QNAP

QNAP Enterprise Storage

# QES

# Powerful

**Optimized for All-Flash**

# Reliable


## *Highlights*

### *Worry-free Data Integrity*
Self-healing protects from silent data corruption.

### *Powerful Data Reduction*
Save up to 99% storage space in VDI environments

### *Snapshot Protection*
Take up to 65,535 snapshots for thorough data protection.

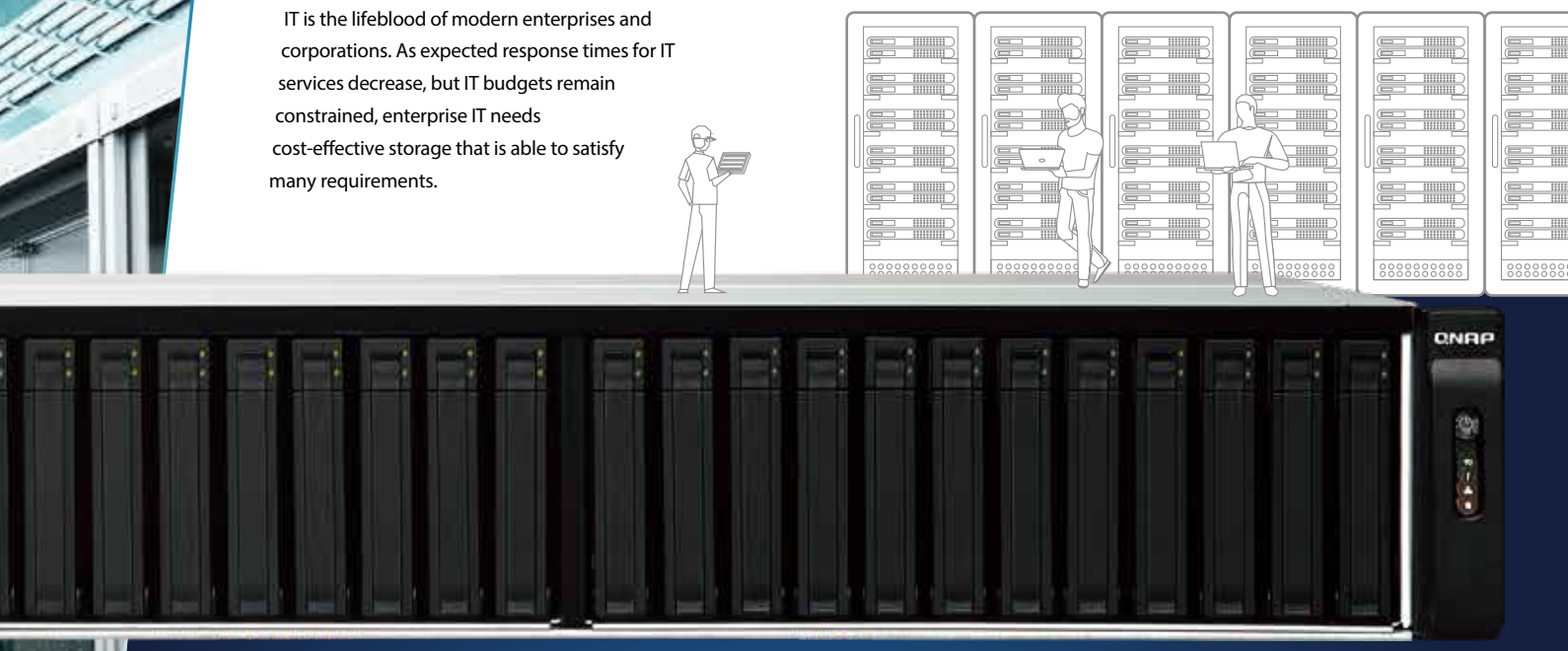
### *Effective Remote Replication*
Block-level & real-time snapshot remote replication for quick disaster recovery.

### *Quality of Service*
Configurable performance capacity allocation and control

### *Extensive third-party application support*
Supports VMware, Windows, Citrix, Veeam and OpenStack.

# Designed for modern enterprise IT environments

IT is the lifeblood of modern enterprises and corporations. As expected response times for IT services decrease, but IT budgets remain constrained, enterprise IT needs cost-effective storage that is able to satisfy many requirements.




