



## Case Study: Questar Assessment

# Educational Testing Leader Modernizes File Storage with Nasuni

Questar Assessment is a wholly owned subsidiary of Educational Testing Service (ETS), developer of the world's most widely used educational tests, including the College Board's Advanced Placement® (AP®) Program, GRE®, and Praxis®. Questar's specialty is K-12 assessments, sharing a belief with its corporate parent that better measurement solutions can make a positive impact on education.

When the student assessment process began undergoing massive changes with the advent of online testing, Questar realized its business needed to transform, too. A modern, high performance storage infrastructure would be needed to handle the increasing data demands of digital transformation.

To manage its fast-growing structured data, Questar implemented Pure Storage FlashArrays. To ensure its new FlashArrays wouldn't be consumed by its even faster-growing unstructured data, Questar implemented Nasuni Cloud File Services™ with Microsoft Azure cloud storage. The combination of on-premises flash storage, cloud file services, and cloud storage is delivering unlimited capacity and blazing data access speeds for Questar users, while greatly reducing cost and complexity for IT.

## Business and IT Challenges

### Unpredictable File Growth

Questar's clients are typically education departments within state governments. Each new state translates into more testing data to ingest, store, and securely retain. This influx of unstructured file data, combined with the software development team's steady demand for project resources, put a constant strain on Questar's storage



## Summary

**Industry:** Education Assessment

**Cloud File Services:** Nasuni

**Cloud Storage:** Microsoft Azure

### Use Cases:

- File server consolidation
- ROBO file storage
- Cloud backup
- Cloud DR

### Benefits:

- Unlimited file storage
- 60% cost savings vs. traditional file infrastructure
- Elimination of tape backup
- File recovery times reduced from days to minutes
- Pure Storage leveraged for high-performance file access
- Simple external file sharing

infrastructure. With client needs difficult to predict, Senior Infrastructure Systems Administrator Nicholas Winnie and his colleagues found capacity planning nearly impossible.

Explains Winnie, “We’re growing at an unprecedented rate, and that is really changing the way we run our business. Now, we’re more of a software development company, and we have more people on the IT side than in any other part of the organization. Even though we’ve been around for 40 years, the fast pace makes it feel like more of a startup. We needed a file storage solution that could be as agile as our business.”



## Secure, Affordable Long-Term File Retention

A sizable portion of Questar’s file storage consists of scanned images of student testing materials, which often include sensitive personal information. While these files aren’t accessed frequently, they need to be securely retained for long periods of time. They also need to be quickly retrievable on-demand.

Storing the images on primary file storage would guarantee fast retrieval, but would add substantial cost. Archiving them to disk or tape would cost less, but retrieval would be too slow, and the administrative overhead of constantly migrating the data back and forth would offset any capital cost savings.

## Slow File Backup and Recovery

Questar relied on traditional backup software and tapes to protect its unstructured data assets. This limited how often the backups could run, increasing the time between recovery points.

Recovering backed up data from tape was also a slow and often unreliable process. It would often take days to recover requested files.

