Windows Storage Server 2019 Appliances

Release Date:
Q4 2019

Suitable For:
IP Surveillance, Cloud Hosting, Small Business

Tags:
CyberServe, Windows, Storage, Server

Introduction:

The multi-award winning CyberStore WSS range comes pre-configured with Microsoft Windows Storage Server 2019.

Our WSS range of iSCSI SAN/NAS storage appliances comes with great storage features such as Storage Migration Service and Failover Clustering.

Features:

- Performance improvements
- Tremendous storage capacity
- Pre-configured with WSS 2019

020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk

The Broadberry CyberStore WSS® range of iSCSI SAN / NAS Unified storage appliances include 1U-4U server offerings boasting huge raw storage capacity in a single storage unit.

Pre-loaded and configured with Microsoft's ground-breaking Windows Storage Server 2019 operating system, the CyberStore WSS® range has been designed from the ground up to harness the advantages of this feature-rich storage appliance OS.

CyberStore storage servers can be optimised for a wide number of uses, including:

- IP Surveillance
- ISPs & Cloud Hosting
- Education Sector
- Small Businesses

CyberStore WSS® Applications

From the BBC archiving the programmes we grew up watching, to CERN using them to store big data collected researching how our universe was created, the potential uses of the CyberStore range are almost unending.

In today's world, storage appliances are used in almost every aspect of our lives across all market sectors and industries. The flexibility and configurability of Broadberry CyberStore storage servers make them superb options in a wide range of markets.

CyberStore appliances are widely used in the education sector due to their competitive pricing (compared to tier ones) and the data deduplication feature that compresses data by up to 70%. We supply our storage solutions to all of the top 10 universities in the UK including Oxford and Cambridge, as well as many other colleges and schools.

Another big market for the CyberStore WSS range is IP Surveillance. With storage requirement rapidly growing as HD cameras become the norm, the renowned reliability, performance and high availability of the CyberStore WSS range make it the perfect solution to store CCTV data securely and cost-effectively.

020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk

CyberServe WSS®

Multi-Award Winning Storage Servers

The Broadberry CyberStore WSS® range is a Network Attached Storage (NAS) and iSCSI SAN range of storage appliances ranging from 1U to 4U. Based on ultra-reliable hardware from leading component manufacturers, the CyberStore WSS® is ideal for unified storage. With a massive selection of customisation options available, this flexible solution can be configured for almost any storage application, from a small business storage server to high availability enterprise-class storage appliance with built-in failover. Since 2012 the CyberStore WSS® range has consistently beaten Fortune-100 server OEM's as the best storage appliance available.

"With its new storage server, Broadberry Data Systems has beaten the blue chips... "

- IT Pro | ★★★★★★

"...Good value, great performance and massive expansion potential."

- PC Pro | ★★★★★★

"Brings together a substantial hardware package with room to expand, offers plenty of storage features, and tops it off with strong performance and exceptional data reduction ratios."

- PC Pro | ★★★★★

020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk

Windows Storage Server 2019 introduces an impressive range of new features in a number of areas. Below are, in no particular order, our top 8.

Persistent Memory support for Hyper-V Virtual Machines

In order to leverage the high throughput and low latency of persistent memory in VMs, it can now be projected directly into virtual machines, significantly lessening database transaction latency or reducing recovery times for low latency in-memory databases on failure.

Linux containers on Windows

With WSS 2019 you are now able to run Windows and Linux-based containers on the same container host, using the same docker daemon. This allows for you to have a heterogenous container host environment whilst still giving application developers flexibility.

Windows Defender Advanced Threat Protection (ATP)

The ATP deep platform sensors and response actions expose memory and kernel level attacks. They respond through suppressing malicious files and terminating malicious processes.

Windows Defender ATP Exploit Guard is a new set of host-intrusion prevention capabilities. The four components of Windows Defender Exploit Guard are designed to lock down the device against a large range of attacks and block behaviours often used in malware attacks, while simultaneously balancing security risk and productivity needs.

With **Network protection**, the endpoint is safeguarded against web-based threats via blocking any outbound process on the device and untrusted hosts/IP addresses through Windows Defender Smartscreen.

Sensitive data is protected by **controlled folder access**, which blocks untrusted processes from accessing your protected folders.

