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10 questions IT managers ask when migrating medical data

The top 10 questions

Contents:

The best technologies are designed with the future in mind

When healthcare systems reach full capacity or obsolescence, migrating data to a more capable system can be the path to support effective care.
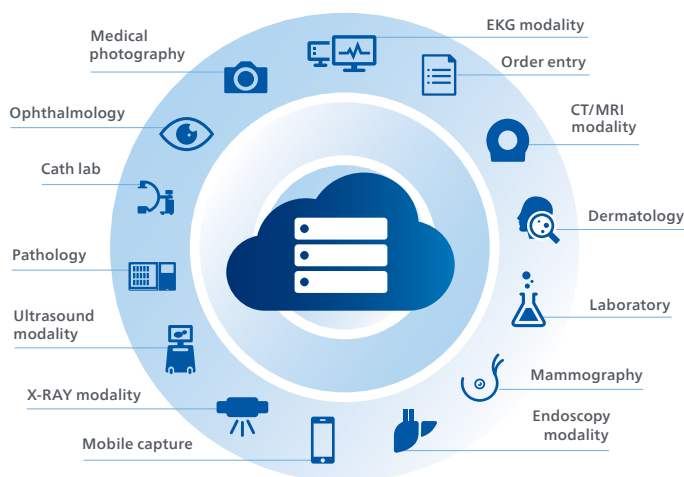
With a plethora of data sources, types, metadata and pixels that organizations must transfer, medical imaging data presents a particular challenge. The datasets may be large; the legacy systems and target system may be very different; but the data needs to arrive at its future home as intact, complete and usable as possible.

Departmental imaging systems — such as radiology and cardiology PACS — that have been in productive use for several years are good candidates for replacement and data migration. Newer technologies deliver medical images and data with improved speed, anywhere/anytime access, consistent workflows and full clinical context. To stay up to date with current best practices, most healthcare organizations will need to upgrade their departmental silos to enterprise imaging solutions.

CIOs and IT managers put a lot of time and effort into selecting the right vendor to meet their requirements. But the data-migration process Is critically important to the success of the upgrade project to get data migration right.

Some people may already be obsessed with the challenge. Others may have barely given it a thought. Those involved in a migration project typically ask 10 common questions.

Medical photography · EKG modality · Order entry · Ophthalmology · CT/MRI modality · Cath lab · Dermatology · Pathology · Laboratory · Ultrasound modality · Mammography · X-RAY modality · Endoscopy modality · Mobile capture

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2

1. Will all my data transfer at the original quality?

2. What resources will we need for the project and will we have to pay migration costs to the legacy vendor?

3. Why is the migration taking so long?

4. Will the migration affect the performance of our legacy system?

5. Some clinical functions in our legacy system depend on proprietary data. Will we be able to use those functions in the new system?

6. Should I be worried about security during data migration?

7. What happens to unstructured data? Can it be migrated?

8. After records have been migrated to the new platform, what happens if data changes on the legacy system?

9. Do we have to wait until the end of the migration before going live with the new system?

10. Why Philips?

A top-ranked migration vendor can deliver a success rate above 99.8%.

If the quality of legacy data and storage support are problematic, the failure rate can be as high as 10%

1 Will all my data transfer at the original quality?

This largely depends on the data quality at the source. While a migration vendor can often deliver a success rate above 99.8%, many elements can affect the overall result. When the quality of legacy data and storage support is very problematic, the failure rate can be as high as 10%. The project scope should include an assurance of data quality. A detailed migration control plan is essential to success, with quality and completeness of migration guaranteed at the image level.

The planning process begins when the new vendor, legacy vendor and customer agree on defining and updating the migration list, as well as success criteria for the migration. The process concludes when the three reach a final position for all studies on the list. The migration tools must verify alignment of all medical data with legacy system data — including image-level data when migrating radiology and cardiology studies — to ensure the object count is consistent between the legacy system and the new enterprise solution.

A migration vendor will provide a quality assurance document based on a QA session with the customer at the beginning of the project. Before starting the mass migration of the full data set, a significant sample set of data should be used to validate data quality as displayed on the new system. This QA process should be repeated until the image quality is acceptable. Spot checks should be performed throughout the actual migration to ensure that image quality remains acceptable as demonstrated with the sample data set.

At the beginning of the project, a migration vendor will always provide a quality assurance document based on a QA session with the customer.