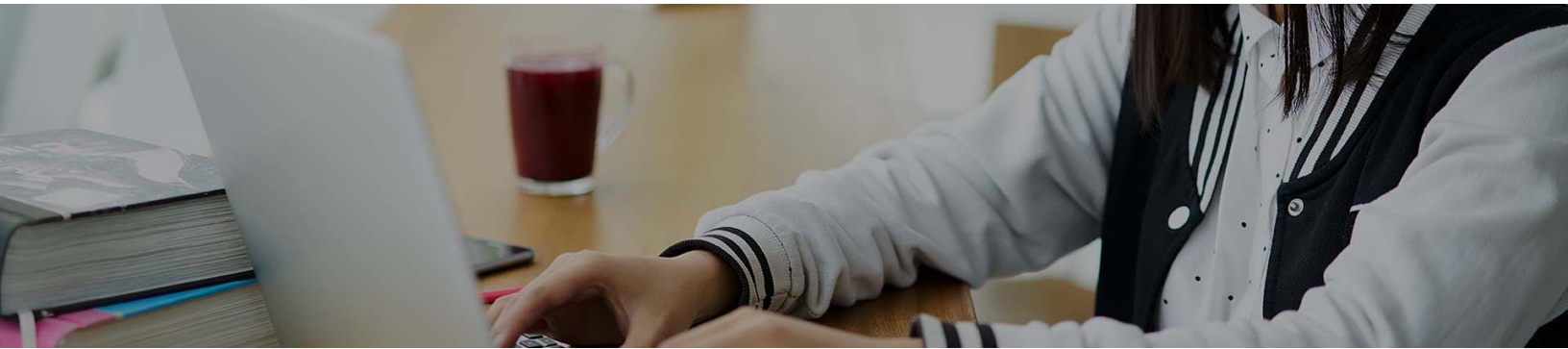
## Compatibility with Pure Storage

As part of a 3-year digital transformation plan overseen by Questar Senior Director of IT Enterprise Services Stan Berris, the IT department upgraded every server, then replaced the storage behind every server with all-flash arrays from Pure Storage. The goal was to give Questar’s employees the tools and infrastructure they needed to work as efficiently as possible.

“We needed a file storage solution that could be as agile as our business.”

Nicholas Winnie  
Senior Infrastructure  
Systems Administrator  
Questar Assessment

The goal was achieved – employees are thrilled with the performance of Pure Storage, to the point that anything less is unacceptable. Any new file storage solution would have to be compatible with the existing Pure Storage arrays.



## Solution

The IT team at Questar began looking for options that could offload file data from its Pure Storage FlashArrays, but still leverage the FlashArrays to deliver high performance file access. Nasuni Cloud File Services, backed by Microsoft Azure cloud storage, was the solution.

Questar deployed Nasuni in a hybrid cloud configuration that connects Azure cloud storage to its own virtual infrastructure powered by Pure Storage. Nasuni Edge Appliance virtual machines present standard SMB file shares to Questar's users and applications, and integrate with Questar's Active Directory for authentication and access. When files are written to the Nasuni VMs, the data is reduced, encrypted, then stored as objects in Azure cloud storage through Nasuni's patented UniFS® file system. Actively used files are cached locally by the Nasuni VMs on the Pure Storage FlashArrays to avoid cloud latency and data egress charges.

The joint Azure-Nasuni-Pure Storage solution leverages the high-performance of the on-premises Pure Storage arrays for blazing fast file access, and the unlimited capacity of Nasuni and Azure to free up the flash arrays for I/O-intensive structured data workloads.

Comments Winnie, "Our employees and developers had become accustomed to fast file access, and they're still seeing that now. With Nasuni, we get to take advantage of Pure Storage and those ridiculously fast read and write speeds. Except by storing all file data in Azure and caching only the files that are actively used in our offices, Nasuni frees up a lot of Pure Storage capacity for other workloads. So while our users don't notice any difference with Nasuni, we in IT do. Before we were filling up our SAN at a rapid rate. Now we can manage our growth in a predictive manner."

An accelerated implementation service from Nasuni Professional Services helped Questar deploy Nasuni over the course of a few days. Within a few weeks, most of Questar's 50 TB of file data had been ingested by Nasuni and stored in Azure.

Says Winnie, "With help from Nasuni PS, the transition was seamless. The only reason our end users knew we switched to Nasuni is because we notified them. We already use a DFS namespace, so with Nasuni we were really just changing the storage on the backend."



## Results

### High-Performance File Access on a 64% Smaller Footprint

Nasuni gives customers the option to use hardware or virtual edge appliances to cache frequently used files. Each appliance can be sized to fit the particular needs of a given office. Questar has deployed 3 Nasuni virtual appliances in front of its Pure Storage arrays. Each VM is sized at 6 TB of capacity, meaning Questar can now provide high-performance access to 50 TB of file storage using only 18 TB of on-premises capacity – a 64% savings. The IT team no longer has to worry about unexpected storage growth forcing unplanned capital expenditures.

