



TScale® Technical Review

By Citrix Consulting Services

Citrix Systems, Inc.



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Introduction

The purpose of this document is to discuss KevSoft Corporation's TScale product. TScale is intended to increase the number of sessions that can be handled by a single server by managing memory more efficiently.

This document will discuss the marketing information on TScale, and the technical background of product. Controlled testing on a limited basis was performed in the CCS Lab. Case studies and conclusions and recommendations are also be provided in this document.

This document contains the following sections:

- **Product Overview.** Explain the concept of KevSoft Corporation and its product. Give a quick overview of the product and benefits it may provide for clients
- **Technical Overview.** Discuss how the TScale product works and its interaction with servers
- **Controlled Testing.** Discuss preliminary findings of a TScale evaluation within a controlled environment
- **Case Studies.** Discuss scenarios in which TScale may prove to be beneficial
- **Conclusions and recommendations.** CCS recommendations to potential clients considering the use of this product.

It does not intend to:

- Provide detailed instructions on the installation and configuration of TScale
- Provide a blanket recommendation on the product. In no way is this intended as an endorsement or certification of TScale by CCS

Product Overview

TScale is a scalability utility developed by KevSoft Corporation (<http://www.kevsoft.com/>). It is deployed on MetaFrame and Terminal Services running Windows NT and Windows 2000. TScale may deliver the following benefits:

- The number of sessions supported by the server may increase 30% to 40% without upgrading any server hardware.
- The size of the page file can decline by 40%.
- The number of page faults generated by frequently used applications can decline by 30%.

TScale is comprised of an analysis service, an optimization process, and a Microsoft Management Console snap-in, which serves as the control and reporting user interface. The analysis service seeks out applications that are being unnecessarily swapped out to hard disk. The optimization process fixes those applications so that they can live in RAM instead of being swapped out to the hard disk. The user interface shows which applications have been optimized, and how much page file space has been saved.

Technical Overview

When applications containing DLLs, OCXs or other compiled components run on a terminal server, the operating system has to constantly ensure that each application instance's components are in the correct memory location. When an application calls a component, the operating system must load it into a specific location in memory for that component to work. If another component is in that location, the operating system must swap that component to the page file. This relocation and swapping of components often explains why servers seem to be lagging when 1GB of free RAM is available. The primary causes of this relocation and swapping are:

- Writes to the page file
- Page faults (Page faults occur when the operating system expects to find a component in RAM and has to load it from the page file instead.)

TScale watches which components each application loads, and then ensures that they can all live in RAM instead of getting swapped out to the page file.

Installation

The evaluation download, TScale.exe, is approximately 1317 KB in size. It contains the software, the Systems Administrators Guide, a Guide on How to Evaluate TScale, and a Readme file.

TScale 1.2 requires that Microsoft Management Console (MMC) be installed on the server. If the server is running Windows 2000 the MMC is already installed. If the server is running NT 4.0, the MMC may need to be installed.

The installation of TScale does not require a reboot of the server, nor does it require or cause the stopping and restarting of any applications. TScale may be safely installed on an existing production system while production work is occurring. However, CCS does not recommend this practice. The installation is a very simple GUI installation. No configurations at this time are required. When TScale is first installed, it installs and starts the TScale analysis service. This service identifies applications, which need optimization. Optimizations are not performed until it is either invoked manually, or one is scheduled to occur. Please see the Systems Administrators Guide on how to manually invoke and schedule optimizations.

Impact on Production Servers

TScale is designed to respect the demands of a 24x7 applications environment:

- It can be installed on a production terminal server while production applications are running
- It does not require that any applications be shut down and/or restarted
- It does not require that the server be rebooted
- Once installed, TScale performs its analysis of application resource utilization every 10 seconds
- The process of actually acting upon the analysis and performing the optimization will take between 1 and 20 minutes per day, during which time TScale will consume system resources. The optimization process is typically scheduled to occur late at night when other demands upon resources are low

The analysis process is automatic and continuous. Once optimizations have been scheduled to occur at a specific time, they can occur on an unattended basis as well. If new applications or new versions of existing applications are loaded on a server, TScale automatically detects them and optimizes them during the next scheduled optimization session.



Although TScale is designed to perform in a 24x7 environment, it is the recommendation of CCS that TScale be implemented within a test environment during scalability testing of applications. If the applications prove to integrate with TScale and are impacted in a positive way, then rollout to production can be designed.

It is imperative to recognize that TScale will use a considerable amount of system resources during the optimization phase. During this time, CCS recommends implementing a process across the farm similar to that of a reboot script. Schedule the optimizations on a subset of servers while logons are disabled. It is conceivable that 60% – 70% of system resources will be utilized during this time. In turn, this will affect servers in a major way, causing significant degradation to any users on the server.

Controlled Testing

During testing in the CCS Lab, different scenarios were evaluated. Below is a description of the environment, the testing procedure, and the results.

