HEALTHCARE ARCHIVAL STRATEGY WHITEPAPER

Author:
Robert Downey
Vice President, Product Development
Galen Healthcare Solutions

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Abstract

Healthcare organizations face unique requirements when it comes to retiring clinical systems. Understanding the various approaches to extraction, transformation, and storage of the contents of clinical systems is critical to correctly assessing their suitability for a usable and compliant healthcare data archival.

Key takeaways:

- Migrating data to a new EMR is not an archival strategy
- The ability to offer robust legal and clinical archives can be greatly affected by approaches to extraction, transformation, loading and storage of data.
- It is common for solutions to make significant tradeoffs, often sacrificing end-user accessibility for implementation speed and cost or visa versa
- Generic archival tools that are not specific to the healthcare industry often fail to deliver on the needs of clinicians and HIM teams without significant post archival effort

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Analyzing the spectrum of options from a legal and clinical perspective

A Symptom of a Maturing Healthcare IT Landscape

If 2010 was the year of EMR implementations and optimization driven by initiatives like Meaningful Use, the ARRA, and Obamacare, then 2015 might be known as the year that clinical application retirement became a big topic for many mature healthcare organizations. It's predicted that by 2020, 50% of all healthcare organizations will be on their second EMR.[i]

Application retirement is nothing new. Large organizations from all industries have had application retirement strategies in place (typically doled out by expensive consulting companies with fancy matrices, methodologies, and graphs in tow) for a decade or more. Any time an organization outlives a large IT system (or, in many cases, that system's vendor), retirement becomes a pressing need. These systems are costly to maintain and represent an ever-growing, significant liability the longer they exist. In the case of healthcare, the two largest driving factors forcing clinical application retirement are the consolidation of organizations into large integrated care delivery networks and general aversion to their existing electronic healthcare record systems.

Analyzing the merits of abandoning a system as central to the operation of a modern practice or hospital as an EMR is outside the scope of this analysis. Nor will the complex factors causing a furor of merges and acquisitions over the past few years be discussed because the point is moot. That ship, so to speak, has sailed. As it stands today, your organization has an enormous sum of money tied up in infrastructure, software licensing, and support costs for one — or many — clinical system that are now deemed "legacy."

Unfortunately, retiring those legacy systems is not as simple as shuttling users to a shiny new EMR and flipping the power switch. Those legacy systems have countless millions of dollars' worth of critical information in them, both from a continuity of care point of view and from a harrowing legal perspective. There are rules, some specific, some vague, about retaining this data. Indeed, the task at hand can be so confusing at times that many organizations punt on the entire issue and just keep those legacy systems on minimal life support. Minimal life support doesn't always equate, however, to minimal cost and risk.

Unsurprisingly, software and consulting companies are rushing to the specific archival needs of healthcare organizations. The various approaches taken can differ fairly dramatically, and they're worth analyzing in depth.

Migration and Archival – Not Migration Versus Archival

One question that often comes up early on in the process of clinical application retirement: is archival necessary if the data in the application is being migrated into a new EMR? Conversely, one might wonder whether the cost of a migration is worth it when the archival solution being considered supports a form of continuity of care solution like easy single sign-on from the new EMR. In most cases, it turns out that the best and most cost effective approach is migration *and* archival.

Why Not Just Migrate?

The process of EMR data migration almost always results in some fairly fundamental alteration of the legacy EMR data. The underlying data models used by EMRs differ greatly from one another, and it's not a matter of export/import. Instead, it's a true ETL process – extract, *transform*, load.

The shape of the data is changed. Sometimes data types undergo conversions, such as a number to a string, which, if done poorly, can result in loss of precision. Data sets, such as order codes, result codes, diagnosis categories, note types, and various other types of dictionaries are mapped from the values in the legacy EMR to the values used by the new EMR. Fields that have no apparent corollary in the new EMR are often just ignored altogether. It's frequently not possible to

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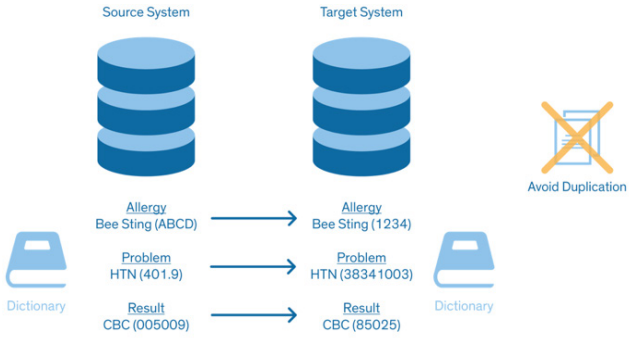
know for sure what the data actually looked like in the legacy system once this process is complete and the legacy system has been sunsetted.



From a clinical perspective, it's probably not useful to take 15 years of legacy data and load that directly into your new EMR. Most organizations opt for something more likely to be relevant, while still preserving patient safety, perhaps three to five years of data. Although the state and federal requirements for archival are clear on how long you need to preserve data (from six years to *forever*, depending on a variety of factors), they aren't nice enough to say that the data you need to preserve is limited to what is currently clinically pertinent. In other words, that 10-year-old test result is still, technically, part of the legal medical record.

Some EMR vendors will even expressly limit the mechanisms for data import to something like a CCD (clinical continuity document) import, which inherently limits the scope and quantity of available data that can be preserved. On top of vendor restrictions, there are two significant data sets that are rarely if ever included in a migration effort: audit trails and clinical item version history.

Audit trails are fairly self-explanatory, and it would seem like a simple process to bring this over as part of a migration, but EMR vendors generally are not on board with customer manipulation of the legal audit trails in their applications.