“All our data centers have switched over to Pure Storage, and the Nasuni virtual edge appliances run on top of that,” explains Winnie. “We know how big the cache size is going to be on each appliance because if it starts exceeding our capacity limits, Nasuni just flushes those files from the cache, leaving them only in Azure storage until they’re needed again. We know we will never exceed the capacity limit we’ve set.”

### Unlimited Storage Capacity

Nasuni enables Questar to store and protect all files without worrying about capacity or volume limits. Applications write to UniFS just like traditional device-based file systems, except UniFS scales without limits inside object storage. Signing on a new state as a client and ingesting all the associated files no longer presents a storage problem for IT.

When its local storage arrays reached full capacity in the past, IT would transfer older files to tapes, then delete the files from primary storage. This was time-consuming and risky – there was no guarantee the files could be restored if needed. Now Questar can expand capacity on-demand just by increasing its Azure storage and Nasuni subscriptions. Nasuni automatically retrieves older files from Azure storage and re-caches them on Pure Storage whenever they are requested.

“When testing season comes up and we have to store millions of files, we don’t have to worry about whether we have enough storage capacity,” Winnie says. “The only thing that’s growing is our Azure storage back-end and Nasuni’s file system, and neither of them has any limits.”

### 50-100 Tapes Per Week Eliminated

Nasuni’s continuously versioning file system securely protects Questar’s files in cloud storage as they change. All deltas are stored as WORM objects in Azure to create a limitless version history of every file. This cloud-based approach eliminates the need for traditional file backup and archive solutions, providing a more reliable and robust file data protection solution that requires minimal oversight.

Yet, it also gives Questar the kind of long-term file retention plan the company has been looking for – one that is both efficient and affordable. Instead of regularly transferring older files to tape, then calling up tape vendors and waiting for a delivery when clients demand access to that data, older files are a few clicks away.

“Prior to Nasuni we were sending off 50 to 100 tapes a week just in file server data,” Winnie adds. “That has gone away completely.”

“When testing season comes up, and we have to store millions of files, we don’t have to worry about whether we have enough storage capacity. The only thing that’s growing is our Azure storage back-end and Nasuni’s file system, and neither of them has any limits.”

Nicholas Winnie  
Senior Infrastructure  
Systems Administrator  
Questar Assessment



## 10 Minute Recovery Points, 5 Minute Recovery Times

Another advantage of an unlimited version stream in the cloud is breakthrough recovery points and recovery times. Whether files have been lost, accidentally deleted, or compromised by a malware attack, Nasuni Continuous File Versioning™ enables Questar to restore any version of any file from Azure storage – minimizing the impact of such events on end users and the business.

“We set our versioning frequency to every ten minutes, and the time to recover a version from Azure is only about five minutes,” notes Winnie. “Before Nasuni, we were doing backups to tape once a day and sending the tapes off-site. To recover a file, we’d have to contact our off-site storage vendor and it might take a full day before we got the next tape delivery. Then it would take hours to restore the data from tape. Obviously now with Nasuni our RPOs and RTOs have gotten so much better.”

## A New Kind of Disaster Recovery

By storing the entire file system in Azure cloud storage, Nasuni enables a new kind of disaster recovery that helps ensure business continuity. If a Questar office should become unavailable, the IT team can quickly deploy a new Nasuni Edge Appliance at another safe location and begin rehydrating the appliance with file system metadata and data from Azure. Employees will be able to return to work in just 15 minutes.

Comments Winnie, “We have another data center that we use for DR that we’re able to replicate data to. But being able to stand up another virtual Nasuni Edge Appliance anywhere we want and just point to the storage in Azure will be a lot quicker and more reliable. We can even stand up the appliance VM in Azure if we want to go all-cloud for DR, a solution currently under consideration.”

## Easy Setup of Temporary Offices

Nasuni makes it easy for large offices to expand their storage capacity, but it also simplifies the process of setting up, provisioning, and protecting files at remote or temporary locations – without the usual high costs or time investments. To Questar’s IT team, this is yet another valuable Nasuni capability that supports the business.

