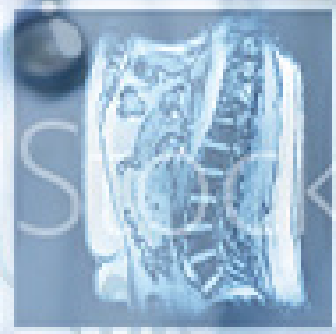
THE GREAT DATA RECKONING

How Enterprise Imaging Is Managing Images and Data Better

5 reasons why infrastructure can help you push through the pandemic:

- Improves reliability, performance & workflow
- Enhances speed & uptime
- Lowers TCO (let's start with less cooling, energy and rack rent)
- Reduces IT complexity
- Protects & future-proofs data



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OUT OF THE BOX

Building foundations for innovation

What once was locked up in radiology now has no walls. Enterprise imaging (EI) sits at the core of the healthcare ecosystem, image-enabling the EMR to offer views of patients and populations. And EI has expanding superpowers: Enabling precision medicine and an ever-increasing set of intelligent tools and analytics to interpret and investigate images, reports and data. It also helps to fast-track patient care and drive efficiencies.

What started as radiology's picture archiving and communications system—a lock-box of proprietary images to view and share if you could access them—enterprise imaging now unites multi-specialty images, reports and data stretching across healthcare systems, myriad states, regions and even countries.

Powering those superpowers is infrastructure that's seen an evolution too. Storage has grown up and out of boxes and 5-year replacement cycles. Hardware offerings have morphed into intelligent software that stores and monitors intuitively, proactively and easily. Organizations can scale up and down according to need.

Providers are embracing the efficiency of one provider for storage across the enterprise and thus leaving behind expensive upgrade cycles, disruptive downtime and rebuys of TBs they already own.

Here we take a closer look at enterprise imaging and why healthcare organizations are thinking differently and working differently supported by infrastructure that is evergreen not everchanging, simple, powerful, sustainable and especially, affordable.

Innovate Healthcare
CONTENT, STRATEGY & AUDIENCE

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THE GREAT DATA RECKONING

Thinking Differently, Working Differently

Healthcare is living in a new space. As we navigate through COVID, the mission of health systems and hospitals comes with a fresh chorus of needs that include hyper efficiency and cost savings. Ever-present are healthcare's goals of improving the health of patients, populations and care team well-being. Smarter, better, tougher, stronger, more resilient health systems and imaging providers are opening their eyes to proven

In this ebook, we bring together data and IT experts to share understanding and insight about how health-care systems, imaging departments and outpatient clinics are utilizing robust enterprise imaging and data storage strategies to improve performance and reduce IT complexity and total cost of ownership.

infrastructure and storage solutions for enterprise imaging that will make them all of those things well into the future.

Good patient care decision-making is all about the data—and many health systems are struggling with technology and need better, more economical options, especially with the strains and stresses of COVID.

Progressive IT leaders are seeking longer term options when it comes to data storage and infrastructure, notably as they manage images across a healthcare system, hospital or outpatient facility. They want: Better performance, fewer vendors and to make data migration a thing of the past. Most would prefer to avoid the storage buying process ever again. They're choosing storage delivered as-a-service or capital expense that allows enterprises to extract maximum value from their data while reducing complexity and expense. Here's why a more innovative and modern data experience is right for enterprise imaging.

Thinking Differently

There's nothing like a pandemic to change minds and priorities. The top concerns of CIOs, CFOs and IT leaders across healthcare have shifted with spending priorities now focused on areas such as infrastructure, cybersecurity and artificial intelligence and machine learning. So says a survey from Fortune and Adobe on the shifting priorities with a more often remote workforce.

For IT and enterprise imaging leadership teams, this new normal has changed mindset when it comes to data, data management and data accessibility. While physicians, nurses and administrators focus on saving lives and getting patients back into the hospital for needed care and procedures, their IT teams have undergone a massive shift to working from home or offsite while juggling data availability and security. Compounding the situation are short-staffed medical facilities where IT resources are needed the most.

Many hospitals and outpatient imaging providers have changed their purchasing and project priorities, pivoting to define projects they can delay and which must move forward.

Providers tell us they are continuing investments in strategic tech initiatives such as data analytics, telehealth, urgent infrastructure upgrades and investments, storage, data center consolidation, artificial and augmented intelligence, automation and clinical consolidation and standardization efforts. In particular, CIOs and CMIOs are moving forward with projects that present a return on investment or long-term cost savings.