Virtually all forbid that type of data import. In many EMRs, it's possible to do a bulk export of this data and store it separately, perhaps in a spreadsheet, but correlating that audit data with contextual information that was in the EMR can be difficult.

The other major data set not included in data migrations is the version history for individual clinical items. A common example of this is for visit notes. Most note workflows include multiple edits to a visit note. Perhaps a nurse starts the note as the beginning of a visit, a doctor adds some relevant content during the face to face with the patient, and another clinical staff member adds additional content after hours. Each time this note is saved, it's usually a *copy* that's saved.

There is a good reason for this – it shows who made exactly which changes, and it shows what information was present in the EMR at a given point in time. Clinically, the most relevant data is usually the most recent, although there are certainly exceptions to this. Legally, having that "point in time" view is frequently critical. That's one big reason why virtually all EMRs do this type of versioning or change history for almost all important clinical documentation. It's also why your organization should not be quick to ignore this data during a retirement. It's possible, perhaps even likely, that you won't ever need it, but, as the sophistication of clinical documentation has increased, so too have the lawyers requests for information when litigating cases and issuing eDiscovery requests.

Consider the following example data set, which demonstrates how data can change in legally *and* clinically relevant ways and yet would *not* be captured by a migration.

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Version	Problem Diagnosis Database Record	
3 (Latest)	{ "Created": "2006-12-28T09:13:49", "Updated": "2009-04-05T10:04:12", ← Updated "LastUpdatedBy": "MD Howell, Chris", ← Updated "Recorded": "2006-12-28T09:13:49", "OnsetDate": "2009-03-22", ← Updated "Diagnosis": "Myocardial Infarction (lateral wall)", "DiagnosisCode": "I21.29", "View": "Chronic" }	"Unsafe" Change
2	{ "Created": "2006-12-28T09:13:49", "Updated": "2006-12-28T09:13:49", ← Updated "LastUpdatedBy": "MD Smith, John", ← Updated "Recorded": "2006-12-28T09:13:49", "OnsetDate": "2006-11-14", "Diagnosis": "Myocardial Infarction (lateral wall)", "DiagnosisCode": "I21.29", "View": "Chronic" ← Updated }	"Safe" Change
1 (First)	{ "Created": "2006-12-28T09:13:49", "Updated": "2006-12-28T09:13:49", "LastUpdatedBy": "MD Levine, Elizabeth", "Recorded": "2006-12-28T09:13:49", "OnsetDate": "2006-11-14", "Diagnosis": "Myocardial Infarction (lateral wall)", "DiagnosisCode": "I21.29", "View": "Active" }	Initial Data Entry

In the above example, which is admittedly oversimplified for clarity, we have a patient who was diagnosed in December of 2006 (version 1) with a myocardial infarction. This version represents the initial data entry into the EMR by Dr. Elizabeth Levine. Note that the onset date was documented as November 14th, 2006. In version 2, Dr. John Smith modified the diagnosis to change the view in which it appears. This change is probably not clinically or legally relevant, so the loss of this information during a migration is likely not a serious issue. Version 3 (updated on April 5th, 2009), however, shows that Dr. Chris Howell changed the onset date for the diagnosis to March 22nd, 2009. Imagine that, in this case, it was due to the patient having a second heart attack, and when this fact was learned by the provider, they decided to update this existing heart attack diagnosis with the most recent incident date.

This likely represents improper usage of the EMR, as this diagnosis should have been resolved or put in a past medical history category, and a new diagnosis should have been recorded. For whatever reason, that did not occur. This change has significant clinical implications, as each heart attack a person suffers increases the risk of subsequent heart attacks and may require modifications in treatment plansii. The loss of this information represents a gap in your organizations' ability to protect itself from litigation as well as your ability to ensure patient safety.

So why don't migrations include this data too? It's complex and expensive and, in many cases, not possible for the same reasons that audit trails are not possible.

Why Not Just Archive?

Clearly, a migration isn't going to cover all of the legal scenarios, and if the archive has everything we need legally *and* clinically, why not just skip that time-consuming and expensive migration process and only archive. Primarily, it's because an archive-only approach means abandoning millions of dollars' worth of hard-won documentation and all the automation and analytics that goes with that once the transition to the new EMR is complete.

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An EMR is a lot more than a place to store clinical documentation. Virtually all modern EMRs have substantial functionality surrounding clinical decision support, health maintenance planning, and quality reporting. They also often are crucial sources of data for analytics suites that are the pillars of population health management. In short, not maintaining the easy availability of this data inside the active EMR is akin to having used paper charts up until your latest and greatest EMR was available. That's not a reality that most organizations are comfortable with. One could certainly argue that much of the data in some EMRs, especially those that were implemented very early on in the transition to electronic records, contain a significant amount of "junk" data that ends up hurting more than it helps when migrated to a new system. Although that can be true, it also varies greatly on a patient by patient basis, and making a decision to abandon all data due to some bad data is rarely sound.

It's certainly possible to bring over data in a manual, piecemeal fashion as patients are seen or based on some other reasonably predicable event whose workflow can be augmented. This will, eventually, patch up the gaps in data that not performing a migration results in. If your organization is willing to suffer the significant, but probably short to medium term repercussions of temporarily losing this data in your EMR and related operational data repositories, then migration might not be necessary.

The decision to only archive should be based on hard numbers, however, not guesswork. Quantify the costs involved (patient safety issues, empty health maintenance plans, lack of population health management, the chance for data entry errors when re-entering data, inevitable penalties related to duplicate or missing testing, etc.) and weigh that against the cost of a data migration. In many cases, data migrations are far less costly than any attempt at manual population of data when all these factors are considered.