Windows Defender Application Control (also known as Code Integrity (CI) policy) was a feature present in Windows Server 2016. While hailed as a great concept, feedback from users had suggested it was difficult to deploy. This issue is addressed in Windows Storage Server 2019. Default CI policies have been built, which allows for Windows in-box files and Microsoft applications. It blocks known executables that can bypass CI.

020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk

Container Improvements

Improved Integrated Identity

Integrated Windows authentication in containers has been made simpler and more reliable, addressing many limitations present in previous versions of Windows Server.

Better Application Compatibility

Container Windows-based applications have become a lot easier. The app compatibility for the existing windowsservercore image has been enhanced. For applications with additional API dependencies, you now have a third base image: windows.

Reduced Size and Higher Performance

The base container image download sizes, size on disk and start-up times have all been improved, speeding up container workflows.

Management Experience Using Windows Admin Center (Preview)

It is now easier than ever before to view which containers are running on your computer and manage individual containers with a new extension for Windows Admin Center. Simply search for the "Containers" extension in the Windows Admin Center public feed.

Built-in Support for Kubernetes

Windows Server 2019 carries on the improvements to storage, computing and networking from the semi-annual channel releases required to support Kubernetes on Windows.

Container Networking in Windows Server 2019 significantly boosts the usability of Kubernetes on Windows by enhancing platform networking resiliency and support of container networking plugins.

Encrypted Networks

Virtual network encryption allows for the encryption of virtual network traffic between VMs which communicate with each other within subnets that have been marked as Encryption Enabled. Also utilised is Datagram Transport Layer Security (DTLS) on the virtual subnet to encrypt packets. DTLS protects against any tampering, forgery or eavesdropping by anyone with access to the physical network.

Failover Clustering

- Cluster sets
- Azure-aware clusters
- Cross-domain cluster migration
- USB witness
- Cluster infrastructure improvements
- Cluster Aware Updating supports Storage Spaces Direct
- File share witness enhancements
- Cluster hardening
- Failover Cluster no longer uses NTLM authentication

Low Extra Delay Background Transport

The Low Extra Delay Background Transport (LEDBAT) is a latency optimised, network congestion control provider designed to automatically yield bandwidth to users and applications, whilst consuming the entire bandwidth available when the network is not in use. This technology is meant for use in deploying large, critical updates across an IT environment without negatively impacting user facing services and associated bandwidth.

020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk

Redesigned ReFS - Key Benefits

Microsoft's newest file system, the Resilient File System (ReFS) has experienced many improvements. Designed to maximise data availability, effectively scale large data sets across diverse workloads and deliver data integrity through resiliency to corruption. It aims to deal with an expanding set of storage scenarios and establish a foundation for future innovations.

Resiliency

ReFS possesses a number of new features which can accurately detect corruptions and mend those corruptions while still remaining online, aiding in delivering improved integrity and availability for your data.

- **Integrity-streams** Checksums are used for metadata and data. This gives ReFS the ability to reliably catch corruptions.
- **Storage Spaces integration** When utilised in conjunction with a mirror or parity space, ReFS is able to automatically fix corruptions by using an alternate copy of the data provided by Storage Spaces.
- **Salvaging data** Repair processes are localised to the area of corruption and performed online. This means no volume downtime will be required.
- **Proactive error correction** As well as validating data prior to reads and writes, ReFS introduces a scrubber (a data integrity scanner). This scrubber periodically

Scalability

ReFS is designed to support humungous data sets (possibly millions of terabytes) without it having a negative impact performance, allowing it to achieve a greater scale than previous file systems.

Limit / Recommendation	Windows Server 2016	Windows Server 2019	Increase
Max servers per cluster	16	16	
Max drives per cluster	416	416	
Max raw capacity per cluster	1 PB	4 PB	4x
Max raw capacity per server	100 TB	400 TB	4x
Max number of volumes	32	64	2x
Max size per volume	32 TB	64 TB	2x

020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk

Performance

ReFS not only provides resiliency improvement, but it also introduces new features for performance-sensitive and virtualised workloads. Real-time tier optimisation, sparse VDL and block cloning are great examples of the evolving capabilities of ReFS, which are designed to support dynamic and diverse workloads:

Mirror-accelerated parity This feature provides blazing fast performance in addition to capacity efficient storage for your data.

