



Integrated IBM eServer xSeries for iSeries Benchmark for Citrix® Access Suite

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Introduction

This paper is intended for IBM field support specialists who are interested in the baseline performance Citrix Presentation Server™ running on an IBM eServer xSeries system connected to an iSeries system via the Integrated xSeries Adapter.

Citrix Presentation Server is utilized by customers to centrally deploy and manage applications, especially in a heterogeneous environment, and to deliver their functionality as a service to workers, on a variety of devices, wherever they may be.

The Integrated xSeries Adapter (IXA) is a PCI-based interface card that installs inside selected models of xSeries systems, providing a 1 Gigabyte per second (Gbps) High Speed Link to an iSeries system. The Integrated xSeries Adapter allows an xSeries system to share the virtual storage, networking, DVD and tape resources of an iSeries system and enables customers to create an integrated i5/OS and Windows application infrastructure with centralized storage, operations and backup.



The purpose of this paper is to present the results obtained in a benchmark running Microsoft Office applications via Citrix Presentation Server on an xSeries 346 system connected to an iSeries 520 system through an Integrated xSeries Adapter. The paper is also intended to provide an example for guidance for sizing Citrix Presentation Manager workloads in an iSeries infrastructure with xSeries attached via Integrated xSeries Adapters.

Hardware Configuration

xSeries Configuration

- xSeries 346 - 8840-22Z: dual processor, 3.4GHz w/Hyper-Threading, 1MB Level 2 cache, 4GB System Memory
- Integrated xSeries Adapter for iSeries– 1519-200
- Windows Server 2003 Standard Edition
- Citrix MetaFrame Presentation Server 3.0
-

iSeries Configuration

- iSeries 520 – #0901, 4GB System Memory
- 20 – 35GB disk drives
- OS/400 – V5R3

Software and Test Scenarios

Load Generator Software: Mercury LoadRunner Release 8.0

Client Software: Windows XP, Office XP Standard, Citrix Client 7.0

Test Scenarios: There were two test scenarios used. Both scenarios measured Microsoft Office® workers using MS Word and Excel. Although the scripts used in both cases worked at a human pace, long pauses and idle time were minimized, which created a higher stress load on the Citrix environment.

The “Single Login” scenario minimized logon traffic to simulate a steady work environment. Users were spread across eight load generator servers, each generating approximately equal amount of users. Each load generator server would logon one new user every five seconds. The user would log on once, open Word and create a document, spell check, save and close. Then open Excel, create a spreadsheet, perform simple calculations, create a graph, save and close. This process would be done multiple times to make sure all the users were logged on at the same time.

The “Multiple Login” scenario was basically the same except after the user had completed the Word and Excel document they would log off and then immediately log back on and run the same processes. This test was targeted to measure have multiple random users logging on nearly continuously.

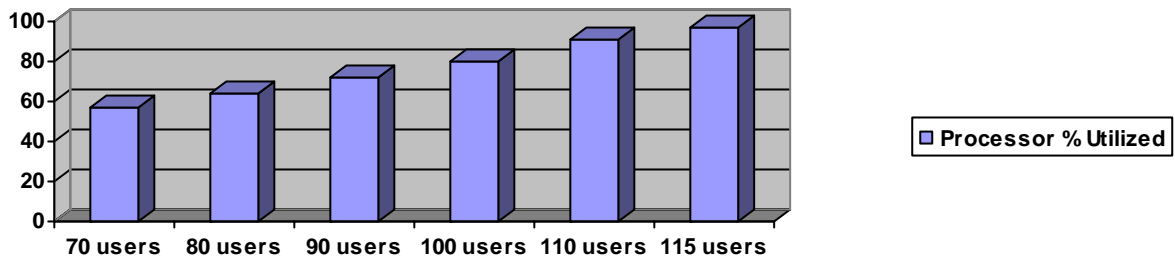
The test load was generated in increments of ten users until the test would start to have a significant change in response time when the Canary program was run. At that point we would change the increment of users to five. The Canary program was a single user log-in that ran both Word and Excel. The Canary was run with no other users logged in to generate a baseline. This test was run three times to establish a baseline of 16:48. Each time the test was run with a load the Canary would be run after all users were logged on. This established our Canary Runtime. We followed industry standards by looking for a deviation of no more that 10% from the Baseline. With the load on the server we would also login to the server with an additional client workstation and do a level of acceptance testing.

The intent of the test is to show two different types of users that may be logging into a Citrix server. A user that logs on and stays logged on for a period of time. The second was to show where you have multiple users logging in and out.

Summary and Observations

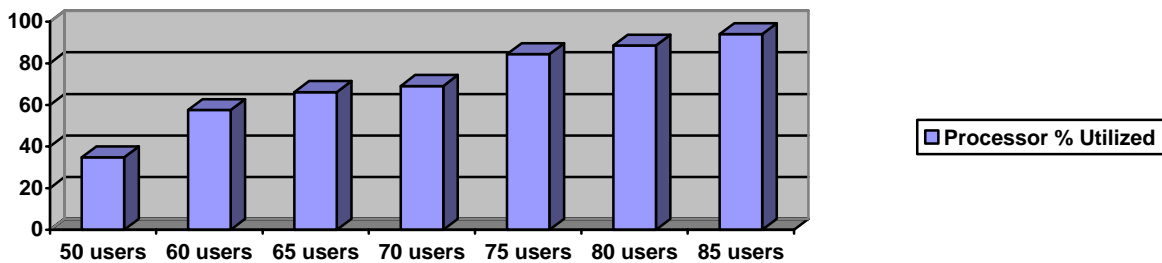
Single Login Summary:

When looking at the Single Login test we were able to achieve 110 users before exceeding the canary threshold of 18:29. Looking at the average and maximum percentage would give some concern about supporting that many users. **100 users** seem to provide the best balance between the threshold and the load on the processor.



Multiple Login Summary:

When the Multiple Login test was run there was a significant drop in the number of users which would be expected with that type of load. We were able to achieve 80 users before exceeding the canary threshold of 18.29. With 80 users there were sustain times where the processor was above 90% - 95% which may not provide a stable environment for your users. It may be more realistic to run with **70 - 75 users** since the processor did not show a sustained maximum time.



Observations

These tests utilize a simulated workload and the amount of actual users that a customer can expect to support is dependent on the applications that are being run and the characteristics of your users. In this simulated test, all of the applications and data are being served on a single Windows server, which also support Citrix. If you look at the details of each of the user test runs below, the amount of I/O being done on the server, (Disk Transfer per second), you will see that the maximum number of transfers were 143. The amount of I/O is very small.

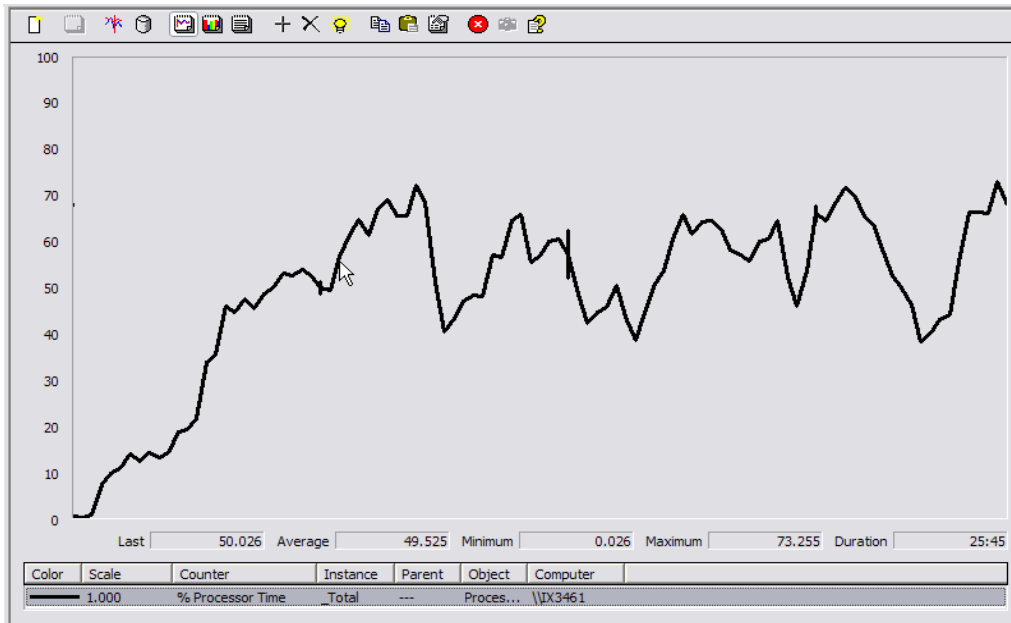
In Citrix installations supporting a variety of Windows applications workloads (file serving, e-mail, SQL Server, web serving) we would expect the number of Disk Transfers per second to be potentially much higher than we saw in this simulated workload. An iSeries system can provide advantages, through its storage architecture, in these more I/O intensive environments where Citrix users access data or applications on other servers. For example, if a customer had their Windows file server on a different xSeries system than the Citrix server, they could take advantage of the iSeries virtual storage for I/O performance and Virtual Ethernet connections in the iSeries to move the files from the Citrix server to the file server. The above summaries will give you some guidance for sizing your work load appropriately.

