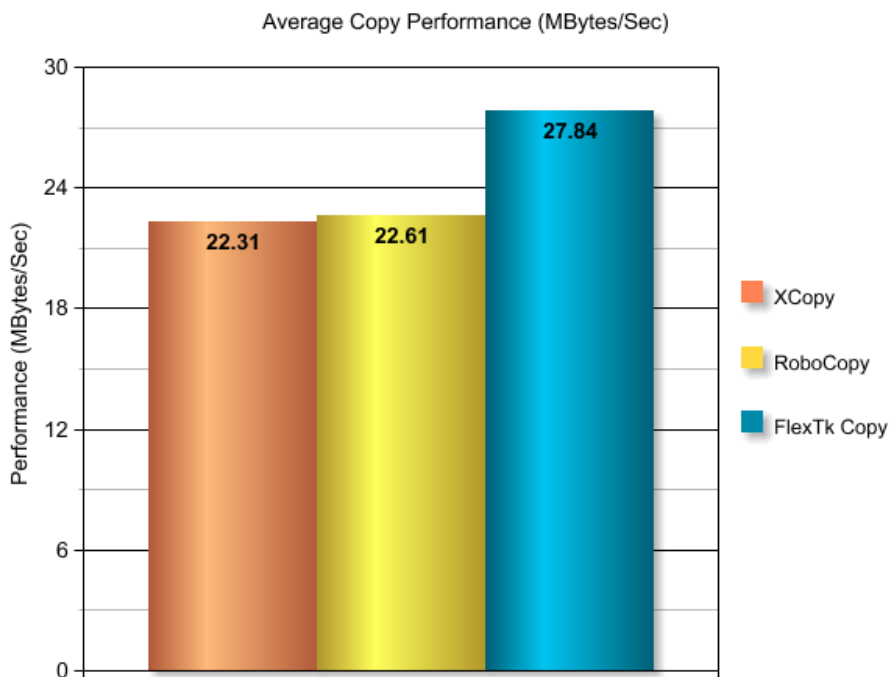


## FlexTk File Copy Performance Review

Copying files from one location to another is potentially one of the most frequently performed operations. Most of the time we are copying a couple of small files and the performance of the used copy tool will have no significant impact on the overall copy time. If it is copied within 20 seconds or 30 seconds is not so important. But, when we need to copy a number of recently downloaded DVD images, or backup the whole hard disk to another computer over the network than better copy performance may result in significant time savings.

Business needs are much more demanding and every computer professional knows that each saved hour means a lot of money. Data migration projects have very strictly defined windows of time and every hour of downtime costs thousands of dollars. The following factors may be identified as the most important for each data migration project: data integrity, reliability and fault tolerance and consistent copy performance.



The FlexTk's build-in copy engine has been designed to meet demands of advanced computer users and computer professionals performing small to medium-sized data migration projects. The FlexTk's copy engine employs integrated fault-tolerance and data integrity verification mechanisms while pushing the performance of copy operations to the limits of the used hardware components.

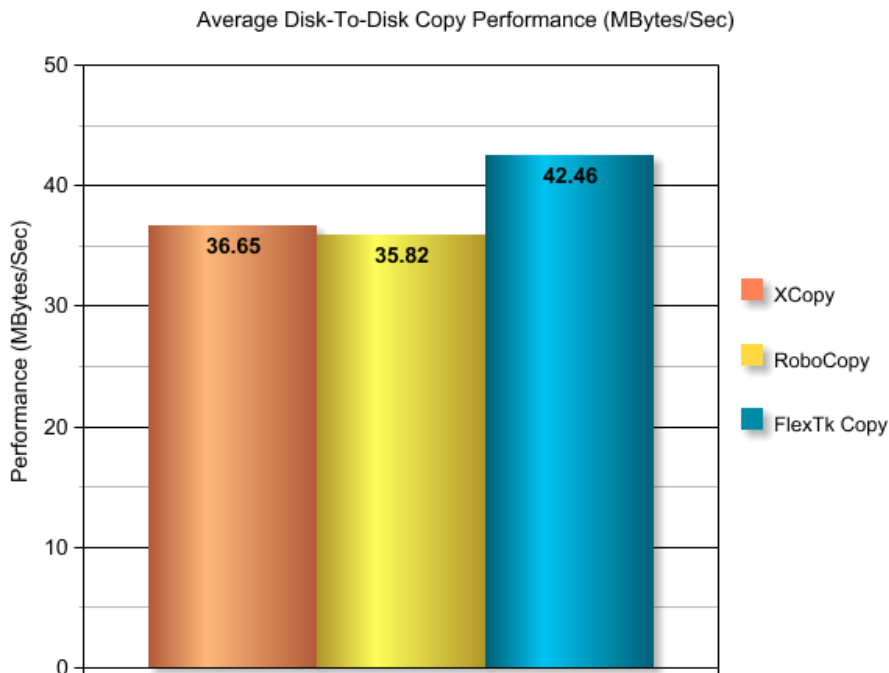
In order to be able to maximize the copy performance, the FlexTk's copy engine provides the user with the ability to specify the number of copy streams that should be utilized during the copy operation. The copy engine employs an intelligent, adaptive scheduler, which on-the-fly selects the most effective scheduling policy according to the currently copied content type thus maximizing the overall copy performance.

