



IFS Firebird Server – consistently designed for database performance

Holger Klemt, July 2026

A high-performance Firebird server is not created solely by fast processors, plenty of RAM or storage devices with impressive manufacturer specifications. What matters most is the interaction between all the components: the motherboard, CPU, RAM, mass storage, controllers, drivers, operating system and Firebird must all be optimally coordinated with one another.

Our IFS Firebird servers are therefore not based solely on theoretical performance figures. We regularly test the components used under realistic conditions. In doing so, we pay particular attention to how they perform on Windows Server, as hardware that achieves very good results on Linux or Windows 10 or Windows 11 does not necessarily deliver the same performance on Windows Server.

Firebird places specific demands on the storage system

The I/O profile of a Firebird database server differs significantly from simply copying large files.

Whilst traditional storage tests often involve sequentially reading or writing files several gigabytes in size, a database handles a large number of small, distributed access operations. Under heavy load, there are constantly many short read and write operations taking place at different locations on the storage medium.

It is therefore not just the following factors that are decisive:

- the maximum sequential transfer rate,
- the IOPS specified by the manufacturer,
- the nominal speed of the interface,
- or the size of an existing cache.

Equally important are low latencies, suitable drivers, stable response times and direct access to the storage medium without unnecessary intermediate layers.

A drive may be very fast when copying large files, yet still be of limited suitability for a heavily utilised Firebird server.



Manufacturer's specifications alone are insufficient

Theoretical performance figures are often determined under idealised conditions. In practice, however, the performance that can actually be achieved depends, amongst other things, on the following factors:

- the operating system used,
- the quality and configuration of the drivers,
- the storage controller,
- the virtualisation layer,
- the connection to a SAN or NAS system,
- shared resources,
- CPU performance per core,
- and the actual latency of the overall system.

Significant differences can arise, particularly with Windows Server. Components that achieve very good performance on other operating systems may, under certain circumstances, deliver only a fraction of their theoretical performance on Windows Server.

That is why we do not evaluate hardware solely on the basis of data sheets, but test it using realistic Firebird workloads.

Why a large storage system is not automatically a fast database server

In client projects, we have also examined very high-performance centralised storage systems. Such systems can provide enormous storage capacities and transfer large files in a very short time. Nevertheless, their performance in typical database access scenarios can fall significantly short of that of a specially configured Firebird server.

The reason usually does not lie in the fundamental quality of the storage system. Rather, it has been optimised for other requirements, such as:

- large volumes of data,
- centralised storage management,
- a large number of virtual machines,
- high reliability,
- snapshots,
- or the sequential transfer of large files.

The reason usually lies not in the fundamental quality of the storage system. More likely, it has been optimised for other requirements, such as:

- large volumes of data,
- centralised storage management,



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- multiple virtual machines,
- high reliability,
- snapshots,
- or the sequential transfer of large files.

A Firebird server, on the other hand, requires, above all, short response times when handling a large number of small, distributed access requests.

A dedicated server with directly connected, extremely fast storage devices can therefore achieve significantly better results with Firebird than a considerably more expensive centralised storage system with additional network, driver and virtualisation layers.

These differences are not only evident in artificial benchmarks. They are immediately noticeable in day-to-day operations: when opening orders, generating reports, printing documents or carrying out other frequently performed database operations.

Even short delays can amount to significant productivity losses when multiplied across many employees and thousands of daily tasks.

High speed without the need for risky auxiliary structures

In some cases, unsuitable hardware can be improved by using RAM-disk-like techniques, aggressive caching solutions or other intermediate layers. However, such set-ups can introduce additional risks and make recovery following a failure more difficult.

Our aim is therefore to achieve high Firebird performance on regular, long-term suitable server hardware.

Speed should not be achieved at the expense of operational reliability. Our servers are designed to deliver consistently high performance without the need for risky workarounds.

Combining dedicated hardware and the cloud effectively

We have tested Firebird systems on various cloud platforms and on virtual servers provided by customers. The results consistently show that high-end product designations and theoretically high-performance instance classes do not necessarily provide a reliable indication of Firebird's actual performance.

Possible causes include:

- shared CPU resources,
- fluctuating storage latencies,
- older processor platforms,
- limited performance per CPU core,



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- overbooked host systems,
- virtual storage controllers,
- or technical limitations that cannot be clearly identified.

Using our IBExpert benchmark software, our IFS servers running on Windows typically achieve scores of around 500 to 700 per cent. In certain drive tests under Linux, scores of over 900 per cent are even possible.

Benchmark figures are not the only yardstick here. However, they do help to highlight differences in performance that will later also be reflected in an applications' response times.

A tried-and-tested solution is therefore the combination of a dedicated Firebird server and a flexible cloud infrastructure.

The database server is hosted on our optimised hardware in a professional data centre. Additional virtual systems – for example, for web applications, interfaces, development environments or other services – can be provisioned within the same data centre environment as required.