CCS performed the evaluation of TScale on two Windows 2000 Servers. The servers were Compaq DL360s with dual 700 MHz processors and 1 Gigabyte of RAM. MetaFrame XP was installed on the servers, and the applications used were from the Microsoft Office 2000 Suite: Excel, Word, and PowerPoint. The CCS automated build was used to build the servers. This provided a consistent and controlled approach to the server build.

TScale was then applied to a single server, leaving the other server as a control group. To perform the scalability tests, the CSTK was used. The pre-written scripts for Word, Excel, and PowerPoint were used. The following results were seen:

- Microsoft Word had an average savings of 3 Megabytes of RAM
- Microsoft PowerPoint had an average savings of 2 Megabytes of RAM
- Microsoft Excel had an average savings of 3.5 Megabytes of RAM

The results varied depending on the number of applications installed on the server. It appeared that as more applications were brought on the server, the more memory was being allocated efficiently. One negative of the test was that the CPU utilization spiked to 65% during the optimization process, rendering any session unusable. This is a huge factor, as any 24x7 environment will experience many customer calls during this period.

It is important to remember to use this product in a scheduled manner, while minimal users, if any, are accessing the server.

Case Studies

TScale has performed several case studies with respect to their product. Listed below are some of the success stories. Please see <http://www.kevsoft.com> for more information.

David Bradshaw at the Excel Division of Cargill, "We purchased it for all of our servers. We scaled about 25% more users and 20% increase in speed. Out of one of our 10 server farms we'll be reallocating 2 quad boxes. We were running about 70 users/box and will now be running about 90-100 users/box with n+2 redundancy. These are quad processor boxes with 4gb of memory running productivity applications."

Michael Pardee at Coventry Health Care, "I can backup those numbers as well on a 70 server farm at the exact same configuration. We are now pushing them from an average of 70 users per server to 90 per server in hopes that we will not have to add more hardware to handle additional apps or users."

Jan Broucinek at Arthur Rutenberg Homes, "I have it running here. It seems to eliminate some of the high bumps along the way, basically smoothing the response. Of course that is a direct result of having more free Virtual Memory. It does what it says it will do. As to if it is worth it or not, how much will another system and licenses from Microsoft (and Citrix if on MF 1.8) cost you vs. TScale?" [Read the Case Study](#).¹

¹ Information found on KevSoft web page, <http://www.kevsoft.com/Default.htm>. CCS has not verified any of this information

Conclusions and Recommendations

Below is a list of conclusions and recommendations resulting from the evaluation and testing of the TScale product. Please refer to these recommendations when determining if a client may be an appropriate candidate for this application.

- The greater the number of applications that reside on a server, the greater the likelihood that TScale will prove effective
- When scheduling the server optimization process, schedule servers at different times. Disable logons on all servers before optimization is run. It is highly likely that the server CPU will spike significantly
- TScale should be rigorously tested in the Build & Test phase of the CCS methodology. This process will be best implemented during the scalability or application integration stage
- TScale is not intended for use on servers housing a single application
- A separate design for integrating TScale into a MetaFrame environment is needed for a successful implementation
- TScale is not for all users of Terminal Services or MetaFrame XP

The following table and data are provided by TScale. The per-user VM savings were taken from actual TScale installations. CCS **did not** validate any of this information.

Application	Representation per user Savings	Total Server VM Savings with		
		30 Users	50 Users	70 Users
ACT	8.5 MB	255 MB	425 MB	595 MB
ARCGIS	55.0 MB	1,650 MB	2,750 MB	3,850 MB
Clarify	4.0 MB	120 MB	200 MB	280 MB
Cognos Portfolio	2.7 MB	81 MB	135 MB	189 MB
Cognos PowerPlay	5.5 MB	165 MB	275 MB	385 MB
ESSBASE(Excel Client)	4.8 MB	144 MB	240 MB	336 MB
Hummingbird BIUSER	4.0 MB	120 MB	200 MB	280 MB
IE with Shockwave	8.5 MB	255 MB	425 MB	595 MB
iManage	10.0 MB	300 MB	500 MB	700 MB
JDE One World	44.0 MB	1,320 MB	2,200 MB	3,080 MB
Microsoft Outlook	4.0 MB	120 MB	200 MB	280 MB
MS Access	9.0 MB	270 MB	450 MB	630 MB
Notes	14.0 MB	420 MB	700 MB	980 MB
Oracle Database Drivers (Custom App.)	8.0 MB	240 MB	400 MB	560 MB

Oracle Forms (Custom App.)	2.0 MB	60 MB	100 MB	140 MB
Oracle Report Writer (Custom App.)	11.0 MB	330 MB	550 MB	770 MB
Reflection for Windows	8.0 MB	240 MB	400 MB	560 MB
Siebel Client with Oracle Database	21.0 MB	630 MB	1,050 MB	1,470 MB
Star Reader	7.5 MB	225 MB	375 MB	525 MB
TBS	9.0 MB	270 MB	450 MB	630 MB
Visio	12.0 MB	360 MB	600 MB	840 MB
Visual Basic (Custom App.)	11.8 MB	354 MB	590 MB	826 MB



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