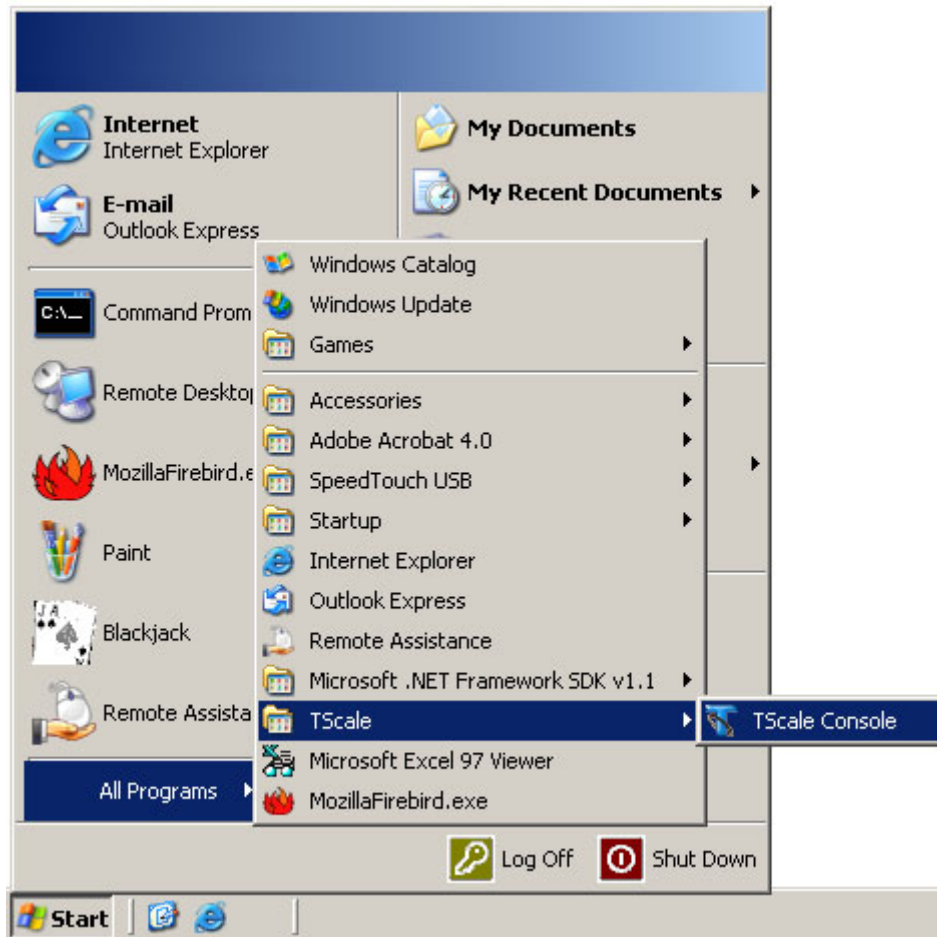
If you are running TScale in evaluation mode, the following message will appear. This message will appear every time you launch the TScale Console in evaluation mode.
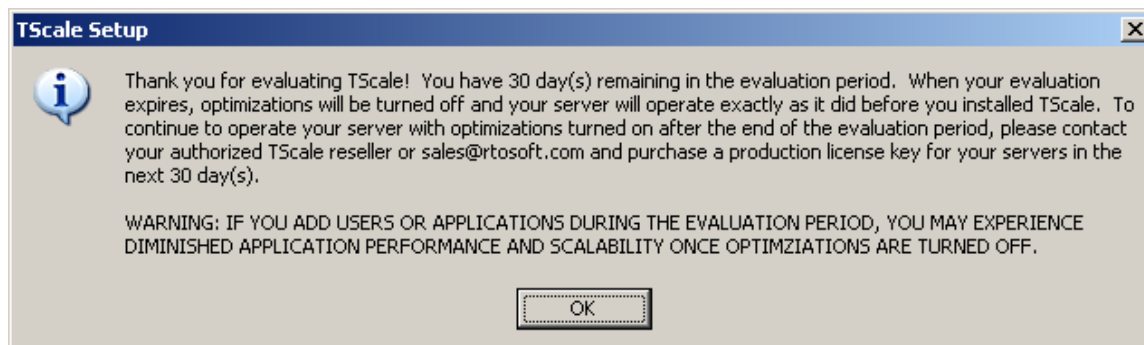
Click "OK" to close the message and continue.

# 5.	Setting The Optimization Policy in the TScale Console

The TScale Console gives you the ability to change the level of optimization for the whole server, for any process running on the server, and for any component that is part of any process. To access the Optimization Policy for your server, right click on "TScale Optimizations" in the TScale Console, and select "Optimization Policy".

The table below depicts the granularity of control that you have over TScale optimizations:

System Optimizations	Applications Optimizations	Component Optimizations
VM Capacity	VM Capacity	VM Capacity
VM Performance	VM Performance	VM Performance
MT Performance	Services	
System Registry		
User Registry		
System Protected Files		

(Context menu shown beside table:)
Optimize Now
Schedule...
Optimization Policy...
TScale Support
View ▶
New Window from Here
New Taskpad View...
Export List...
Help

Once you have accessed the Optimization Policy for your server you will see the dialog below with three sliders. You can change the Optimization Policy for your server by moving the sliders up and down, or by clicking the details box and selecting the various options in each slider.
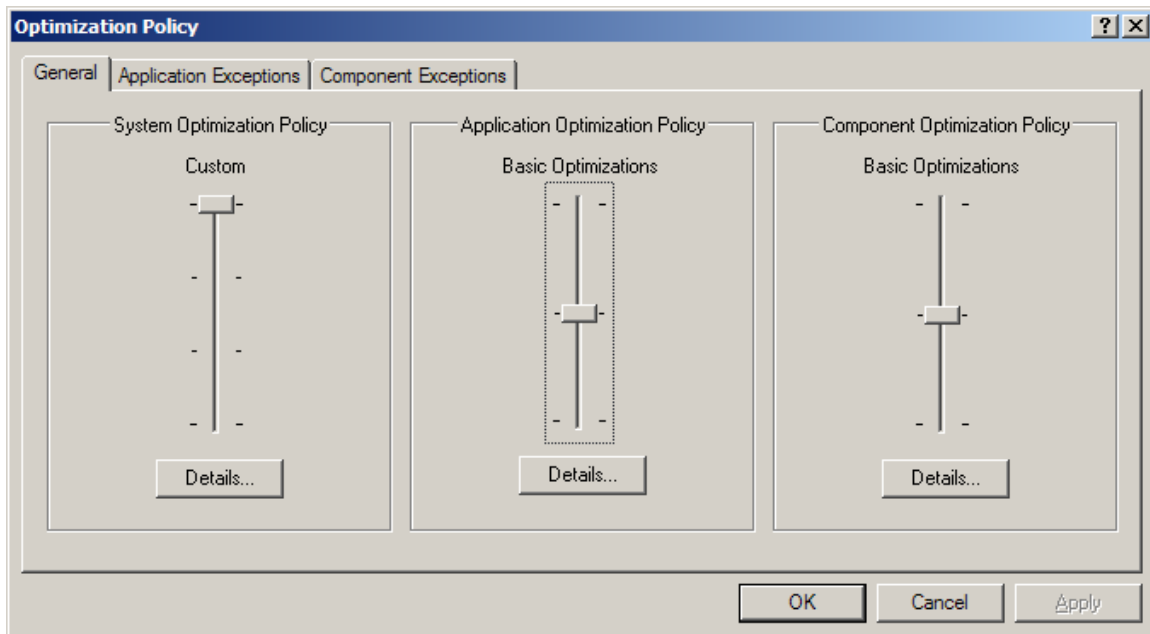
When changing the level of optimizations that are in effect for your Terminal Server, please keep in mind the following important information:

- All optimizations only take effect upon applications and components that are loaded after the optimizations are implemented for that application or component. So, if you install TScale and run an optimization session at 10:00 AM, only users who load applications after 10 AM will get the benefit of that optimization session.

- VM Capacity optimizations take four or five days to converge upon a "solution." So you will not see the benefits of VM Capacity optimizations until after four or five nightly scheduled optimization sessions have occurred.

- VM Performance optimizations should only be turned on AFTER the VM Capacity optimizations have converged upon a solution. Please also be aware that every server has two or three applications or components that are incompatible with this optimization, and you should be prepared for those applications and components to cease to function after a VM Performance optimization, and then for you to have to turn VM Performance optimizations off for these applications and components.

- MT optimizations take effect immediately after they are turned on (or after TScale is installed) and they take effect upon all applications that are loaded after MT optimizations are turned on (or TScale is installed). So, if you install TScale on a server at 8 AM in the morning before any users have loaded any applications, you will get the benefit of MT optimizations that day.

- If you turn any optimization off, this will take effect upon all applications loaded after the optimization has been turned off. To ensure that the effect of turning an optimization off has been fully implemented on a server, either have all of the users log off of the server, or reboot the server.

- Registry Optimizations are only implemented upon a reboot of your server. If you are going to turn these optimizations on, you must schedule an optimization session to occur during reboot, and you should reboot your server after the TScale Analysis Service has had a week to find things in the registry that need optimization. *Note that the System Registry Optimization task will consume 100% of one CPU on your server for between 2 and 30 minutes*. So, if you turn this optimization on, make sure that you do not run optimization sessions during normal production work periods.

The following sections describe the optimization choices available in the Options dialog.

5.1. Setting the System Optimization Policy

The System Optimization Policy contains controls for optimizations that are turned on and off for all applications and components on the server. Turning optimizations on or off here affects the server globally and overrides more detailed settings elsewhere in the TScale Console. The levels in the sliders have the following meanings:

- No Optimizations – All optimizations are turned off for this server.
- Basic Optimizations – Only Applications Shaping is turned on.
- Advanced Optimizations – MT, Registry, and Application Shaping are turned on.
- Custom Optimizations – Used to individually turn on or turn off any optimizations.

5.1.1. System Optimization Policy Details

Click the Details button under System Optimizations to enable and disable five different optimizations. Checking and unchecking optimizations here turns them on and off system-wide.
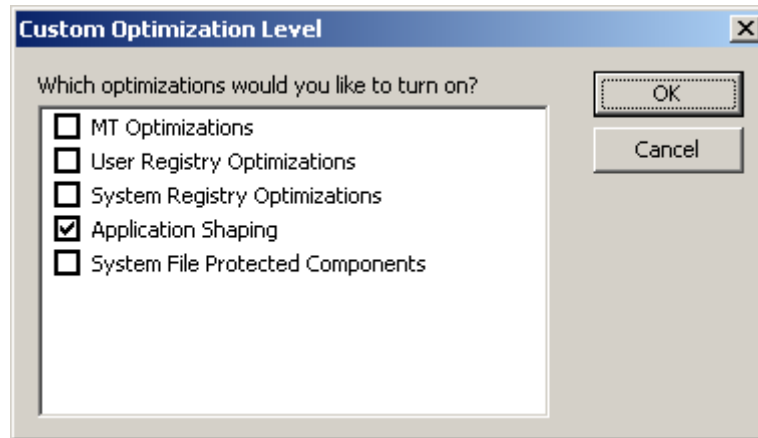
MT Optimizations improve the execution efficiency of multi-threaded applications. It is generally safe turn this optimization on.

User Registry Optimizations automatically compress the user registry to free up virtual memory, which can be used to support incremental users. These optimizations mitigate the impact of the W2K registry size limit upon scalability.

System Registry Optimizations automatically compress the system registry to free up virtual memory, which can be used to support incremental users. These optimizations mitigate the impact of the W2K registry size limit upon scalability. If you turn these optimizations on and then run an optimization session (Optimize Now or a scheduled optimization session), ***performing these optimizations will consume 100% of one CPU on your server for between 2 and 30 minutes.*** Therefore you are strongly encouraged to implement these optimizations ONLY via a scheduled optimization that runs upon reboot of your server.

Application Shaping keeps rogue instances of an application from harming more than one CPU on the server and other applications/users. It improves utilization of server resources by eliminating headroom previously reserved for runaway applications.

System File Protected Components refers to giving TScale permission to optimize these components as it implements its VM Capacity and VM Performance optimizations. You should try these optimizations on a test server before you try them on a production server.

## 5.2. Setting the Application Optimization Policy

The Application Optimization Policy contains controls for optimizations that are turned on and off on an applications level for your server. Turning optimizations on or off here affects all applications and overrides more detailed settings elsewhere in the TScale Console. The levels in the sliders have the following meanings:

- No Optimizations – All optimizations are turned off for this server.

- Basic Optimizations – Only VM Capacity Optimization is turned on.

- Custom Optimizations – Used to individually turn on or turn off any optimizations.

To see the optimizations that are turned on, click the Details button for each slider

5.2.1. Application Optimization Details

Click the Details button under Applications Optimizations to enable and disable three different optimizations. Checking and unchecking optimizations here turns them on and off for all applications that are running on the server.
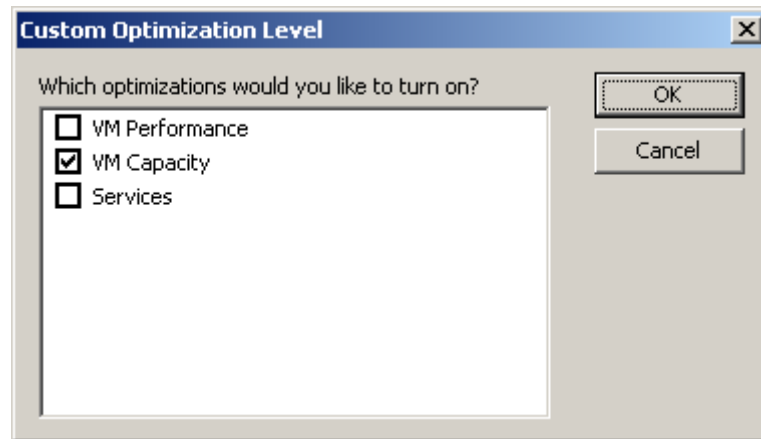
VM Capacity optimizations reduce the amount of virtual memory and page file that each application uses, allowing more concurrent copies of each application to run on each server. It is safe to turn this optimization on.

VM Performance optimizations reduce the time required for applications to load the components that comprise each application. This improves the load times and overall execution efficiencies of applications running on the terminal server. Not all applications are compatible with this optimization so you should not turn it on unless you have given the VM Capacity optimizations a chance to complete, and you are willing to do compatibility regression testing.

Services defines whether or not the VM Capacity and VM Performance optimizations will be applied to processes that run as system services. A conservative optimization policy would be to leave this unchecked. If you wish to be aggressive and are prepared to regression test compatibility issues that may arise, you can check the Services box.

## 5.3.   Setting the Component Optimization Policy

The General tab in this menu is used to set the optimization level globally for the system, all applications, and all components running on the Terminal Server. By default, the Basic Optimizations are turned on for the system, all applications, and all components running on the server (except for certain ones – see the discussion of Applications and Components exclusions below). The levels in the sliders have the following meanings:

* No Optimizations – All optimizations are turned off for this server.

* Basic Optimizations – Only VM Capacity Optimization is turned on.

* Custom Optimizations – Used to individually turn on or turn off any optimizations.