Detailed Test Results – Single Login

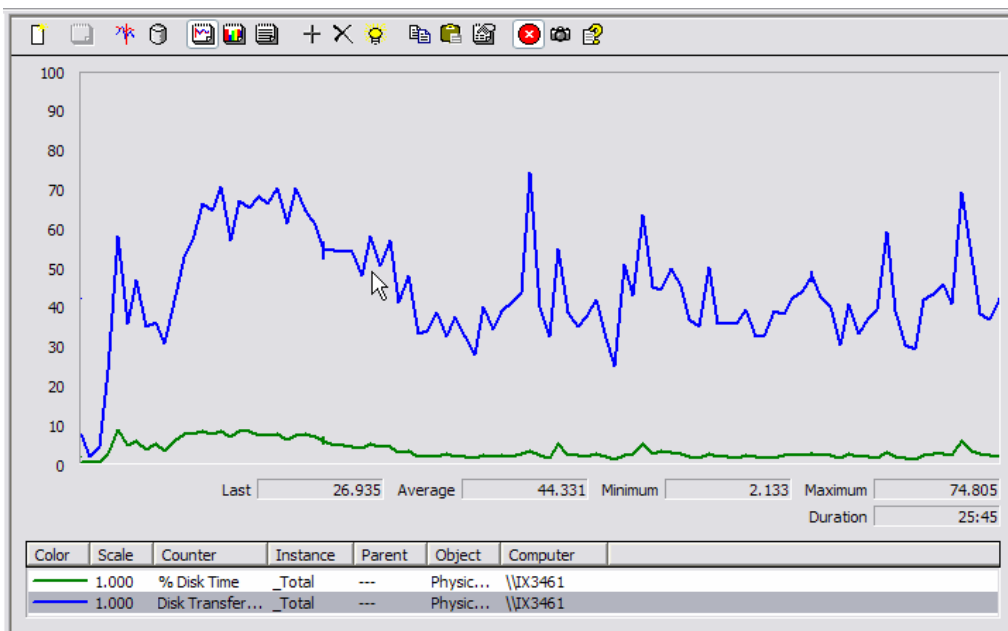
70 Users:

- Canary Baseline: 16:48, Threshold: 18:29
- Canary Runtime: 16:53

The results show there was no real load on the server by having 70 users. The processor average is only 49.52%. During peak load with all users on-line processor average is 57.31%.



Processor

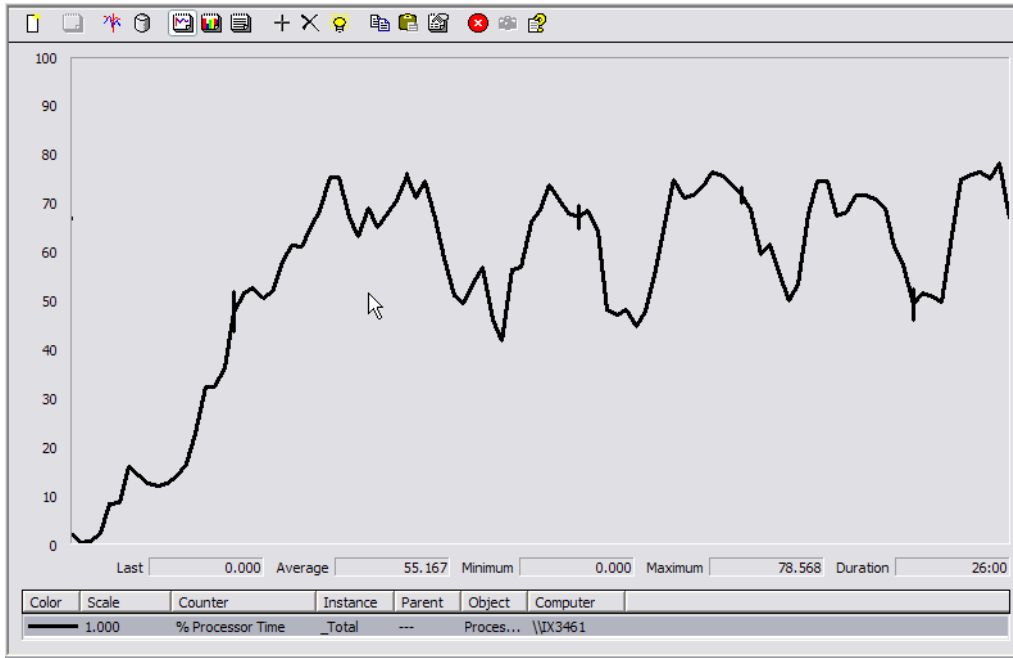


Disk

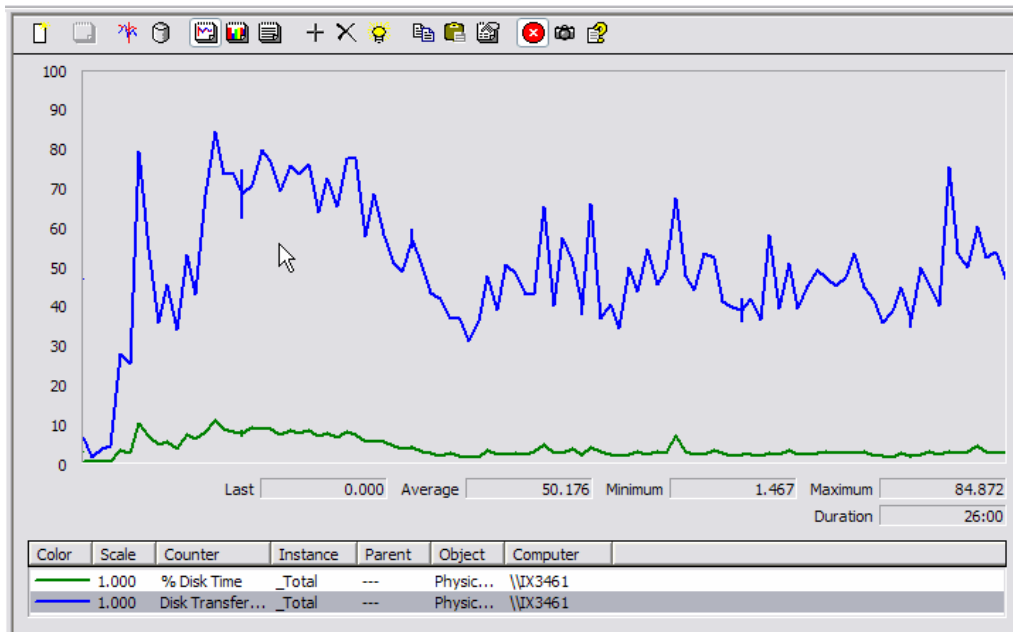
80 Users:

- Canary Baseline: 16:48, Threshold: 18:29
- Canary Runtime: 16:55

The results show there was no real load on the server by having 80 users. The processor average is only 55.16%. During peak load with all users on-line processor average is 64.22%.