Factor	Typical Cost
Manual Chart Data Re-entry	$8 to $30 per chart[iii]
Manual Chart Data Re-entry Duration	17 to 64+ minutes per chart[iv]
Test Duplication & Treatment Delays	$1,100 per incident[v]
Incomplete Chart Information	$96 per patient[vi]

Not All Archives Are Created Equal

Inside the world of data archival, there are nearly as many different *types* of archives as there are vendors. Many of the existing archival solutions that have gained popularity with large healthcare organizations are ones that are also frequently utilized by other sectors and often claim to be able to "archive anything." This can be very appealing, as an organization going through a merger will often retire dozens or even hundreds of systems, some clinical, but most only tangentially related to the delivery of care. HR systems, general ledger financial systems, inventory management, time tracking, inventory tracking systems, and CRMs are just a few of the systems that might also be slated for the chopping block. The idea of retiring all of these into a single logical archival solution is very appealing, but this approach can be a dangerous one. The needs of healthcare organizations are not necessarily the same as the needs of other sectors.

Some factors that make healthcare different include:

- Highly complex data models and knowledge domains
- The common need for specialized user interfaces to properly visualize the data
- The continuing need for clinicians to seamlessly access the archived data with minimal workflow interruption
- The incredible variety of source systems that are in need of archiving
- The lack of data format standards to make it easy to determine what needs to be archived
- The need for HIPAA and HITECH compliance (encryption, auditing, etc.)
- The massive size of the data to be archived
- The need to frequently add new sources of data to an existing archive as the organization expands
- The frequent need to rapidly produce specific subsets of archived data during an eDiscovery proceeding or other legal compliance scenario

From a legal perspective, the one-size-fits-all archival solutions almost certainly cover you. But when your

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organization is faced with an official request for records, or in the event that a clinician requires access to data that is only accessible in the archive, you will often be faced with large, unexpected costs related to the access and retrieval of the archived data. Under the pressure of an eDiscovery request, your organization will take on the daunting task of understanding your already "retired" legacy EMR's data model.

Five Point Comparison Methodology

To understand why some archival approaches are superior to others, it's useful to visualize the way each of the solutions extract, store, and visualize data. The methodologies used typically trade fidelity (how well it preserves the original shape and precision of the data) for accessibility (how easy it is to get at the information you need), and they trade how easily the solution can archive disparate sources of data (such as archiving both an EMR and a time-tracking system) with, again, accessibility. The primary considerations used in this methodology are as follows:

Extraction / Load Implementations
The expense and duration of loading a particular legacy system's data into the archive. For some vendors, this can vary based on the legacy system in question.

Data Visualization Implementations
The expense and duration of implementation to visually present information from the archive to the end user. Sometimes, this expense is baked into the Extraction / Load Implementation, as the data is loaded into a solution with pre-built visualizations.

Data Fidelity
How complete the data set is relative to the original data source. Clinical continuity often requires a subset of compliance and legal data sets. Transformation and mapping reduces data fidelity.

Accessibility (Clinical)
The ease with which a clinician can access archived information to facilitate care delivery or other clinical tasks. This includes operations such as finding a particular record, as well as drilling down and filtering data within that record. It also encompasses how closely the data is visualized relative to what a clinician expects.

Accessibility (Compliance)
The ease with which a compliance officer or legal team member can analyze data pertaining to audit trails, change history, or clinical data to answer internal or external requests for records, as well as produce records in the format demanded. This can be especially critical during eDiscovery windows.

There are certainly other ways to judge an archival solution. For instance, an important factor may be whether or not the solution is hosted by the archival vendor on-premises or remotely. Some factors, such as the reliability of the system, service level agreements, or its overall licensing cost are big inputs into the equation as well, but those aren't necessarily specific to the overall archival strategy utilized by the solution. There are also factors that are so critical, such as security and regulatory compliance, that deficiencies in these areas are deal-breakers.

Now that we have the criteria with which to judge the solution, let's delve into the specific archival strategies being used in the marketplace. This may not be a comprehensive list, but it does encompass most of the larger vendors as well as current market leaders in the healthcare sector.

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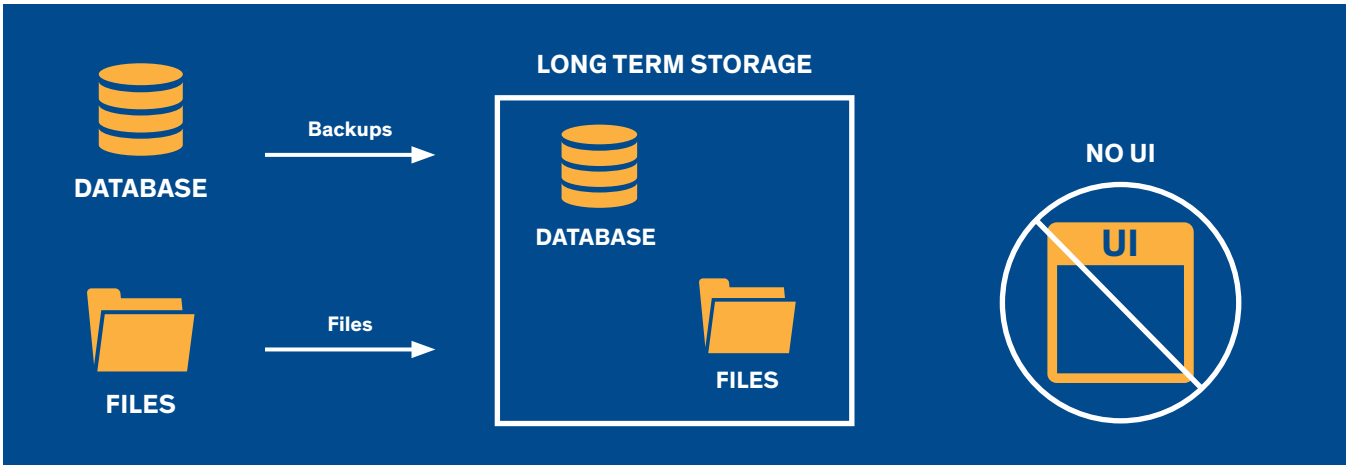
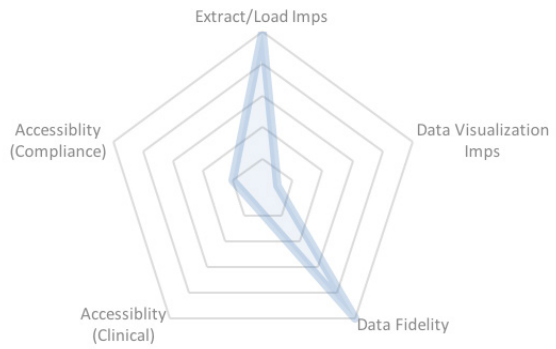
Raw Data Backups