To see the optimizations that are turned on, click the Details button for each slider

5.3.1.   Component Optimization Details

Click the Details box under Component Optimizations to enable and disable two different optimizations. Checking and unchecking the VM Capacity and VM Performance boxes here turns these optimizations on and off for all components that run on the server.
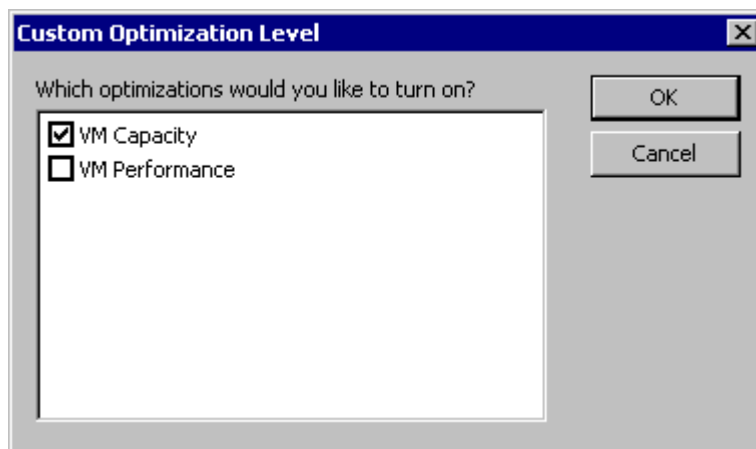
VM Capacity reduces the Virtual Memory and Page File utilization of each component allowing more concurrent copies of these components and the applications that use them to be run concurrently on the server. It is safe turn this optimization on.

VM Performance improves the speed with which one component loads when it is called by another component. Not all applications are compatible with this optimization so you should not turn it on unless you have given the VM Capacity optimizations a chance to complete, and you are willing to do compatibility regression testing.

5.4. The Application Exceptions Tab

The applications listed in the Applications Exception menu are applications for which all optimization have been turned off by default. You are strongly encouraged not to turn on optimizations for any application in this list.
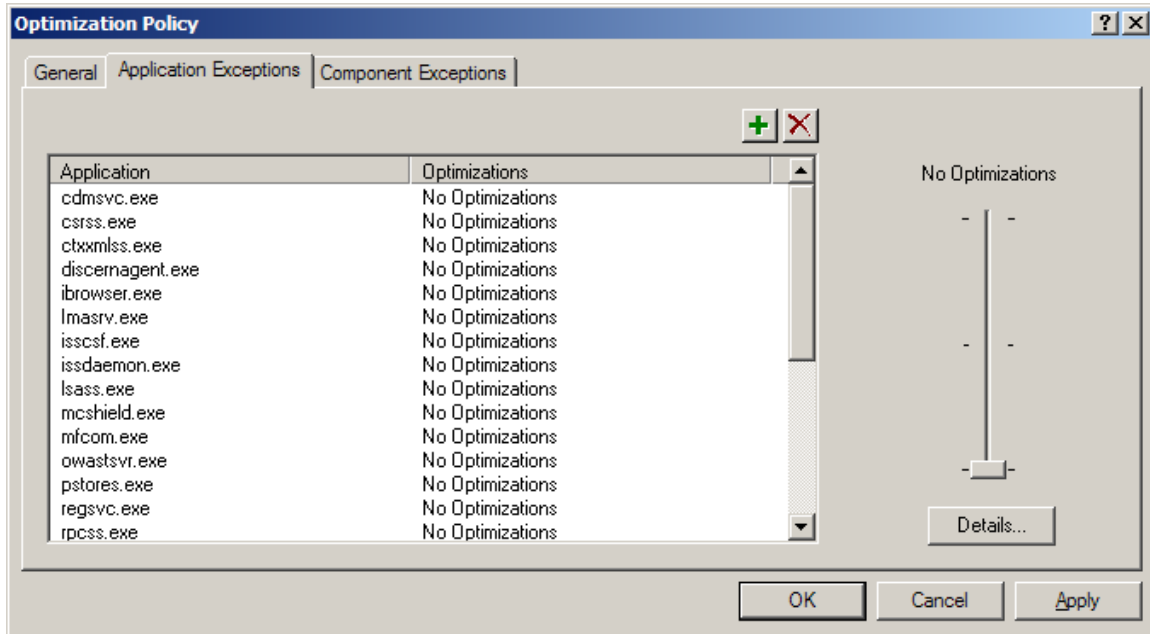
If you encounter an application compatibility issue after TScale is installed on your server, you may want to temporarily add that application to this list in order to isolate the impact of TScale from other factors that may be affecting the application. To add an application to this list, click the +, browse to that application's .exe and add it to this list. In general, you should not add or remove applications from this list unless you are in consultation with RTO technical support about an application compatibility issue. Applications compatibility issues occur infrequently, which makes it unnecessary to exclude applications from optimization.

You can also turn off optimizations for an application or component by right clicking on it in the Applications tree or the Sessions tree.

5.5.   The Components Exceptions Tab

In the Components tab of the Options Menu, you can turn VM Capacity and Performance optimizations on or off for any individual component. You are strongly encouraged NOT to turn on optimizations for any component that is in this list.
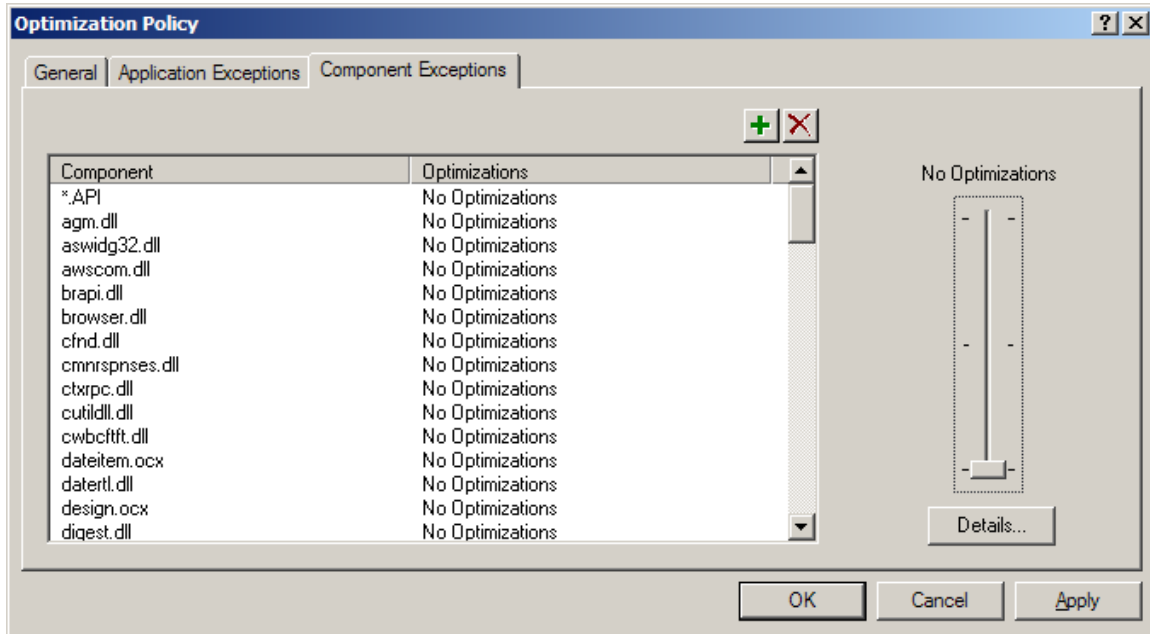
If you encounter an application compatibility issue and you can identify which component of the application is having the problem, then you can try to resolve the issue by adding that component to this list. If you find that it is necessary to add a component to this list, please contact RTO Technical Support (support@rtosoft.com) and let RTO know that you have experienced an application compatibility issue. These issues occur very infrequently, but they can be resolved via an update to the default exclusion list so that the issue does not impact other customers.

You can also turn off optimizations for an application or component by right clicking on it in the Applications tree or the Sessions tree.

6. Toggling Optimizations On and Off For Your Applications and Components

The Optimization Policy menu (see Chapter 5) allows you to turn various optimizations on and off and to add applications and components to the list of items that will not get optimized. If you know that you want to exclude an application from optimization before TScale optimizes it, you should make this addition to the Exception list in the Optimization Policy menu.

You should use the Set Optimizations menu if TScale's optimizations cause problems for your applications to turn optimizations on an off for components so as to isolate the problem components from ones that are compatible with optimization. You can right click on the Applications tree, the Sessions tree, or any item in these trees to access this menu.

In order to use the Set Optimizations menu, it is important to understand how TScale Optimizations are applied to your applications:

1. MT optimizations are applied globally to every application on your server. The only place you can turn these on and off is in the Optimizations Policy menu.

2. Registry optimizations are applied globally to the system and user registries on your server. The only place you can turn these on and off is in the Optimizations Policy menu.

3. VM Capacity and VM Performance Optimizations can be turned off globally (in the Optimizations Policy Menu for Applications and Components). Applications and components can be excluded from these two optimizations in the Policy menu.

4. Once VM Capacity and/or VM Performance optimizations have been applied to an application or component they can be dynamically toggled between an on and off state on a per application and component basis in the Set Optimizations menu.

Turning Optimizations on and off works via the following process:

1. You decide in the Policy menu whether to apply VM Capacity or VM Performance or both to your applications (it is strongly recommended that you stick with just VM Capacity unless you talk to RTO Technical Support first).

2. Once TScale optimizes an application or component, those optimizations are stored in the program files directory where the applications files are stored (but those optimization are not stored in the binary applications files themselves).

3. If you turn optimizations for a file or component on (the default state), then when a user loads that application or component, they get the optimized application and components.

4. If you use Set Optimizations to turn optimizations for a file or component off, then when that application or component is loaded, the un-optimized version is loaded instead of the optimized version.

5. If you make a change to an application or component in Set Optimizations, you will need to exit and reload any instance of that application in order to have the change that you just made affect that application.

6. When you bring up the Set Optimizations menu, you will notice two "Use Policy" check boxes. These are checked by default, and mean that you are using the optimizations settings defined in the Optimization Policy menu. You have to uncheck these boxes to respectively make changes to the optimizations for Applications and Components. You can at any time recheck these boxes to cause your settings to again be consistent with what you have defined in the Optimization Policy.

In the example below we are going to pretend that applying VM Capacity optimizations cause the ENVELOPE.DLL component not to load (this is not the case, and just an example).

Right click on the Applications or Sessions Node in the TScale Console and select "Set Optimizations". Drill down until the focus is on ENVELOPE.DLL. Notice that when you are at the component level, the Applications level is grayed out. The Details button on the component level will be grayed out as long as you have Use Policy checked.
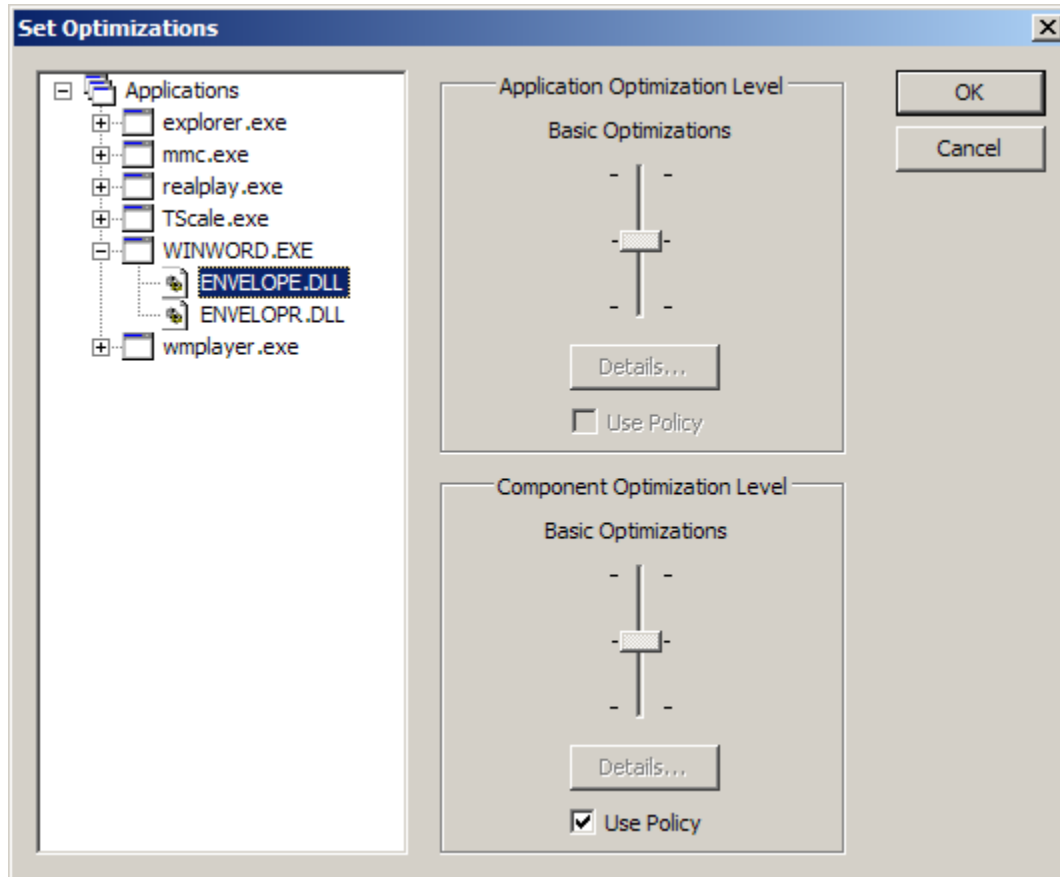
Now uncheck the Use Policy box so that you can access the individual settings for the ENVELOPE.DLL
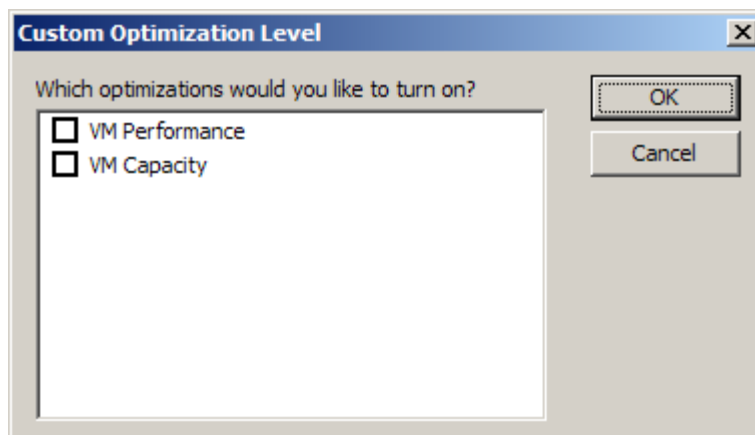
component. Uncheck the two boxes (VM Performance and VM Capacity). This turns off Optimizations for the ENVELOPE.DLL component. You have to exit Word and reload it to get the effect of this change.