After the migration of image data, top-ranked vendors can provide data cleansing services that greatly increase the value of the data and ensure that migrated studies meet your defined gold standard for data quality. Depending on your specified requirements, customize data cleansing options to meet the needs of the project, quality of legacy data and availability of alternative data sources.

For example, the legacy system may provide all image pixels, but the information system may have more complete and useful metadata. Data cleansing consolidates the best available data from all legacy systems to improve the quality of records on the new system. Cleanse a representative data sample first. An application specialist from the new system vendor and your own designated specialists should review before proceeding. Cleanse he full data set only after processing of the sample set yields satisfying results.

2 What resources will we need for the project and will we have to pay migration costs to the legacy vendor?

While maintaining the support contract with the existing legacy vendor is not mandatory, it is highly recommended. The migration costs depend on the contractual agreement. It speeds up the migration and ensures that data is moved. The responsiveness and quality of support offered by the legacy vendor has a direct bearing on the estimated risk of a data migration. Any attempt to save costs with the legacy vendor should be made with a full understanding of how it might affect project risk.

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At a minimum, the feasibility of a migration requires the legacy vendor to configure interfaces for proper connectivity and communication with the new solution. In many cases, on-demand technical support may be sufficient to resolve issues that may arise with migration of specific studies.

You must assume responsibility for configuring the network appropriately and ensuring full availability between legacy and new systems. In addition, clinical internal resources are required to perform the initial QA in collaboration with an application specialist from the new solution vendor. Depending on the size of the migration, this may require one person or several.

It's important to identify suitable QA resources. They must have a thorough understanding of the data clinicians need to do their jobs well. And they must assume responsibility for green-lighting the data transferred to perform the migration in time.

> Clinical internal resources are required to perform the initial QA in collaboration with an application specialist from the new solution vendor.

At the same time, the new solution vendor must not overburden people performing work beyond their normal responsibilities. Since QA can't possibly be executed on all the medical data to be migrated, identifying a statistically relevant sample of data is the key to ensuring the quality of the migration without overextending the QA team.

## 3 Why is the migration taking so long?

Migration is a critical activity and should be well-planned in advance by the migration vendor. The plan should set realistic expectations regarding the timeline and include plans for continued productivity during the process.

Users will depend on the legacy system during migration. It's important to consider all potential limitations of the migration scenario — such as legacy hardware/ software capabilities, network performance and daily utilization patterns — and to design the optimum approach for speeding the migration while ensuring the stability and availability of the legacy system.

In perhaps 98% of cases, the DICOM standard can be used to migrate medical images to the new solution with minimal intervention. However, DICOM processing consumes resources on the legacy system, affecting performance for users. For very large migrations - roughly 2 million records or more - migrating the whole file system may be a better option than migrating individual records over DICOM transfer.

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However, file system migration requires thorough understanding of how the files are stored on the legacy system. Responsible vendors will provide the necessary information. Scripts must be written and thoroughly tested to ensure an accurate and orderly transfer of files from their legacy format into the new system. These tasks require considerable time and effort up front, but in the end provide a much faster migration with far less

File system migrations

2%

DICOM migrations

98%
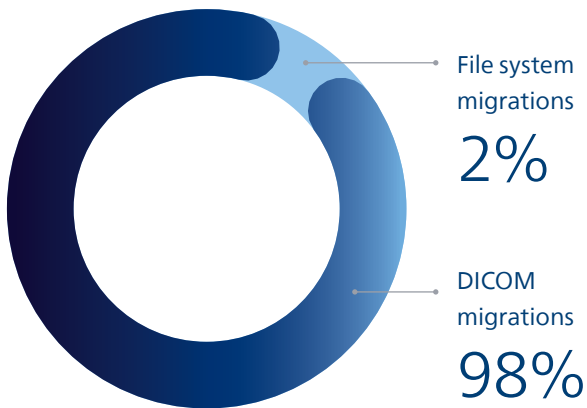
Although DICOM processing consumes resources on the legacy system, it's still the optimum solution for 98% of migration projects.

consumption of system resources compared to a DICOM transfer. Removable media, such as DVD or tapes, are inherently slow in file access compared to disks or flash storage. Production or archived files stored on these media can substantially add to the migration time, particularly if the media must be mounted manually. If the legacy system uses removable media, it's essential to analyze the distribution of studies on the media and formulate a plan to optimize retrieval speed with minimal swapping of media.

