

Frequently Asked Questions (FAQs)

Is your disk activity light blinking? Does your system only seem to slow down while performing particular tasks? Is the light steadily blinking while performing these tasks? Do you use a lot of disks? Are you running several applications or multi-user? Does the workloads on your system change over time? If the answer is yes to any of these questions, then you probably have disk I/O bottlenecks and UpTempo can make a significant impact on your performance.

FAQ:

- 1. What is the performance gap?**
- 2. What kind of applications get bottlenecked by I/O performance?**
- 3. Is it easy to use?**
- 4. Why do I gain more performance from UpTempo when I have more users, more disks or faster disk subsystems?**
- 5. Where can I learn more about the technology?**
- 6. What Benchmark information is available?**
- 7. What performance gains will I see?**
- 8. How much memory is required?**
- 9. Who can benefit from UpTempo?**
- 10. Does this replace Windows Cache?**
- 11. What are the system requirements?**
- 12. How does UpTempo compare to specialized RAM disks or DB optimizers?**

1. The Problem: The Growing Performance Gap

The Breakthrough: UpTempo Performance Software

- CPU and memory performance and disk capacity have advanced very rapidly over the last 15 years.
- Disk performance has not kept pace.
- So many if not most applications are performance-bounded by disks and the inadequacies of I/O subsystems.
- Operating System and File System caches sometimes help, but cannot fully compensate for the ever growing performance gap.
- The gap is now so significant that even modest I/O gains yield radical results in application behavior.

Disk I/O performance is the most significant bottleneck to application performance

While many factors can impact overall server performance, the four fundamental drivers of server performance are: processor speed, memory, network bandwidth, and disk I/O. The performance of processors, memory, and networks has advanced dramatically each year, but disk throughput and I/O (the rate in which your system reads and writes data to its disk drives) continue to greatly lag behind.

Because hard drives are mechanical and these other elements of system performance are not, hard drives will always be much slower. When disk I/O is the performance bottleneck, other system resources are underutilized. In particular, processors and applications are left waiting for disk data and systems become sluggish even when the fastest CPUs or high-speed memories and networks are deployed.

As a result, disk I/O performance is the major obstacle to optimal system and application performance.

CPUs, Networking and Memory Speeds = Doubles every 12 to 24 months

-Versus-

Disk Speeds = Doubles every 12 to 24 years!

The performance gap continues to grow each year!

The Breakthrough: UpTempo Performance Acceleration Software

DataCore's UpTempo software takes a simple but dramatically effective and proven approach to closing the performance gap. With UpTempo, you can overcome the limitation of the mechanical speed of your disk drive by enlisting the lightning fast electronic speed of your system's underutilized random access memory [RAM]. Studies have shown that the majority of storage accesses are against a relatively small percent of frequently accessed data. UpTempo uses sophisticated disk caching algorithms and self-learning workflow assessing technologies that predict and optimize accesses to frequently utilized data staged in electronic memory. This can eliminate a great majority of slow, mechanical, disk accesses, which makes it possible to dramatically improve system performance. Previously these capabilities only existed in the highest-end storage controllers, RAM disk systems and computing complexes.

Your System: Is your disk light blinking? [Try UpTempo Now!](#)

2. What kinds of applications get bottlenecked by I/O performance?

- Back office software such as Oracle, Exchange, SQL Server, SAP, etc.
- Financial/Investment Analytics and Real-time Trading
- Database and Business Intelligence Systems
- Mail Collaboration Systems
- Online Transaction Processing (OLTP)
- CAD (Computer-Aided Design)
- Internet, and Intranet-related, Web Serving, Hosted ISP and ASP Solutions
- Database & Software Development
- Aerospace, Seismic, Telemetry and Data Acquisition
- Data Backup, Recovery, and Migration
- Energy Exploration and Geosciences
- Medical Sciences, including Healthcare and Imaging

- Data Cataloging, Paging, Log, Journal and Indexing
- Still and Moving Video Surveillance
- Video Editing and Processing, including Post-Production
- Video On Demand and Video Services
- Data Warehousing and Data/File Serving
- Voice Recognition
- Graphics and Image Processing
- Weather Forecasting and Simulation
- Rich Media and Multi-Media Center Systems
- Multi-User Applications that drive diverse I/O requirements
- Applications which are subject to recurring cyclical workloads

On-Line Transaction Processing and Networked Systems – There are a broad range of transaction processing applications that can be sped up by as much as an order of magnitude with UpTempo technology. These include heavily loaded reservations systems, trading and banking applications and larger scale order/claims processing applications.

