

WHITE PAPER

Seven Key Storage Considerations for Digital Pathology

Make data storage predictable with healthcare solutions from Pure Storage.

Introduction

Pathology is one of the first areas healthcare organizations look at when deciding to go digital.

Pathology supports every aspect of medicine and is vital for studying and diagnosing diseases, such as cancer. With the growing prevalence and complexity of cancer cases, compounded by an aging patient population and number of available pathologists, organizations are ready to trade in their microscopes and glass slides for digital solutions. Adopting digital pathology can enhance diagnosis, research, and collaboration. It also means gaining the ability to use artificial intelligence (AI), decreasing costs, increasing efficiency, and preserving data and image quality.

It's time to think about what it means to go digital and how it impacts your current processes—starting with assessing how your organization currently operates. As you evaluate your overall digital pathology strategy, the data storage that powers your applications is a major factor. The current buzz is to make a beeline to the cloud, but other options are available.

Explore seven key considerations and dependencies your organization should keep in mind when choosing storage, including your digital workflow, speed, scale, cost, security, cloud vs. on premises, and regulations. And discover how Pure Storage® for digital pathology offers a path forward to succeed in this highly specialized field.

\$1.8B

Global digital pathology market projected revenue by 2028¹

13.6%

Global digital pathology market projected CAGR from 2023-2028,² which is nearly 3x the CAGR as radiology

\$1.6B

Digital pathology funding since 2016³

30x

Average file size of a single digital pathology case can be up to 30x larger compared to enterprise imaging (3GB vs 100MB)⁴

Storage Considerations for Digital Pathology

1 Understand Your Digital Workflow and Data Handling Processes

A typical digital pathology workflow consists of a laboratory information system, a whole slide scanner, an image management system (IMS), AI applications, and data storage. It's important to identify and understand your organization's requirements when selecting software and hardware vendors to create an end-to-end solution because each component must be interoperable and integrated for a digital workflow to function properly. Your storage infrastructure, for example, must support viewing images from any location, regardless of where the data is stored, and ensure the associated patient and case data for each image is kept intact.

How Pure Storage Helps

Pure Storage has deep experience in driving better outcomes for picture archive and communications system (PACS) and vendor-neutral archive (VNA) providers as well as life sciences organizations, where the workflows have been digital for over two decades. Consolidate and simplify your data management with a Pure Storage solution that can serve use cases like radiology, cardiology, genomics, digital pathology, cryoEM, and proteomics.

2 Make Scanning Technology as Fast as Glass

Scanning products support digitization of entire glass slides, referred to as whole slide images (WSIs), digital slides, or virtual slides. As part of the digital workflow, speed of throughput is crucial in whole-slide scanning. A single scanner can generate thousands of high-resolution images per day. To increase daily throughput, some scanning vendors deploy a "hub" or central system onsite that manages the images from multiple scanners before moving them to an Imaging Management System (IMS). Performance is especially critical during periods of high load and moving data from a hub to the IMS followed by the storage required to quickly access the images.

How Pure Storage Helps

Experience consistently fast input/output (I/O), even during peak use. Pure Storage provides high-performance flash storage solutions that are optimized for digital pathology workloads, regardless of image volume or how many active users are requesting data. With the industry's best data reduction ratio on digital imaging and communications in medicine (DICOM) images, you can reduce storage costs while recalling your data at high speed, whenever you need it. By accelerating access to images pathologists can operate "as fast as glass," leading to timely diagnosis and better patient outcomes.

3 Accommodate Growth and Emerging Technologies

Expanding your pathology practice requires deploying multiple scanners and storage to communicate with each one. The adoption of AI solutions will also require greater scalability—driving performance levels and the need to quickly access data. For healthcare organizations and labs, scaling effectively means reducing the need to pay for unused storage and making hardware and software upgrades without the need for data migration. Many labs and hospitals in the United States are digitizing, reviewing, and purging images in the short term while keeping the original physical images to compensate for the related storage costs and legacy storage architecture.

How Pure Storage Helps

From GBs to TBs to PBs, Pure Storage solutions are highly scalable, allowing your organization to easily expand storage capacity as your needs grow. This ensures that you can keep up with the growing volume of images and data while accommodating AI workloads from the same platform. Pure Storage FlashBlade® and AIRI® support AI and machine learning (ML) workloads out of the box, with minimal configuration and no fine-tuning. According to the [Digital Pathology Association](#), "Digital pathology images are about 10x that of Radiology images and will require more storage management through their useful life cycle."



4 Keep Costs in Check

Organizations may perceive that by moving to the cloud they can quickly access images while paying less for storage. Yet, when moving to the cloud, most organizations will have to increase their bandwidth with their local internet service provider (ISP) while also contracting with the cloud provider for dedicated connections. With the size and volume of digital pathology WSIs, coupled with ingress and egress fees and API calls, unexpected cloud storage costs can quickly add up to thousands of dollars per month.