Processor

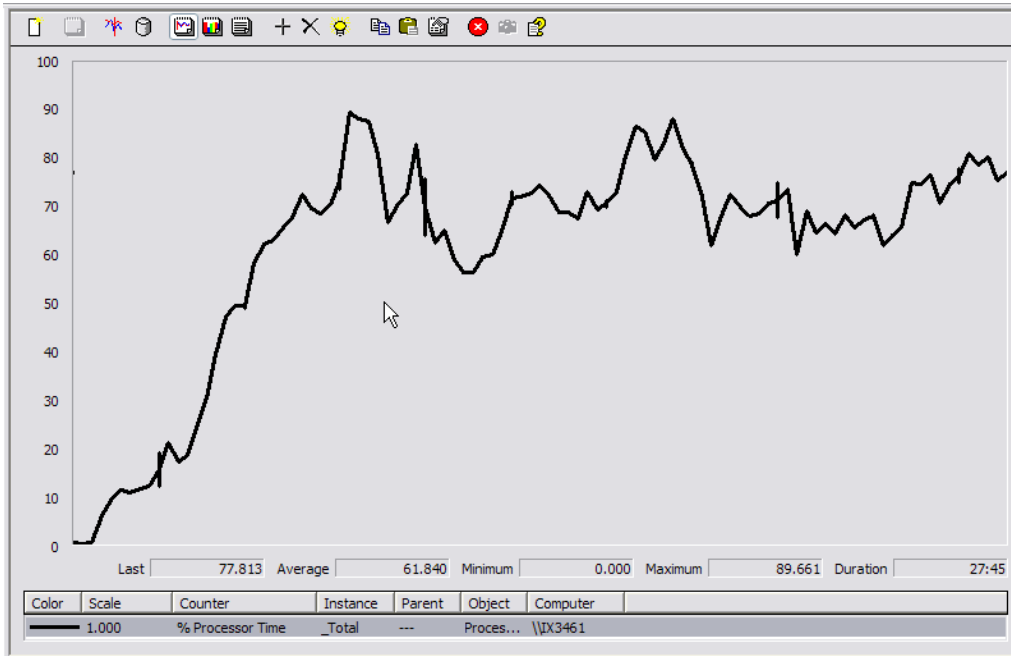


Disk

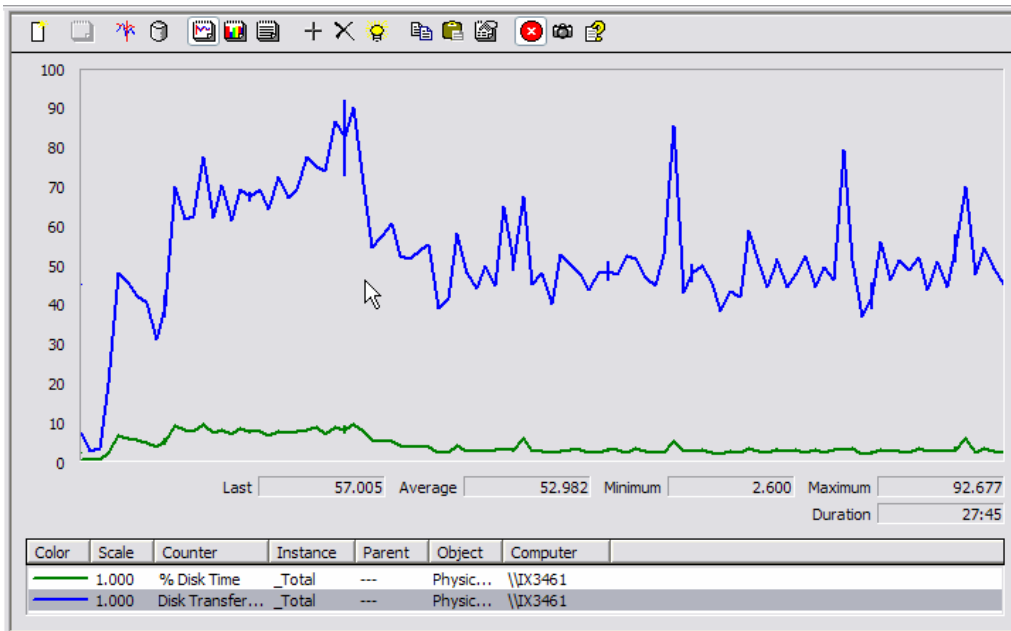
90 Users:

- Canary Baseline: 16:48, Threshold: 18:29
- Canary Runtime: 16:57

The results are starting to show more of a load on the server by having 90 users. However the average is still only 61.84%. During peak load with all users on-line processor average is 71.64%.