A shockingly large number of organizations treat raw data backups of the various databases and file systems as their archival solution. There are some scenarios in which this may be good enough, such as when the source system is not so much being retired as it is being upgraded or otherwise still maintained. Another scenario might be when the data in question comes from systems so well known that the organization won't have significant issues retrieving information when it becomes necessary.



The greatest benefit to this approach is that acquiring the data is fairly trivial. Underlying data stores almost always offer easy built-in backup mechanisms. Indeed, the ability to back up data is a certification requirement for EMRs, as well as a HIPAA and HITECH legal requirement. This strategy also offers "perfect" data fidelity, as the data is in the raw, original format.

Once it actually comes time to access the "archived" data, however, the organization is forced to fully reverse engineer the underlying database schemas and file system encodings. This leads to mammoth costs and protracted timelines for even simple data visualization, and it's a major undertaking to offer any kind of significant direct clinician or compliance access to data.

Another danger with raw database backups is that many clinical system vendors have language in their licensing related to the "reverse engineering" of their products. So while it may be "your" data, the vendor may consider their schema intellectual property — and the act of deciphering it, not to mention keeping a copy of it after the licensing agreements with the system vendor have been terminated — may well be a direct violation of the original licensing agreement.

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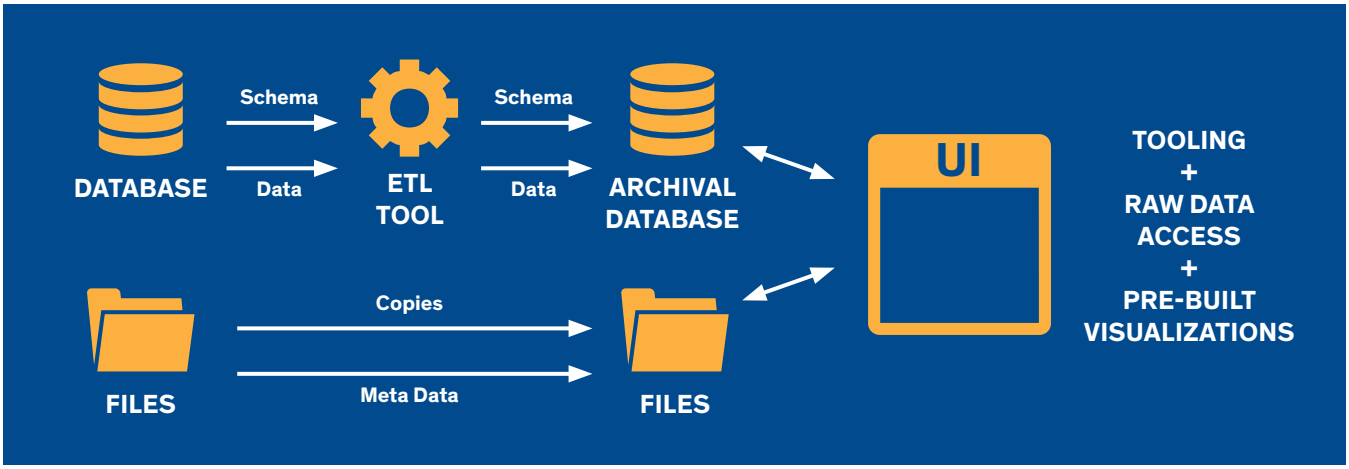
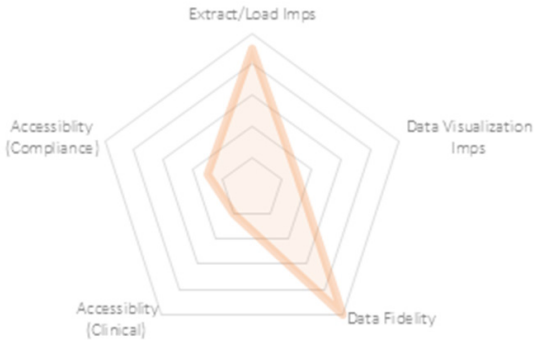
Extracted Schema Stores



This is a very common and popular mechanism that is leveraged by many of the largest enterprise archival solutions. Under this method, the archival vendor targets data storage technologies rather than specific applications, and they might provide "connectors" for Microsoft SQL Server, Oracle, IBM DB2, Intersystems Cache, MySQL, and various other database systems. When the connector is pointed at a particular system's database, it extracts the shape of the data directly from the database itself and replicates that shape to its own data repository. It then copies the data, bit by bit, from the original vendor database into the archival "mimic" data store.



Sometimes the archival storage mechanism is not relational, and the archival vendors may utilize a proprietary file format for storage. Others leverage a standard format such as OAIS[vii], which utilizes a particular set of XML schema rules to describe archived data. Regardless, the shape of the data is always determined by the data source, not the target archival storage mechanism.

