

A woman with long brown hair, wearing a light blue lab coat, is looking intently at a computer monitor. The monitor displays several medical scans, including a large axial CT scan of the chest and several smaller axial CT scans of the abdomen. The background is a plain, light-colored wall.

PHILIPS

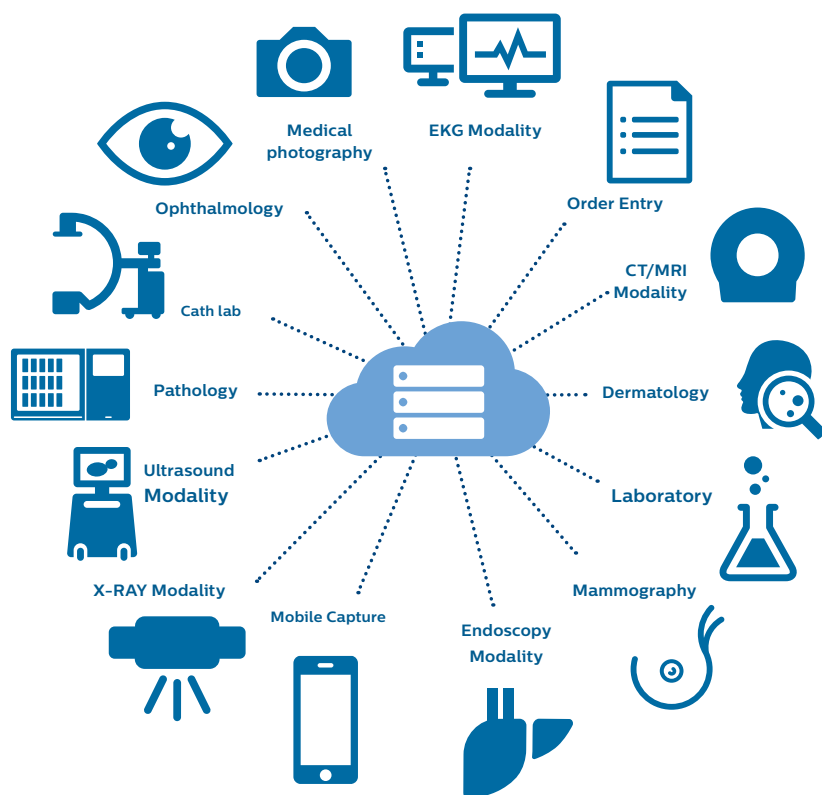
Data migration

Whitepaper

The top 10 questions
IT Managers worry about when
migrating medical data

The best technologies are designed with the future in mind

For healthcare systems that become obsolete or reach their full capacity, the path to more effective care is to migrate data to a more capable system.



Medical imaging data presents a particular challenge, with a plethora of data sources, types, metadata and actual pixels that must be transferred. The data sets may be large; the legacy systems and target system may be very different; but all 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.

Sooner or later, most healthcare organizations will need to upgrade their departmental silos to enterprise imaging solutions to stay up to date with current best practices.

Most healthcare organizations will need to upgrade their departmental silos to enterprise imaging solutions to stay up to date with current best practices.

CIOs and IT managers put a lot of time and effort into selecting the right vendor for their requirements. But what about the data-migration process? It's 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. Either way, everyone involved in a migration project will likely face these 10 fears:

1. Will I succeed in transferring all my data at the original quality?
2. Are there migration costs that must be paid to the legacy vendor?
3. Why is the migration taking so long?
4. Will the migration affect performance of the legacy system?
5. Should I assign internal resources to the project?
6. Some of the clinical functions in my legacy system depend on proprietary data. Will I be able to use those functions in the new system?
7. Should I be worried about security during data migration?
8. What happens to unstructured data? Can it be migrated?
9. What happens if data changes on the legacy system after records have already been migrated to the new platform?
10. Do I have to wait until the end of the migration before going live with the new system?

A top-ranked migration vendor can often deliver a success rate above 99.8%. When the quality of legacy data and storage support is very problematic, the percent of failures can be as high as 10%.

1 Will I succeed in transferring all my data at the original quality?

This largely depends on the data quality at the source. While a top-ranked 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 percent of failures can be as high as 10%. In any case, 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 with an agreement between the new vendor, legacy vendor and customer on how to define and update the migration list and on success criteria for the migration. The process is concluded when a final position has been reached for all studies in 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 — ensuring that the object count is consistent between the legacy system and the new enterprise solution.

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

A significant sample set of data should be used to validate data quality as displayed on the new system before starting the mass migration of the full data set. 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 data-migration project, a top-ranked 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 are also able to provide data-cleansing services that greatly increase the value of the data, ensuring that migrated studies meet your defined gold standard for data quality. Data cleansing options should be customized to the needs of the project depending on your specified requirements, the quality of legacy data, and the 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. Cleansing should be executed first on a representative data sample and reviewed by an application specialist from the new system vendor as well as by your own designated specialists. The full data set should be cleansed only after processing of the sample set yields satisfying results.

2 Are there migration costs that must be paid to the legacy vendor?

Maintaining the support contract with the existing legacy vendor is not mandatory, but is highly recommended insofar as it speeds up the migration and ensure 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.

The responsiveness and quality of support offered by the legacy vendor has a direct bearing on the estimated risk of a data migration.

The feasibility of a migration requires the legacy vendor, at a minimum, 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.