## 1. Ensure Data Integrity

Vast data storage and higher transfer speeds increase the risk of silent data corruption, which can cause irreparable long-term damage.

## 2. Efficient Storage

Intuitively, more space savings leads to more cost savings, especially for All-Flash deployment.

## 3. Protect Data

Backup tasks must be quick, easy, and enable data to be restored to any point of time to prevent loss of critical data.

## 4. Disaster Recovery

Local data protection alone is not enough to prevent data loss if disasters occur. They require efficient remote replication to reduce the RPO & RTO.

## 5. Performance

High-performance hardware is not enough to sustain multiple services. The ability to allocate the performance capacity is paramount to balancing services.

## 6. Virtualization & Cloud

Storage must support mainstream applications to provide easier resource allocation and management.

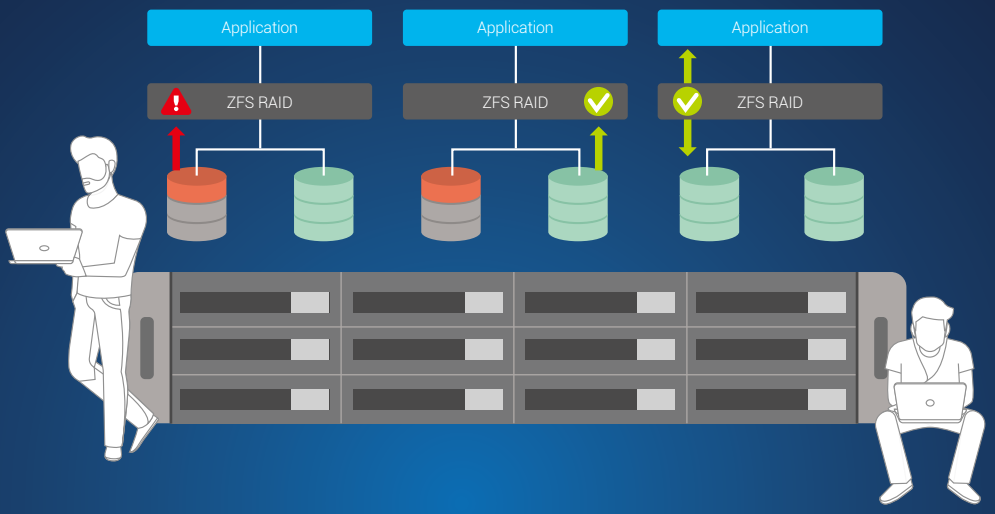
## QES—A ZFS-based unified storage system

The QES (QNAP Enterprise Storage) operating system is based on the ZFS file system that has been proven through years of refinement to be most suitable for high-end enterprise applications. It is also a multi-protocol storage system that consolidates file- and block-based access in a single storage platform and provides great scalability for all-flash, HDD, and hybrid configurations.


QNAP Enterprise Storage
QES

# Self-Healing mechanisms ensures data integrity and reliability

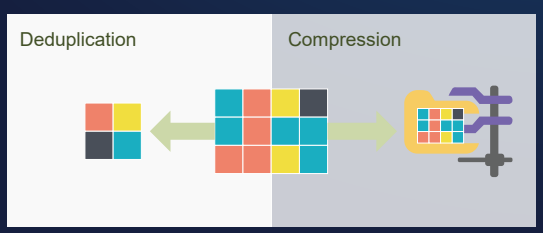
Designed with a focus on data integrity, a fundamental aspect of storage security and reliability, QES uses end-to-end checksums to detect and correct silent data corruption caused by hardware defects, bugs in firmware or metadata errors. If an integrity violation is detected, QES automatically repairs the damage using data from the other mirror before the data is passed to applications.




# Data reduction technologies optimize capacity efficiency

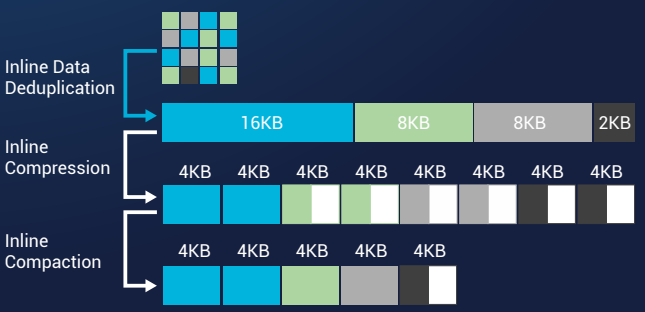
## Compression & Deduplication

QES supports block-based inline data deduplication to reclaim storage used by redundant/repeated data and in-line data compression to shrink file sizes. Both functions optimize storage utilization and provide cost savings for all-flash storage deployment - especially in VDI environments where there could be over 90% duplicate data from OS images and applications that are spread over virtual desktops. Deduplicated virtual desktops become easier to be cached to achieve optimal virtual desktop performance.