You can take a similar step to turn off optimizations for an entire application. Simply put the focus on the Application (Word) as depicted below, uncheck Use Policy, and hit the Applications Optimizations Details button.
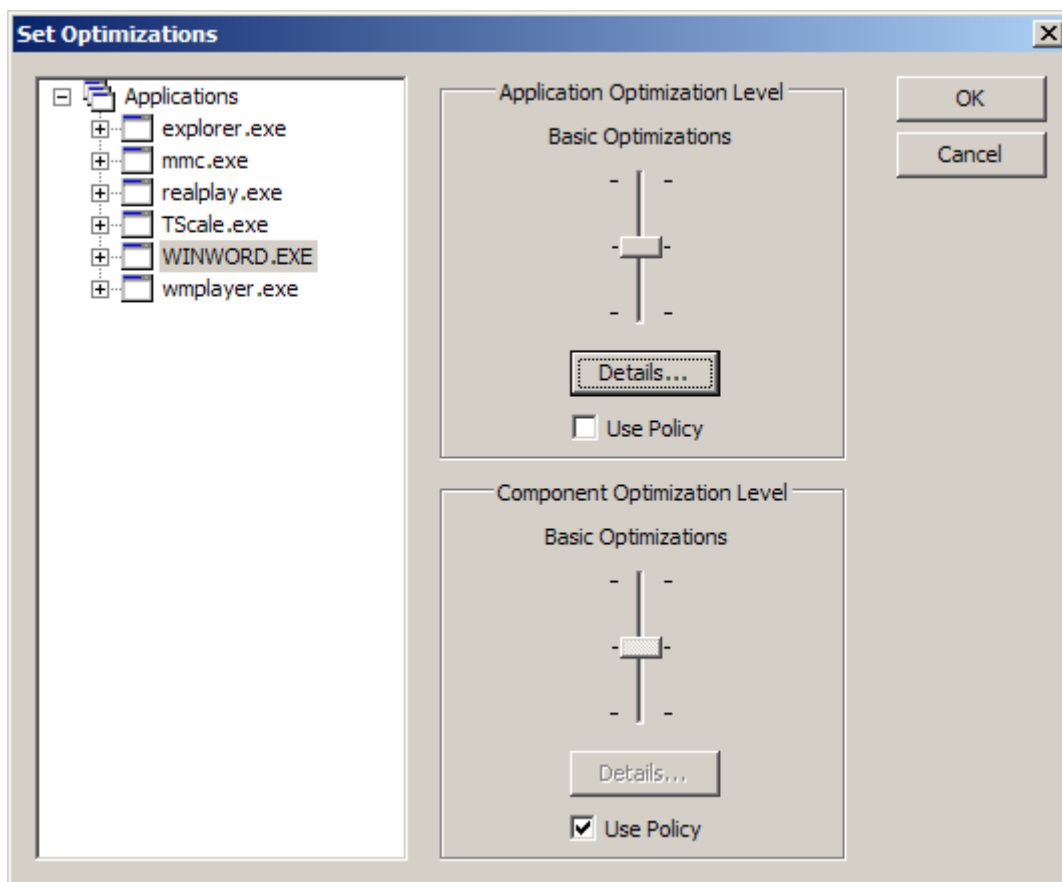
Now uncheck the optimizations boxes in the detail menu.
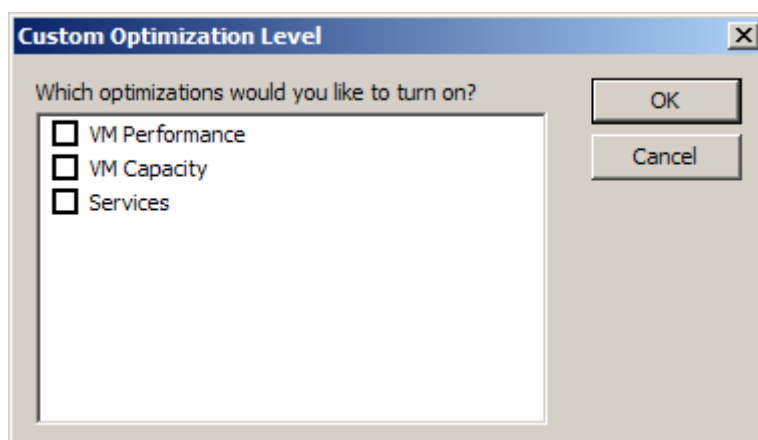
7. Using Application Shaping™

Application Shaping™ consists of two component features that together allow you to prevent a runaway (or rogue) application from damaging the performance of your servers and the experience of your users. The features that comprise Application Shaping are:

1. Application Affinity™. Affinity allows you to specify on which of the n CPUs in your server all instances of a process will run. So, if you have a dual processor, and you frequently have cases of an application running away with your servers, you can use Affinity to nail all instances of the application to a CPU so that when rogue instances of the application occur, only one CPU is impacted.

2. Application Priority™. Priority allows you to reduce the CPU priority of an application after it has used x% of the CPU for n minutes. So, if an instance of an application runs away with the CPU, you can have TScale reduce its priority after 1 minute. All other applications (including other instances of the application) will be able to get the CPU resource that they need before the rogue instance of the application takes the rest.

You set up Application Shaping™ using the Application Shaping™ node, which has two nodes underneath it, Application Sets and Schedules.
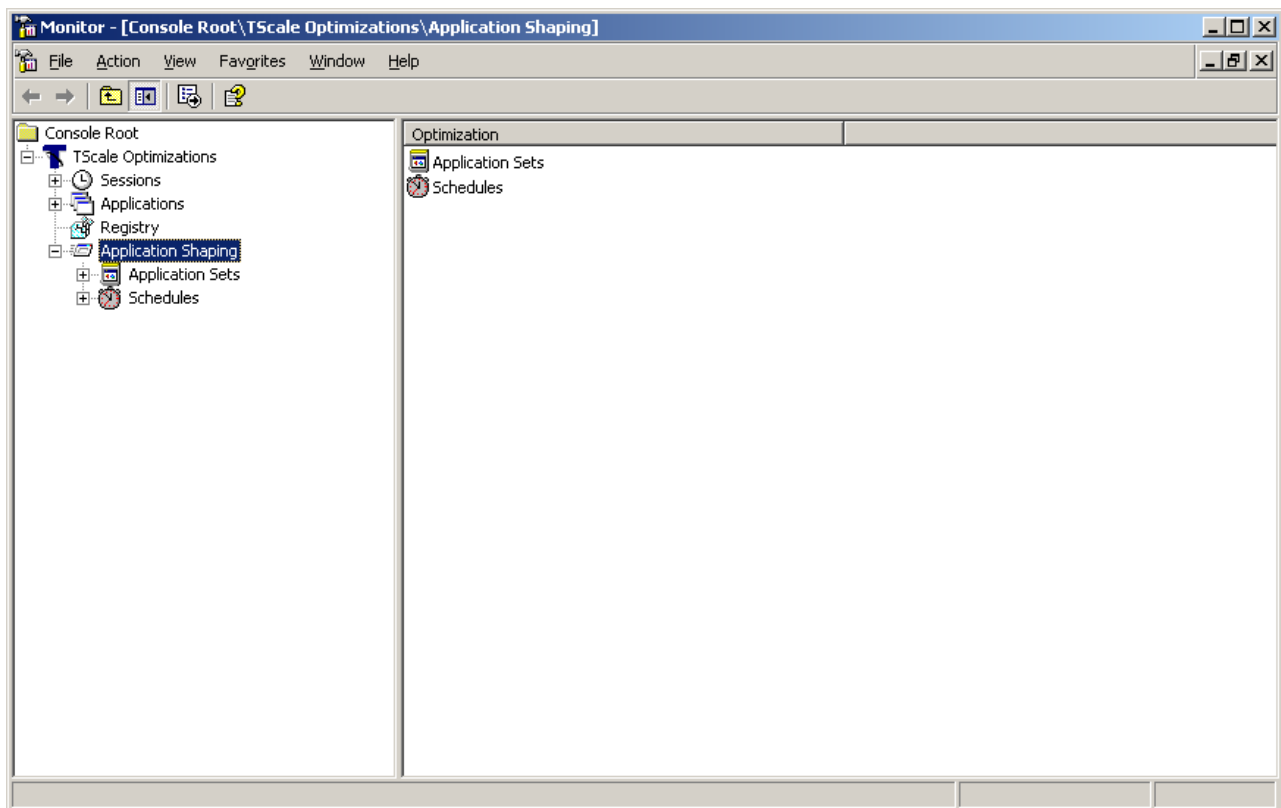
Under Application Sets you define Application Sets, which are collections of applications to which you want common shaping policies applied. Under Schedules, you define a Schedule for each Application Set that determines when (what times of the day), and to whom (which users) Shaping is applied. You can populate the Default Application Set that is provided with the first set of applications to which you want to apply Shaping.

7.1. Setting Up Application Shaping™

To set up Application Shaping™ in TScale, simply add the applications that you want shaped to the Default Application Set. Expand out the Application Shaping Node and then the Application Sets Node, and highlight the Default Application.
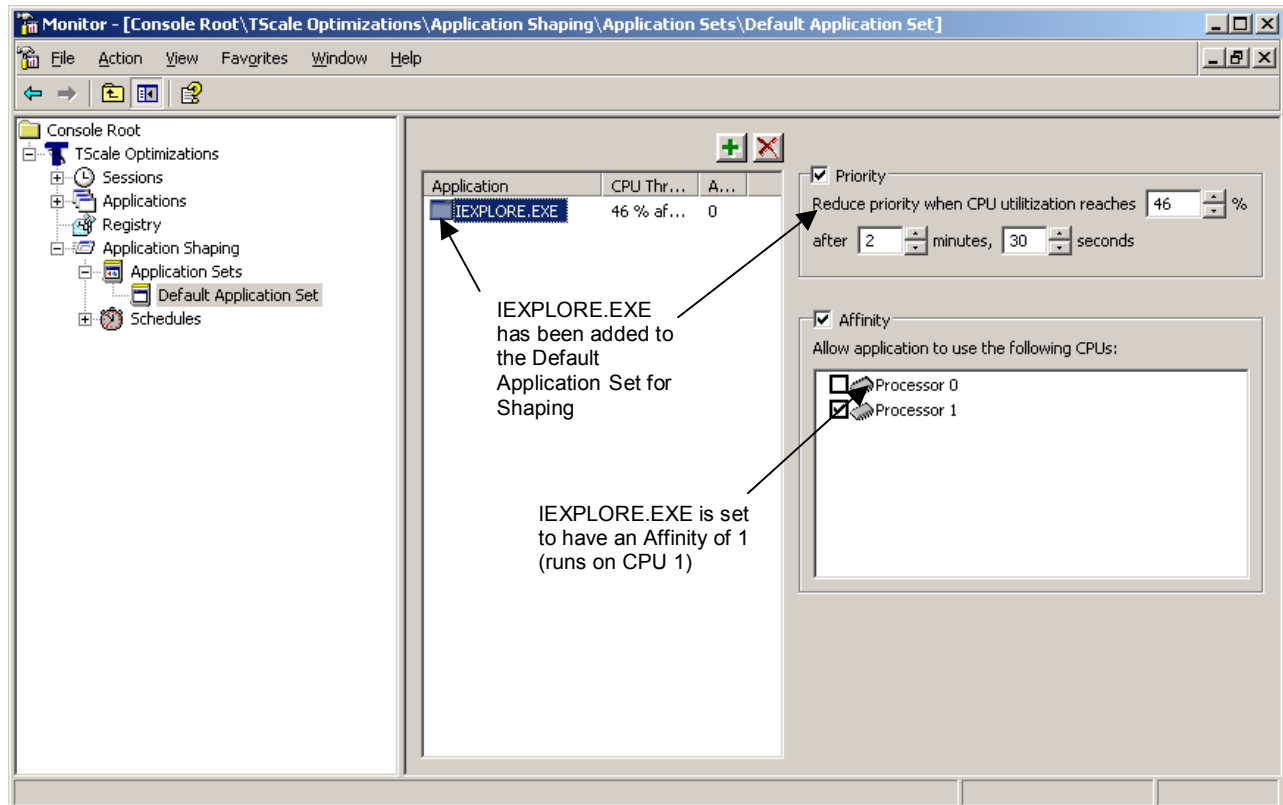
To add an application to the Default Application Set, click the Default Application Set name. Click the green "+" at the top of the list of applications that Shaping will be applied to. A dialog is displayed.
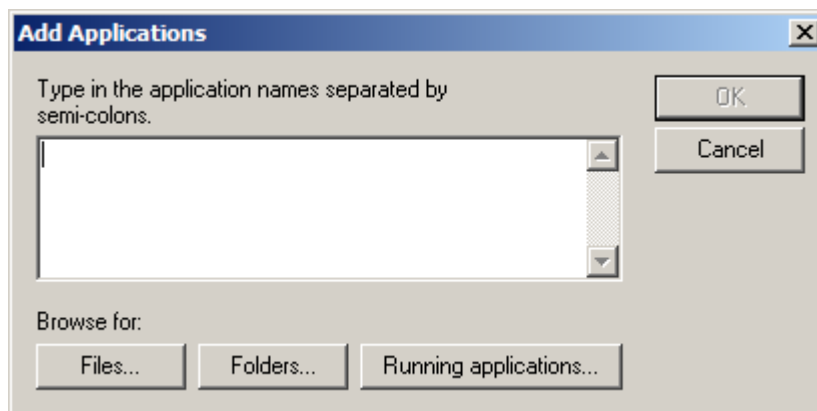
If you select the Files or Folders button you will be able to browse the file system of the server as shown below. Navigate to where the application resides in the Program Files Folder on your server. Select the application and click the Open button.
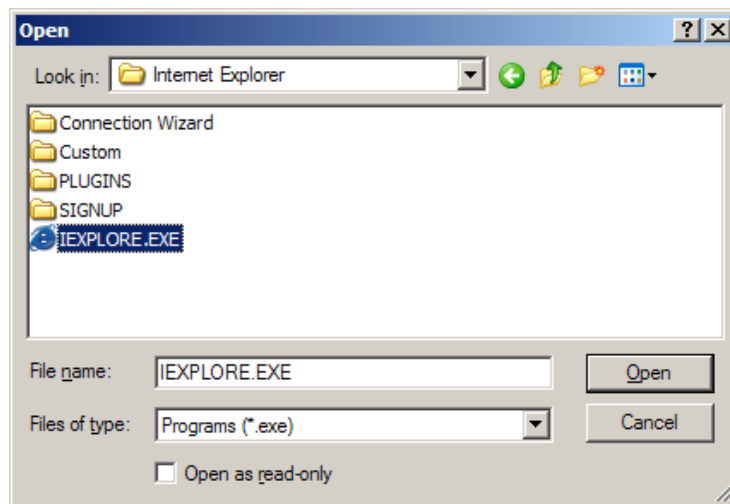
If you click the Running Applications button, a list of the processes currently running on that server will appear. Put a check mark next to the application(s) that you wish to add to the Default Application Set.
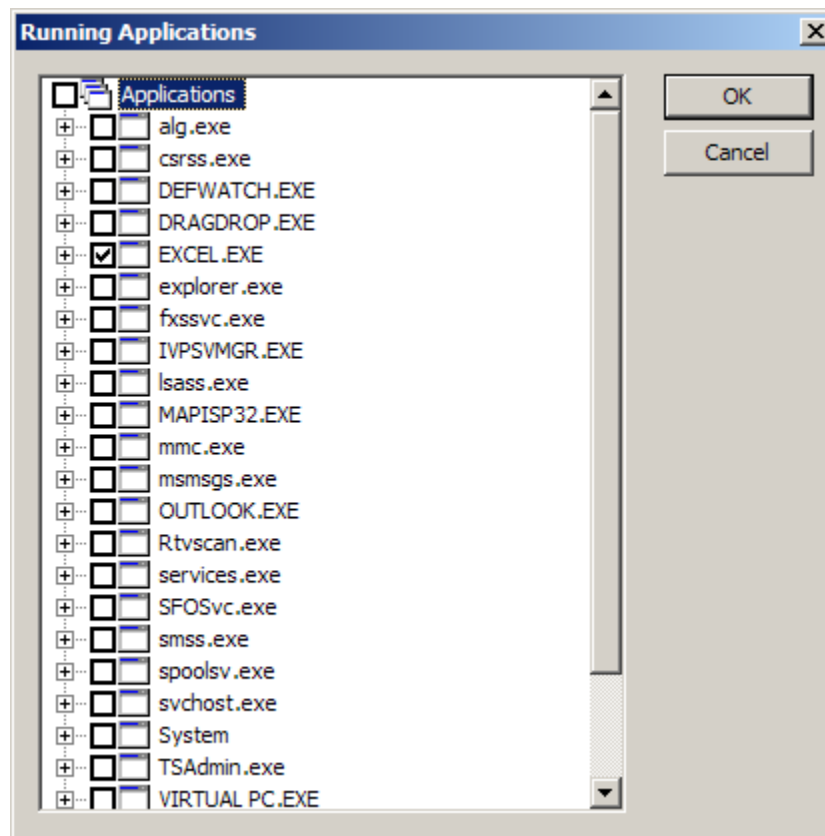
Once you have added the application to the Application Set, it will be listed in the set of applications shaped by the Application Set.