This approach allows the solution to archive virtually any type of application, as almost all enterprise applications leverage a common database storage technology such as the ones listed above. No data model is manually created ahead of time, nor does the existing data model need to be understood in any significant way, which means there is very little effort during the extraction or loading phases of implementation.

In addition, the data is usually exactly the same as it was in the source system. No significant transformation of data types occurs, nor is there generally any mapping of source values to target values. This makes initial implementation less expensive. This also means that virtually any type of source system can be archived into the same logical archive, even totally novel sources of data that the archival vendor has never encountered before.

The downside of this approach is that it is essentially kicking the can down the road. While many archival vendors utilizing this approach offer some type of basic data visualization tooling, it's not generally suitable for non-technical end-users. Clinicians and compliance users must wait for

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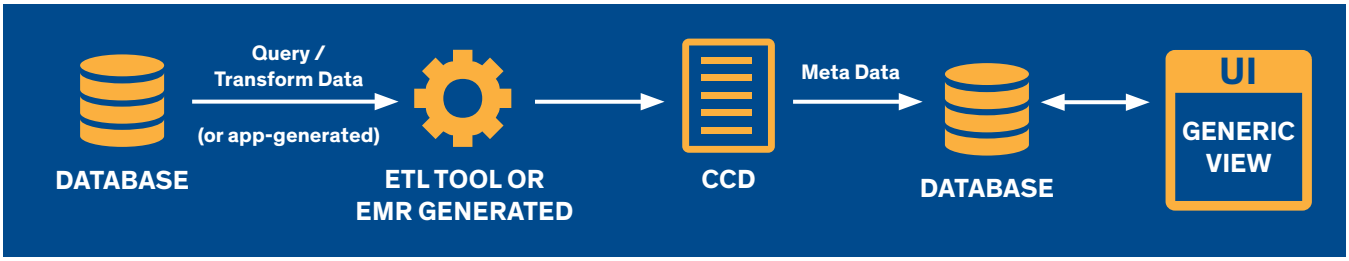
domain experts that understand the data models (and the vendor tooling) to create report-type visualizations with the requested data. In effect, the archival vendor has shifted the cost and responsibility from the initial extraction/load implementation to a post-archival visualization implementation, and, in many cases, that must be done by the organization itself.

Most vendors utilizing this strategy will offer some types of pre-built visualizations for popular archival data sources. These may or may not be included in the initial licensing for the solution. Furthermore, in many cases, these pre-built offerings still require mapping and transformation work even for well-known source systems, further disguising the true cost of the solution. The end result is that the accessibility of the data can be hit or miss and will vary dramatically based on the source system that was archived.

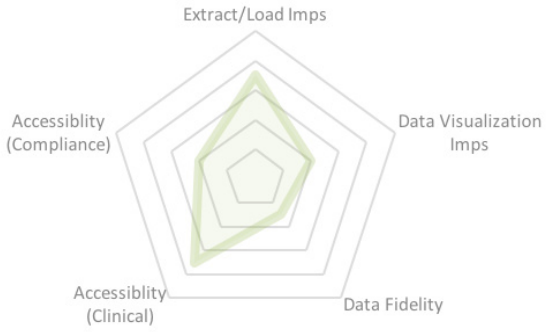
As the data that is provided to both clinicians and compliance users is data derived from visualizations in many cases created by the organization itself, the fidelity of the data will only be as good as the domain expertise of the individuals who built the visualizations. This is less of a factor when it comes to archival vendor-provided visualizations.

This approach can also potentially run into the same intellectual property issues as the raw database backup strategy, although legal action from the system vendor seems unlikely. A database is usually made up of schema (the shape of data), logic (business rules), and data. Without the business rules, the intellectual property rights applying to the schema alone are very debatable.

Modeled Document



The most common form of modeled document used in healthcare is the continuity of care document[viii] (CCD), but this strategy is not limited to a particular format. The key aspect of this approach is that the document format used is predetermined, and the data being extracted from the source systems must be normalized and transformed to fit the target document schema. This transformation is usually limited to shape changes, rather than the more problematic mapping involved during data migrations of fully modeled archival systems.