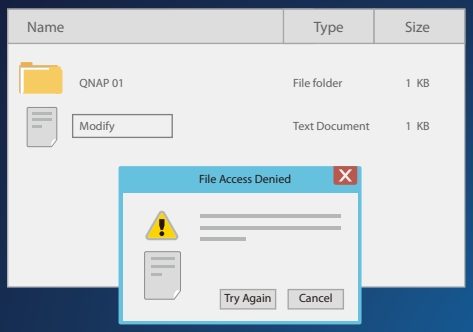



## Data Compaction

Besides compression and deduplication, QES achieves greater space saving with advanced inline data compaction techniques, which combines two or more of the compressed small data chunks into a single 4KB physical block before writing the data block to SSDs. Accompanied with compression and deduplication, it delivers higher cost efficiency of all-flash storage systems, especially when highly-repetitive data or massive small files (e.g. transaction logs of banks or e-commerce) are generated



# Protect your critical data




## WORM (Write Once Read Many)

With increasingly stringent regulations on how information is stored, many countries require government agencies, financial institutions, and health care providers to comply with strict data archiving regulations. Some data should not be modified once stored. QES provides WORM technology is ideal for protecting this data and avoiding accidental modification.

## Comprehensive Snapshot Support

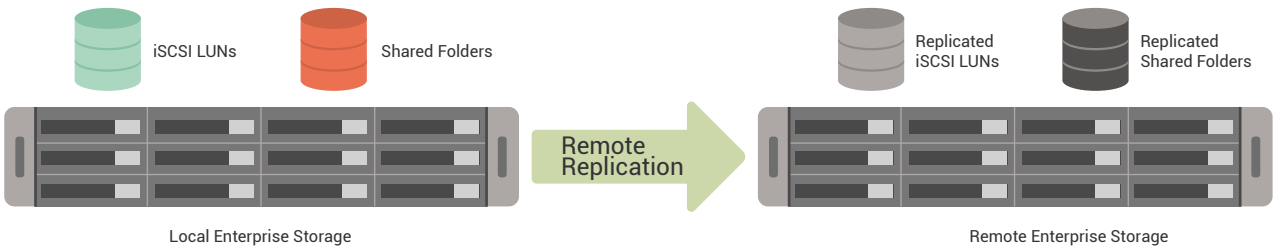
QES supports up to 65,535 snapshots for iSCSI LUN and shared folders (if 1 snapshot is created every hour, 24 snapshots per day, then up to 7 years worth of snapshots can be created without needing to delete any). Copy-on-write technology makes snapshot creation almost instantaneous without affecting ongoing data writes. Incremental snapshots create timestamps that allows each snapshot to be easily previewed and restored, without disrupting current system services.




# Effective remote-replication for quick disaster recovery

## SnapSync helps backup your critical data to the remote site

QES supports block-level SnapSync for remote snapshot backups. It only needs to transfer changed data to save required storage space and to improve backup speeds. You can set a SnapSync schedule frequency or use the real-time mode, meaning whenever a change is made to the files in the target storage space, a remote replication will be processed. In the event of a primary site failure, SnapSync helps businesses to resume essential services in the shortest time.