Your next decision is whether or not to use Affinity in conjunction with Priority, or whether you want to use Priority alone to manage rogue applications. The considerations that impact this decision are:

- If you only host one application on your servers and certain instances of this application have a tendency to go rogue, you probably do not want to use Affinity, since Affinity will nail all instances of your one application to one of your n CPUs.

- On the other hand if you have many different applications on your terminal server and a few of them tend to go rogue, then it may make sense to use Affinity to nail those applications to a specific CPU so that when they do go rogue only one CPU is impacted.

- If you have a server with more than two CPUs you can select multiple CPUs for an application. So, if you have a quad processor server, and both IE and Word have a tendency to go rogue, you can nail IE to CPUs 0 and 1 and Word to CPUs 2 and 3.

- It is important to note that if you select Affinity for an application, all instances of that process (good ones and bad ones) will be nailed to the CPUs that you select for that process.

When you decide to use Priority for a process, the most important decision is the CPU threshold at which Priority will kick in and the time window for the threshold. The considerations that impact this decision are:

- TScale uses the CPU utilization numbers reported by Task Manager for a process.

- In general, even multi-threaded applications will not consume more than 100% of ONE CPU on the server. On a dual processor machine, it is extremely rare for a process to consume more than 50% of the CPU on a server (100% of one of the two CPUs). On a quad processor machine, it is extremely rare for a process to consume more than 25% of the CPU on the server (100% of one of the four CPUs). Therefore, in general, if you set the threshold value to be higher than 50% or 25% (depending upon whether you have duals or quads), Priority will never kick in. In most cases, you should use thresholds lower than 50% or 25%.

- The actual threshold you use should be a function of how many concurrent users there typically are for that application, and whether or not you are using Affinity in conjunction with Priority, or Priority alone.

- If you typically have 20 users of IE on a dual processor and you are not using Affinity, then you will have 10 users on each CPU. If no other work is going on, each IE user will be using 5% of the CPU. So, you should define a rogue process of IE as one that is using more than the 5% that would be normal for some period of time (like 20 or 30 seconds). You should apply some judgment as to how much more than 5% you are willing to let one process consume since CPU utilization normally varies quite a bit from moment to moment.

- If you have the same 20 users of IE on a dual processor and you are using Affinity to nail all of the instance of IE to one CPU, those same 20 users will be sharing 50% of the total CPU resource on the server, meaning that the average utilization for one user will be 2.5%. You should then set the threshold level at which Priority kicks in at some level above 2.5 % again allowing for some normal variation in how much CPU a process uses.

- If you set the time window to be very long (over a minute or two) you risk a rogue process doing damage to your servers and the experience of users before priority kicks in.

- If you set the time window to be very short (less than 10 seconds), you risk priority kicking in while an application is launching, which will cause it to take longer to launch.

In the example below, both Priority and Affinity have been set for IEXPLORE.EXE. The Priority rule is to reduce the Priority of IEXPLORE.EXE if it uses more than 30% of CPU for more than 10 seconds. The Affinity Rule is to run all instances of IEXPLORE on Processor 1 (the second CPU in a dual CPU server).
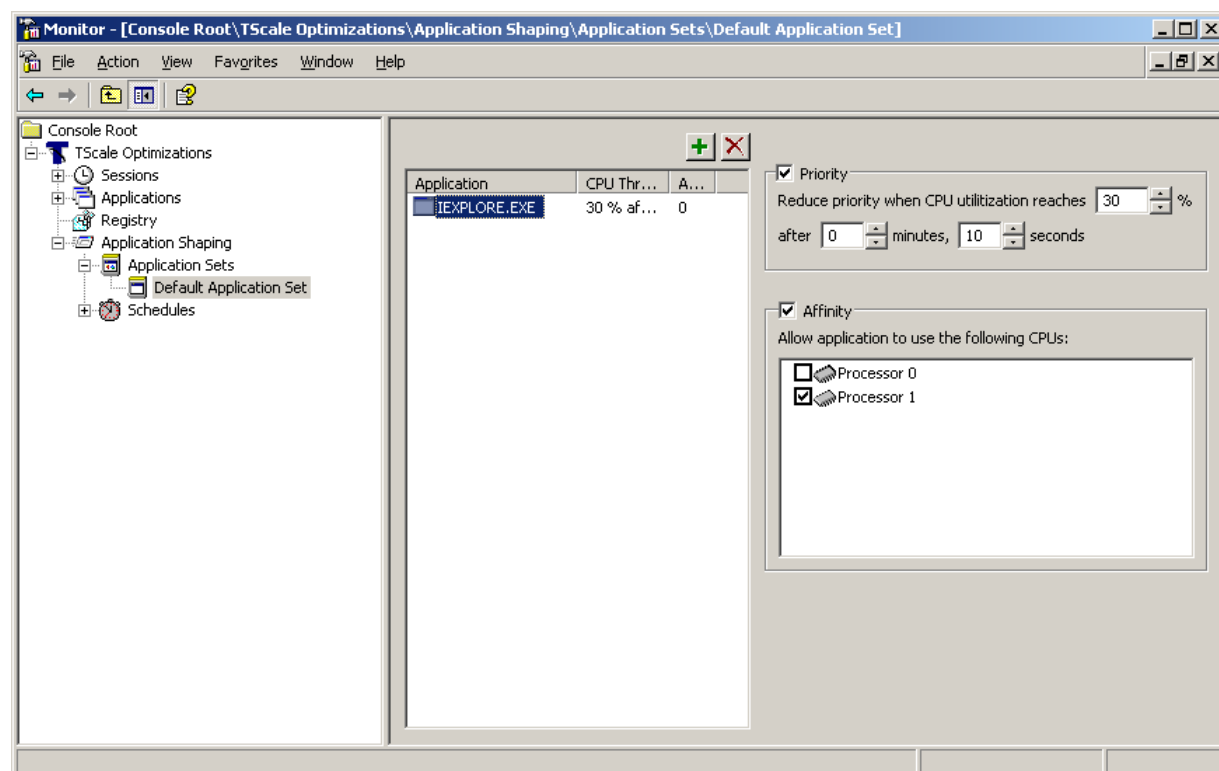

You can add as many applications as you wish to one Application Set. Each application in an applications set can have its own unique Priority and Affinity rules associated with it. Each Application Set will be associated with a Schedule, and if you desire, an Exceptions Schedule.

You can set up more than one Applications Set. In general this is only necessary if you have Applications that you want to have shaped in different schedules and for different sets of users.

7.1.1. Setting Up Application Shaping Schedules and Exceptions

You can control the times at which Application Shaping occurs as well as the users to which it is applied. This is set in a schedule that applies to each Application Set. The Default Application Set has a Default Schedule associated with it.

To set the schedule and the users, click on a schedule listed under the Schedules node. You can use the Default Schedule as the starting point to control timing and users for the Default Application Set. You will see that the Default Schedule applies to Everyone, and you will see by the width of the blue bar, the time period during the day that the Default Schedule is in effect.
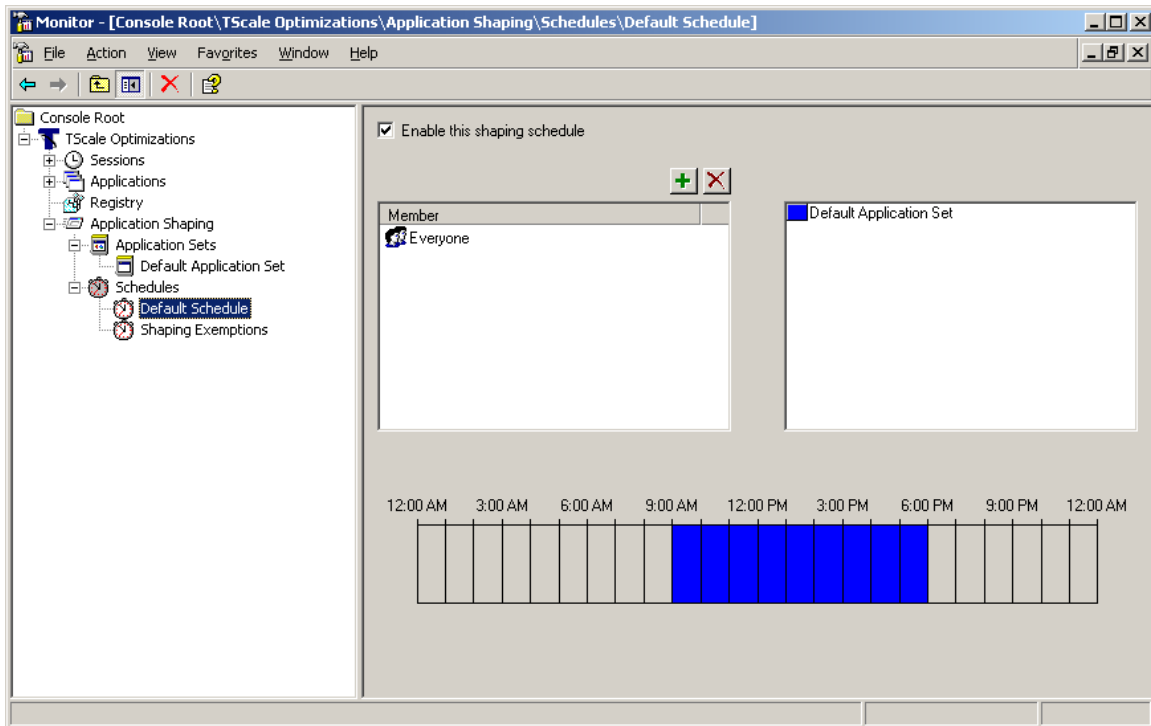
You can add or delete users to the list of people that this schedule impacts by clicking the "+" button and using the resulting dialog box to add or remove users and groups.

You can modify the time window during which this schedule is in effect by dragging the ends of the blue bar to the left or the right as dictated by your needs.

To add an application set to the schedule, right click the time line. Select the application set to add.

The selected application set will fill the open area of the timeline.

Click and drag to set the time window for that application set to be applied.

To exempt a user from shaping, simply add a user to the Exemptions Schedule. The Exemptions Schedule has no application sets defined for it, and users added to it will be exempt from Shaping in all other schedules. You can add users individually to a Schedule and then delete those that are exempt, but using the Shaping Exemptions schedule is much easier.

To add users to the Shaping Exemptions schedule, click Shaping Exemptions under the Schedules node.
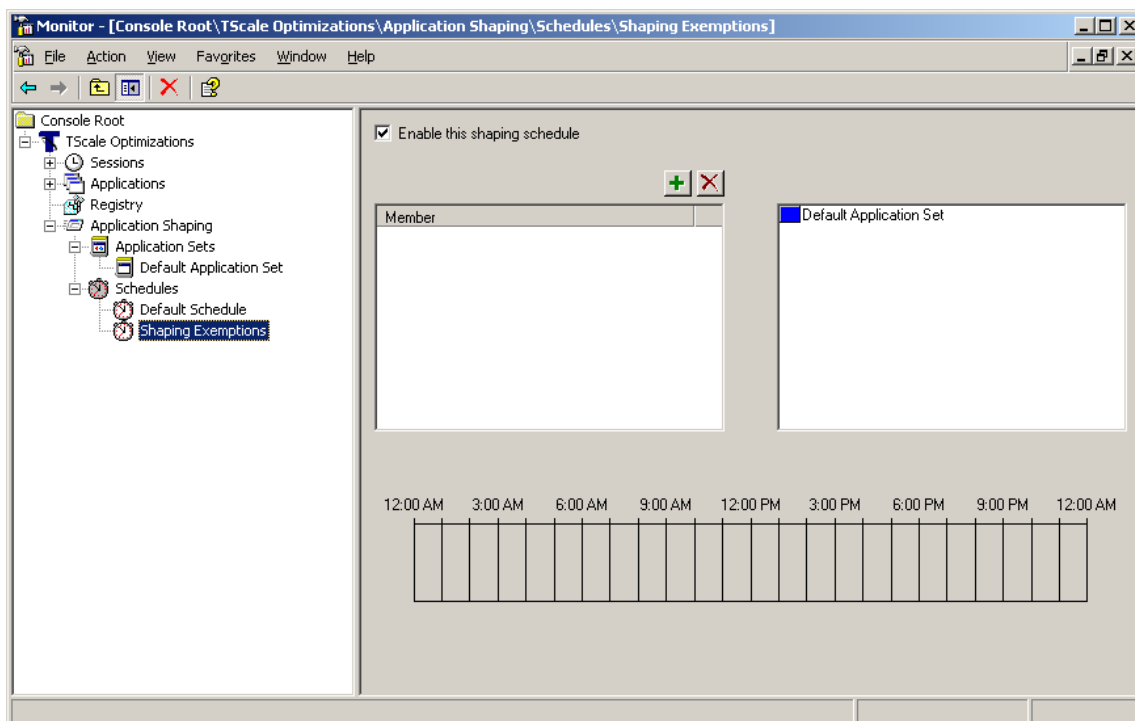
Click the **+** sign. The Add Users and Groups dialog is displayed. Highlight users or groups in the list then click Add. This will allow you to exempt individual users and groups from a particular Application Shaping schedule.
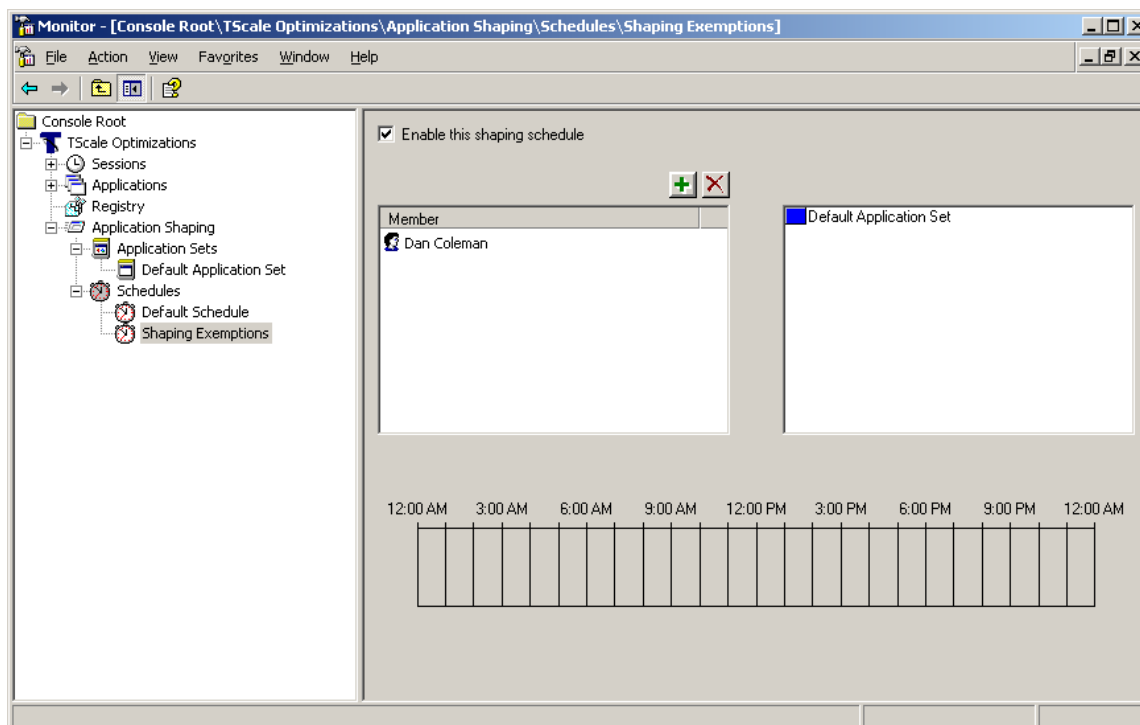
8. Performing Optimizations

To have TScale to optimize your applications, you need to either manually start an optimization session, or create a scheduled task to perform optimization.