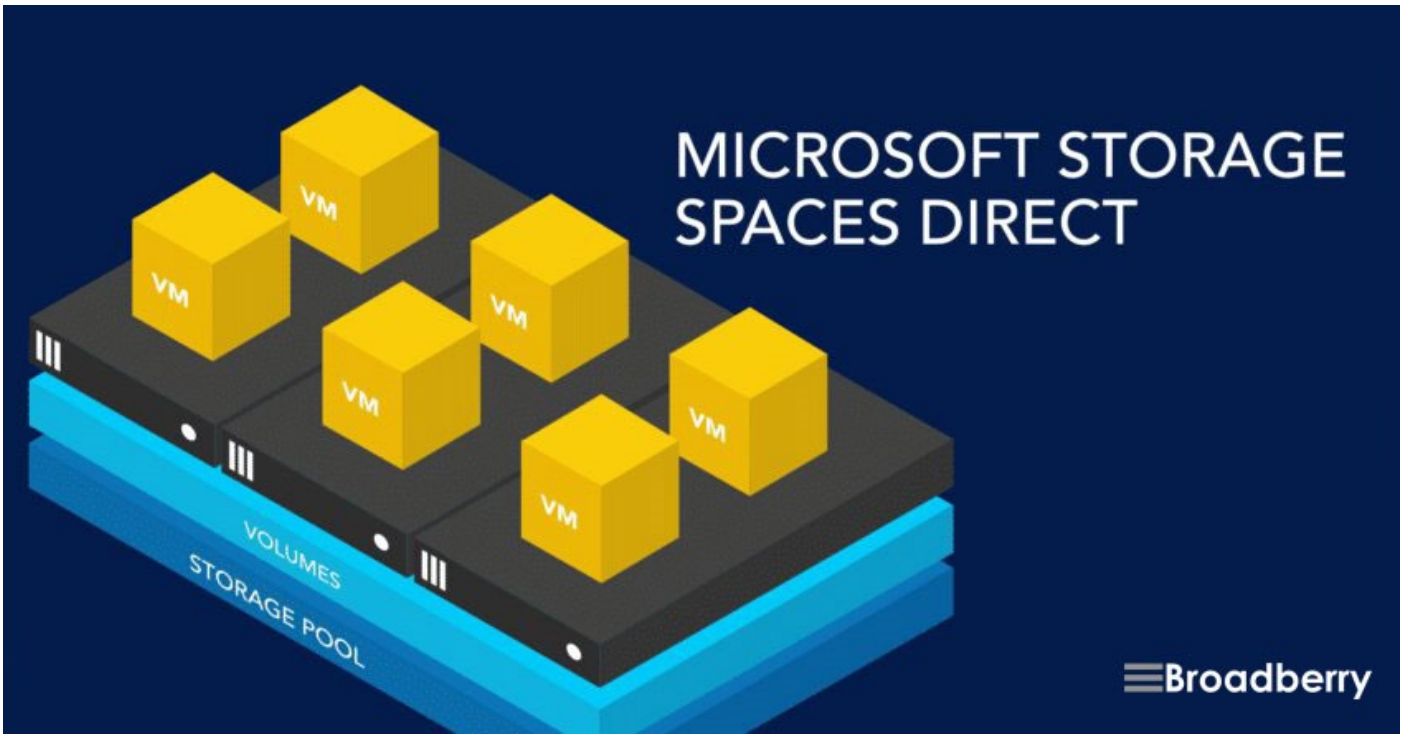
ReFS delivers this by dividing a volume into two logical storage groups, known as tiers. Each of these tiers can possess their own drive and resiliency types, enabling each tier to optimise for either performance or capacity. Examples of configurations included can be seen in the table below.

After these tiers are configured, ReFS uses them to provide super-fast and capacity efficient storage for hot data and cold data respectively:

- All writes will occur in the performance tier and big blocks of data that are left in the performance tier will be efficiently and effectively moved to the capacity tier in real-time.
- When utilising a hybrid deployment, the cache in Storage Spaces Direct helps in accelerating reads, lessening the effect of data fragmentation characteristic of virtualised workloads. Otherwise, if you are using an all-flash department, reads also can happen in the performance tier.
- Accelerated VM operations ReFS features new functionalities specifically designed to improve the performance of virtualised workloads. Block cloning accelerates copy operations enabling quick low-impact checkpoint merge operations. With Sparse VDL, ReFS can zero files rapidly, lowering the amount of time needed to create fixed VHDs from tens of minutes to just a few seconds.
- Variable cluster sizes ReFS supports 4K and 64K cluster sizes. 4K is the size recommended for the majority of deployments, however 64K cluster are more appropriate for massive, sequential IO workloads.