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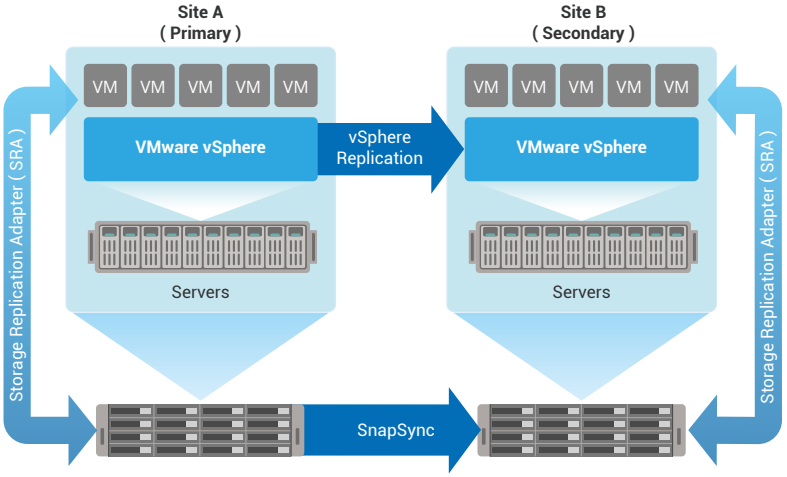
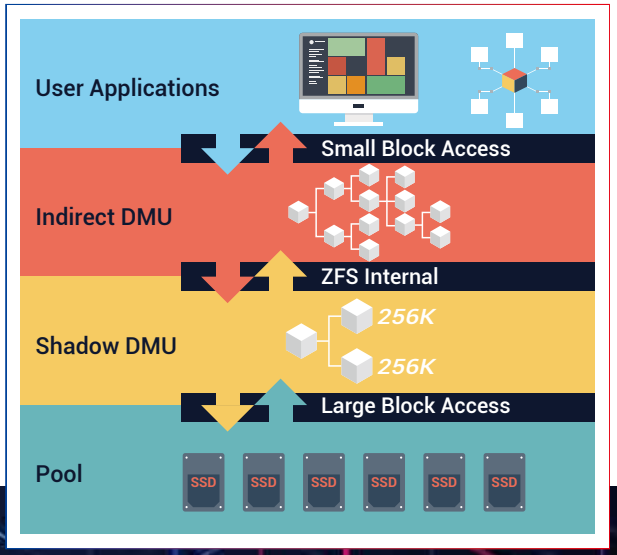
## VMware vCenter Site Recovery Manager

SnapSync supports VMware vCenter Site Recovery Manager (SRM), providing an enterprise-class remote backup & disaster recovery solution for virtual applications to fulfill business continuity. With the Storage Replication Adapter (SRA) for SRM, operation overheads of the ESXi® server can be offloaded to the QNAP NAS to accelerate and simplify virtual machine backup and restoration.



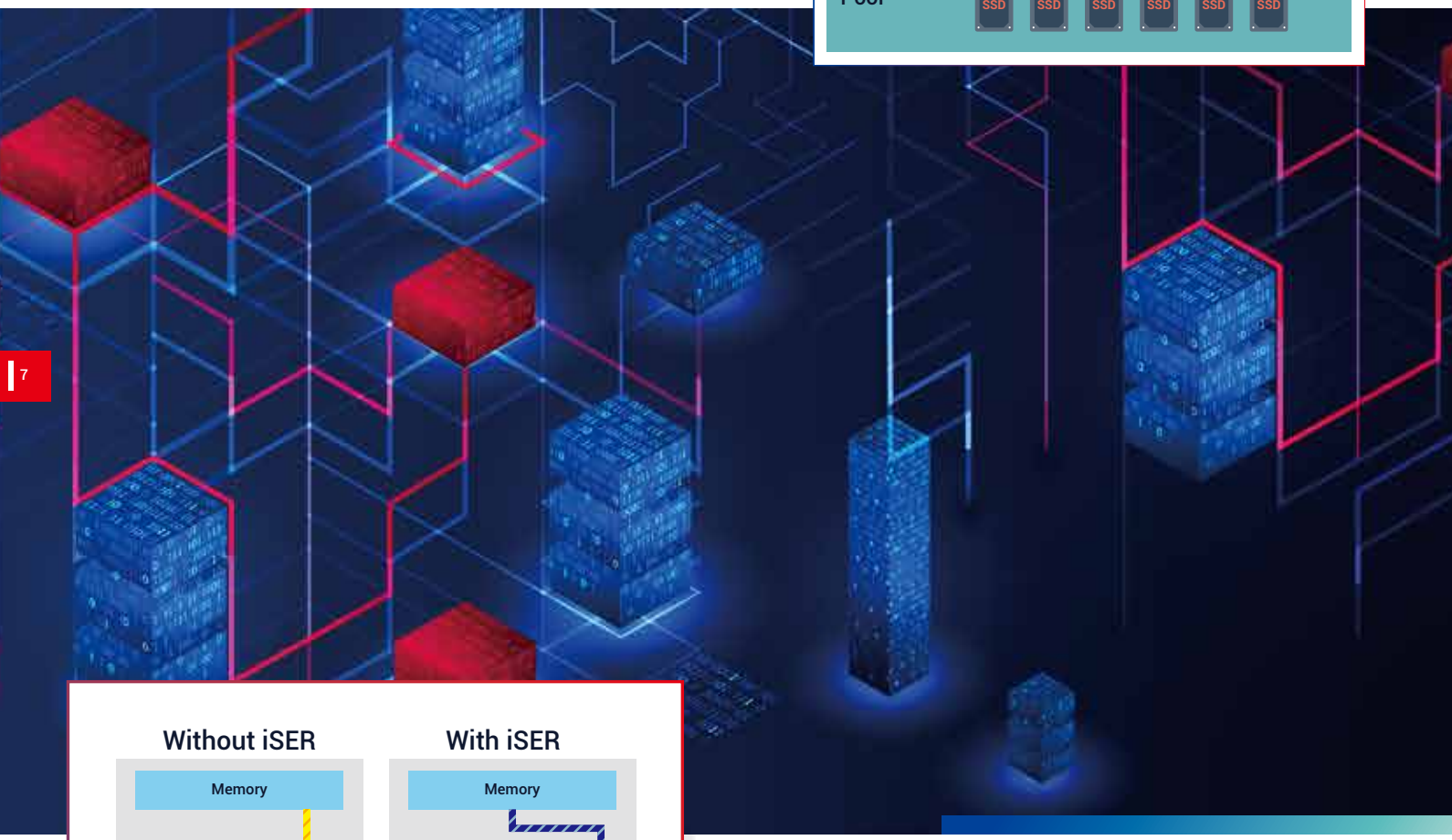
# Optimized performance for All-Flash Storage