8.1. Executing a Manual Optimization

To start a manual optimization session, right click on the TScale Optimizations node. The picture below shows the pop-up menu that will appear. Select Optimize Now. Note that an optimization session can easily take between 1 and 30 minutes to run, and will consume substantial system resources while running. It is highly recommended that you run optimization sessions during times that are not characterized by peak production loads.
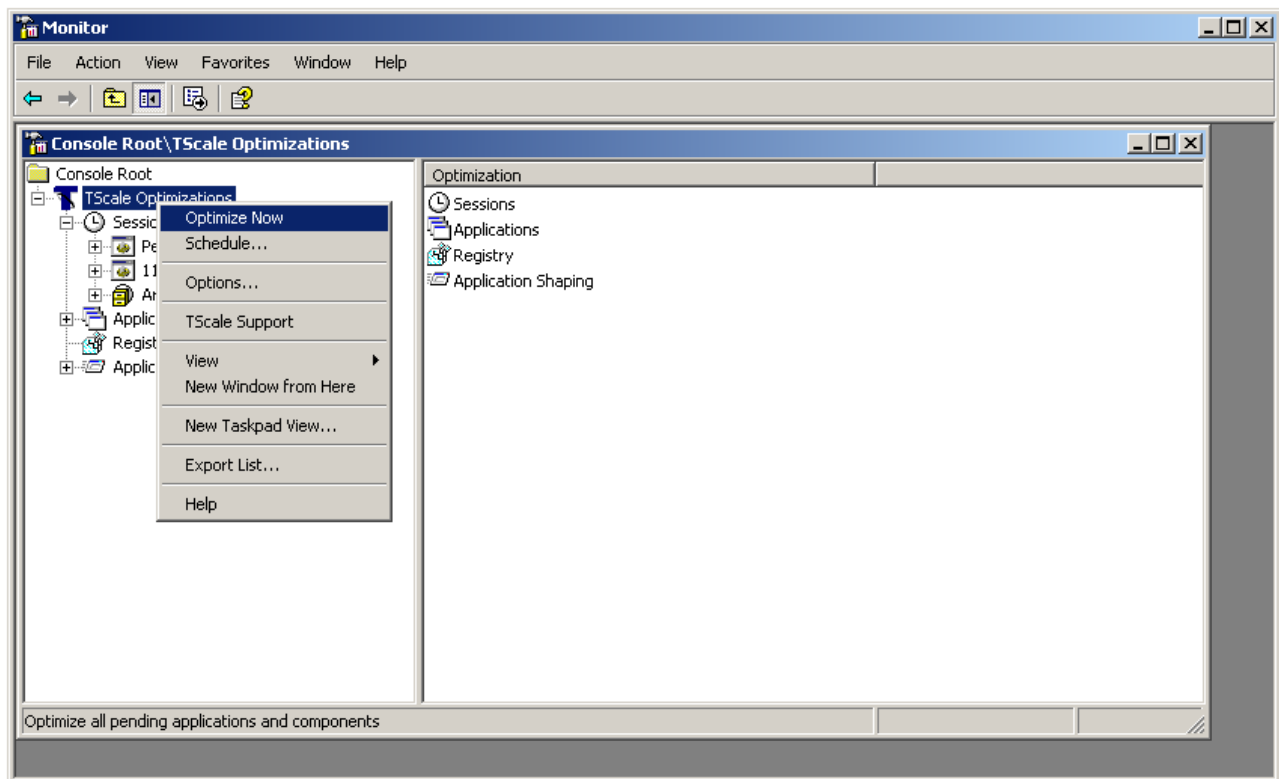
8.2. Scheduling Optimization Sessions

To cause TScale to run in unattended mode, highlight the TScale Optimizations node near the top of the tree control. Right-click and then select the "Schedule" menu item as depicted in the screen below:
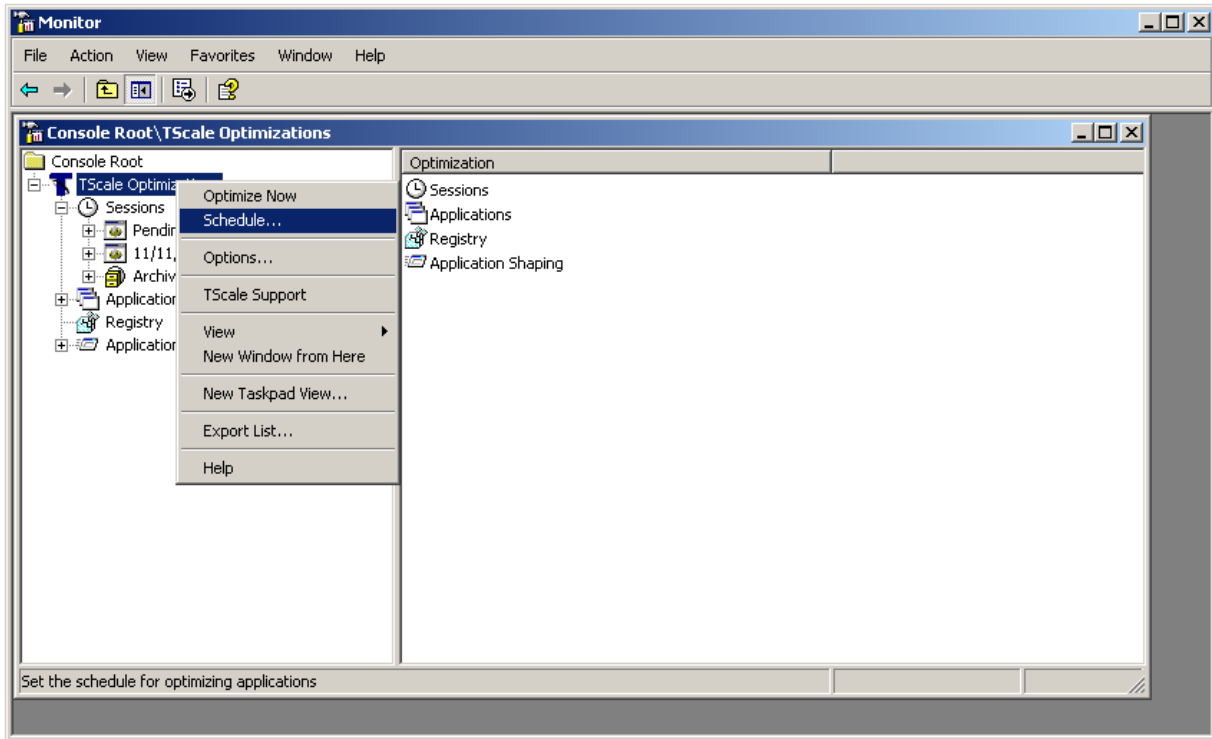
Selecting Schedule on the menu item will cause the following dialog box to appear.

You should make sure that the path for the program TScaleBace.exe in the "Run" field is the same path where TScale is installed. TScaleBace.exe is the program that performs the actual optimizations, so it must be called correctly from this menu in order for any actual optimizations to occur.

If at any time you want to stop optimizations from occurring, simply uncheck the "Enabled (scheduled task runs at a specific time)" box at the bottom of the screen above. This will suspend scheduled optimizations until you recheck this box, or start an optimization manually.
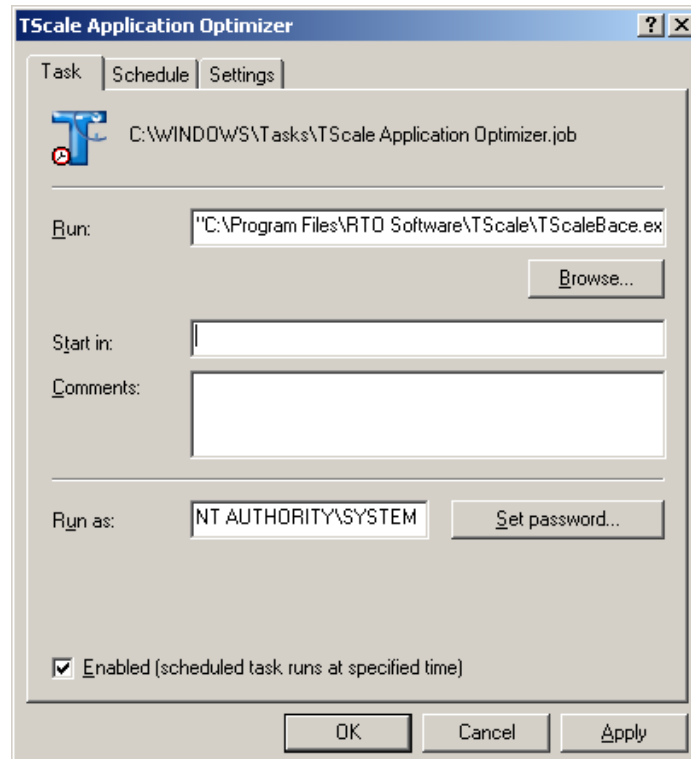
Click on the "Schedule" tab on this dialog box to schedule the time of your optimization sessions. The schedule tab should appear similar to the dialog boxes below. It is strongly recommended that if you reboot your servers periodically, that you schedule the optimization task to occur at system startup as depicted in the picture on the left. For TScale optimizations to take effect, they must be run while the applications being optimized are not in use. Running optimization sessions immediately after a reboot is the best way to ensure that TScale optimization sessions are effectively and completely optimizing all of the target applications. If you do not regularly reboot your servers, please choose a time for the TScale optimization sessions to run where there is likely to be either no users using the applications, or as low a user load as possible. If you reboot your servers occasionally, then pick both a time to optimize (when user load is low), and a second optimization schedule to occur upon reboot. This will ensure that any components that are in use during regular optimization sessions are in fact caught during the system restart.
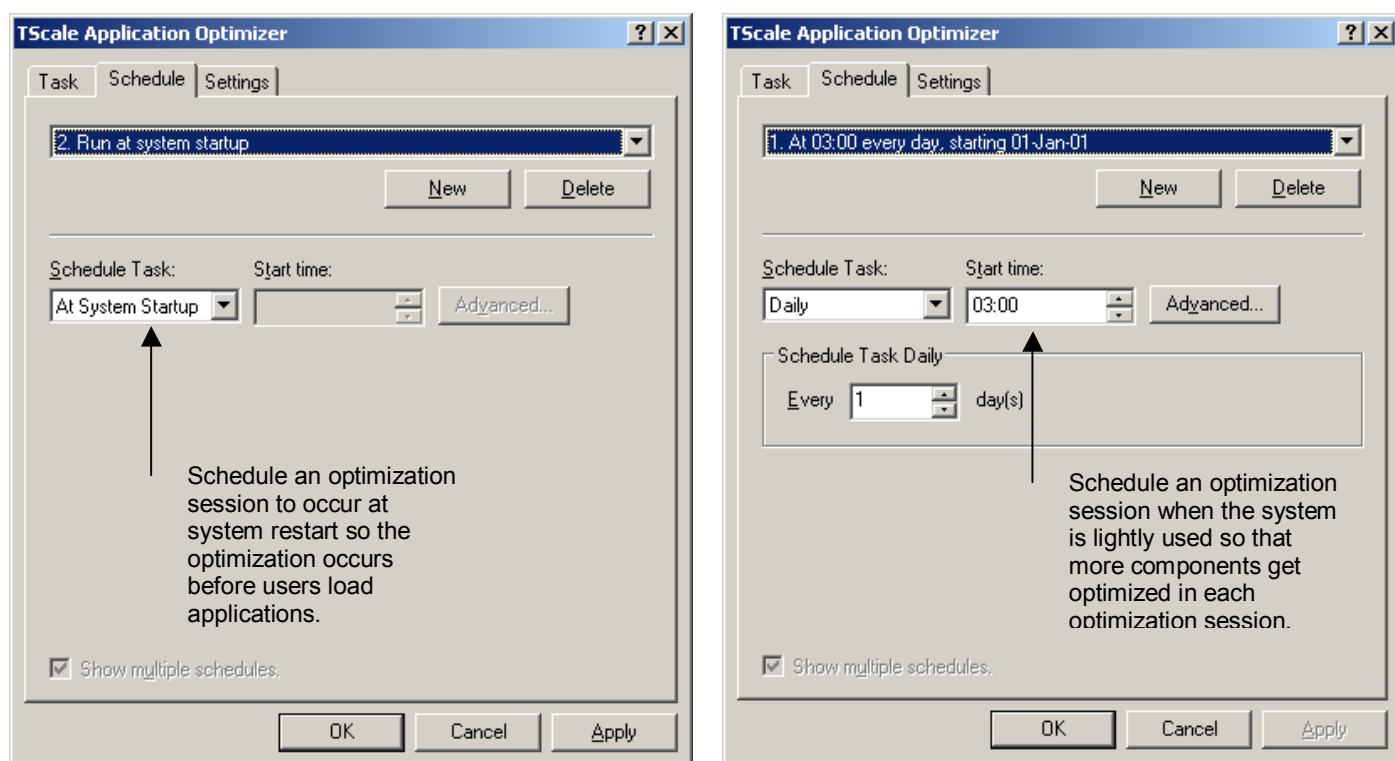
8.2.1. Using Your Own Scheduler

If you do not have the Windows Scheduled Tasks add-in installed, or if you prefer to use a different scheduler, you can schedule the running of the TScale program in the task scheduler of your choice. To schedule an optimization session, enter the following command line in the task scheduler of your choice:

```
TScaleBace –optimize
```

9. Viewing Optimizations

The TScale Console application has two ways of viewing optimizations:

- The Sessions view contains a list of all optimizations that have been done to date. This list also includes the next optimization which will occur which is listed as "Pending."