Performance Tier	Capacity Tier
Mirrored SSD	Mirrored HDD
Mirrored SSD	Parity SSD
Mirrored SSD	Parity HDD

020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk

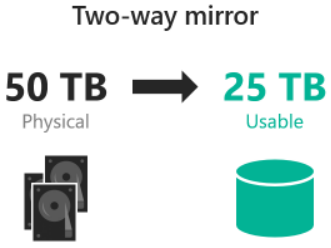


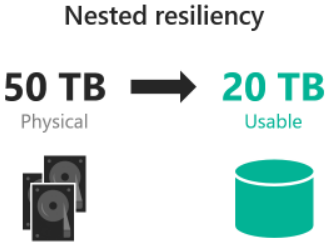
The Broadberry CyberStore WSS range includes Storage Spaces Direct in Windows Server 2019. A new feature of SSD is nested resiliency, which allows a two-server cluster to resist multiple hardware failures simultaneously without loss of storage availability, enabling users, apps and VMs to continue running uninterrupted.

There are two new resiliency options offered by Storage Spaces Direct in Windows Server 2019 implemented in software, without the requirement of any specialised RAID hardware:

Nested two-way mirror In each server, local resiliency is provided by two-way mirroring. Greater resiliency is then provided by two-way mirroring between the two servers. With two copies in each server, it is essentially a four-way mirror. Nested two-way mirroring delivers uncompromised performance, writes goes to every copy and read come from any copy.

Nested mirror-accelerated parity Essentially combine nested two-way mirroring and nested parity. In each server, local resiliency for the majority is provided by a single bitwise parity arithmetic, with the exception of new recent writes which utilise two-way mirroring. Then, further resiliency for all data is provided by two-way mirroring between the servers.





020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk

Capacity efficiency

Capacity efficiency is the ratio of usable space to volume footprint. It's used to describe the capacity overhead that can be attributed to resiliency and will depend on which resiliency option you choose.

For example, storing data without any resiliency is 100% capacity efficient (as 1 TB physical storage capacity). In comparison, two-way mirroring is 50% efficient (1 TB of data will take up 2 TB of physical storage capacity).

Nested two-way mirror writes four copies of everything. If you want to store 1 TB of data, you need 4 TB of available physical storage capacity. While a very simple option, the capacity efficiency of nested two-way mirror is only 25%. Meaning it has the lowest capacity efficiency of any resiliency option in Storage Spaces Direct.

Capacity drives per server	10% mirror	20% mirror	30% mirror
4	35.7%	34.1%	32.6%
5	37.7%	35.7%	33.9%
6	39.1%	36.8%	34.7%
7+	40.0%	37.5%	35.3%

Nested mirror-accelerated parity can achieve higher capacity efficiency, up to 35%-40%. That depends on two key factors. Firstly, the number of capacity drives present in each server. Secondly, the mix of mirror and parity you specify for the volume. The table on the left provides a lookup for commonly used configurations.

You may notice that the capacity efficiency of classic two-way mirroring (which is about 50%) and nested mirror-accelerated parity (up to 40%) aren't too different. Depending on what your requirements are, it may be worth taking the lower capacity efficiency to enjoy a serious increase in storage availability. As you can select resilience per-volume, you can mix nested resiliency volumes and two-way mirror volumes within the same cluster.

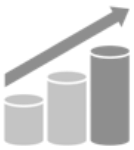
020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk

Key Benefits of Storage Spaces Direct

Simplicity. From industry-standard servers running Windows Server 2019 to your first Storage Spaces Direct cluster in under 15 minutes.

Unmatched Performance, featuring hypervisor-embedded architecture and built-in read/ write cache.

Fault Tolerance. The built-in resiliency deals with drive, server, or component failures with continuous availability. Software heals itself, with zero convoluted management steps.