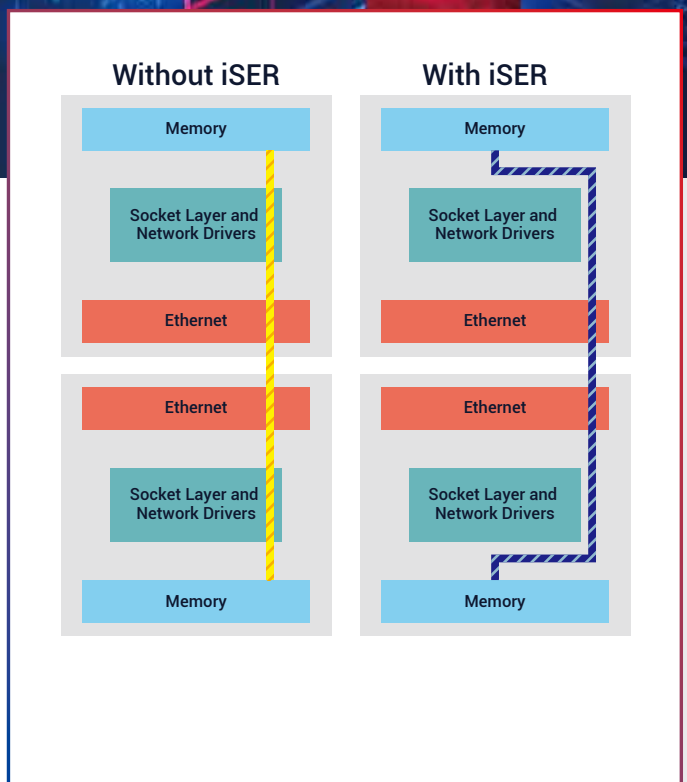



## Write Coalescing

QES features QNAP's proprietary Write Coalescing algorithm that is engineered for flash optimization by transforming all random writes to sequential writes along with reduced I/O. It not only effectively increases random write performance for all-flash environments, but also extends SSD lifespan. QNAP Lab testing shows that Write Coalescing can increase random write performance by up to 400%.