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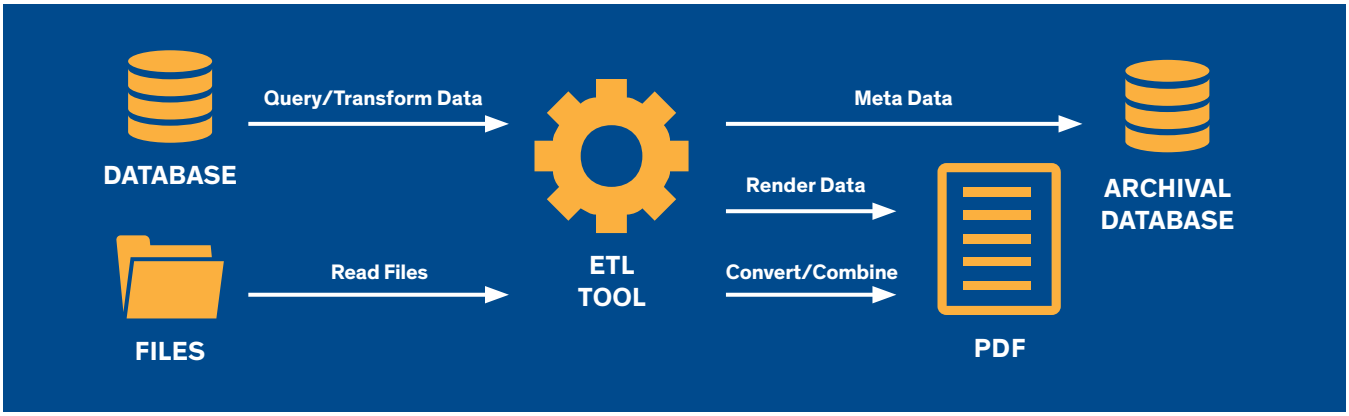
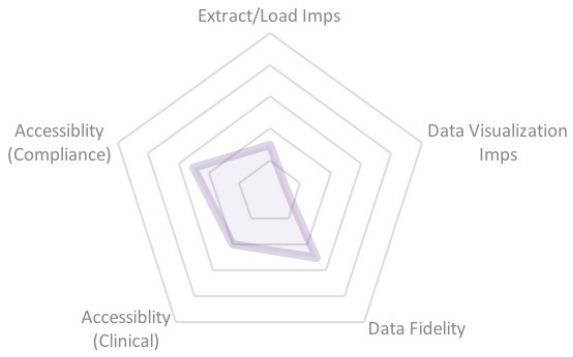
Normally, this requirement to transform and normalize would have significant downsides from an extraction and load perspective, but this strategy is most commonly used with a format natively supported by the source system itself. Virtually all EMRs support exporting clinical data in the form of a CCD. Indeed, the fact that this is a typically well-supported mechanism for data export from an EMR is the primary driving factor behind its use. The resulting documents may be stored in a generic document management system that facilitates the indexing of the documents for retrieval. Alternatively, such documents may be fed through some kind of rendering solution that understands the document format so that its contents can be displayed to end-users. These rendering solutions, especially for formats such as CCD, are common and widespread. As a result, this approach has good accessibility for clinical users, and, depending on the mechanism for indexing and display of the documents, the implementation phases are often on the shorter side of the spectrum.

The downside is that CCDs and similar formats were never designed for archival purposes. They were designed to serve as clinical summaries, not a full patient record, and, as such, they often miss significant portions of clinical data. They are also generally not supported by standalone practice management solutions or imaging repositories, which means a different archival mechanism is required for those systems. Data included in the clinical summaries will be bereft of critical information needed for compliance, including audit trails and version histories. These factors make it very difficult to use this strategy alone as a complaint legal archive.

Non-Discrete Indexed Document



This approach is most commonly in the form of a PDF export of data in a pre-rendered format that is suitable for direct consumption. As PDFs by themselves may be fairly difficult to discover, they're almost always imported into a document management system with some type of associated metadata. This metadata is used to index the PDFs so they can be more easily retrieved by end-users. The data inside the document is not stored in a way that easily allows for discrete data operations. Data is viewed in an all-or-nothing manner, with no easy ability to sort or filter.



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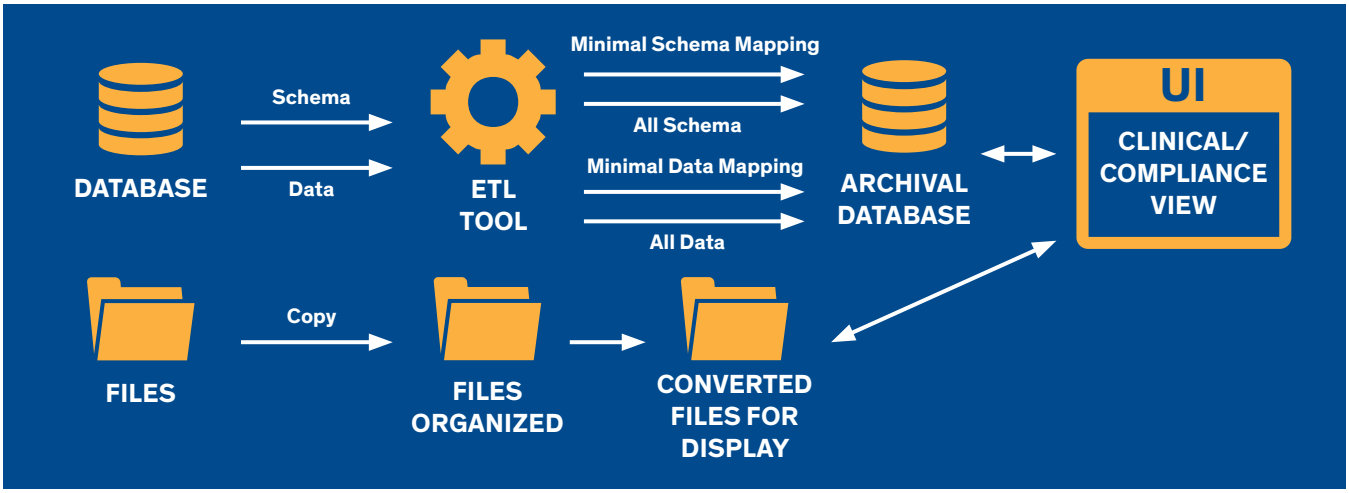
This method is particularly popular with organizations that already use a document management system, especially when that system has good integration with clinical and other supporting systems. This provides fairly seamless access to the archived data. It's also reasonably good at capturing data from practice management systems, although it can be more problematic for that type of data, as it is common to require reporting or Excel exports of financial data for analysis. A PDF export is not well-suited for this.

In some cases, no separate document management system is utilized, and, instead, the data is loaded directly into the new electronic healthcare record system. This reasonably satisfies scenarios of clinical continuity.

Unless the source system has the ability to export data natively as a PDF or other type of pre-rendered document, substantial up-front implementation cost and time is usually involved in extracting the data and rendering it. The PDF output has a particular layout and shape, and this can be thought of as a model that must achieve a normalized format. Even in cases where the source system is capable of producing this output, there are often significant limitations as to what data is included. It is common for imaging data to be excluded in the output of the documents, thereby requiring a separate strategy.