Health IT leaders

are taking a fresh look at their overall technology architecture amid revenue declines.

WHO is essential to make progressive decisions?

WHAT has become essential amidst COVID? And what investments will bring long-term economic gain?

WHERE do we have duplicative services?

WHEN is the right time to reduce or make staff more efficient?

WHY is now the time to maximize current investments?

Innovating the Enterprise

Enterprise imaging is one area healthcare systems and imaging center groups are thinking differently about how to grow, recover, modify, expand services, time slots and staffing. Providers also are thinking about the storage and infrastructure that support them as they offer ways to ensure access, speed and boost productivity.

With an eye toward sustainability and growth, they're pushing to strategically differentiate their services and offerings and whittling down and driving out cost with subscription-based storage purchases.

Some 40% of U.S. health systems have already invested in enterprise imaging, utilizing a single vendor neutral archive for images and data. Coordinating and utilizing imaging across service lines is supported

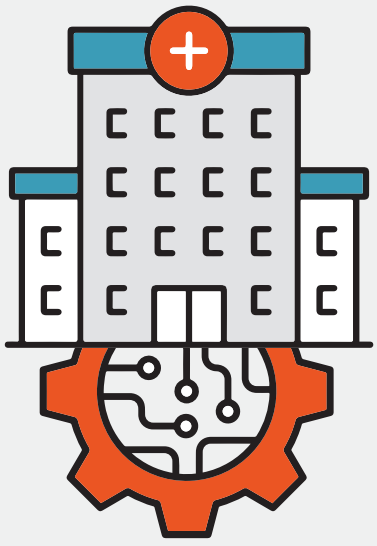
SOLUTION BRIEF

Improving Enterprise Imaging with Storage

CLICK HERE TO READ

Enterprise imaging is "a set of strategies, initiatives and workflows implemented across a healthcare enterprise to consistently and optimally capture, index, manage, store, distribute, view, exchange, and analyze all clinical imaging and multimedia content to enhance the EHR."

Joint definition of the Healthcare Information and Management Systems Society (HIMSS) and the Society for Imaging Informatics in Medicine (SIIM)



by a universal viewer, universally accessible storage and clinical workflow and collaboration tools.

Radiology and IT leaders started uniting radiology and cardiology almost a decade ago. The idea was to image and report-enable the EMR. However, nearly all EI programs are still a work in progress as providers orgs look to enterprise-enable more 'ologies. Many IT project leaders struggle with particularly data-heavy images from digital pathology, high-magnification dermatology, surgical and orthopedic videos, 3D tomosynthesis and functional MR. The most forward-thinking are quick to recognize the need to muscle up not only on compute power but storage capacity too.

While enterprise imaging is inherently saying yes to more power, they're saying no to greater IT complexity and cost. Pulling off the pivot comes down to managing massive imaging datasets, and lots of them, with maximal efficiency. Doing so can only optimize data-management and ROI.

The disruptors in enterprise imaging are investing in all-flash array (AFA) storage: the glue that binds and propels care and operations. Why? Because all-flash handles tens of thousands of concurrent

Enterprise imaging STRATEGY

seeks to:

- Consolidate imaging data and related content and from multiple, clinical departments within one platform
- Create a single point of access to imaging and report data from the EHR
- Collaborate resources and teams to optimize utilization intelligently by uniting care, tools and workloads

Tech Focus

To achieve true enterprise imaging, clinical and IT leaders are focusing on:

- Centralizing governance and access to all imaging and clinical media;
- Updating, maintaining and securing thousands of clinical applications;
- Integrating with the EMR viewer and enabling access to images through the EHR, often a couple
- Managing imaging referrals and image exchange with third-party organizations;
- Utilizing analytics and operational business intelligence to offer a look inside performance, assets and resources; and
- Consolidating of the procurement and supply chain

requests, eliminating imaging delays. All-flash allows organizations to take full advantage of their critical EI system updates and upgrades, which may require additional storage or performance requirements. Downtime, planned or not, is unacceptable.

To facilitate efficient reads and swift care management, physicians need resilient infrastructure that delivers the performance each application and reading protocol demands. On the must-have list are standards-based, structured data management and vendor and data agnostic solutions that avoid proprietary data storage formats. Also key are centralized security compliance and cross-enterprise maintenance and updates.