- The Applications view lists all of the optimizations that have been done by application.

Between these two views you will be able to see both how applications have been optimized over time, and what the total optimizations are for each application. Once you have this information, you can decide if you need to change how and when TScale runs. You can also undo changes made by TScale.
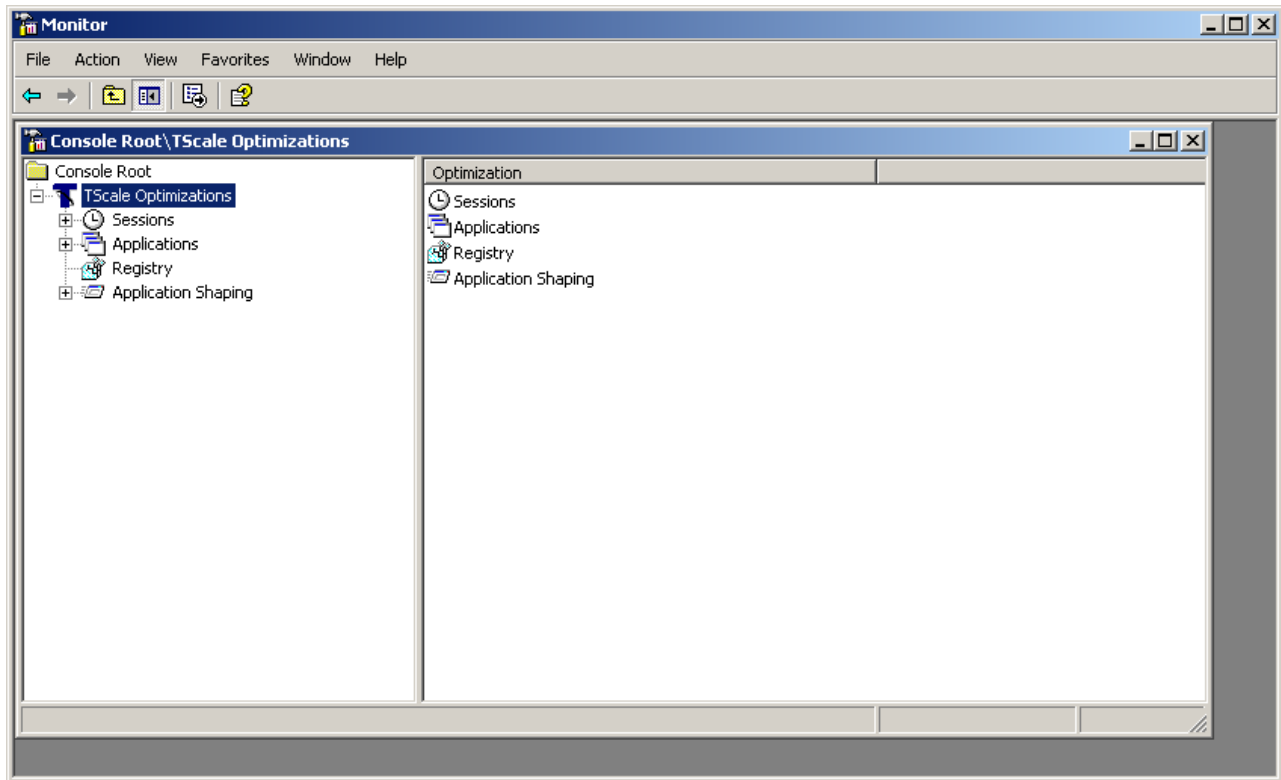
9.1. Viewing Pending Optimizations

When you start the TScale Console for the first time, you are likely not to see any items under the "TScale Optimizations" item. The reason for this is that your first scheduled optimization task probably has not run yet. If you click on the Pending node, it will run a calculation which will determine what the savings will be the next time you run an actual optimization session.
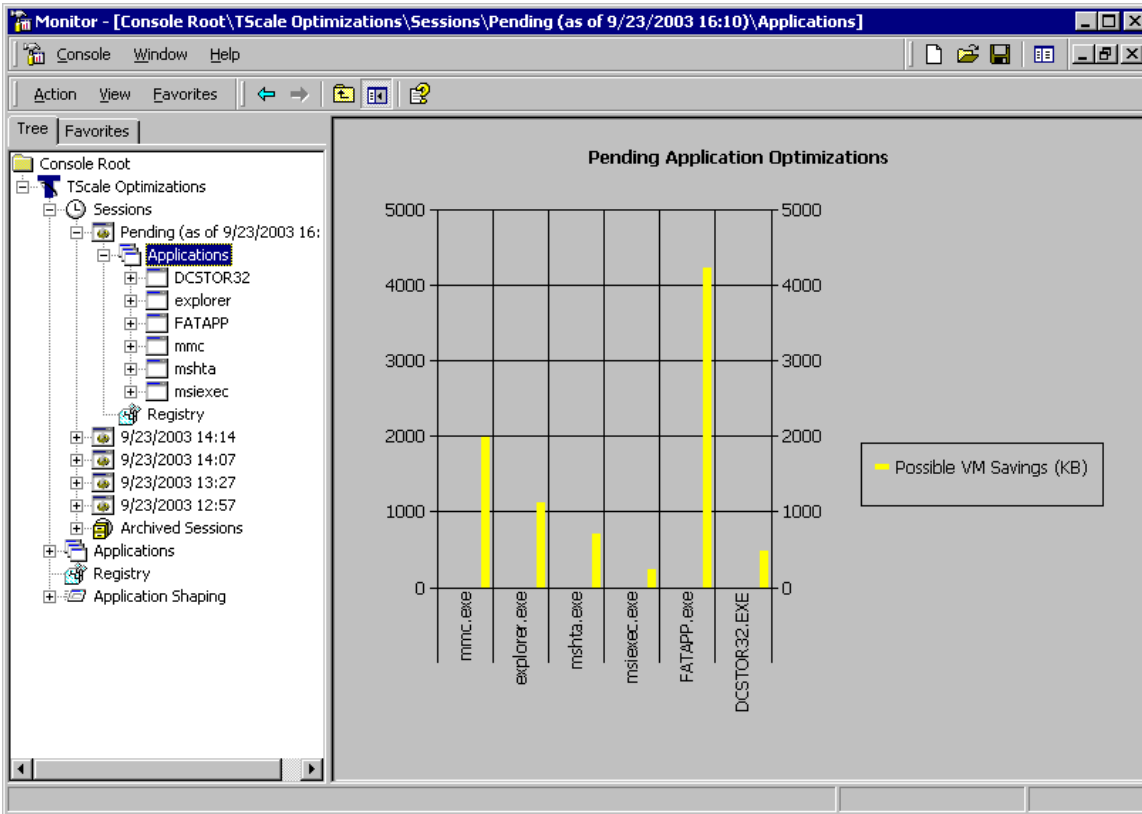
A screen will appear indicating the progress that the program is making in the process of updating the pending list. The result of this calculations process will be displayed in a tree under the Pending node.

Once the update process has completed, you will see a new node underneath the Sessions Node in the TScale Console. It will be listed with a name of "Pending (as of mm/dd/yyyy hh:mm) where the date and time are the date and time at which you updated the list of pending optimizations.

When you highlight the "Pending" node in the tree, you will see a bar graph similar to the one above. In this bar graph, the height of the green bars represents the amount of virtual memory that TScale will save you per instance of each optimized application. The best way to use this information is to determine the applications which are loaded once for ever user (like Outlook, WinWord, Excel, and any line of business applications) and then multiply the per copy savings in virtual memory by the number of users which run that application concurrently. This will give you the total amount of virtual memory that TScale will save you, which will be reflected in a smaller page file size and far fewer page faults. The improvements in these metrics will enable you to support more applications and more users on a TScale optimized Terminal Server than would be possible otherwise.

9.2.   Viewing the Results of Optimization Sessions

Once you have run an optimization session, there will be another node under the Sessions node in the tree of the TScale Console. There will be a node for each optimization session that you run. We recommended that you run an optimization session daily. Sessions are typically run at night since production usage is during the day.

After you have run several optimization sessions, the tree control in the TScale Console will appear similar to the picture below.
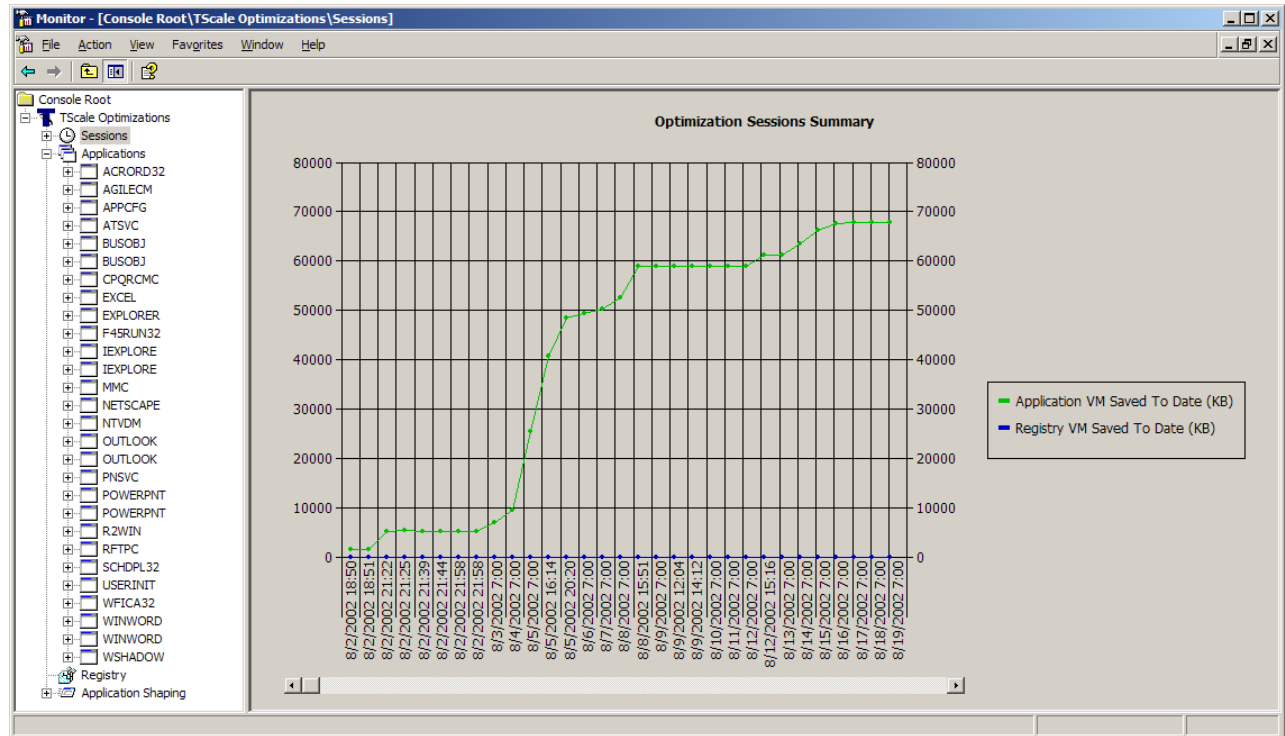
Optimization information is presented on an optimization session basis. Over time, as the optimization sessions "catch" all of the components on the system, the system will become fully optimized. At that point the Optimizations Summary Graph will start to "flatten out," indicating that the system has been fully optimized.

The TScale Console contains two high level nodes, the Sessions Node, and the Applications Node. The Sessions Node contains a node for each optimization session that you run. The Applications Node contains the cumulative Virtual Memory savings for each application that TScale optimizes.

9.3. The Sessions Optimizations Graph

If you click on and highlight the node associated with a particular optimization session, then you will get a bar chart in the right pane that shows you the savings for each process that was optimized in that particular optimization session. The chart will typically look something like the one in the screen below:
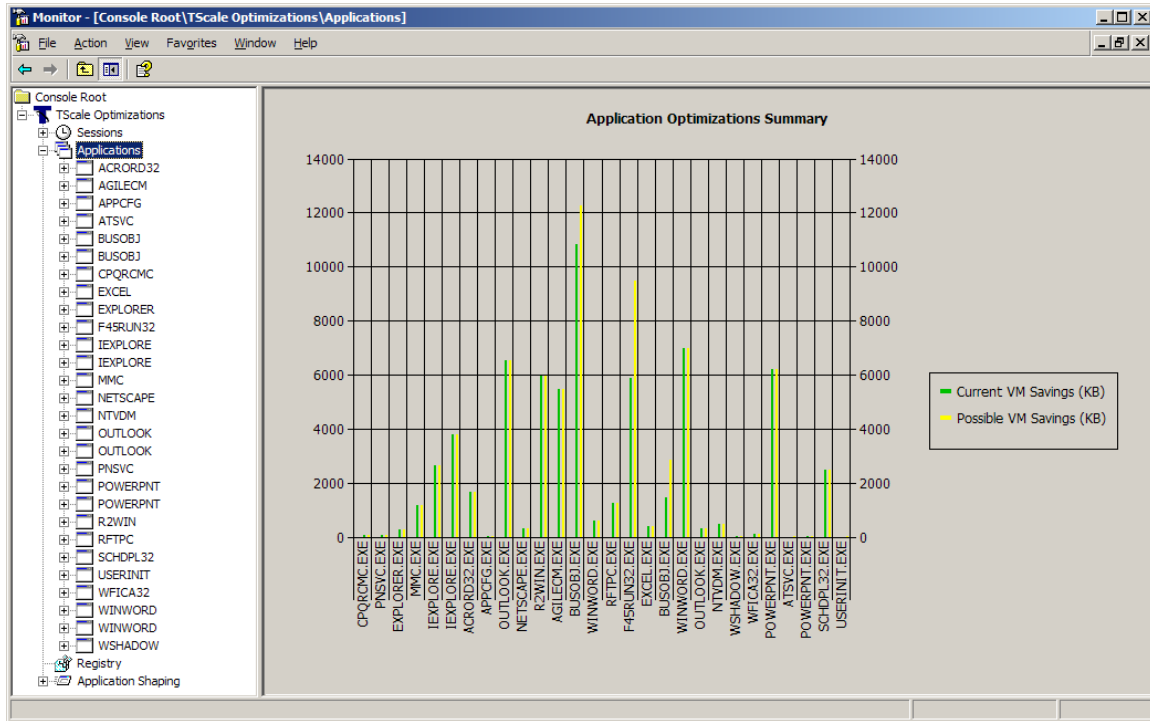
Note that TScale was able to reduce the Virtual Memory used by Outlook by 6MB per instance, reduce Business Objects by 11MB per instance. These reductions in VM usage by the applications result in substantially fewer page file writes and page faults generated by the applications, and thus improve the performance of the applications and the scalability of the server running the applications. You can take the performance benefits of TScale in a number of different ways:

1. You can use the benefit as headroom for periods of peak load – thereby allowing your servers to deliver better peak load performance to your users.

2. You can use the benefit as additional user capacity – thereby allowing your existing farm to support more users without have to buy more servers

3. You can use the benefit as additional application capacity – thereby allowing your existing farm to support more applications without buying more servers.

4. You can use the benefit to consolidate servers – thereby supporting the same user load with fewer servers and freeing up servers for other uses.

9.4. The Sessions Detail View

If you drill down into an individual optimization session, you can see which optimizations have been implemented for each application and each component of that application. In the screen shot below, you can see that both VM Capacity and VM Performance optimizations have been implemented for a variety of components that comprise the BUSOBJ process.