Lastly, the documents almost never include version history information, making it difficult to handle certain legal scenarios. Auditing data would typically also not be included in most PDF exporting capabilities, so, like imaging data, auditing data would require another archival strategy. This further complicates legal scenarios, as it's frequently necessary to correlate patient chart data with audit trails. Having these archives disconnected makes such a process very challenging.

Hybrid Modeled / Extracted Schema



To address the inherent deficiencies of an extracted schema-based archive while also preserving its benefits, some vendors have utilized a hybrid approach in which a minimum subset of data properties are mapped during the extraction/load process to their equivalents in the archival data model.

These properties facilitate clinical and legal workflows, and they often include critical common data attributes such as date of service, ICD codes, item authors, and flags related to visibility and security. Data is generally stored in similar logical containers in the archive as it was in the source system. In other words, storage is broken up into problems, allergies, medications, claims, transactions, etc. Archival solutions that utilize this approach are therefore industry-specialized.

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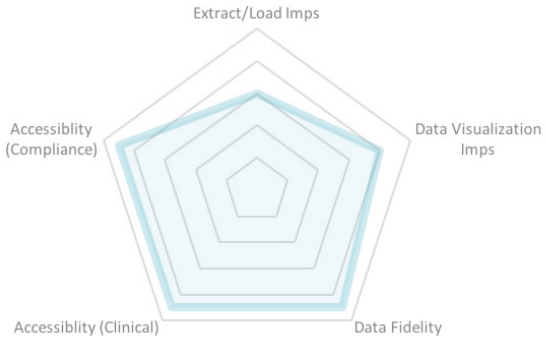
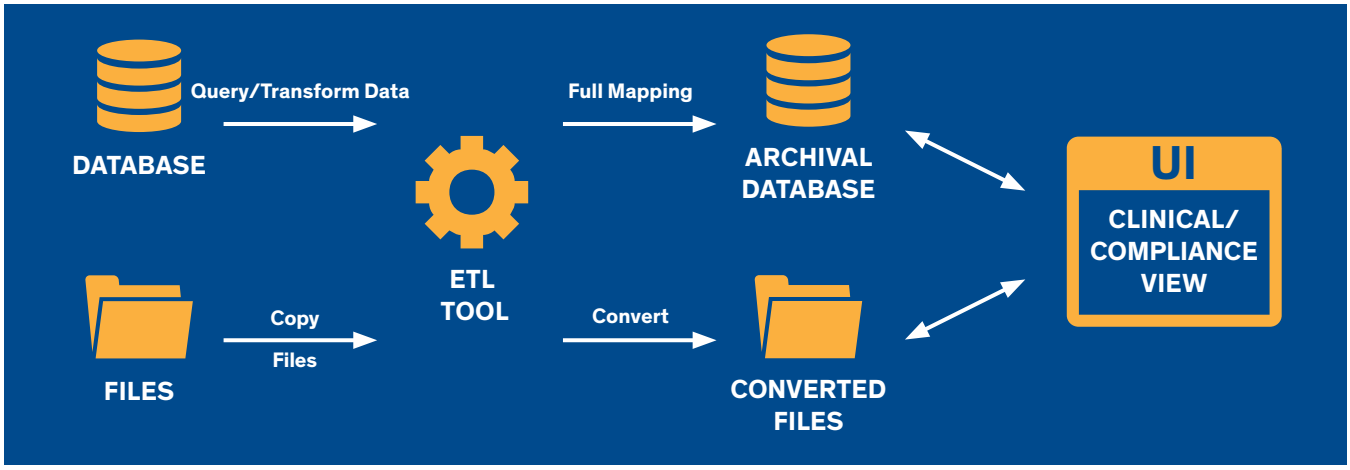


Virtually all other properties and their schema are stored verbatim in the archive, meaning no knowledge of their meaning or structure is necessary for their archival. This method still requires significant domain expertise for each type of source system. Unlike straight schema extraction, this mechanism requires that the extraction understand key elements of the source system's data structures. For example, a diagnosis in an EMR may be made up of data from a half-dozen different tables, and those tables must be joined together to give a logical and complete data element for archival. This can drive up the cost, especially if the vendor hasn't previously extracted data from a particular source system.

The benefits of having key properties in a normalized, well-known data structure are substantial. Doing so results in a moderately expensive extraction and load phase, as well as one that can vary by source system type, but it will generally be less expensive and time-consuming than something like a full data migration or a load into a fully modeled archival solution. It also allows the vendor to provide a familiar clinical experience as well as a highly focused compliance solution out of the box, rather than requiring significant data visualization efforts after the load has been completed.

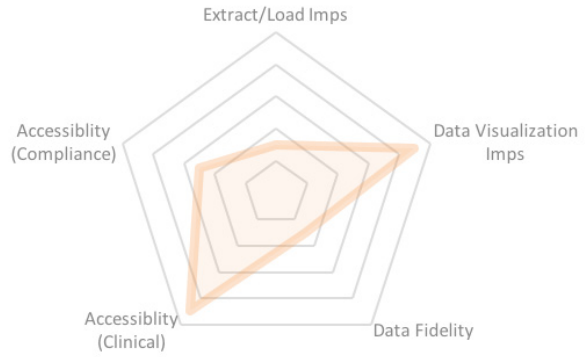
The fact that only a small subset of properties undergoes any type of transformation or mapping means that the data fidelity is kept high, although not as high as a raw backup or extracted schema store. The small amount of normalization also generally insulates this strategy from intellectual property concerns.