Less complexity is a requirement too, with IT teams relying on their vendors to offer intuitive solutions—not systems that force team members to spend hours reading through user manuals.

Storage admins want storage to be a management task rather than a full-time job.

They also want infrastructure that helps organizations model or simulate future additions or changes so they can predict |when they should scale more capacity or even increase controller performance.

Consistent performance of all-flash arrays eliminates the math and science experiment that must be performed to determine how much and what data should sit on SSD and when and what data can sit on legacy spinning disks. Just as the maintenance costs should stay flat, the storage platform should remain stable. Always-on data encryption, in line compression and deduplication, multi-cloud enablement, and ransomware protection are standard, not expensive or a-la-cart add-ons.

To bring on new technology, the underlying infrastructure should

Tech Refresh

Qs to address before you start purchasing technology:

- Where are all of the systems, devices and locations where my organization's healthcare data can be found?
- What type of storage is it residing on now?
- Does the data storage meet our current regulatory requirements and standards?
- What is the annual cost of storing, securing and searching my data?
- What would these costs be if we moved to a storage as a service (SAAS) solution?
- What are the clinical, operational and financial benefits of centralizing all of our imaging data in one location?

be sustainable, scalable, and agile enough to handle any new applications. It's wise in 2021 to plan on adding, for example, an enterprise viewer, new modalities such as digital pathology or breast tomosynthesis, or advanced analytics or AI. New projects, implementations or even changes in workflow should not be hamstrung by the supporting infrastructure. Essential too is the ability to easily get thoroughly upgrade installed, production systems to next-generation technologies. Such upgrades can and should be done without planned downtime or data migrations.

Providers are breaking from old habits of swapping out storage platforms every 3 to 5 years in favor of steady maintenance schedules and allowing flat support prices. To make the task of consuming storage predictable for the long haul, it's usually best to stick with one storage vendor.

Done well, enterprise imaging optimizes the EMR so physicians and providers have immediate, intuitive and easy access to all clinical images and videos, reports and documentation, no matter where datasets reside.

Enterprise leadership as well as physicians and end-users have to support a long-term enterprise imaging strategy. This will dramatically reduce the impact of imaging on overall IT resources and costs while improving care quality and user experience.

It is *thinking differently* and pivoting to all-flash that leads healthcare systems to *working differently* and recognizing the benefits that come with it.

Working Differently
Putting the pedal to the metal

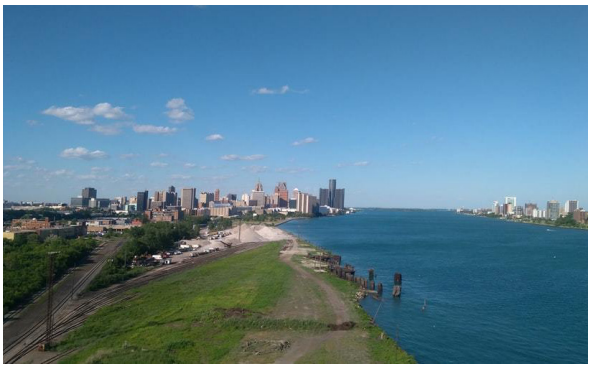
Meet the leaders of a health system and a large radiology group that picked all-flash storage from Pure Storage for enterprise imaging.

Here's why.

Prime Healthcare and Advanced Radiology Solutions have chosen all-flash storage to address their deluge of data. AFA's leg up is a flexible architecture that can manage both the expanding volume and variety of imaging data while eliminating complexity and reduce cost. That means having the bandwidth to deliver imaging data with consistently low latency, especially during unpredictable surges in activity.

Prime Healthcare

"The overall stability of the Pure design is compelling, especially for use in healthcare."



Advanced Radiology Services

"We now run everything on Pure…PACS, RIS, dictation, telemedicine, billing [and] legal."

Prime Healthcare:
'It's Hard Work to Make Something Complex So Simple and Stable'

Making Pure the Enterprise Standard for Storage

- 47 Hospitals
- 14 States
- 11 FlashArray//X units with plans to grow to 50 in the next 2 years

Pure FlashArray//X guaranteed uptime of 99.9999% is 'not something you see in a midrange storage tier'

- Downtime is no more than 2.63 seconds per month.

Driving Costs Down

- One storage pool allows compression and deduplication across the entire pool vs. multiple pools that increases cost and complexity.