Processor

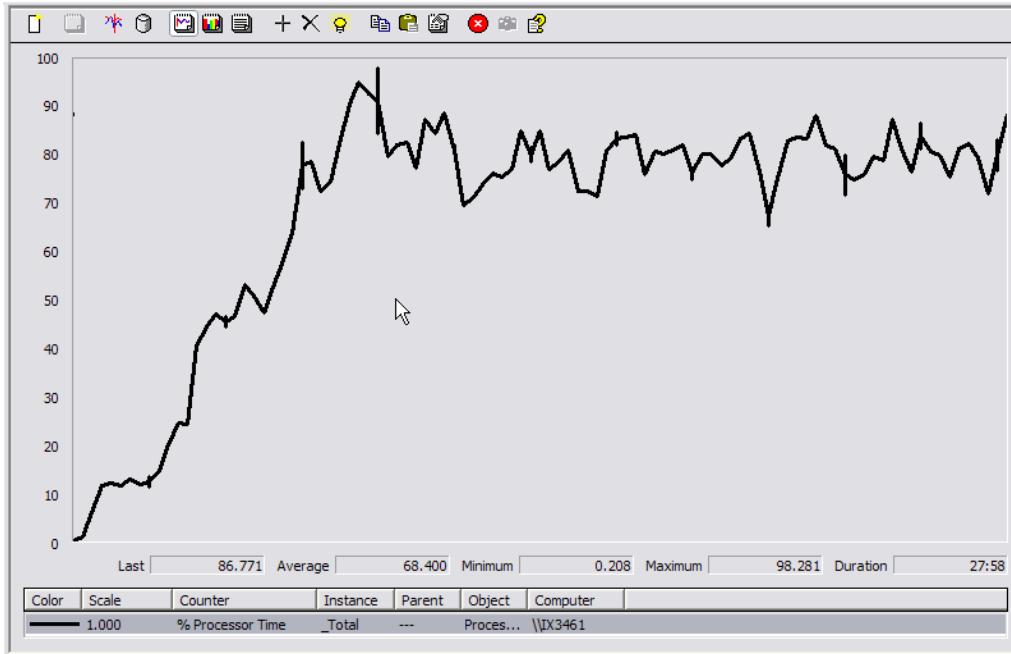


Disk

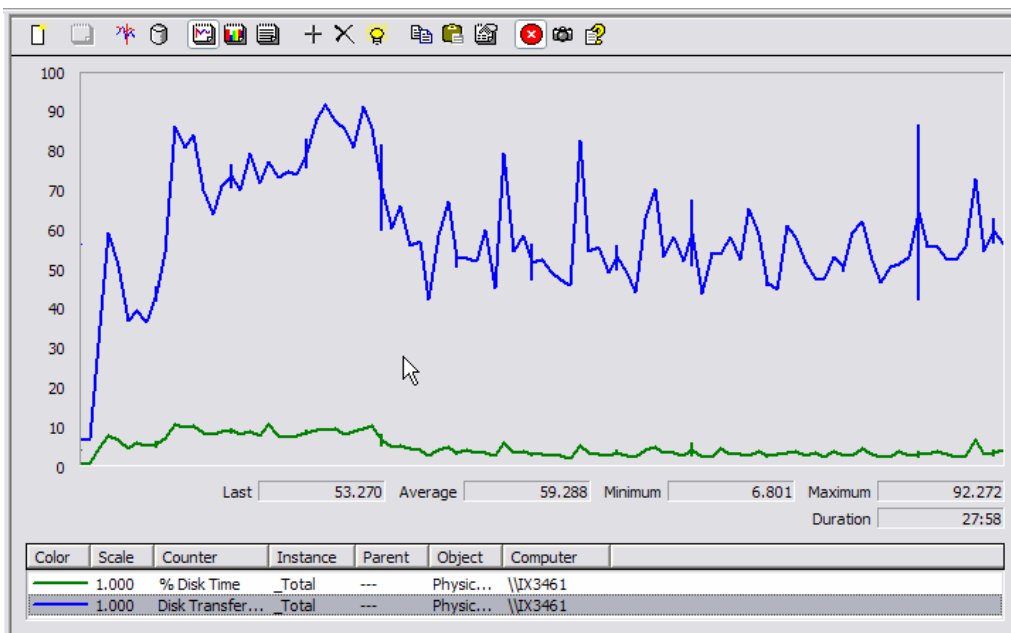
100 Users:

- Canary Baseline: 16:48, Threshold: 18:29
- Canary Runtime: 16:58

The results are starting to show more of a load on the server by having 100 users. However the average is still only 68.40%. During peak load with all users on-line processor average is 79.82%.



Processor

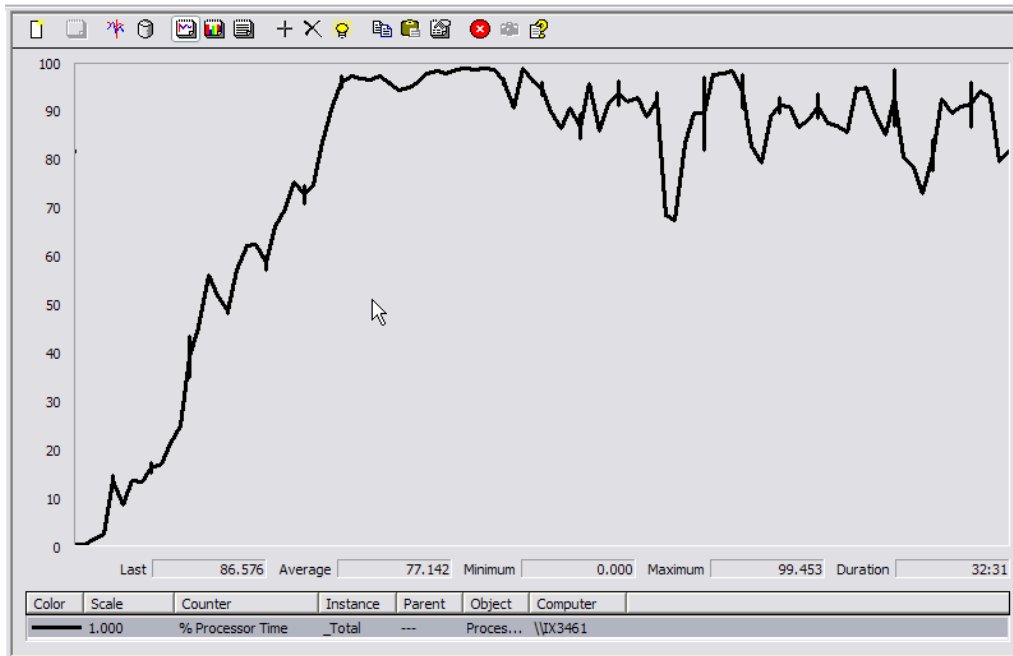


Disk

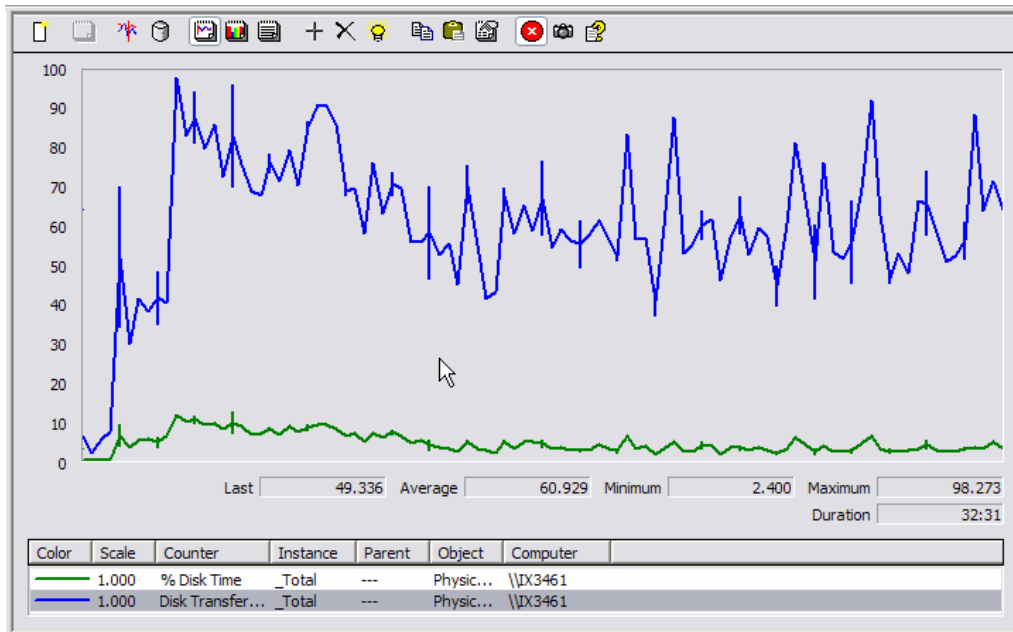
110 Users:

- Canary Baseline: 16:48, Threshold: 18:29
- Canary Runtime: 17:54

The results show there is starting to be a real load on the server. Maximum processor is now gone up to 99.45%. Even though the average processor time is showing 77.14%, you have to take into account the ramp up time of the users. During peak load with all users on-line processor average is 90.90%.