Resource Efficiency. Erasure coding provides up to 2.4x higher storage efficiency, done whilst minimising CPU consumption to send resources back to where they are most needed - the VMs.

Manageability. With Storage QoS Controls you can keep overly busy VMs in check with minimum and maximum per-VM IOPS limits.

Scalability. Go up to 16 servers and over 400 drives, for up to 1 petabyte (1,000 terabytes) of storage per cluster.

020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk

Storage Spaces Direct Features

Software Storage Bus The Software Storage Bus is a new feature in Storage Spaces Direct. Spanning the cluster, it establishes a software-defined storage fabric where every server can see the local drives of each other server. It has essentially replaced costly and restrictive Fibre Channel or Shared SAS cabling.

Storage Bus Layer Cache The Software Storage Bus dynamically binds the fastest drives present to slow drives, in order to provide server-side read/write caching that accelerates IO and boosts throughput.

Networking Hardware Storage Spaces Direct utilises SMB3, including SMB Direct and SMB Multichannel, over Ethernet in order to communicate between servers.

Storage Pool The storage pool is the collective drives that form the basis of Storage Spaces. It's created automatically, all eligible drives are automatically discovered and added to it.

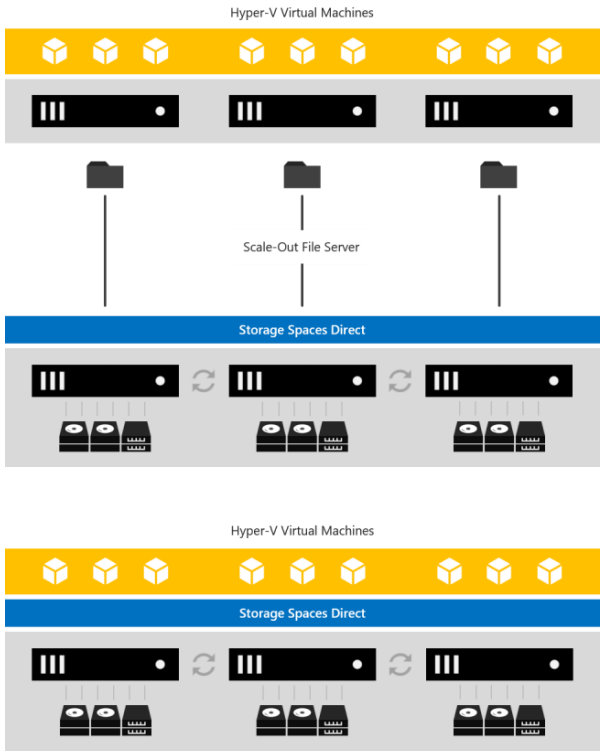
Cluster Shared Volumes All ReFS volumes are unified into a single namespace by the CSV file system. This is accessible through any server, so to each server every volume looks and behaves as if its mounted locally.

Scale-Out File Server Only converged deployed need this final layer. It delivers remote file access using the SMB3 access protocol to client, like another cluster running Hyper-V, over the network. This essentially turns Storage Spaces Direct into network-attached storage (NAS).

Failover Clustering Built-in clustering feature of Windows Server is used to connect the servers.

Storage Hardware From 2 to 16 servers with local-attached SATA, SAS or NVMe drives. Each server requires at least 2 solid-state drives and at least 4 additional. The SATA and SAS drives should be behind a host-bus adapter (HBA) and SAS expander.

Storage Spaces Storage Spaces delivers fault tolerance to virtual disks by utilising erasure coding, mirroring or both. It can essentially be thought of as distributed, software-defined RAID utilising the drives in the pool. In Storage Spaces Direct, these virtual disks usually possess resiliency to two simultaneous drive or server failures (for example 3-way mirroring, each data copy in a different server) though chassis and rack fault tolerance is also available.



020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk

CyberStore WSS® Features The Broadberry CyberStore WSS range explained:

3 Years Warranty as Standard

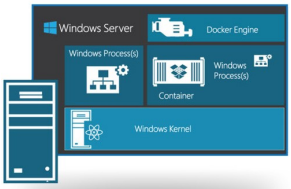
Buy with confidence knowing all Broadberry CyberServe rack servers are backed up by our 3 year warranty, with further warranty upgrade options available.