Relational Data Bases and Data Warehousing Applications –UpTempo allows very rapid access to random, short data files. In database applications, these include frequently used tables, database indexes, and transaction logs which greatly benefit from UpTempo acceleration.

Internet Service Provider and E-Commerce Applications - Many Internet applications can benefit. These range from Mail and News Servers to Search Engines and Web Hosting applications, data base servers and on-line e-based transaction processing and web shopping sites.

High Speed Data Acquisition – There are many custom and unique applications requiring high speed acquisition of data for R& D, structural analysis, telemetry, seismic data collection, simulation and modeling applications.

Video Processing – UpTempo is a great fit for large block video streaming applications that require real time editing and processing.

Multi-User Systems – UpTempo is designed to perform under heavy loads. UpTempo's caching is highly efficient and because it is able to adjust to workloads it actually reduces context switching and disk thrashing that often occurs when running many applications or jobs simultaneously.

UpTempo shines in larger multi-user, multi-disk environments. With more traffic there is more congestion and therefore more opportunity for UpTempo to break the bottlenecks and accelerate the I/O.

As increased demands are placed on system resources – particularly storage resources – context switching rates can quickly rise above healthy levels. At very high rates, the

system is actually realizing less work. This is because threads and processes are increasingly unable to access the resources they require, so the operating system must switch many times from one waiting thread or process to another until it finds one with available resources. This condition is frequently accompanied with high levels of swapping and disk thrashing.

There are a lot more opportunities to be efficient when UpTempo works across multiple users or a large number of disks. The more the better...

See more desktop and server class application software that can benefit from UpTempo.

3. Is it easy to use?

UpTempo is transparent to the user and to system applications. What's noticeable is increased speed and responsiveness.

UpTempo is fully automatic. Click your choices and let it run...

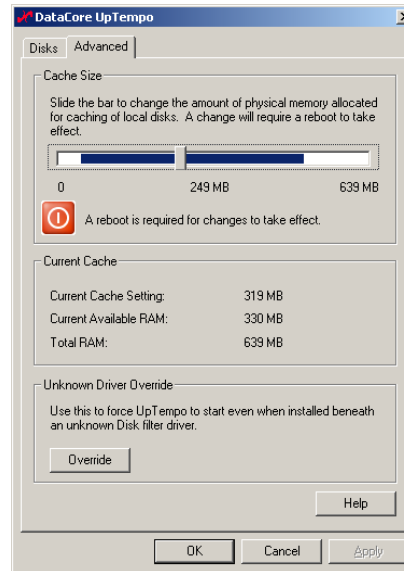
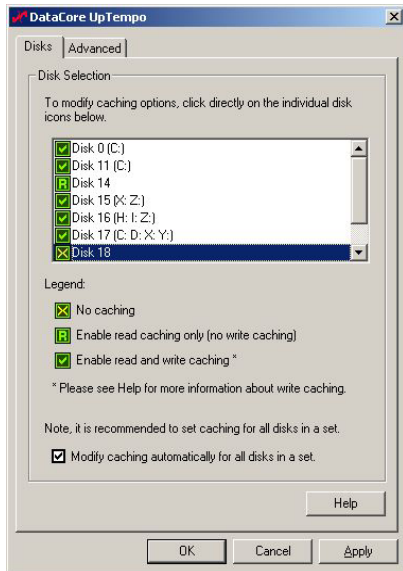
Choice – Which Disks?

Choice – Read/Write or Read Cache?

Choice – Total Size of Block Cache?

THAT'S IT!

Couldn't be Simpler...



4. Why do I gain more performance when I have more users, more disks or faster disk subsystems?

If you have a single disk or a single user – UpTempo can make your system faster.

If you have many disks or many users – UpTempo can make your system much faster!

Most systems are bottlenecked by I/O and the more tasks and the more disks you have running the more you can gain from UpTempo. Computers are general purpose in nature and therefore workloads constantly change. UpTempo improves single user and single disk systems but it shines even brighter in larger multi-user, multi-disk environments. With more traffic there is more congestion and therefore more opportunity for UpTempo to break the bottlenecks and accelerate the I/O. You might not be bottlenecked on I/O during a particular instance of time – but due to changing workloads and usage rates - you likely will be now or later. That's when you really appreciate the UpTempo performance boost.