Processor

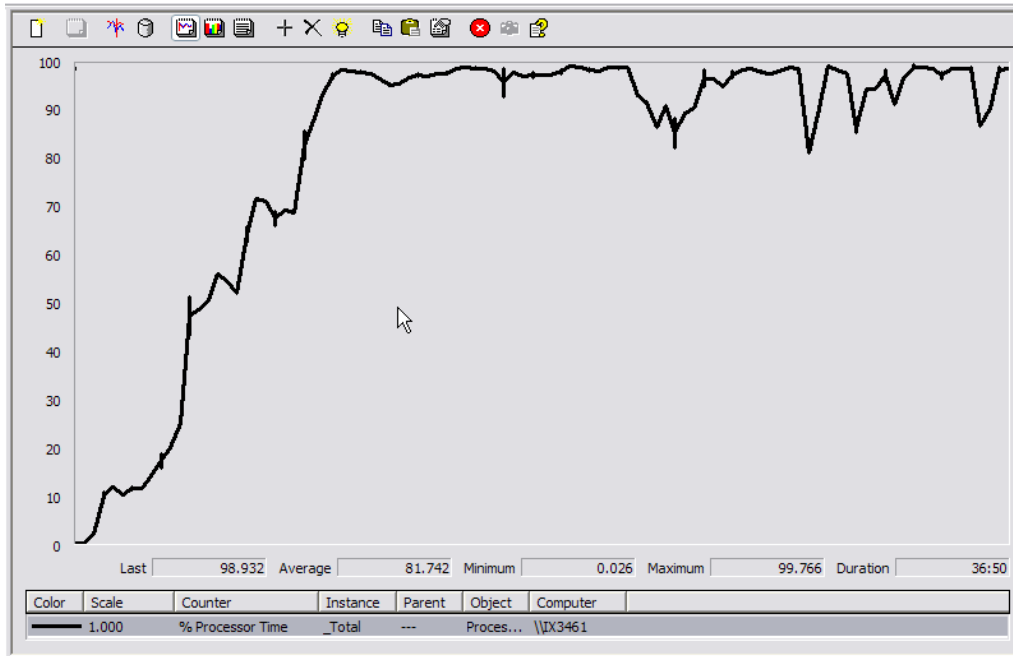


Disk

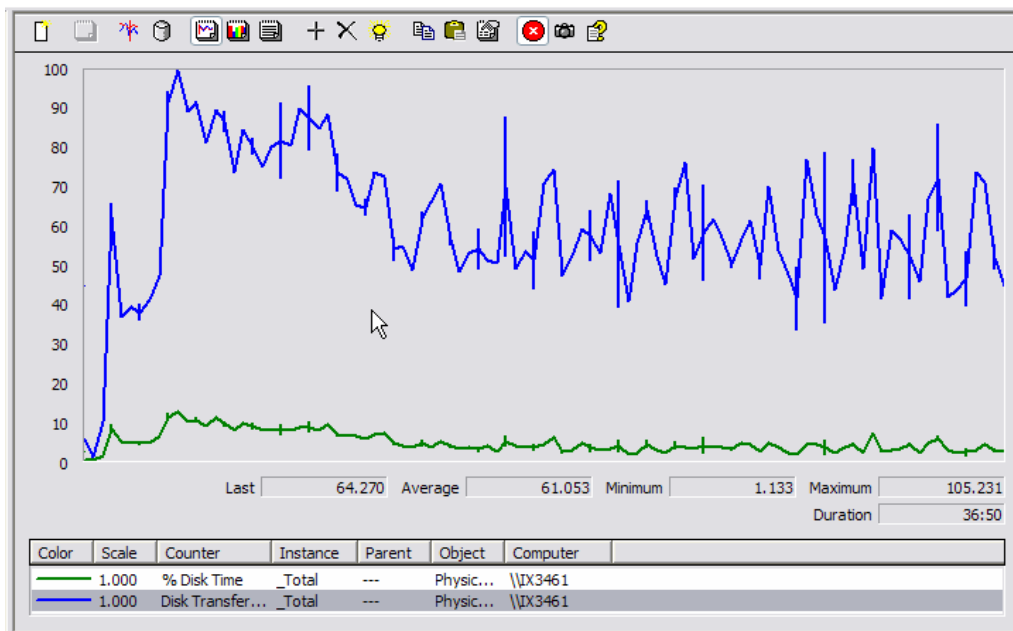
115 Users

- Canary Baseline: 16:48, Threshold: 18:29
- Canary Runtime: 19:27

With 115 users we have exceeded the 10% rule on the canary. You will also notice that the processor peaked at 99.76% while all the users are online. At this point you will start to experience a high number of users failing to log into the Citrix Server. During peak load with all users on-line processor average is 96.70%.



Processor



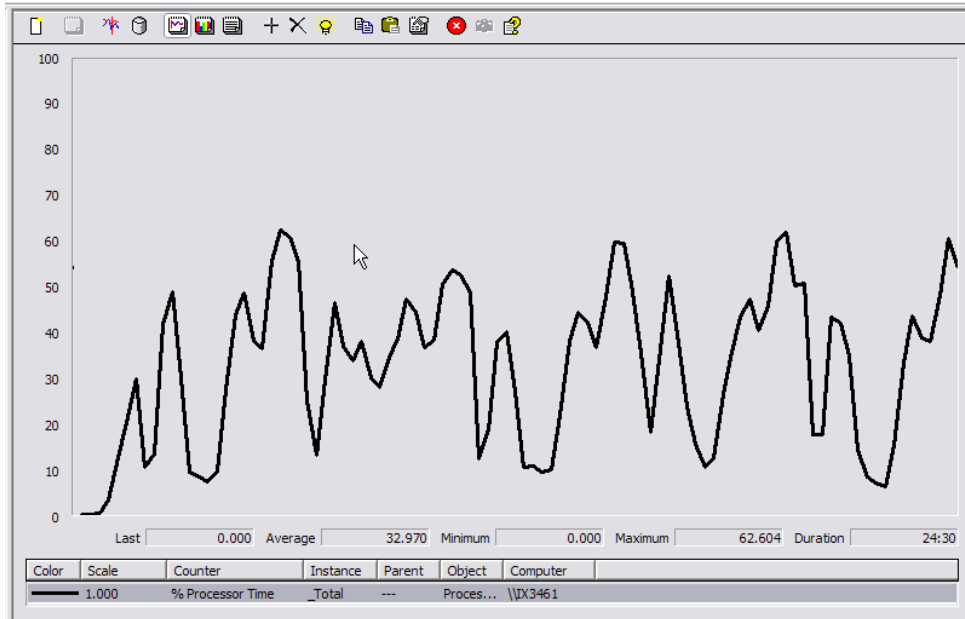
Disk

Detailed Test Data – Multiple Login

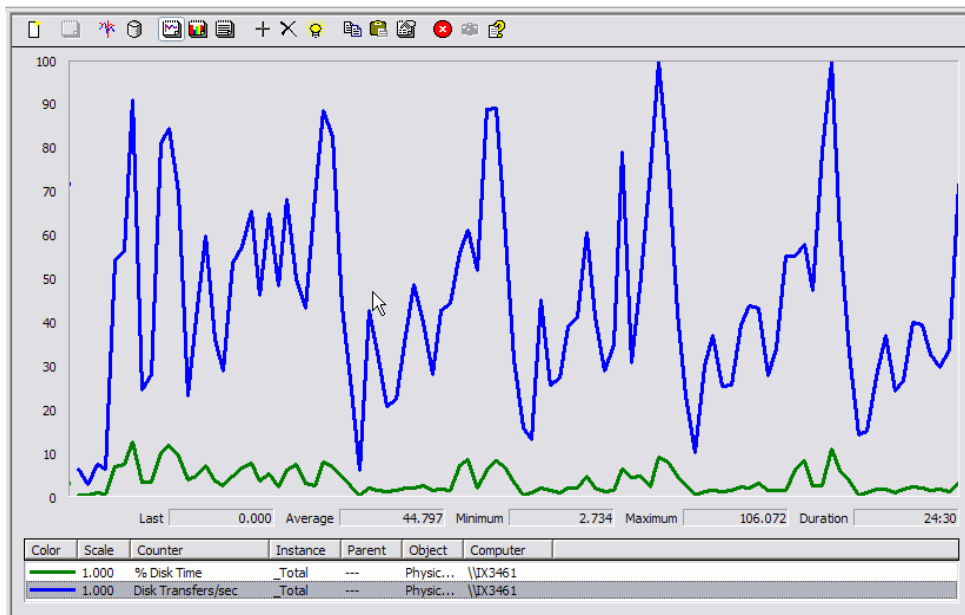
50 Users:

- Canary Baseline: 16:48, Threshold: 18:29
- Canary Runtime: 17:03

With 50 users continually logging on and off there will be significant load on the processors for shorter periods of time. The average processor is at 32.97% with a maximum load of 62.60%. During peak load with all users on-line processor average is 34.85%.