Fully Modeled



A common approach utilized by healthcare-specific archival solutions is to create a lightweight EMR and practice management schema that includes the most common data attributes from many different source system vendors and then map the data in the source system to this fully modeled schema. The mapping involved is usually limited to field-type mapping rather than dictionary mapping, although occasionally, dictionary data which feeds user interface aspects such as grouping (problem categories, for instance) may require some high-level mapping.

Analyzing the spectrum of options from a legal and clinical perspective



This approach usually yields excellent clinical accessibility because the vendor can create highly focused clinical workflows just like an EMR vendor can. Since these visualizations don't need to be created or altered based on the source system being archived, it means that there is generally no data visualization implementation cost.

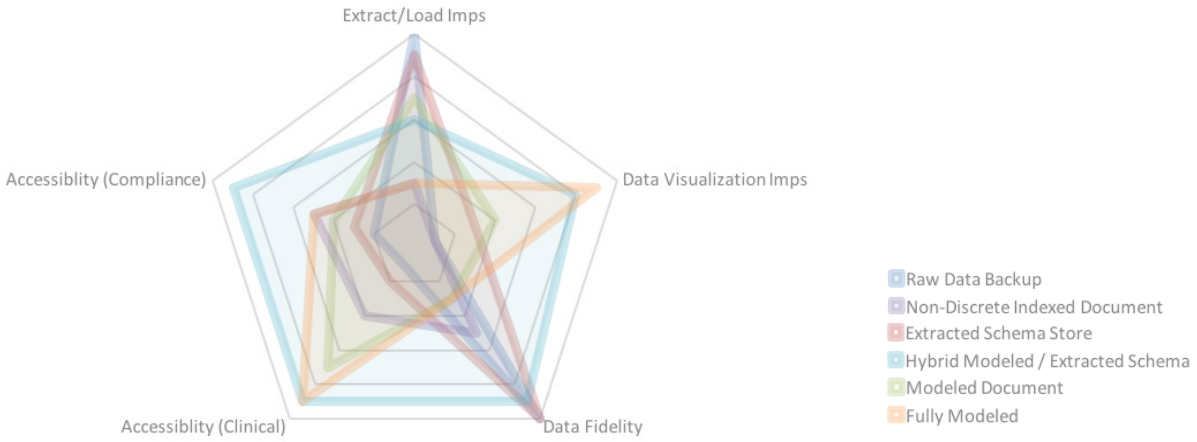
As the mapping is limited to the schema, the extraction and load phase is usually not as expensive as a full EMR data migration, but because every required source field must have a place in the target archival schema, the process is typically more time-consuming and expensive than the hybrid modeled / extracted schema or non-discrete document approaches. That said, vendors that have a solid library of extraction processes for various source systems can often offer lower initial implementation costs than would otherwise be possible.

The compliance accessibility and data fidelity of this strategy can be problematic, however, as unknown fields are often dropped and data types are frequently normalized. This fundamentally alters a substantial portion of the data being archived in the same way that a full data migration can — although, again, not as severely given the typical lack of data dictionary mapping requirements. In some cases, vendors will recommend that a full backup of the original data be kept in addition to the "live" archive, providing some level of data fidelity problem mitigation. Should a compliance request require this information, however, the organization may be left in a similar position to those utilizing raw data backups or extracted schema stores with no pre-built visualizations.

Archival solutions utilizing this strategy may also frequently require augmentation by the vendor as new sources of data are encountered. This can make the implementation phase longer, as those changes typically need to happen before any data can be loaded.

Analyzing the spectrum of options from a legal and clinical perspective

Summary



It's tempting to jump to the conclusion that the Hybrid Modeled / Extracted Schema strategy is the clear winner, but each organization has different requirements that may mitigate the superiority of this particular strategy. There may already be a strong relationship with an archival vendor that uses a different approach, or perhaps your organization is engaged in a simultaneous data migration, and going with a vendor that does both migration and archival can offer significant cost savings. Whatever the factors, there will never be a one-size-fits-all solution across organizations, and even within an organization, when determining the strategy for multiple systems.

Another key takeaway is to always be wary of all the "phases of implementation." Many vendors will attempt to win deals with quick and inexpensive initial implementations, but they leave significant work for when the data actually needs to be visualized in a meaningful way. That task either falls on the organization, or it must be further contracted with the archival solution provider.

It also is valuable to consider solutions specifically designed for archival purposes and, ideally, one that focuses on the healthcare sector. There are simply too many archival-specific scenarios to utilize a general purpose data backup, and many organizations find that the healthcare-specific requirements make general purpose archival products ill-suited for their needs.

References:

i https://www.galenhealthcare.com/wp-content/uploads/2016/07/EMR-Archival-Infographic-Healthcare-Data-Archival.pdf

ii https://www.nhlbi.nih.gov/health/health-topics/topics/heartattack/lifeafter

iii Based on analysis of customer-reported data. Data entry typically done by an RN with an average pay rate of $28/hour.

iv Based on analysis of customer-reported data.

v https://www.ajg.com/media/72413/Duplicate-Patient-Records_healthcare.pdf

vi https://www.ajg.com/media/72413/Duplicate-Patient-Records_healthcare.pdf

vii https://en.wikipedia.org/wiki/Open_Archival_Information_System

viii https://en.wikipedia.org/wiki/Continuity_of_Care_Document

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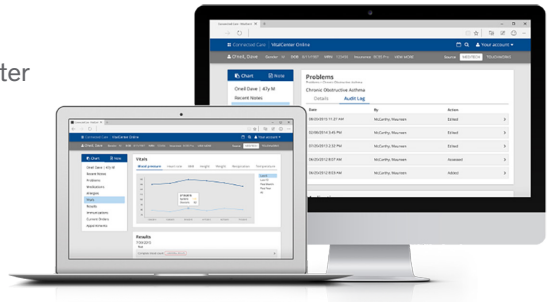

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