When Prime Healthcare went looking for a new data storage solution in 2018, the options initially seemed overwhelming. At least six vendors with multiple products seemed qualified. The team wanted a solution that would be readily installable and seamlessly adaptable across the entire California-headquartered enterprise that includes 46 hospitals across 14 states. Their choice was locked in on Pure Storage after they saw a demo of FlashArray//X at work, a decision that would lead to Pure soon becoming their storage standard across the health system and including enterprise imaging.

"One of the things that really popped out to me was Pure's 'six nines' guaranteed uptime," recalls

team lead Clint Monchamp, who joined the health system that would become Prime back in 1998 and now serves as its corporate manager of storage, business continuity and disaster recovery. "Guaranteed uptime of 99.9999% is not something you see in a midrange storage tier…You usually don't hit guarantees of six nines until you're paying for Tier 0 storage."

That "six nines" translates to downtime of no more than 2.63 seconds per month—which works out to 86.4 milliseconds per 24 hours.

Rewinding to 2018, Monchamp had been watching with interest as the cost per terabyte for flash storage vs. spinning-disk storage trended downward. In addition to price, data stability was a key need too.

"The overall stability of the Pure design is compelling, especially for use in healthcare," he explains. "It's simple and rock solid."

Pure is now Prime Healthcare's enterprise standard for storage.

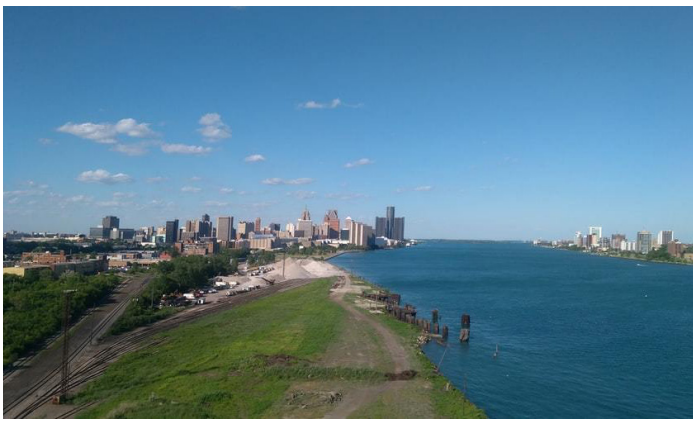
Thus far the health system has installed 11 FlashArray//X units. As other non-Pure arrays reach end of life and end of support, they'll be replaced by Pure. Monchamp expects to have close to 50 Pure arrays up and running within two years or so. The Pure arrays host the mission critical applications of their Meditech EHR and their Infinitt PACS, as well as other applications, in a simple consolidated solution.

Behind the technology was something else that set Pure apart too: the Evergreen Storage model that keeps customers current as software advances.

And has Monchamp sees it: "Stable IT systems are absolutely necessary for Prime Healthcare to provide the best care at the quickest pace possible. The Pure arrays have been simple, solid and stable."

PRIME HEALTHCARE:
READ THE ENTIRE STORY

Advanced Radiology Services:
Pure Supports Everything Enterprise Imaging



Savings adds up thanks to

- Less rent for rack space: Reducing to a half rack where the old storage system needed two full racks
- Less power needed for cooling

Pure FlashArray is 'Much Quicker'

- Thanks to reductions in CPU time and load average, with writes that are much faster too, ARS is running more smoothly, with the metrics to prove it.

All Pure, All the Time

- All of ARS' PACS, RIS, dictation, teleradiology, billing and legal systems now run on Pure Storage

Advanced Radiology Services—ARS—is a large radiology practice focused on high-quality, quick imaging and quick results for referrers and patients. They're supported by a highly reliable, fast and nimble IT infrastructure that optimizes the responsiveness of their 160 radiologists, including 21 neurorads, and 30 or so advanced practice providers who collectively cover 11 subspecialties and modality-specific exams for patients imaged at 60 sites across Michigan. Ranking 5th among radiology's top practice per *Radiology Business*' Exemplary 80 list, they're a successful group others can emulate.

Advanced Radiology prides itself on meeting every expectation regarding turnaround times for imaging studies, says

Infrastructure Manager Tom Roberts. "With support of the infrastructure that we built, all our radiologists are really good at hitting those numbers."