Processor

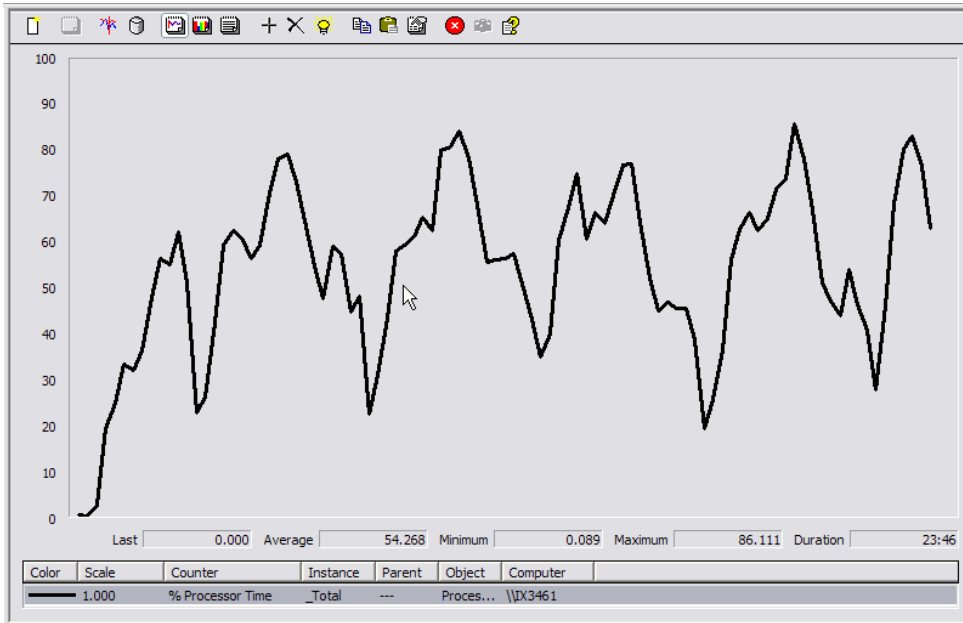


Disk

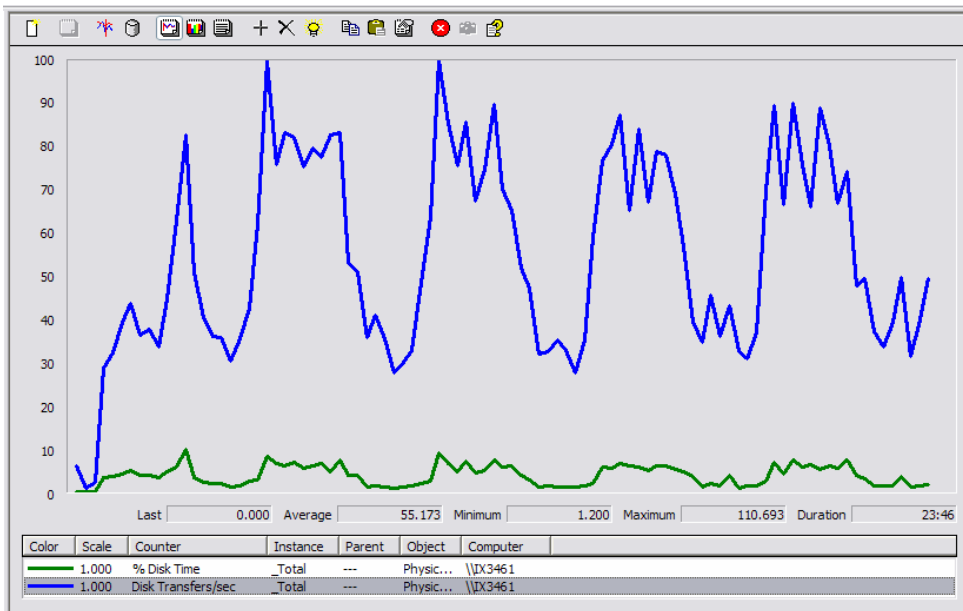
60 Users:

- Canary Baseline: 16:48, Threshold: 18:29
- Canary Runtime: 17:05

With 60 users continually logging on and off there was a reasonable jump in the load on the processors. The processors average rose to 54.26%, which is a 68% jumped up compared to having 50 users. Also notice the maximum has moved up to 86.11%. During peak load with all users on-line processor average is 57.54%.



Processor

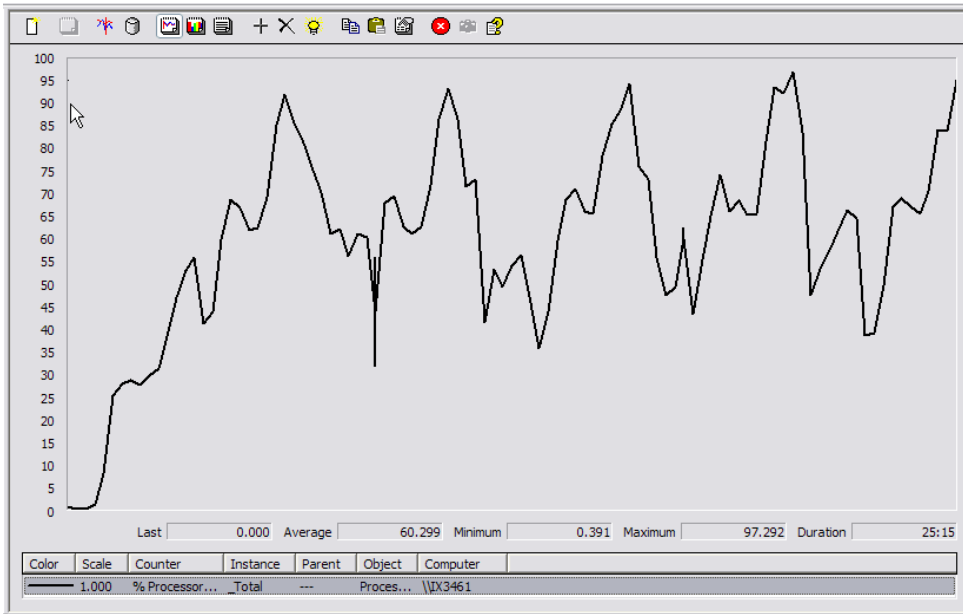


Disk

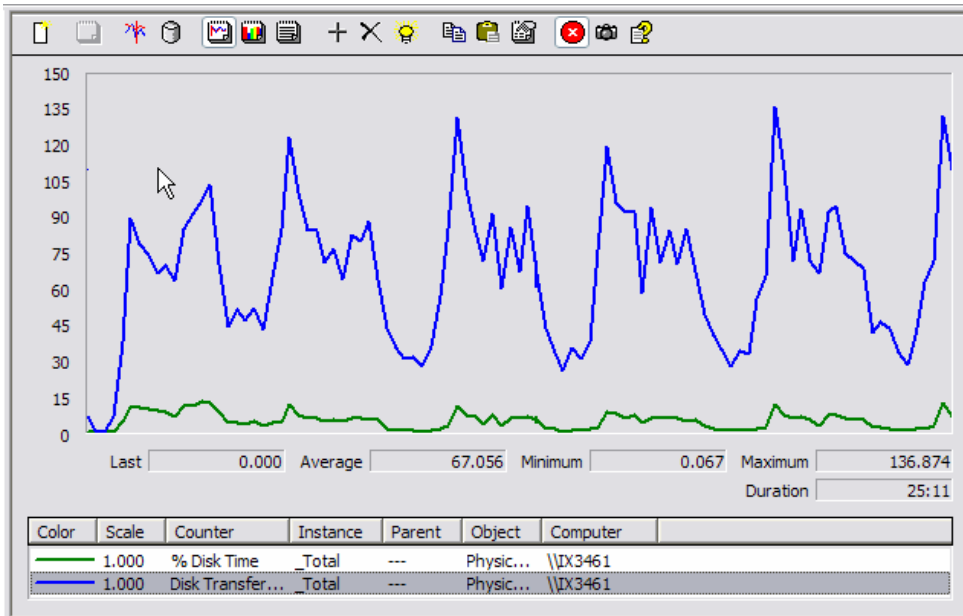
65 Users:

- Canary Baseline: 16:48, Threshold: 18:29
- Canary Runtime: 17:08

With 65 users there is not much of a big change when compared to 60 users. However the CPU average (60.29%) and the maximum (97.29%) are still high. Even with the processor at a higher rate the canary time is still within the threshold. During peak load with all users on-line processor average is 66.17%.