There are a lot more opportunities to be efficient and overcome bottlenecks when UpTempo works across multiple users or a large number of disks. The greater the load the better UpTempo performs...

Fast I/O disk subsystems? UpTempo makes them more efficient – The faster the backend typically the greater the performance gain from UpTempo. UpTempo removes bottlenecks by efficiently managing the flow of I/O and optimizing accesses to your I/O subsystem. Therefore, your fast I/O and disk subsystems can run to their full potential.

5. Where can I learn more about the technology?

Techno Talk:

UpTempo is intelligent caching and I/O control software. It has the flexibility to seamlessly balance and adjust to your systems' changing workloads and resources, thereby providing you with a very powerful solution for achieving optimal system performance and making your applications run faster.

When disk I/O bottlenecks limit system performance, other system resources wait idly by. By putting these resources to work, system performance is improved. UpTempo applies processor and memory resources to the I/O bottleneck problem.

The UpTempo block-level cache assesses your workload I/O patterns and optimizes the flow of I/O traffic between memory and disk locations. Inserted into the path of the I/O subsystem, it learns to cache the most active read/write disk I/O. With UpTempo enabled the cache technology reduces context switching, enhances server response and results in a much more satisfying and productive user experience.

What is UpTempo?

- Advanced block cache / sophisticated “virtual” I/O controller that sits below the file system
- I/O Scheduler
- Very advanced mechanisms for increasing the performance of local I/O
- Predictive self learning and workload aware algorithms
- A general schema for reducing exception overhead for disk I/O

UpTempo Is Not a Tuning Utility for Windows I/O...

- UpTempo sits ‘below’ the Windows file system and improves its performance, no matter how the file system is tuned.
- Operating System tuning is always a compromise – gains here... lose there. UpTempo operates independently of such decisions.
- UpTempo helps in a multitude of cases where the OS cannot.
- UpTempo is fully automated and very simple (OS tuning is complicated and highly specialized).

UpTempo Is Not a RAM Disk...

- UpTempo is automated and requires no application knowledge from the user. It is many times more efficient than a RAM disk.

UpTempo Is Not a ‘Simple Block Cache’...

- UpTempo is very sophisticated and complete, compatible with the broad range of Windows versions and applications and ranking with the fastest and most expensive I/O systems. The only thing simple about UpTempo is its ease of use.

UpTempo makes a difference...When and How Much?

When doesn't UpTempo help?

- When the application bottleneck is not disk I/O related.
- When your File System is performing flawlessly (rare).
- When your storage hardware is completely saturated (very rare).

When does UpTempo help?

- At all other times... a very broad range.

How much does UpTempo help?

- Depends on how much your application is I/O bound... mileage may vary. BUT, 3 to 4x I/O performance boosts (and sometimes 10x or more) are not uncommon.

Read Only or Read/Write Caching for Maximum Performance:

When UpTempo Write mode is selected both read and write caching is activated and all the powerful capabilities are engaged to accelerate performance. Enabling the write caching option maximizes read and write performance. Read only mode engages the read caching features.

Prefetching:

UpTempo includes predictive intelligence that enables it to pre-read data that your application hasn't even asked for yet! This allows it to transfer data in larger “chunks,” reducing the number of I/O operations that are required to the physical disk and, thus, significantly improving the responsiveness of your application.

Read/Write Cache Mode: Load Balancing and Background Writes:

UpTempo write caching includes load balancing algorithms that give priority to read requests, allowing writes to complete in the background when there is less demand on system resources.

Write caching notes:

In addition to activating the read cache, the write cache mode activates write-behind caching (also known as “delayed” writes or “lazy” writes) for data that is being written to disk. Write caching is a technique used in the most modern operating systems and I/O subsystems.

As a best practice for systems using write delayed caching techniques, normal system safeguards such as UPS or battery backed-up power and normal precautions should be taken. Note: The read or read/write modes of operation are selectable on a per disk volume basis. In typical usage, the system disk may operate in read-only caching mode while data disks are set to read/write cache operation

Read Cache Mode: Read Only and Write-through protection:

Memory is significantly faster than disk, but unfortunately it can lose its contents during sudden power loss or system crashes. In such situations, the last few writes may be lost. For the highest level of “data protection” UpTempo supports write-through or immediate writes to disk. Each read hit continues to get its data from the cache without having to go to the slower mechanical disk. The read or read/write modes of operation are selectable on a per disk volume basis. In typical usage, the system disk may operate in read-only caching mode while data disks are set to read/write cache operation.