3 Why is the migration taking so long?

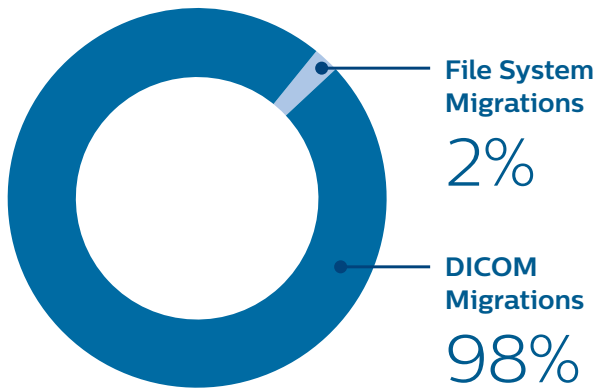
Migration is a critical activity, and should be well-planned in advance by the migration vendor. The plan should set realistic expectations regarding how long the process will take and provide for continued productivity during the migration.

Users will continue to 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 the 2% of migrations that are very large — roughly 2 million records and up — migrating the file system as a whole may be a better option than migrating individual records over DICOM transfer.

For the 2% of migrations that are very large — roughly 2 million records and up — migrating the file system as a whole may be a better option.

However, file system migration requires a thorough understanding of how the files are stored on the legacy system. Responsible vendors will provide the necessary



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

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 for a much faster migration with far less 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 to 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, insofar as possible. Whatever method is used, 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. Full details should be given for 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 performance of the legacy system?

Legacy system performance can be affected. Keep in mind that you are 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 up front, before doing the full-scale migration. The goal is to ensure that the legacy system will continue to perform well for users under the added burden of processing studies for migration. Top-ranked migration vendors are able to forecast legacy system behavior during the quality assurance session and target the bulk of the migration to occur 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.

Top-ranked migration vendors are able to forecast legacy system behavior during the quality assurance session and target the bulk of the migration to occur during off-hours, when the legacy system is under minimal stress.

For example, various DICOM operations are involved in the migration, and these can be optimized in terms of the number of concurrent operations and copies in order to maintain acceptable performance of the legacy system. Test runs can be performed with a given number of studies processed concurrently, and that number can be scaled up or down depending on the resulting impact to 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. On the legacy vendor's side, in addition to securing any necessary support for the migration, you should also keep your service contract active throughout the migration process to ensure availability of the legacy system for users up until the new system goes live.

5 Should I assign internal resources to the project?

Yes. 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 might be one person up to several. It's important to identify suitable QA resources. They must have a thorough understanding of the data that clinicians need to do their jobs well, and they must assume responsibility for green-lighting the data that is transferred in order 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 take care not to overburden these people, who are performing work beyond their normal responsibilities. Since QA cannot 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.

6 Some of the clinical functions in my legacy system depend on proprietary data. Will I be able to use those functions in the new solution?

Users who are 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. Top-ranked enterprise imaging vendors understand functions specific to the legacy vendor and should be able to 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.

There may also be legacy vendors who store data items in a private, proprietary format. This is no obstacle to a full migration, assuming that the legacy vendor provides proper support.

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

For example, radiology studies that are 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 that is implemented in different ways by different vendors. With the cooperation of the legacy vendor, these files can be migrated properly to the new vendor's format; and with suitable training, users can quickly adjust to the new method for accessing these files.

7 Should I be worried about security during data migration?

Yes, security should always be a priority, and a top-ranked migration vendor will highlight any opportunities to improve security beyond your current capabilities. You are responsible to secure 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, and a top-ranked migration vendor will highlight any opportunities to improve security beyond your current capabilities.

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

8 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.

The Cross-Enterprise Document Sharing (XDS) standard provides a means for migrating unstructured non-DICOM data. A vendor with expertise in XDS solutions should be able to 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.

9 What happens if data changes on the legacy system after records have already been migrated to the new platform?

Data migrations can be long-running tasks, so it's common for users to be updating 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 may be able to discover changes through C-FIND scans of the legacy archive, through standard DICOM protocols, or via an IOCM interface. The latter method, used by all top-ranked vendors, 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.

10 Do I 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. Top-ranked migration vendors are able to 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 that is 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

Philips is your **migration expert**

75K

studies migrated every day

89

migrations done in the last 12 months

11PB+

migrated in the last 10 years

migration process, this delay is relatively minor (though still limited by the response time of the legacy system). However, for the best performance, the studies that are most recent and most likely to be requested should be migrated first. From a clinical perspective, a good target for most organizations is to have migrated all data, including pixel data, from the most recent 18 months before going live. The actual volume of pixel data available at the go-live date should be defined and agreed to as part of the migration strategy.

A good target for most organizations is to have migrated all data, including pixel data, from the most recent 18 months before going live.

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 being used for production. The vendor's migration tools should enforce defined protocols to determine which of these older studies are migrated first, with studies requested on demand given top priority. Philips Healthcare Information Solutions has performed successful migrations for major healthcare organizations around the world, interfacing with practically every major vendor including GE,

Siemens, Change Healthcare, IBM Merge, Agfa, Fuji, Sectra, Acuo (Hyland) 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.

Philips Healthcare Information Solutions has performed successful migrations for major healthcare organizations around the world, interfacing with practically every major vendor.

And when we give answers to allay those fears, we're offering best practices developed exclusively by Philips Healthcare Information Solutions. 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 this: Is my migration partner experienced enough?

The long term experience of Philips Healthcare Information Solutions will help you to deliver a successful migration. Whether you choose a radiology - only module or add additional modules to serve your entire enterprise, we'll help you truly unify your imaging ecosystem - from workflow management to the clinical repository, diagnostics, image sharing and analytics.

Learn how your data migration project can empower collaborative care across sites, specialties and technologies. Explore the Clinical Collaboration Platform and schedule a personal consultation today at www.philips.com/collaboration