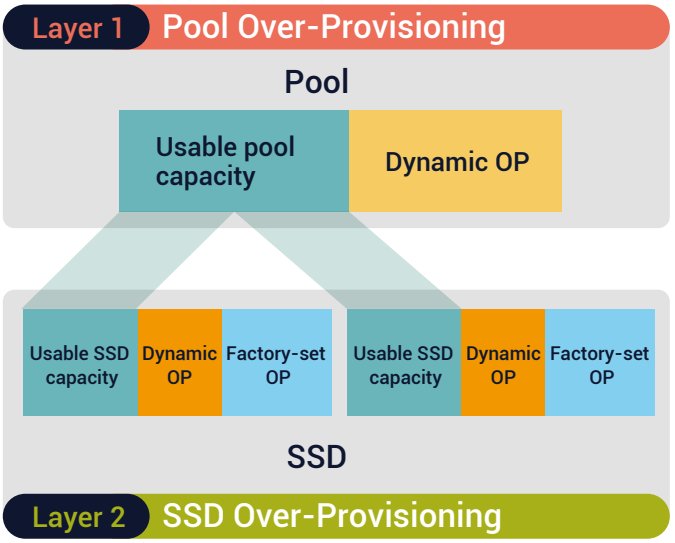



## Support iSCSI Extensions for RDMA (iSER)

QES supports the iSCSI Extensions for RDMA (iSER) protocol, which allows data to be transferred directly into and out of SCSI memory buffers with minimal CPU usage. QNAP Lab testing shows that iSER can increase random read/write performance by up to 140% for VMware ESXi storage, and up to 250% for Linux.

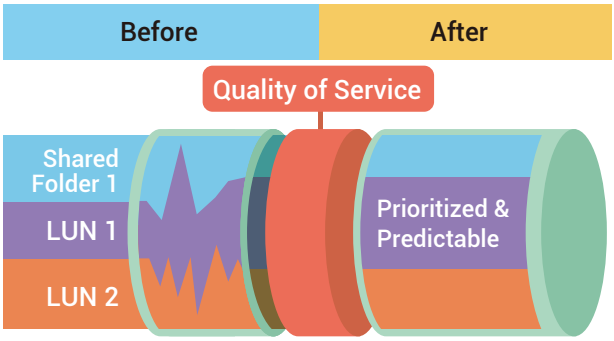
## Flexibly Configurable Over-Provisioning Settings

QES provides two layers of cutting-edge over-provisioning technologies which prevent performance degradation when the storage pool or SSD blocks are nearly full. They also lower write amplification and boost SSD endurance for higher reliability and lifetime.










## Quality of Service (QoS)

QES supports the Quality of Service (QoS) feature to realize optimal-performance resource allocation, based on I/O and bandwidth for LUNs/shared folders at different service levels. This helps to guarantee the performance of critical business applications that run concurrently with lower-priority applications as well as reducing potential "noisy neighbor" issues.

# Extensive third-party application integration and support

## Supports VMware, Microsoft and Citrix virtualization

QES is certified for VMware® vSphere®, Windows Server®, and Citrix XenServer®, benefiting flexible deployment and management in virtualization environments. With VMware® VAAI and Microsoft® ODX support, QES can increase performance by offloading server loading for ESXi® server and Hyper-V® respectively, allowing standard virtual machine management operations and deployment to be performed faster, using less ESXi CPU, memory and bandwidth.