Large Multi-User Applications and Workload Optimizations

More jobs and more applications mean greater I/O traffic and slower response. UpTempo is designed to perform under heavy loads. UpTempo’s caching is highly efficient and

through its ability to adjust to workloads it actually reduces context switching and disk thrashing that often occurs when running many applications or jobs simultaneously.

As increased demands are placed on system resources – particularly storage resources – context switching rates can quickly rise above healthy levels. At very high rates, the system is actually realizing less work. This is because threads and processes are increasingly unable to access the resources they require, so the operating system must switch many times from one waiting thread or process to another until it finds one with available resources. This condition is frequently accompanied with high levels of swapping and disk thrashing.

UpTempo optimizes the I/O subsystem and memory usage reducing the times Windows is forced to swap and context switch. This serves to increase performance and lower response times, especially when running several applications simultaneously.

RAID5 Implications

RAID5 disk sets offer data protection but are known to be slow, especially for write traffic. With UpTempo, systems gain the intelligence and ability to buffer many writes to optimally combine, order and stage them to minimize the flow of write traffic to disks. Only those writes that change data need to be written to disk, lessening the total workload. In addition, since writes can be buffered, ordered and optimally combined prior to metering them to disk, the read I/O rate also improves for RAID5 systems.

6. What Benchmarking Results are available?

See [Benchmark Results](#)

How does UpTempo perform?

- The best way is to download a copy and [try it](#) for yourself in your own environment.
- You can run benchmark suites and mixes that simulate business, database, web, and video server workloads (e.g., IOMeter Test Suite, available at www.iometer.org).
- Any specific benchmark is open to debate. Therefore, see the [benchmark results section](#) to review a series of different industry benchmarks and simulated mixes covering a range of workloads. As a whole, they represent a much better indicator of relative performance improvements than any single benchmark.
- You can conduct "simple time tests."

Simple Timed Performance Tests – "Watch the clock"

"As a home user, I could tell UpTempo was working, but I wanted to see how much of a difference it made and I didn't have time to run elaborate benchmarks. So I tried 2 simple

tests:

Test 1 - Before I clicked UpTempo on, I opened up a large PowerPoint slide set, a large PDF doc, a game and a Photo. Got out my stopwatch and timed how long it took to open each and marked down the times. Then, clicked UpTempo Read cache on and repeated the process a couple of times and timed each open again.

Test 2 - Ran the virus scanner on my largest disk drive - timed it without UpTempo, then with UpTempo turned on to Read only mode.

Compared the results – got better than twice the performance."

7. What performance gains will I see?

Try it and experience the difference for yourself.

Why wait? [Download a free 30 day trial of UpTempo now.](#)

How much faster? - Depends on how much your application is constrained by I/O bottlenecks. **Mileage may vary! But, speed ups by a factor of 3 to 4x I/O performance (and sometimes 10x or more) are not uncommon.**

Is your disk light flashing? Most applications are bottlenecked by I/O and the more tasks and the more disks you have running the more you can gain from UpTempo.

Computers are general purpose and therefore applications, workloads and the nature of system bottlenecks are likely to keep changing in the future.

Even if there are times when your system is not bottlenecked, you'd be surprised how often I/O slow downs occur while you're working and the overall impact it has on your productivity over time. With UpTempo you can eliminate bottlenecks before you feel their impact. UpTempo removes the big speed bumps and gives you a smoother and faster ride.

You can check out the benchmark results, but seeing is believing. It's easy enough to just try it.

8. How much memory is required?

Depends. Just a little makes a big difference and even more can make a huge difference. More memory is good. Bottom-line, when you install UpTempo you will use up some of the memory in your system – the good news is that PC memory prices continue to drop every year and UpTempo provides tremendous performance gains by trading a bit of memory for much greater speed.

What is the minimum requirement? Your PC should have at least 256MB of main memory to run UpTempo and the operating system and applications.

Note: UpTempo will automatically set its own default size which you can easily adjust – see sidebar control.

Since operating system and application memory requirements keep growing, the standard amount of memory installed in systems has also grown, typically new systems are now being sold with a minimum of 512MB on desktops and 1GB on servers.