9.5.   The Sessions Archive Node

In the list of Sessions under the Sessions node, there is a node named "Archived Sessions." By default, sessions that were run more than 30 days ago are placed in this Archived Sessions Node. This prevents you from having to scroll through a large number of Sessions when expanding the Sessions Node.

To modify the threshold for the number of days that are allowed to lapse before a session is archived, right-click on the Archive node and select "Set Archive Threshold."
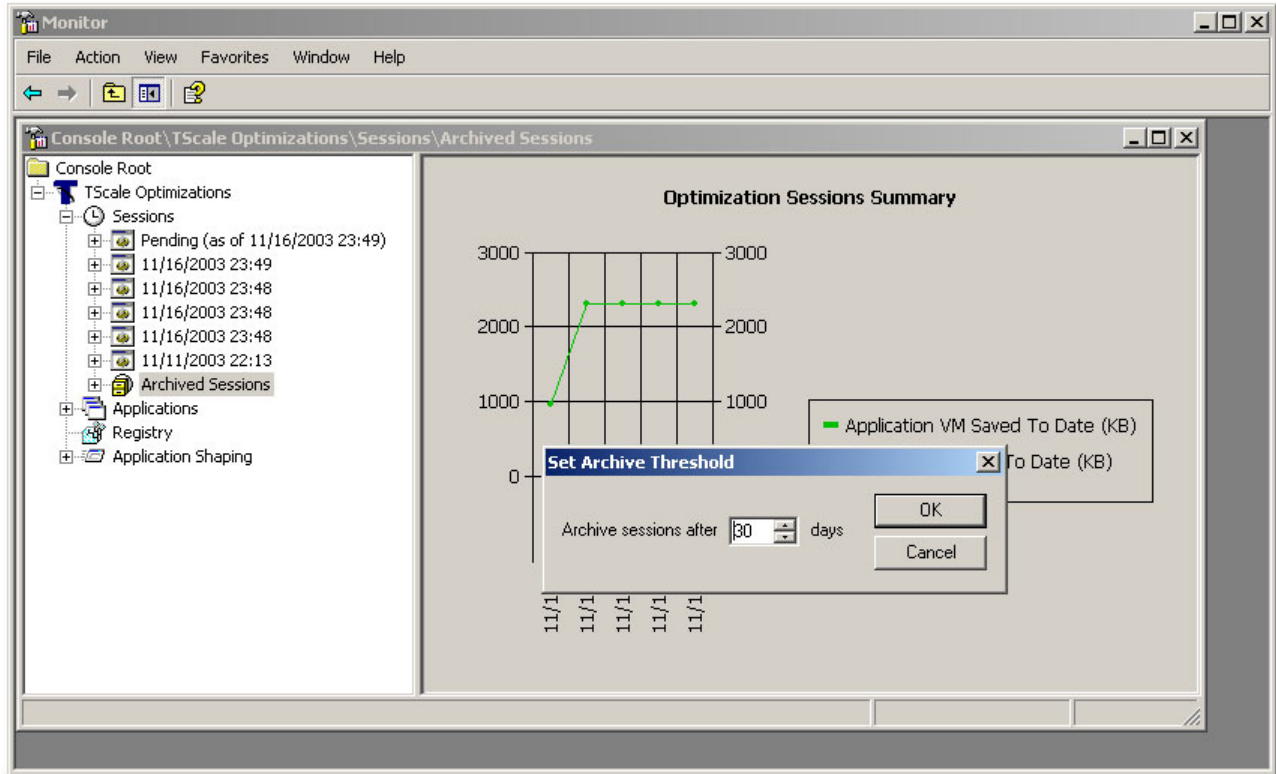
Enter the number of days and click "OK."

9.6.   The Applications Optimization Graph

The Applications tree in the TScale Console shows you the total optimizations that have occurred to each optimized application across all optimization sessions. The applications view shows the optimizations performed over time rolled up on a per applications basis. The purpose of this view is to prevent the need for going through all of the different optimization sessions to find out how much a particular application has benefited from TScale. So the benefits on a per applications basis are simply listed in the applications tree.

The bar chart above show you two values for each application. The yellow bar shows you the maximum possible savings assuming you are optimizing all of the components of the application. The green bar shows you how much savings you are actually getting. These two bars will differ in height if you turn off optimizations for any or some of the components that comprise your applications.

To use the information in the applications tree, find the applications that are run by every user on your terminal server system. Multiply the savings depicted in the bar chart for these applications by the number of users that run each application. Add up the per-application savings and you will see the total impact of TScale upon the virtual memory of your terminal server.

To partially automate this analysis, you can export all of the detailed data behind this graph to a CSV file. See "Using the Export Function to Analyze TScale Results" for details.

9.7.   The Applications Detail View

If you drill down onto one particular application, in this case BUSOBJ (Business Objects – a popular decision support package), you will be able to see all of the optimizations that have been implemented for that application and its components. In the screen below, VM Capacity and VM Performance optimizations have been implemented for all of the components that comprise Business Objects.
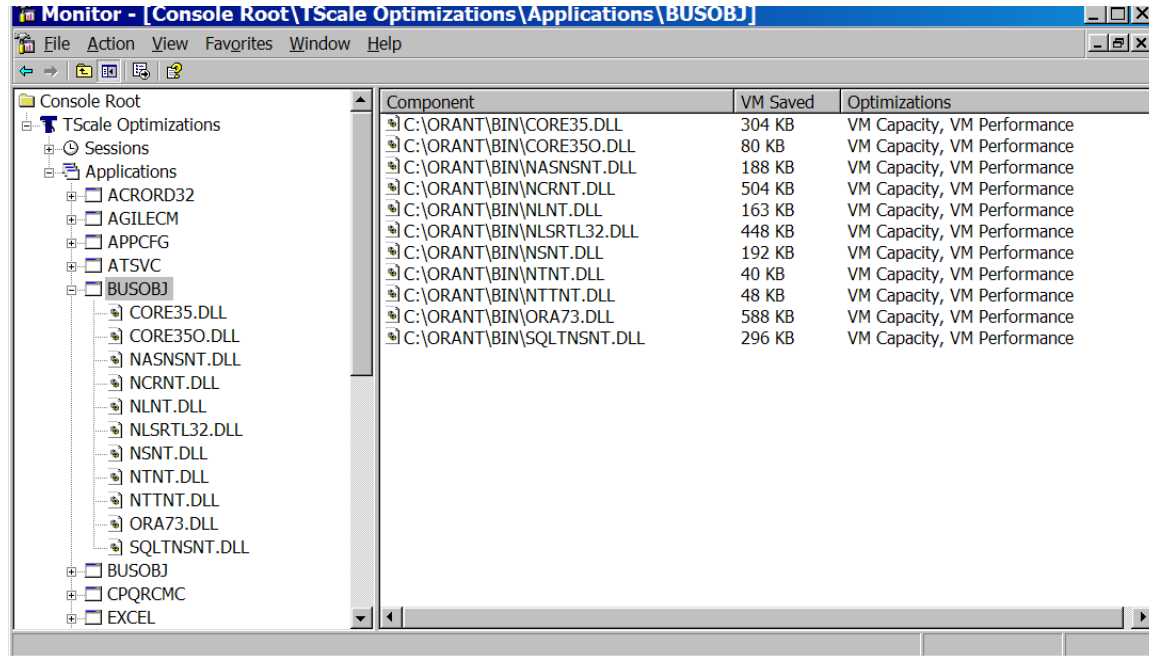
9.8.   Using the Export Function to Analyze TScale Results

You can export data from TScale to an Excel-compatible file that you can use to analyze the VM savings that TScale delivers across all of your applications. Right click-on the Applications Node (as shown on the left below), and then select Export, you will bring up a dialog box similar to the one depicted on the right. Select Text (Comma Delimited) (*.csv) as the file type.
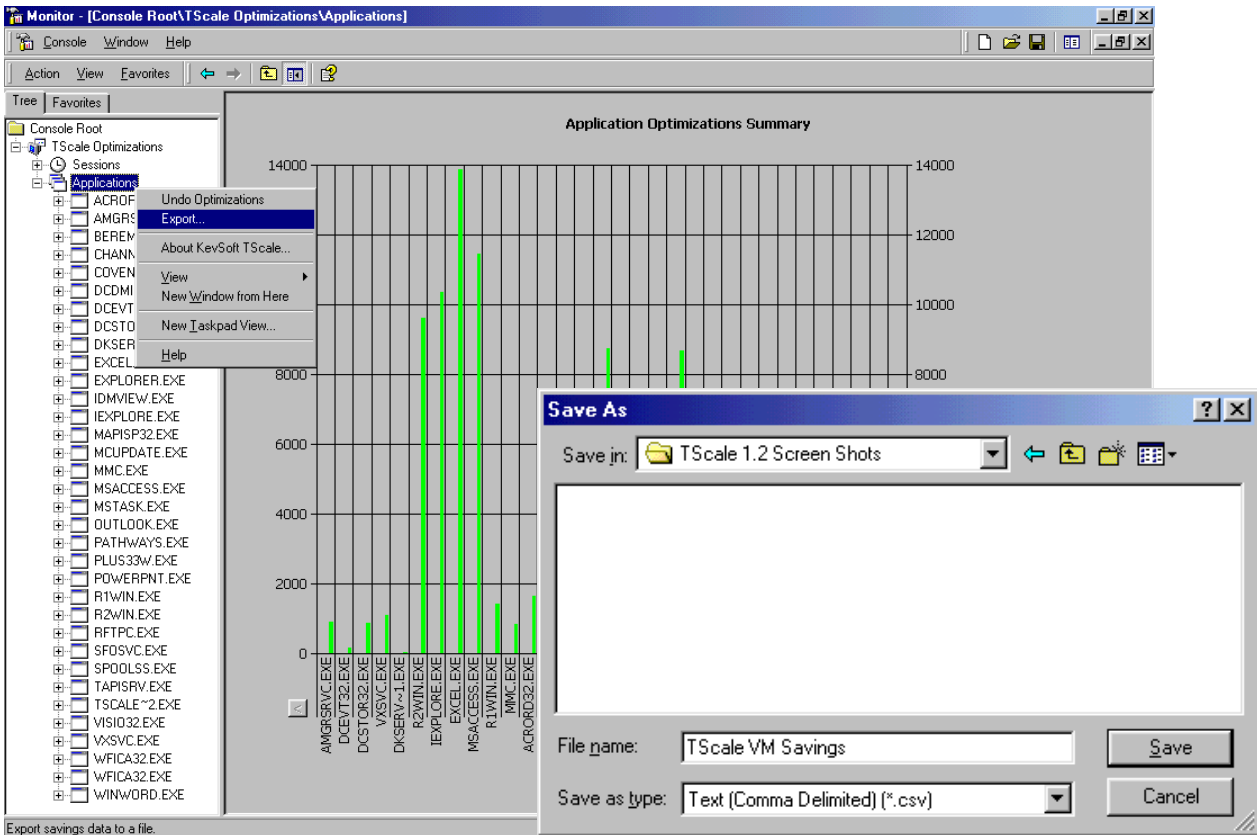
You can use the file produced by the export feature of the TScale console to build a section like the one below for each of the heavily used applications in your Terminal Server environment.

Application	Component	VM Size Before (KB)	VM Size After (KB)	VM Saved (KB)
NLNOTES.EXE	D:\PROGRA~1\NOTES\NLSXBE.DLL	672	88	584
NLNOTES.EXE	D:\PROGRA~1\NOTES\NSEN31EN.DLL	24	12	12
NLNOTES.EXE	D:\PROGRA~1\NOTES\NSKN31EN.DLL	24	12	12
NLNOTES.EXE	D:\PROGRA~1\NOTES\NNTCP.DLL	92	20	72
NLNOTES.EXE	D:\PROGRA~1\NOTES\NTCP.DLL	44	16	28
NLNOTES.EXE	D:\PROGRA~1\NOTES\NAMHOOK.DLL	28	16	12
NLNOTES.EXE	D:\PROGRA~1\NOTES\NICNV.DLL	24	12	12
NLNOTES.EXE	D:\PROGRA~1\NOTES\NPLUGINS.DLL	88	24	64
NLNOTES.EXE	D:\PROGRA~1\NOTES\NNOTES.DLL	7400	660	6740
NLNOTES.EXE	D:\PROGRA~1\NOTES\LTSSB01.DLL	72	16	56
NLNOTES.EXE	D:\PROGRA~1\NOTES\NDBNOTES.DLL	36	16	20
		8504	892	7612
	Per Instance VM Savings For Notes			7612
	Typcial Number of Concurrent User			50
	Total Virtual Memory Saved for Notes			380,600

In the spreadsheet above, you can see that TScale is saving 7.6 MB of VM for each user who loads Notes. If there are 50 concurrent Notes users, the total savings is a little over 380 MB for this one application.

For more details on how to use this information, and on how to correlate it with information about your Terminal Server that you can gather via other means, please see the "How to Evaluate TScale 3.0" manual.

10. Optimization Failures

In general, TScale cannot optimize components of applications that are in use at the time that the optimization session is run. To ensure that you get the maximum benefit from TScale, you need to run optimization sessions when applications components are not in use. The single best way to do this is to schedule optimization sessions to occur upon System Restart, since very few applications components get loaded automatically upon the start of the server. Please see "Scheduling Optimizations Sessions" for more information about the best way to schedule optimization sessions.

If TScale encounters an application or component to optimize, but finds that it cannot because the component is in use, this component will reappear in the Pending folder with a special flag. There are three special flags that TScale uses to mark components that have failed to optimize.

The green flag means that TScale could not access the application or one of its components because another process has locked part of that file. The Optimizations column in the Applications Detail view will display a message, "The process cannot access the file because another process has locked a portion of the file. Optimizations will take effect on the next instance of the application."