In the case of tapes, it's also important to process records in the same order in which they're stored. No matter the method you should require weekly progress reports from your vendor, customized to outline the relevant details of your specific migration project. A final migration report should provide the status of all studies included in the migration list. You should get complete details on any studies that couldn't be migrated even after all possible resolution attempts. The final report should provide all the information you need to confidently sign off on the completion of the project.

4 Will the migration affect the performance of our legacy system?

The migration process can affect legacy system performance. Keep in mind that you're migrating to a new solution because the old one is reaching full capacity at the end of its useful life. To keep users productive and protect data integrity, it's essential to analyze requirements, optimize processes and test results before doing the full-scale migration. The goal is to ensure that the legacy system will perform well for users under the added burden of processing studies for migration.

Migration vendors can forecast legacy system behavior during the quality assurance session and schedule the bulk of the migration during off-hours when the legacy system is under minimal stress. The new solution vendor should also offer the ability to fine-tune migration tools for an optimum balance of legacy system resources devoted to ongoing production versus migration tasks.

> Migration vendors can forecast legacy system behavior during the quality assurance session and schedule the bulk of the migration during off-hours when the legacy system is under minimal stress.

To maintain acceptable performance of the legacy system, test various DICOM operations involved in the migration to optimize the number of concurrent operations and copies. Test runs performed with a given number of studies processed concurrently can be scaled up or down depending on impact on system performance. Individual operations involved in the transfer can also be fine-tuned to optimize use of resources, avoid demand spikes and ensure legacy system stability. In addition to securing necessary support from the legacy vendor, you should keep your service contract active throughout the migration process to ensure availability of the legacy system for users until the new system goes live.

5 Some clinical functions in our legacy system depend on proprietary data. Will we be able to use those functions in the new system?

Users accustomed to working a certain way may balk at the features and flow of a new system, even if it ultimately provides a better way to get the job done. Topranked enterprise imaging vendors understand functions specific to the legacy vendor and should propose alternative solutions that replicate the same capabilities — or better, improve upon them to further empower users. Proper training can help ease the transition to a new system that should ultimately benefit users through improved information access and consistency.

Some legacy vendors store data in private, proprietary formats. Assuming the legacy vendor provides proper support, it shouldn't be an obstacle to a full migration, This is no obstacle to a full migration, assuming that the legacy vendor provides proper support.

> Radiology studies marked as teaching files on the source system should also be identifiable and usable as such on the target system.

For example, radiology studies marked as teaching files on the source system should also be identifiable and usable as such on the target system. However, the DICOM standard does not have a specific definition for teaching files. It's a common PACS feature implemented in different ways by different vendors. With the cooperation from the legacy vendor, these files can be migrated properly to the new vendor's format. Provided with suitable training, users can quickly adjust to the new method for accessing these files.

6 Should I be worried about security during data migration?

Yes, security should always be a priority. A migration vendor will highlight any opportunities to improve security beyond your current capabilities.

You're responsible for securing the data in your private network as you do for all your internal communication. If data is migrated straight from the legacy archive to the new archive over the hospital network, ensuring a high degree of security is relatively straightforward. The entire migration takes place over a closed loop with the same level of security that the organization affords for all its private records.

> Security should always be a priority. A top-ranked migration vendor will highlight opportunities to improve security beyond your current capabilities.

When migrating data from an on-premises system to a cloud solution (public or private), organizations sometimes use temporary storage to physically move data from the hospital network to the external data center. In such a scenario, the temporary system should offer the same security capabilities of the new vendor's solution. You should secure shipment of the storage system by a carrier with the appropriate security credentials. Once you've completed the data migration at the secure data center, all data on the temporary storage system should be wiped using a method that makes it permanently unrecoverable.

7 What happens to unstructured data? Can it be migrated?

Yes. DICOM is not designed for processing unstructured data, but a wide range of non-DICOM images and videos, radiology reports, paper charts, scanned documents, emails and other documents are often used in making healthcare decisions. Support for these unstructured files is a common requirement for healthcare migration.

A robust enterprise imaging platform is able to support all required documents — even if they weren't available on the legacy system — and the vendor should provide a method for migrating unstructured data into the new system from RIS, HIS or other imaging data sources.