More memory is good; therefore a better starting point is to begin with 512MB of main memory on a desktop with at least 96MB set aside for UpTempo. Likewise, on servers try to start with at least 1GB of main memory with 192MB or more allocated to UpTempo.

Need more performance?

If you need even more performance, you can add more memory –how much? The basic answer again is “it depends” – you can keep adding memory until you stop getting additional performance gains. In general, the more the better...

Most users add UpTempo, see tremendous gains and since they can - they then run more applications or add a greater load onto their systems. As you add much larger loads – don't forget to see if you can allocate more memory to UpTempo - then you can really fly since UpTempo soars as you add more memory.

9. Who can benefit from UpTempo?

Everyone now or later...

Is your disk light flashing? Most applications are bottlenecked by I/O and the more tasks and the more disks you have running the more you can gain from UpTempo.

Computers are general purpose and therefore applications, workloads and the nature of system bottlenecks are likely to change as time progresses.

Even if there are times when your system is not bottlenecked, you'd be surprised how often I/O slow downs occur while you're working and the overall impact it has on your productivity over time. With UpTempo you can eliminate bottlenecks before you feel their impact. UpTempo removes the big speed bumps and gives you a smoother and faster ride.

10. Does this replace Windows Cache?

No. UpTempo is complementary.

Windows does cache files. Unfortunately, Windows caches lots of information that doesn't necessarily enhance application performance. It does a good job for the general purpose use it was designed to serve but it is not specifically tuned for application disk I/O. You also have little control over Windows caching since it handles such a diverse set of varying user requirements. UpTempo is a separate “smart” caching program dedicated to disk I/O. In most cases, Windows file system cache and UpTempo work together to achieve optimal performance.

11. What are the system requirements?

System Requirements

The minimum hardware and software requirements for UpTempo are defined below.

Minimum Hardware Requirements

- At least 300 MHz CPU; Intel Pentium/Celeron family, AMD Athlon/Duron family
- 256 MB of memory
- 32 MB available hard disk space

Supported Operating Systems (English Language)

Note: 64 Bit edition is not supported.

- Windows 2000 Family with SP3 or greater
- Windows XP Home or Professional Edition with SP1 or greater
- Windows Server 2003 Family

Note:

It is important to note that DataCore UpTempo is effective only when sufficient processor and memory resources are available and disk I/O is constraining server performance. With these resources available, overall server performance will improve significantly, especially under heavy loads.

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12. How does UpTempo compare to RAM disk or DB optimizers?

UpTempo is a Better and Easier Approach to Maximize Performance

RAM Disk and DB Optimizer Users Complain: “There's a lot of work to getting additional performance and making it cost-effective .”

Typically, you first have to identify “hot files”. Then there are the economics: the specialized Database optimizer packages and RAM disk solutions are extremely expensive. Users don't have the time or the skills to work with these specialized approaches. Basically, users have to do all the hard work to tune ahead of time (selecting the right data, tables, indexes, etc.) to make these systems cost productive -this just doesn't make sense!

“To get more performance, I have to:

- *Run software and spend the time to identify hot data and files to accelerate.*
- *Calculate the size and space requirements*
- *Get training on how to install and use the software or RAM disk*
- *Tune and Configure.*
- *Monitor and Move*

And that just gets me started because applications loads quickly change and what was hot today might not be hot tomorrow!”

There are problems.

1. **“It's expensive and it's time consuming.**
2. **“It requires planning”**
3. **“It's disruptive”**
4. **“It assumes things don't change much over time”**



5. “It’s complicated”

DataCore UpTempo – A Cost Effective and Simple Way to Get Performance

UpTempo makes it simple; your applications get the performance benefits without the downsides and headaches.

UpTempo is much less expensive: It works with your existing systems. Even if you opt to add extra RAM, you will only pay PC memory prices.

UpTempo saves time: It’s automatic.

The right data will automatically stick into the server's memory. Because of block caching and workflow predictive intelligence: there is no need to do special tuning or identify data ahead of time.

UpTempo is non-disruptive and easy to use: You use a standard Windows Wizard installer and then click which disks to cache and thereafter it’s automatic.

There is a Better and Easier Way!

- Buy UpTempo software (You can actually download it for free and try it for 30 days!)
- Just run it.

So, why go exotic unless you want to spend money and time. Download the UpTempo software and see for yourself the performance difference and how easy it is to speed up your applications.

Why Wait? **Try UpTempo Now!**