ARS recently implemented another round of Pure Storage FlashArray units, adding five more to round out a switch that had begun in 2017 from another storage supplier's technology to Pure's all-flash, enterprise-ready block storage capacity.

"We now run everything on Pure," says Roberts, who technically works for STARS, the practice's 270-employee subsidiary in Grand Rapids that constitutes the non-clinical branches of the business. "And all of our individual systems—PACS, RIS, dictation, teleradiology, billing, legal—are incorporated in that virtual environment."

Roberts was a beta customer of Pure Storage going back to 2012, so when ARS needed to upgrade its storage vendor, he knew Pure was the right choice. "I already knew I liked the products and the people," he says. "But cost was also a central issue, since DICOM images don't really compress and do data deduplication."

Here's what else the team at ARS has come to appreciate working with Pure Storage:

Included with a Pure Evergreen subscription, which seamlessly incorporates upgrades and expansions as they're introduced, ActiveCluster lets Pure customers share datastores between two data centers; Forever Flash automatically upgrades flash technology, and Snapshot, automatically backs up and locks in every piece of ARS's data at intervals throughout the day; and significant improvements in all performance metrics. "CPU time came down, load average is down, writes are much faster," Roberts says. "Really, everything just processes much quicker."

ADVANCE RADIOLOGY SERVICES:
READ THE ENTIRE STORY

Building a Foundation for Better Care

Organizations like Pure Storage are ready to help with planning and prioritizing enterprise imaging storage and infrastructure needs. Now is the time to innovate and create a new strategy to accommodate ever-increasing data needs while more tightly managing costs.

Pure is certified with major enterprise imaging vendors and is unique in offering data reduction for DICOM images. Pure all-flash array storage solutions can handle any protocol, any tier and any workload right out of the box.

Pure's philosophy, the modern data experience, is simple, providing a consistent clinician and patient experience by delivering the image to the right person at the right time. It is also future-proof—eliminating forklift upgrades, and the cost of replacing legacy technology as well as powering imaging in the age of intelligence and analytics.

With the explosion of imaging data—up to 2 trillion images per year, globally—radiology's data foundation must sit on the leading edge of performance. A modern data experience enables increased throughput and decreased turnaround time that very busy radiologists need. It is reliable, consistently delivering needed performance no matter the workload conditions or a specialist's location. Moreover, it is seamless, consolidating applications and removing data silos that have become so common.

This hyper-efficiency is paired with cost efficiency too. Arrays built on consumer-grade flash brings high-volume production and usage and rapid and consistent price decreases. So in this new space healthcare is living in, all-flash storage is the choice for health systems and imaging groups needing a reboot to push through the pandemic.

THE DATA DOZEN:

12 REASONS TO USE PURE STORAGE FOR ENTERPRISE IMAGING

1. Best for enterprise imaging.
Pure is proven and tested with enterprise imaging vendors globally. Only Pures Evergreen business model allows healthcare providers to take full advantage of the EI vendors future upgrades and updates without needing to budget for forklift upgrades or storage migrations.

2. Reliability & performance.
Reliability, dependability, consistent low latency under any load, full performance non-stop.

3. Simplicity.
Who needs training and user-manuals? Pure arrays ship with a business card for a user manual. How big is the user manual for your current storage option?

4. Lower TCO.
Make storage a simple task, not a time-consuming full-time burden. Less storage management, dramatically lower power, cooling, and rack space requirements is a Pure advantage, allowing predictable costs over the next decade and beyond.

5. DICOM data reduction.
Pure uniquely sees on average 1.5:1 data reduction. Ask your current vendor to compare.

6. Standardize.
Over and over again, healthcare systems and hospitals choose Pure and expand their footprint to combine many workloads, on the same platform.

7. Uptime.
Pure is the way to avoid downtime, stop planning for downtime, or accepting it as part of what storage arrays do, the new standard is 99.9999% uptime.

8. Enhanced workflow.
Guaranteed seamless data access and sharing across disparate systems, enabling a complete and longitudinal view of the patient record on an all-flash array.

9. Plug-n-Play.
Pure solutions can handle any protocol, any tier, and any workload, right out of the box.

10. Data protection & Security.
Always on Encryption, Ransomware protection, and safe-mode features standard.

11. Future-proof.
No more data migrations or need to seek a new vendor every several years, all software included at no-charge.

12. Flash is fast.
Health IT leaders are turning to all-flash array (AFA) storage solutions to deal with their data deluge and modernize their storage environments.