> A vendor with expertise in XDS solutions should be able to import virtually any kind of file that the new system can support.

Cross-enterprise document sharing (XDS) standard provides a means for migrating unstructured non-DICOM data. A vendor with expertise in XDS solutions should import virtually any kind of file that the new system can support. The metadata requirements for importing generic files should be minimal, and the vendor should provide support for all required data sources including HL7, foreign databases, XDS, web services and more.

8 After records have been migrated to the new platform, what happens if data changes on the legacy system?

Data migrations can be long-running tasks, so it's common for users to update records on the legacy system even after those records have been migrated to the new solution. To avoid synchronicity problems on the target system, the vendor should provide a managed migration process and tools that ensure alignment between the legacy system and the new solution as new records are created and existing records are updated.

Changes to legacy data can be identified in various ways. The legacy vendor may be willing to provide updated extracts, or the new vendor can discover changes through C-FIND scans of the legacy archive, standard DICOM protocols or via an IOCM interface. The latter method, significantly simplifies the process.

> The vendor should provide a managed migration process and tools that ensure alignment between the legacy system and the new solution.

Using IOCM, the legacy system is queried to return the metadata for studies that have already been migrated. For each study, a cross-check is performed between the metadata on the legacy system and the target system. If there's a match, the migrated file is still valid. If not, it is deleted and reimported to ensure that the latest updates have been captured.

9 Do we have to wait until the end of the migration before going live with the new system?

No, you don't have to wait until the migration is complete. There are several methods to continue the migration process in parallel with live operations on the new solution. Most of the data to be migrated consists of image pixels. Migration vendors can import all metadata from the legacy system before completing migration of all the pixels.This metadata can be indexed to the studies on the legacy archive. When a user requests an image not yet available on the new system, the pixel data can be imported on demand. In this way, the new system can become productive well before all the image pixels have been migrated.

With only non-pixel data available on the new system, there's a delay as the pixel data is processed by the legacy PACS and sent to the new system. With an optimized migration process, this delay is relatively minor (though still limited by the response time of the legacy system). For best performance, the most recent and most likely to be requested studies should be migrated first. From a clinical perspective, a good target for most organizations is to migrate all data, including pixel data, from the most recent 18 months before going live. The actual volume of pixel data available at the golive date should be defined and agreed upon as part of the migration strategy.

200K+
studies migrated
at peak per day

107
migrations done in
the last 12 months

20PB+
migrated in
the last 10 years

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Philips Enterprise Informatics has performed successful migrations for healthcare organizations around the world, interfacing with practically every major vendor.

Older pixels can be migrated after the new system is live. Typically, migration performance improves at this point since the legacy archive is no longer used for production. The vendor's migration tools should enforce defined protocols to determine which older studies to migrate first, with studies requested on demand given top priority. Philips Enterprise Informatics has performed successful migrations for healthcare organizations around the world, interfacing with practically every major vendor including Sectra, GE Healthcare, Agfa, Fuji, Siemens and more. In many cases, these migrations involved several million medical data records stored in different archives, including EMC, IBM, Dell, HP, Hitachi and many more. When we speak of the top ten customer fears, we speak from experience.

And when we give answers to allay those fears, we're offering best practices developed exclusively by Philips Enterprise Informatics. In project after project, our best practices have proven to simplify and speed migration of the most complete, consistent and useful data available in your organization.

While it's important to consider migration strategies and technologies, the most important question to ask is: Does my migration partner have enough experience? The long-term experience of Philips Enterprise Informatics will help you to deliver a successful migration. Whether you choose a radiology-specific module or add additional modules to serve your entire enterprise, we'll help you unify your imaging ecosystem - from workflow management to the clinical repository, diagnostics, image sharing and analytics.

10 Why Philips?

Since forming a dedicated team in 2015, we've completed 472 data migration projects, with over 400M exams and reports migrated. This includes data ingested from more than 100 different PACS versions. We've worked with all major health systems and vendors. Our experience has resulted in an optimized technical procedure and controlled methodology that work on large data migration projects.

Learn how your data migration project can empower collaborative care across sites, specialties and technologies. To explore our Radiology Informatics solutions, visit philips.com.au/healthcare/solutions/ diagnostic-informatics/radiology-informatics

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Interested to find out more?

We love an opportunity to discuss your needs and how we can partner to create solutions and services that work for you.

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healthcare@philips.com