This allows the advantages of both concepts to be combined:

- maximum and predictable Firebird performance on dedicated hardware,
- flexible provision of additional virtual systems,
- short network paths,
- centralised administration,
- and cost-effective operation.

High performance per CPU core

Depending on the model, our IFS servers generally have 12 or 16 high-performance CPU cores. However, Firebird performance is not determined by the number of cores alone.

Many database operations benefit particularly from high performance per core. That is why we use processors that can reach clock speeds of over 5 GHz in turbo mode.

The combination of a sufficient number of cores and high single-core performance ensures that both individual complex queries and a large number of concurrent user requests can be processed quickly.

The average power consumption of a typical IFS server is usually less than 100 watts. This means that our systems combine high performance with economical energy consumption.



Operational reliability through full redundancy

When planning for reliability, we consider not just individual components, but the entire server system.

Rather than relying solely on redundant components within a single server, we recommend, depending on your requirements:

- real-time replication to a second server,
- or regular, automated and verified backup and restore procedures.

A fully replicated second server not only protects against the failure of a power supply or a drive; it can also take over if the motherboard, the controller, the CPU, the operating system or the entire server location is affected.

Our experience has shown that complex, redundant power supply systems are not automatically the most reliable solution in every application. We therefore prefer to use a clear and easy-to-maintain server architecture in conjunction with a geographically separate backup or replication server.

High-speed backups and regularly verified recovery

On suitable hardware, even large Firebird databases can be backed up and restored very quickly.

Depending on the database structure, workload and configuration, databases of around 50 GB, for example, can often be backed up in less than a minute whilst the system is running. Restoration to a suitably equipped backup server can be completed in less than two minutes.

Even significantly larger databases can be processed using the same approach.

It is crucial not only to create a backup, but also to regularly check that it is usable. That is why our backup strategies can include automated restore tests.

Depending on the security strategy selected, the potential data loss is:

- typically, just a few seconds with real-time replication,
- with hourly backup and restore procedures, a maximum of the time elapsed since the last successful backup.

In the event of a failure of the main server, workstations can be switched over to the backup server at short notice. The original server can then be repaired or rebuilt, after which it takes on the role of the new backup system.



This approach has also proved its worth in the event of unusual incidents. In one client project, the main server was completely destroyed by water damage. As the backup server was located in a separate room, users were still able to continue working without any prolonged disruption.

Remote maintenance right down to BIOS level

All IFS servers are equipped with IPMI-based remote maintenance.

This allows us to access the system even if:

- Windows no longer starts up,
- the server is no longer accessible via the normal network,
- there is a driver issue,
- or maintenance is required before the operating system has even started.

Using remote maintenance, we can, amongst other things:

- switch the server on and off,
- restart it,
- check BIOS messages,
- monitor hardware status,
- provide installation media,
- and, if necessary, fully restore the operating system remotely.

Provided there is no physical fault preventing the system from operating, this means that many faults can be rectified without the need for a technician to be on site.

Ample capacity, even for large databases

Our IFS servers are also used by customers with very large Firebird environments. The largest systems we manage comprise a total of up to around 6 TB of databases.

Storage capacity is tailored to individual requirements. Due to significant fluctuations in prices and availability, we currently offer drives with more than 3.2 TB of usable capacity primarily upon explicit request.

In doing so, we focus not only on a drive's nominal capacity, but above all on:

- consistently low latency,
- high write endurance,
- suitable controllers and drivers,
- reliable availability,
- and reproducible performance when running Firebird.



A Firebird server should remain a Firebird server

For optimum performance, we recommend using the IFS server exclusively, or at least primarily, for Firebird.

This means that the system's full resources are available to the database:

- CPU performance,
- RAM,
- storage bandwidth,
- controller performance,
- cache,
- and network access.

Additional services may affect database performance or create undesirable dependencies. This applies in particular to systems that install their own filter drivers, memory drivers or extensive background processes.

These may include, amongst other things:

- mail servers,
- comprehensive Microsoft server products,
- online backup software,
- snapshot solutions,
- antivirus scanners with unsuitable real-time rules,
- indexing services,
- or other data-intensive applications.

Additional drivers relating to storage and file systems, in particular, are often the cause of performance or stability issues that are difficult to trace.

Therefore, where additional services are required, they should preferably be run on separate physical or virtual systems.

Our mission

IFS Firebird Servers are not put together on the basis of the most impressive individual figures. They are the result of many years' experience, regular testing and consistent optimisation for real-world Firebird workloads.

Our aim is to create a system that not only looks impressive on paper but also delivers in day-to-day operation:



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- with fast response times,
- consistent and reproducible performance,
- high operational reliability,
- rapid backup and recovery,
- professional remote maintenance options,
- and a cost-effective overall solution in the long term.

After all, what matters in the end is not how quickly a server can copy a large test file. What really counts is how quickly and reliably your staff can work with the database.