Processor

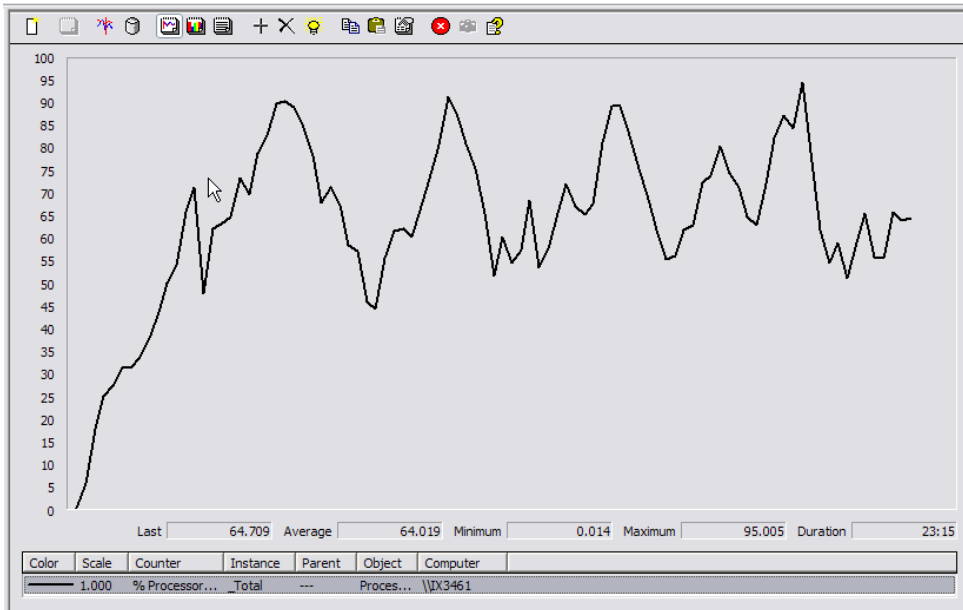


Disk

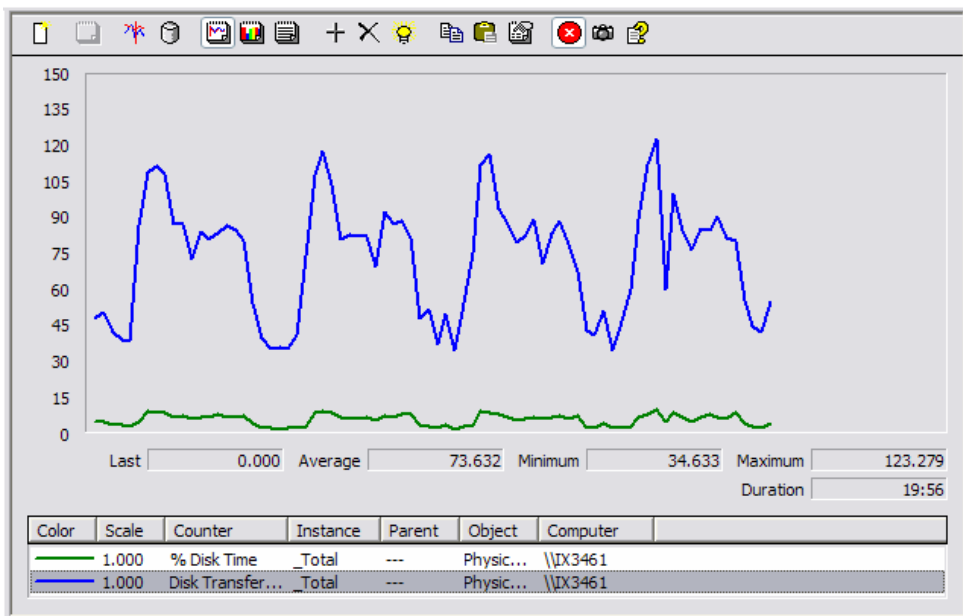
70 Users:

- Canary Baseline: 16:48, Threshold: 18:29
- Canary Runtime: 17:07

With 70 users we saw the runtime of the canary actually decrease in time. The processor average moved up some to 64.01%. Processor maximum has not maxed out yet but close at 95.00%. During peak load with all users on-line processor average is 69.11%.



Processor

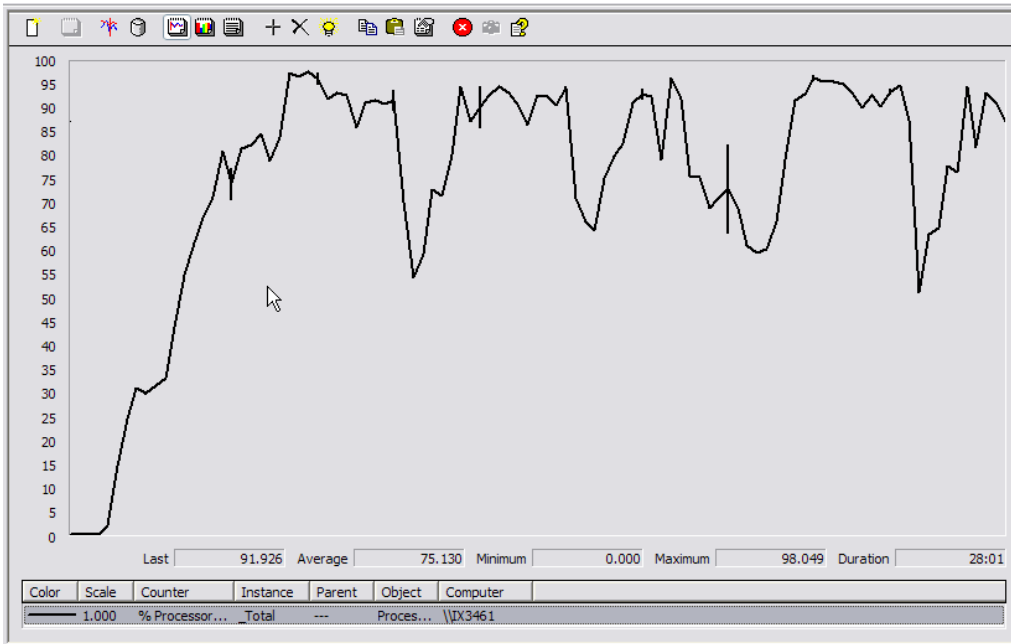


Disk

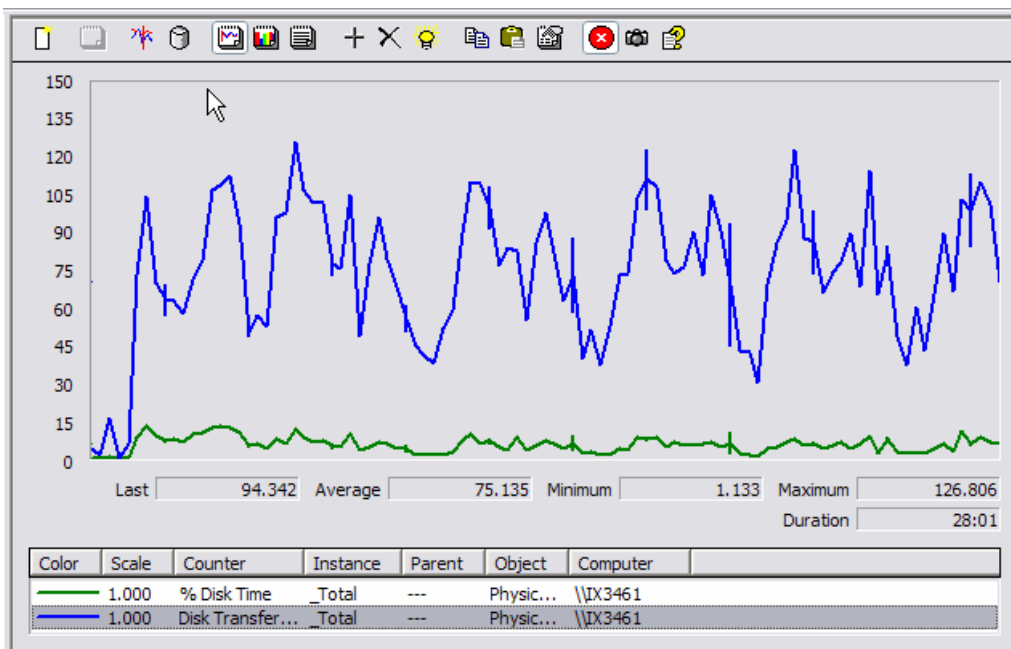
75 Users:

- Canary Baseline: 16:48, Threshold: 18:29
- Canary Runtime: 17:46

With 75 users we now see a bigger jump in the runtime of the canary. Again the average goes up but we have a small move up on the maximum of the processor. During peak load with all users on-line processor average is 84.41%.