The FlexTk's copy engine is especially optimized to deliver a high level of performance on all modern hardware components including fast disk drives, powerful RAID controllers, multi-core CPUs and Gigabit Ethernet networks. When copying data from/to a large-scale enterprise storage system, the user will be provided with the ability to utilize all the available I/O resources by using the parallel file scanning mode and multi-stream copy mode available in the FlexTk's copy engine.

## Disk-To-Disk Copy Performance

All disk-to-disk copy performance tests were performed using FlexTk Version 1.7.10 on a dual-CPU Xeon machine equipped with 2GB of RAM and running Windows XP SP2. For disk-to-disk copy tests we have used two completely identical Western Digital SATA 250GB hard disks equipped with 16MB of cache. Before each benchmark we have reformatted the destination disk and rebooted the test server.

In order to get a better understanding of how different data sets impact the copy performance, we have used numerous 4GB data sets including a set of 100,000 files 40KB each, a set of 10,000 files 400KB each, a set of 1,000 files 4MB each and a set of 100 files 40MB each. In addition, we have used a 6.1GB real-life data set that included about 150,000 files with 1/3 small files, 1/3 medium-sized files and 1/3 large files.



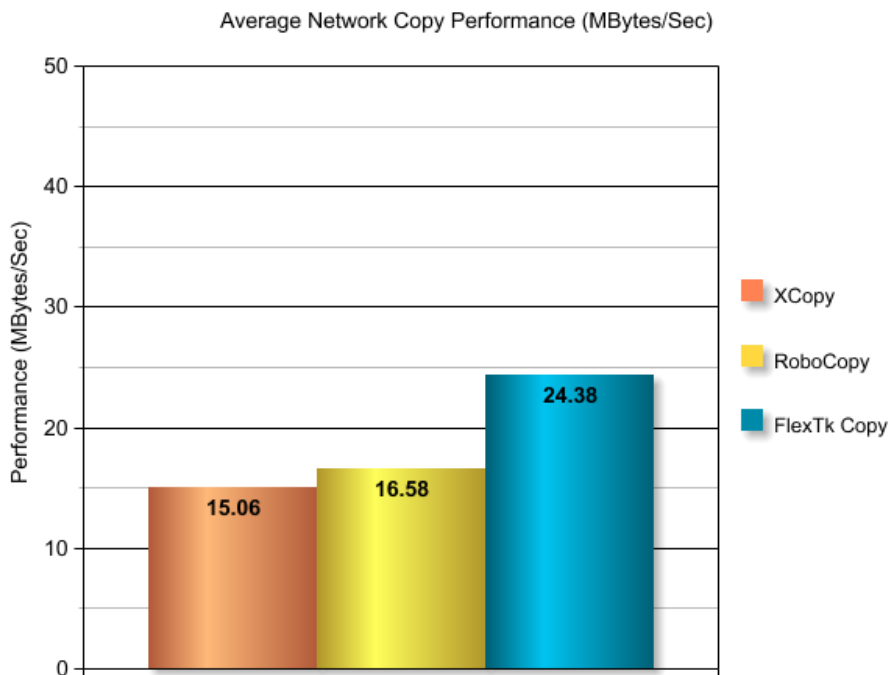
The performance of built-in Windows tools is identical in all three data sets. The performance of FlexTk is slightly better on huge 4GB files and the difference is getting more significant on 40MB files. This performance difference may be accounted to the DMA-Enabled, double-buffering copy mode employed by FlexTk for large files. Also, it should be noted that during the copy operation both XCopy and RoboCopy have utilized about 25-30% of CPU resources, while FlexTk has used only 5%.

As you can see from the performance results, the copy performance gradually decreases as we are copying smaller and smaller files. On medium-sized files performance dropped to about 40 MB/sec and on small-sized files the copy performance has dropped to 20-30 MB/sec depending on the used copy tool.