The yellow flag means that the component was in use during the optimization session. Components with yellow flags will appear in the Pending Folder in a manner like the KSChart.dll below. In this case, a manual optimization session was run while the TScale console was also running, and one of the DLLs used by the TScale console was, of course, in use. Scheduling an optimization session to run when the TScale console is not running would clear this in-use condition. The Optimizations column in the Applications Detail view will display a message, "The process cannot access the file because it is being used by another process."
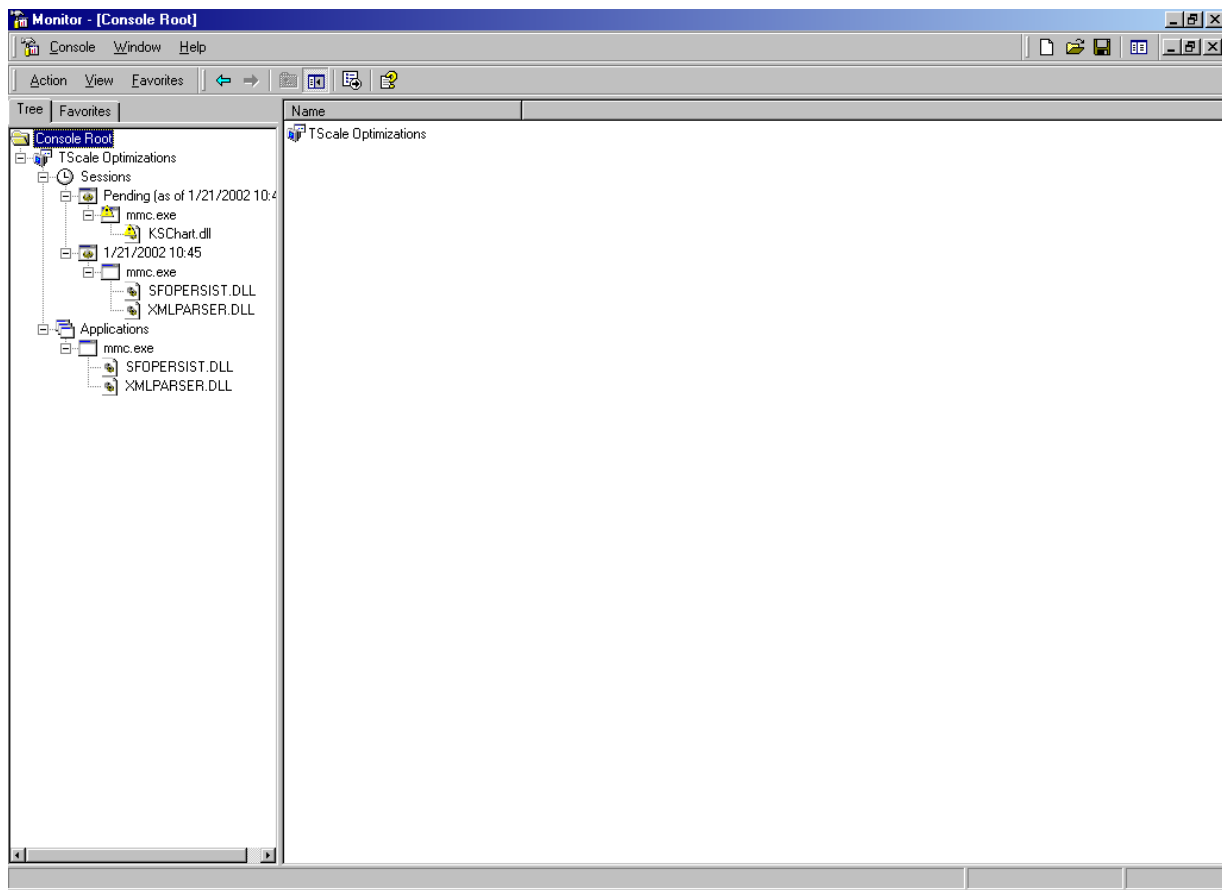
The TScale Console will flag a component with a red flag under the following conditions:

- If a process creates a temporary component that is found by the TScale analysis service, but the component has been deleted when the optimization session is run. This occurs often when new software is installed. You can ignore items listed with red flags in the Pending folder if the items have been deleted.

- If a component is protected in a manner that prevents it from being accessed by the TScale Optimization program. This will occur if the file permissions for the program are set so that only its calling process can access it. If this is the case, and the VM savings for that component are significant, then modify the file permissions for the component so that TScale can optimize it.

- If optimizations have been turned off for the application or component.

Look at the Optimizations column in the Applications Detail view for an exact description of the error.

10.1. Setting Error and Warning Levels

You can set the level of error checking for TScale. To do this, right-click on Pending Session and select Filters Errors/Warnings. The following dialog is displayed:
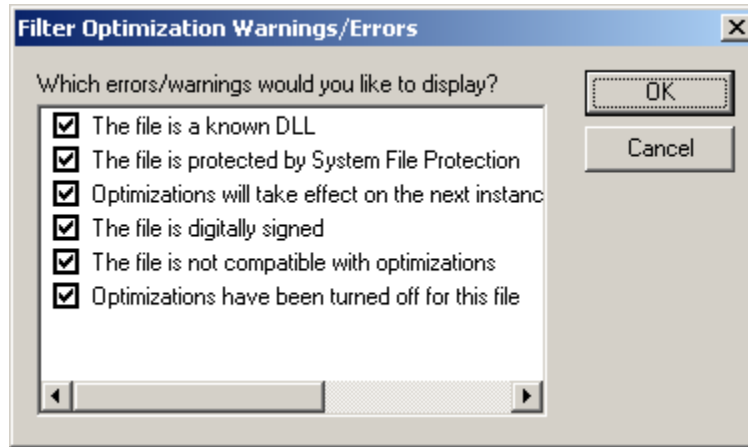
Choose the types of errors/warnings that you want flagged.

"The file is a known DLL."
"The file is protected by System File Protection."
"Optimizations will take effect on the next instance of the application."
"The file is digitally signed."
"The file is not compatible with optimizations."
"Optimizations have been turned off for this file."

These levels are associated with the green, yellow, and red flags described in the previous section.

11. What to do if an Application Stops Working

If you suspect that TScale optimizations have impacted the operation of any application running on the Terminal Server, please take the following steps:

1. Contact RTO Technical Support BEFORE you try to resolve the issue yourself. Please send email to support@rtosoft.com, or call RTO Technical Support at 678-455-5506 Option 4.

2. Before you take any of the actions below, please do a support request from within the TScale Console. Right click on any item in the tree, select TScale Support, then "Contact Technical Support", then put your email id in the field at the top and click Send. This will package up TScale's optimization log files into a file named TScale.zip and email that file to support@rtosoft.com. This file will contain the information that RTO Technical Support staff will need to help you troubleshoot your issue.

3. If you are unable to contact RTO Technical Support, and everything was working well on the previous day, select the most recent optimization session in the Sessions tree of the TScale Console, right click and select "Set Optimizations." In the dialog, drag both sliders down to the bottom (No Optimizations). This will restore your server to the state it was in yesterday. You will need to unload and reload the applications for which optimizations were turned off in order for this action to become effective. See Chapter 6 for more information on how to use the Set Optimizations feature.

4. If you can identify the component of an application that is having trouble, find that component in the Applications tree (find the application and then the component). Right click on the component and then select "Set Optimizations." In the dialog, drag both sliders down to the bottom (No Optimizations). You will need to unload and reload the application that uses that component in order for this action to become effective. See Chapter 6 for more information on how to use the Set Optimizations feature.

5. If you cannot identify the individual component that is causing the applications compatibility issue, then you can turn off optimizations for an application by selecting it in the Applications tree of the TScale Console right-clicking and then selecting "Set Optimizations." In the dialog, drag both sliders down to the bottom (No Optimizations). Again, you will need to unload and reload the application for this action to take effect.

6. If steps 3 –5 above do not work, you can simply go to the Optimizations Policy menu and drag all of the sliders down. This will disable all TScale functionality on your server (you will have to unload and reload the applications) while preserving the TScale data required to allow RTO Technical support to help you make TScale work in your environment.

12.   Troubleshooting Permissions Issues

TScale consists of four components:

1.   The TScale Installation Set (TScale.exe). This program installs the TScale components listed below on a server.

2.   The TScale Analysis Service . This is a service that analyses how applications use virtual memory and writes a log file, repair.sfo, that contains a list of candidate optimizations. This service also implements Application Shaping rules.

3.   The Scheduled Optimization Task (TscaleBace.exe –optimize). This component runs as a scheduled task under the System Account.

4.   The TScale Console. This component runs with the permissions that apply to the user who is logged in when the Console is launched. The account you are logged in under MUST be a member of the Local Administrators Group on the computer where the TScale Console is running. Otherwise you will get an error message saying that you do not have permissions to run the TScale Console.

A variety of issues can arise if the appropriate permissions are not in place for each of the components of TScale. These issues and the appropriate fix for them are listed below:

*   TScale is installed via the TScale.exe package. When you install TScale, you specify the location of the program files (by default, C:\Program Files\RTO Software\TScale), and the location of the optimization log files or data files (by default, C:\Documents and Settings\All Users\Application Data\RTO Software\TScale. Make sure that you are logged onto the server with an Administrators account that has full control permissions to write to these locations, and the registry on the server.

*   The TScale Analysis Service runs in the context of the Local System Account, and writes a file named repair.sfo. If the TScale Analysis Service fails to start, Local System probably does not have permissions to write to the directory where repair.sfo is located (by default, C:\Documents and Settings\All Users\Application Data\RTO Software\TScale). If your TScale Analysis Services is not starting, please either give Local System the full control of the directory where repair.sfo is located, or reinstall TScale and select a location for the data directory where Local System has full control permissions.

*   The Scheduled Optimization Task runs in the context of the System Account. For Scheduled Optimizations to occur, the System Account must have full control permissions to the location where repair.sfo resides, and full control permissions to all of the directories where applications are installed on the server. If these permissions do not exist, the Optimization Task will not be able to find and optimize the applications running on the server, and TScale will deliver no benefits to you. If you have changed (reduced) the permissions of the System account in your environment, then you can give the Schedule Optimization Task a different account to run under by going to the Schedule dialog in the TScale Console and putting the new account in the Run As field.

*   When you launch the TScale Console, you are running it in the context of the account that you are logged in as. If you start an Optimize Now from within the TScale Console, that optimization session will only work if the account that you are logged in as has full control permissions to the data directory where repair.sfo resides, and full control permissions to all of the directories where applications are installed on the server.

# 13. Upgrading an Evaluation License to a Production License

If you received or downloaded an evaluation copy of TScale, and you subsequently wish to purchase TScale, you will receive a production license key to use in place of your original evaluation license key.

To upgrade from an evaluation copy of TScale to a production copy of TScale please perform the following steps.

First, right-click on any node in the TScale Console, and select the TScale Support menu item. The dialog box below will appear:
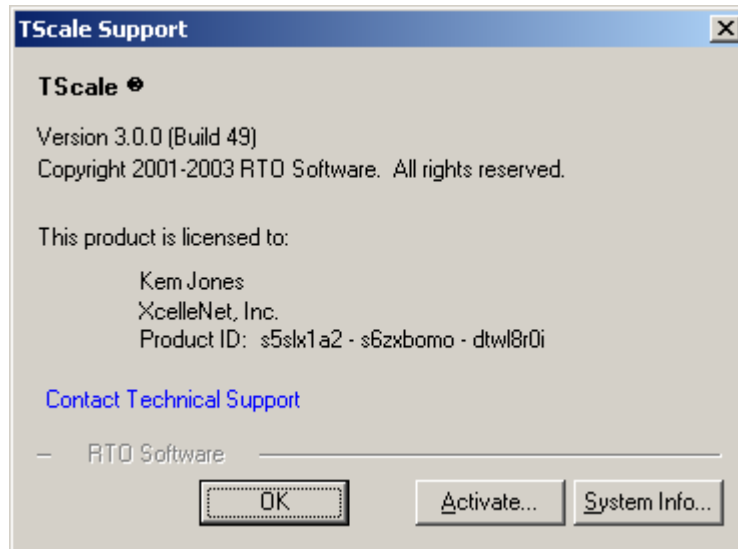
Click the "Activate" button. The following dialog box will appear.
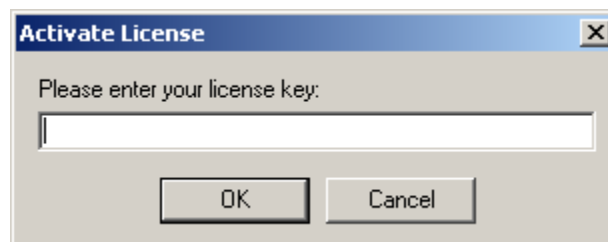
Enter your production license key and click the "OK" button.

Congratulations on your purchase and production deployment of TScale.

14. Optimizing Applications Loaded From File Servers

TScale 3.0 has a feature that allows it to optimize applications loaded from file servers. This works via the following process:

1. The Analysis Service can automatically "see" applications running on the Terminal Server no matter where they are loaded from.

2. If you run an Update Pending, or an Optimize Now, that command will be run in the context of the account that you are logged on as. In order for either an Update Pending or an Optimize Now to be effective with applications loaded from a file server, the account that you are logged into the server that has TScale installed on it, must have full control permissions to the file system on the file server.

3. In order for a scheduled optimization task to be able to implement optimizations on applications loaded from a file server, the scheduled task must have permissions to write to the file system on the file server. The scheduled optimization task ordinarily runs in the context of the System Account that does not have these permissions. Therefore in order for scheduled optimization tasks to be able to implement optimizations to applications loaded from file servers, you need to take the steps outlined below.

To turn file server-based optimizations on, follow these steps:

1. Launch the TScale Console, on your terminal server.

2. Right-click on TScale Optimizations and select Schedule.

3. In the "Run as" box, enter an ID that has full control permissions to the entire hard disk of the file server.
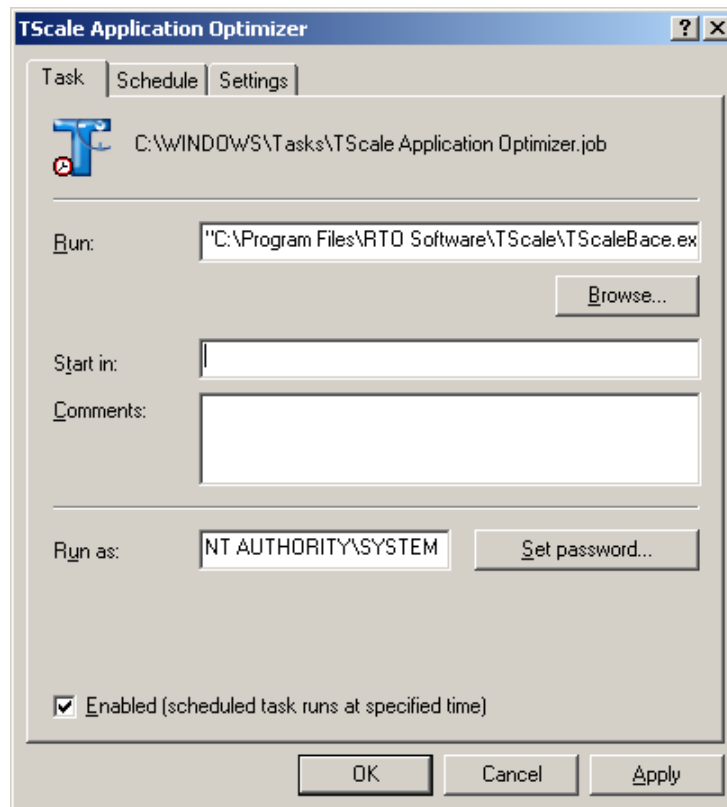
4. Set the password for this account by entering it in the dialog boxes below when prompted.
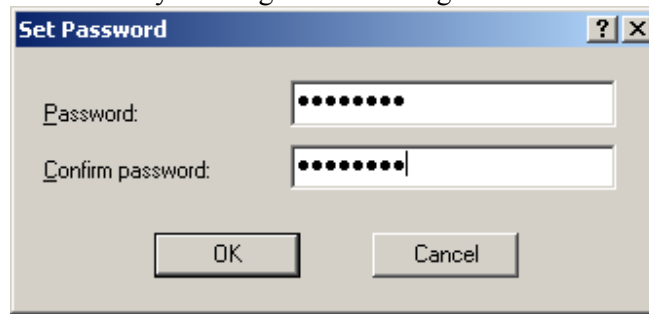
The applications that are loaded from the file server will appear in the TScale Console for each terminal server that loads these applications from that file server.

Alternatively, you can set the file permissions on the file server to give remote servers access to the file system. This will allow each server's system account full control on the shared directory on the file server (using SERVER$). Note that this will only work for Windows 2000 servers (and might only work on Windows 2000 domains too). This method will allow you to make the change in only once place (on the file server), but you will have to add each of the terminalserver$ account names with full control permissions to the file servers file system.