Up to Dual Xeon Processors

Designed for optimal performance, the CyberStore WSS range can be configured with a single Xeon SP processor, or on larger units up to 2x Xeon SP processors.

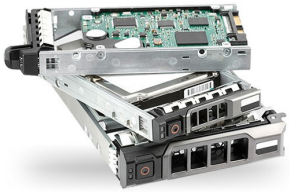
Built in Thin Provisioning

Expand your storage pools online as and when you need to with the CyberStore WSS' built in Thin Provisioning feature.



Windows Server & Hyper-V Containers

The CyberStore WSS range will provide native virtualisation capabilities with two kinds of native containers, Hyper-V and Windows Server.



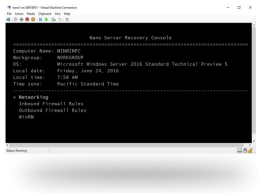
Built with Leading Brand Components

All components in the Broadberry CyberStore WSS range are sourced from leading manufacturers who take reliability as seriously as we do.

Daisy Chain CyberStore Appliances

Increase the storage capacity of your CyberStore WSS storage appliance by daisy-chaining additional CyberStore JBOD units, delivering virtually unlimited storage.

020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk



Nano Server

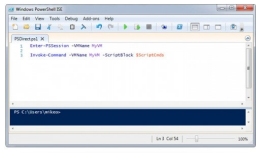
Nano Server will have a 93% smaller VHD size, 92% fewer critical bulletins and 80% fewer required reboots.

With IPMI Remote Management

All Broadberry CyberStore WSS appliances have built-in iPMI functionality, enabling complete control and management of your server through IP.

Hot Add & Remove Memory

The CyberStore WSS range can add and remove virtual memory and virtual network adapters while the virtual machine is running .



Powershell Direct

PowerShell Direct enables you to run PowerShell commands in the guest OS of a VM without needing to go through the network layers.

Linux Secure Boot

The CyberStore WSS now boosts the ability to enable secure boot for VMs with Linux guest operating systems.

Network Adaptor Teaming

The CyberStore WSS range can be configured with up to 16 network adaptors for impressive network performance and availability.

Built in File Replication Service

Windows Storage Server Work Folders works very similar to Dropbox. Install this role on your CyberStore WSS and get a fully functional secure file replication service.

Parallel Rebuild Failed Storage

If you've ever had a disk fail in a RAID array you'll know the rebuild time can take ages, especially with large disks. Rebuild time is now greatly reduced.

Host Guardian Service & Shielded VMs

Enables shielded virtual machines and protects the data on them from unauthorised access - even from Hyper-V administrators.

020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk

Atom Servers

Perfect Appliance Servers the CyberServe range of Intel Atom based rack servers are designed for light processing tasks.

Xeon E Servers

Superb Business Class Servers, an ideal fit for companies looking for an affordable and efficient system.

AMD EPYC Servers

Perfect for data centre servers the revolutionary CyberServe EPYC range of high-performance servers are built for flexibility, performance and security.

Xeon SP Servers

Perfect Enterprise-Class Servers delivering significant benefits in performance, power efficiency, virtualisation, and security. Servers are configurable with up to 3TB DDR4 RAM and 56 processing cores.

Storage Servers

Configure From £1,078

Multi award-winning, enterprise-grade storage solutions used by the world's top organisations.

As-well as thousands of SMBs for everything from backup and replication to high-availability storage.

Rackmount Servers

Configure From £434

Year-after-year voted the best servers available by the most influential IT brand in the UK.

Our CyberServe range of servers are used by all of the UK's top universities and thousands of SMBs.

Workstations

Configure From £234

Ultra high performance workstations built for the most demanding applications.

Our CyberStation range boasts everything from silent workstations to GPU supercomputers.

Trusted by the Worlds Biggest Brands

We have established ourselves as one of the biggest storage providers in the UK, and since 1989 supplied our server and storage solutions to the world's biggest brands. Our customers include:

BBC, sky, itv, Virgin, Google, Shazam, HM Revenue & Customs, Toyota, NASA, CERN, Sony, Toshiba, Rolls-Royce, Walt Disney, ESPN, symantec., University of Oxford, University of Cambridge, Tesco, redhat.

Broadberry CELEBRATING 1989 30 2019

Years of providing enterprise-grade solutions to the world's biggest brands