## Veeam Ready

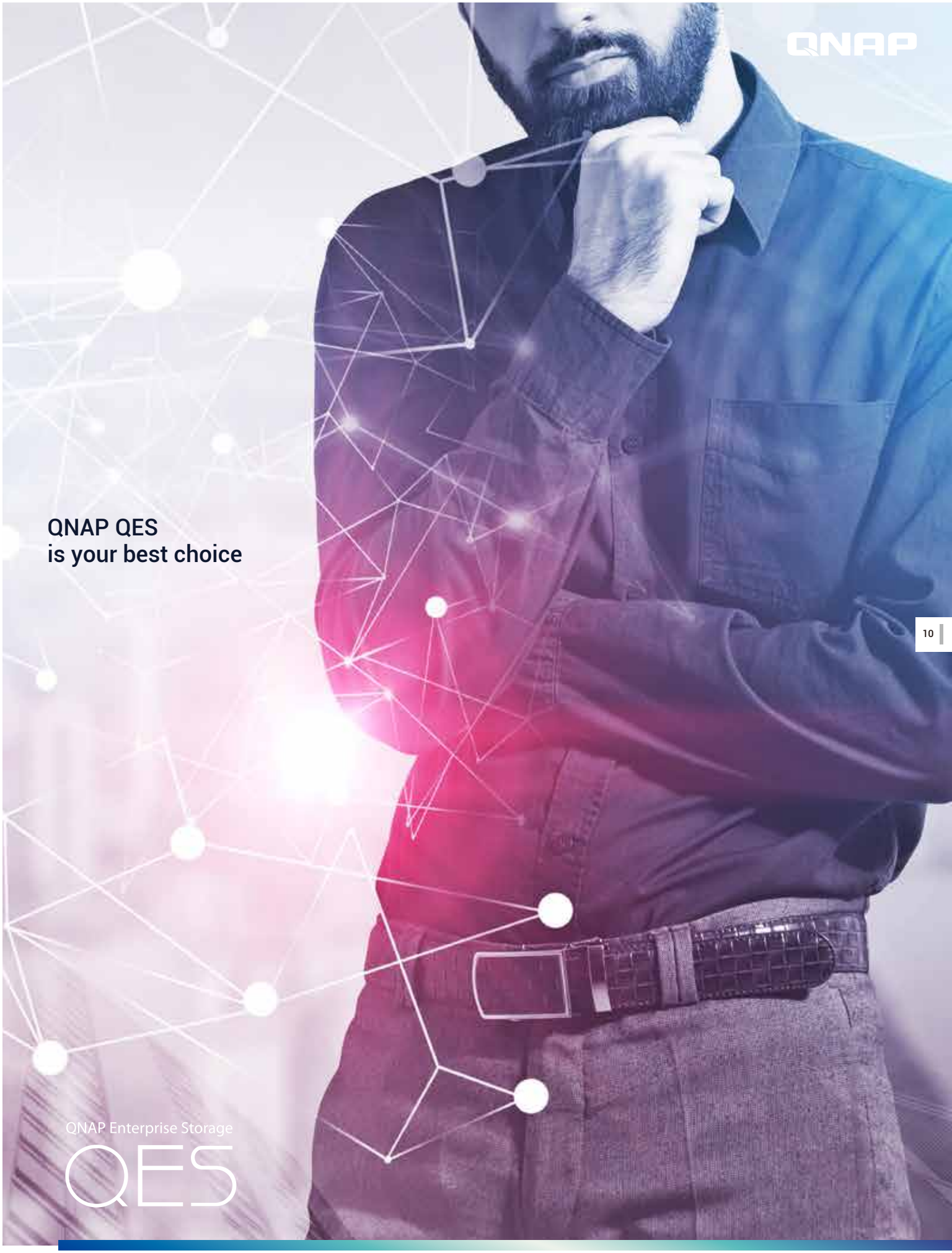
QES is verified Veeam Ready for efficient disaster recovery with Veeam® Backup & Replication™, which allows setting up one or more QES-based NAS as the backup storage, replicating VMs and backing them up to a remote site. Organizations can leverage Veeam's advanced capabilities with QES to improve recovery time and point objectives and keep their businesses up and running.

VEEAM READY
*Repository*

openstack

## OpenStack Ready

OpenStack® is a cloud operating system which helps deploy and manage cloud environments through APIs of multiple open source software projects. QES supports OpenStack® Cinder and Manila file sharing services. It not only accelerates the deployment of virtual machines and enhances virtual machine image access efficiency, but it is also easier to integrate into commercial cloud storage platforms.




## QNAP QES
## is your best choice



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# Reliable

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## QNAP SYSTEMS, INC.

TEL : +886-2-2641-2000 FAX: +886-2-2641-0555 Email: qnapsales@qnap.com

Address : 3F, No.22, Zhongxing Rd., Xizhi Dist., New Taipei City, 221, Taiwan





**Netherlands (Warehouse Services)**
Email: nlsales@qnap.com
TEL: +31(0)107600830

**China**
Email: cnsales@qnap.com
TEL: +86-400-028-0079

**Thailand**
Email: thsales@qnap.com
TEL: +66-2-5415988

**Japan**
Email: jpsales@qnap.com
FAX: 03-6435-9686

**US**
Email: usasales@qnap.com
TEL: +1-909-595-2782

**India**
Email: indiasales@qnap.com

**Germany**
Email: desales@qnap.com

**France**
Email: Frsales@qnap.com



51000-024610-RS
201902 (EN) A