Processor

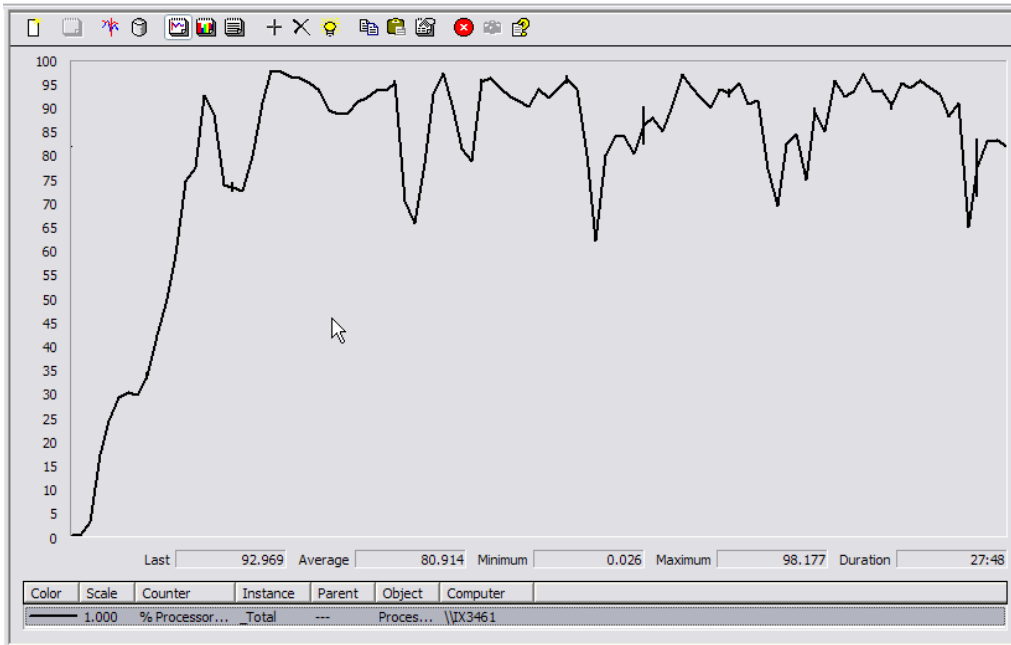


Disk

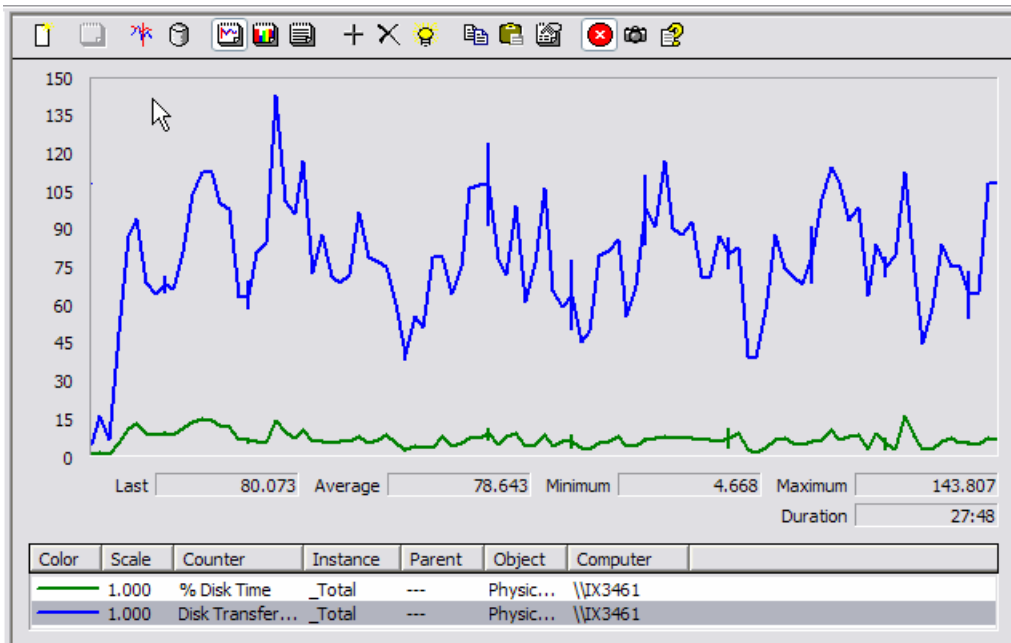
80 Users:

- Canary Baseline: 16:48, Threshold: 18:29
- Canary Runtime: 18:10

With 80 users we still don't exceed the Canary threshold time. Also if we look at the processor when most of the users are logged on we have an average above 80%. During peak load with all users on-line processor average is 88.56%.



Processor



Disk

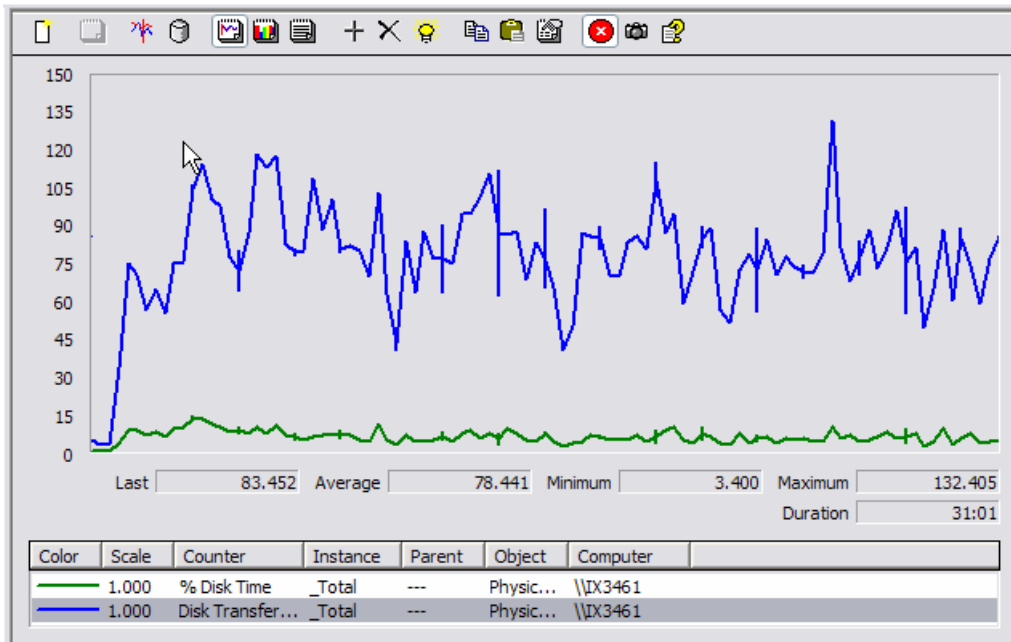
85 Users:

- Canary Baseline: 16:48, Threshold: 18:29
- Canary Runtime: 19:27

With 85 users we exceed the threshold time. Also if we look at the processor when most of the users are logged on we will have a average well above 80%. During peak load with all users on-line processor average is 94.04%.



Processor



Disk



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Somers, NY 10589
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