How Pure Storage Helps

With Pure Storage, there are no ingress, egress, API, or express connection fees. Pure Storage offers predictable and transparent pricing models. This allows your organization to budget for storage needs prescriptively. No math is required to calculate costs compared to cloud storage solutions that can vary depending on usage, data access behavior, and other factors. Pure Storage helps manage your costs more effectively and makes storage a long-term investment in your infrastructure, while maintaining the simplicity that you gain with cloud solutions.

5 Achieve Data Security, Privacy, and Protection Standards

Digital pathology images and data are highly sensitive and confidential, containing personal health information (PHI) that is subject to strict regulations, including Health Insurance Portability and Accountability Act (HIPAA) in the US and General Data Protection Regulation (GDPR) in the European Union (EU). Health organizations expect storage solutions to adhere to security protocols, regardless of where the image files are accessed—and data loss is not an option.

How Pure Storage Helps

According to the [Digital Pathology Association](#), “DPS’s [digital pathology systems] need to be built to be interoperable with storage platforms, which provide high-performing, scalable, cost-effective storage. The application should be able to store and retrieve images and other data without needing to understand how the data is managed by the storage system.”

Pure Storage provides on-premises storage solutions that allow your organization to maintain control over your data and ensure compliance with these regulations. Our solutions are designed for security, with features such as data encryption and strict access controls. Gain end-to-end protection of your data with a ransomware recovery service level agreement (SLA) that guarantees a clean storage environment following an attack. Pure Storage SafeMode™ Snapshots prevent objects from being manipulated or deleted by mistake or malicious activity.

6 Know What it Means to Keep Data in the Cloud vs. On-premises

Many organizations assume data storage solutions must run in the cloud and that moving to the cloud requires little investment while offering endless scalability and flexibility. Some cloud providers may allow you to input your data for free (ingress) but can charge fees (egress) when you view imaging data in the cloud, moving data between different apps, accessing APIs, or migrating to other cloud providers. In most cases, ingress and egress fees may be out of your control. What if your new IMS and viewing vendor standardizes on a different cloud provider than your existing vendor? Migrating large data sets between cloud providers can be costly and time-consuming.

How Pure Storage Helps

Pure Storage solutions allow your organization to expand your storage capacity to keep up with the increasing volume of images or slides being generated. Investing in Pure Storage means putting an end to data migrations and not rebuying the same TB or PB of data repeatedly. Pure Storage delivers simplicity, scalability, security and all-flash performance reliability without additional fees. If you prefer monthly terms that come with cloud contracts, Pure Storage offers the best value and flexibility when it comes to purchasing. Through Evergreen//One™, your organization can enter the monthly operating expenditure (OPEX) world that the cloud brings, but with all the benefits of Pure Storage.



7 How to Prepare When Storage Regulations Are Enforced

In the Europe, Middle East, and Africa (EMEA) market, digital pathology regulations allow organizations to keep digital images for long-term retention. The image storage rules and regulations in the US, though, are not as well defined. Yet, as the market matures, and with digital pathology growing twice as fast as radiology, those rules are likely not far off. With regulations and adopting digital pathology, organizations should expect their workflow and viewing behavior to change. When that occurs, it will be critical to know how you will manage your WSIs in the long term.

How Pure Storage Helps

Organizations often look at the evolution of radiology and cardiology when considering how the digital pathology market will mature. Many scanners and IMS vendors support DICOM and expect digital pathology to adopt similar retention requirements as radiology and cardiology. Just as in the enterprise imaging space, Pure Storage has proven to be a trusted solution. Our commitment to innovate and align with the market demonstrates that as regulations change so will your technology investment.

Move Digital Pathology Forward with Pure Storage

Simple, fast, tested solutions from Pure Storage make data storage management predictable and support rapid, real-time access to your organization’s increasing volume of complex images and AI and ML workloads. Drive innovation with a storage solution that evolves with your organization’s needs while improving security, scalability, and cost efficiencies—all so you can work faster and smarter, deliver better results, and improve patient care.

[Learn more about how Pure Storage can support your digital pathology needs here.](#)

Endnotes

- 1 | Digital Pathology Market Size, Share Trends and Revenue Forecast, June 2023, Markets and Markets
- 2 | Digital Pathology Market to Exceed USD 2.3 billion by 2035, Due to the Growing Demand for Advanced Diagnosing Procedures, December 2023, Roots Analysis
- 3 | Digital Pathology Consultations—a New Era in Digital Imaging, Challenges and Practical Applications, National Library of Medicine
- 4 | From Pixels to Precision 001: Making Sense of the Digital Pathology Ecosystem- Part 1

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