## Network Copy Performance

All network copy performance tests were performed using FlexTk Version 1.7.10 between two dual-CPU Xeon machines equipped with 2GB of RAM each and interconnected via a Gigabit Ethernet network using a pair of Intel single-port network adapters. For network copy tests we have used two completely identical Western Digital SATA 250GB hard disks equipped with 16MB of cache installed in each test server.

Each benchmark was performed twice, first time we have copied data from the local disk to the network share and the second time we have copied the same data from the network share to the local disk. Before each benchmark we have reformatted the destination disk and rebooted both testing servers.



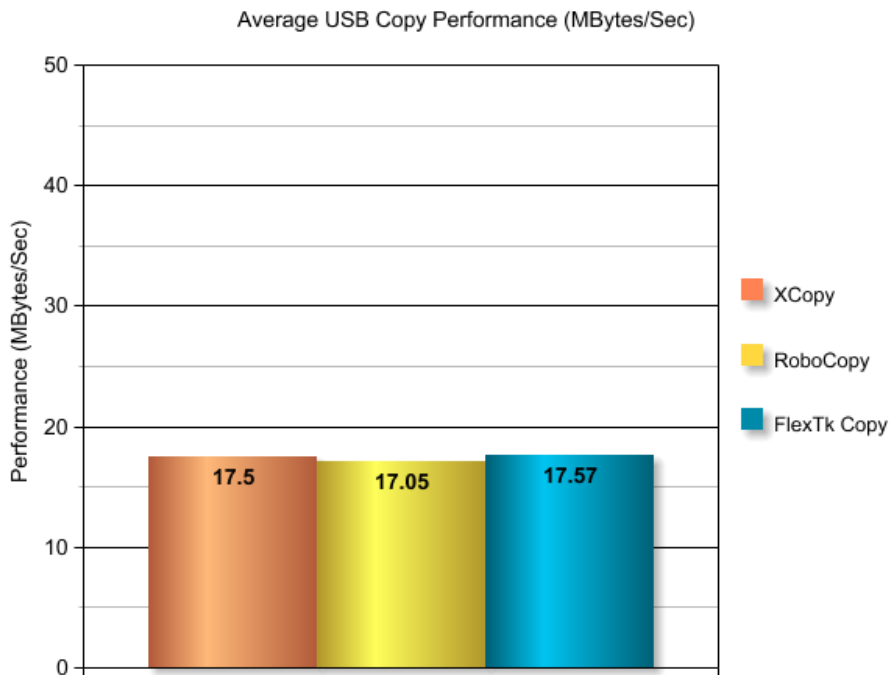
In order to get a better understanding of how different data sets impact the copy performance, we have used numerous 4GB data sets including a set of 100,000 files 40KB each, a set of 10,000 files 400KB each, a set of 1,000 files 4MB each and a set of 100 files 40MB each. In addition, we have used a 6.1GB real-life data set that included about 150,000 files with 1/3 small files, 1/3 medium-sized files and 1/3 large files.

It is clear from the performance results that the FlexTk's copy engine is better in all but one of the performance tests. This performance advantage may be attributed to two reasons. The first one is the multi-streaming nature on FlexTk's copy engine, which is capable of performing multiple data transfers at the same time thus better utilizing the dual-core CPUs. The second reason lies in some basic limitations of modern Gigabit Ethernet cards, which are capable of reaching the maximum possible transfer speed on numerous simultaneous transfers only.

## External USB Disk Copy Performance

All USB-Disk copy performance tests were performed using FlexTk Version 1.7.10 on a dual-CPU Xeon server equipped with 2GB of RAM and a Western Digital SATA 250GB hard disk. As the external USB-Disk we have used Western Digital MyBook 250GB drive connected to a USB2 port.

Each benchmark was performed twice - the first time we copied data from the local disk to the USB disk and the second time we copied the same data from the USB disk to the local disk. Before each benchmark we reformatted the destination disk and rebooted the test server.



In order to get a better understanding of how different data sets impact the copy performance, we have used numerous 4GB data sets including a set of 100,000 files 40KB each, a set of 10,000 files 400KB each, a set of 1,000 files 4MB each and a set of 100 files 40MB each. In addition, we have used a 6.1GB real-life data set that included about 150,000 files with 1/3 small files, 1/3 medium-sized files and 1/3 large files.

In this case the situation changes and the FlexTk's copy engine shows equal or slower performance than the built-in Windows tools. The USB disk copy performance is generally limited by the throughput of the USB interface, which is significantly slower than the performance of the used hard disks.

*\* This performance review has been prepared for information purposes only and we strongly advise you to make your own performance evaluations using your specific hardware components and datasets.*