“We have a lot of seasonal offices that we set up for a few months, but then they go away,” Winnie says. “Like the DR scenario, Nasuni lets us provision edge appliances in these temporary offices in minutes to provide full access to the file system. When we need to close the offices down, we can just delete the VMs.”

## Reduced Network Traffic & Simplified External File Sharing

Every new file and file change is reduced, encrypted, and chunked into objects before being transmitted from a Nasuni Edge Appliance to Azure storage. Not only does this reduce the total amount of cloud storage required, but the secure use of public internet links offloads file transfer traffic from the WAN.

“We do a lot of FTP and SFTP transfers between states and vendors we work with, so having the option to use the internet in a secure manner for external file sharing is very important to us,” remarks Winnie. “Some of our existing SFTP solutions are going to go

## Deployment Details

**File Storage:** 50 TB

**Edge Appliances:** 3

**Edge Appliance Size:** 6 TB

**Appliance Type:** Virtual

**Hypervisor:** VMware ESX

**Users:** 500

**File Workloads:**

- Home directories
- Corporate shares

**Key File Types:**

- Microsoft Office
- Scanned test images
- SQL backup data

**Versioning Frequency:**

- 10 minutes (RPO)

**Recovery Time:**

- 5 minutes (RTO)

**Security:**

- Active Directory for access and authentication on-premises
- AES-256 encryption with customer-controlled keys for protecting data in transit and at rest in Azure cloud storage

away completely because we'll be able to use the built-in external link sharing feature of Nasuni."

## Enhanced File Security

Questar has long been entrusted with sensitive student information. Protecting that personal data is essential. The Nasuni security model, which uses customer-controlled encryption keys to ensure that data is always encrypted in transit and at rest within cloud storage, meets the firm's strict requirements.

"We deal with a lot of personal data that we have to protect, such as student IDs, names, dates of birth, and more," Winnie details. "With Nasuni, we get to use our own encryption keys that no one else has access to, so we're confident when the file data goes to Azure, it remains encrypted in Azure. This adds a higher level of security beyond our data storage practices used in the past."

## Next Steps

Questar Assessment is constantly growing and developing new innovative technologies. That's one of the main reasons for the company's continued success. In looking for a file storage and data protection partner, Questar wanted a solution that could adapt to its changing needs and offer new ways to leverage Pure Storage and cloud storage.

With Nasuni's global file system backed by Microsoft Azure cloud storage providing limitless capacity, and Nasuni Edge Appliances backed by Pure Storage FlashArrays providing blazing fast file access, Questar now has a scalable file infrastructure to support its growing business. The K-12 testing leader has secure, low-cost, subscription-based file storage; a cost-effective long-term data retention plan; significantly improved levels of data protection, and simple storage administration.

Now that the initial deployment focused on daily use file storage with Nasuni Primary is complete, Questar is looking at how Nasuni Archive – another service that is part of the Nasuni Cloud File Services family – can help with long-term storage of cool file data. Facilitating collaboration between temporary offices and headquarters with Nasuni Synchronize and Nasuni Collaborate services are other possible next steps.

"We have been on this three-year journey to transform the IT side of our business with better tools and a standardized infrastructure," concludes Berris. "Nasuni is a critical part of this digital transformation plan to help our employees work more efficiently and offer better service to our clients."

---

### Trademarks & Copyright

NASUNI, UNIFS, and the intersecting ovals logo are Nasuni trademarks and service marks. All other names, brands and products identified herein are the designations of their respective owners.

Copyright © 2018 Nasuni Corporation. All rights reserved. Version 181108

### Contact Us

[www.Nasuni.com](http://www.Nasuni.com) | [Sales@Nasuni.com](mailto:Sales@Nasuni.com) | +1.857.444.8500

 [/company/Nasuni](https://www.linkedin.com/company/Nasuni)  [@Nasuni](https://www.facebook.com/Nasuni)  [/Nasuni](https://twitter.com/Nasuni)