

An Imaging Operations Perspective

HL7 vs. FHIR

The interoperability decision every imaging operation is facing

Why integration protocol choice has become an operational and compliance question — not just an IT footnote.



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HL7 v2

Est. late 1980s · Message-based
Powers today's operational core — orders,
scheduling, results

Most imaging organizations
will need both — for years.

FHIR

Built on 20+ years of HL7 lessons ·
Resource-based Powers patient access,
AI integration, cross-org exchange

Chapter 1

Chapter 1 — Interoperability has quietly become a leadership decision

In nearly every imaging technology evaluation happening right now — a hospital replacing its enterprise imaging platform, a teleradiology group expanding into a new region, an independent imaging center adding its fifth site — one question keeps surfacing earlier in the conversation than it used to: how does this system handle HL7 and FHIR interoperability?

On the surface, it sounds like a technical question. In practice, it's become a strategic one. The answer affects how quickly an organization can onboard referral partners, integrate AI tools, meet evolving interoperability requirements, support patient access initiatives, and scale without accumulating years of integration debt.

That question used to live in an IT appendix, several pages behind the workflow demo. Increasingly, it opens the meeting. IT leaders ask it because integration debt compounds with every new interface. Compliance officers ask it because U.S. information-blocking rules now attach real financial exposure to poor data sharing. And executive teams ask it because interoperability has quietly become a proxy for a bigger question: will this platform still fit the organization in five years, or will it become the reason for a migration project.

Health Level Seven version 2 (HL7 v2) and **Fast Healthcare Interoperability Resources (FHIR)** are the two standards behind almost every answer to that question. But the language surrounding them is muddier than it should be. Vendors describe their support for each standard in terms that range from precise to aspirational, leaving buyers to translate marketing claims into an honest picture of what their organization can actually do.

This guide isn't a comparison of any single platform's HL7 or FHIR support. It's a plain accounting of what each standard does, why FHIR's relevance to imaging is rising now, and what to ask any vendor — including the one that published this guide — before committing to an integration path.

The goal is that after reading it, you have everything you need to make the right call for your organization.

Executive Summary: What imaging leaders need to know

What this delivers:

- HL7 v2 remains the operational backbone of most imaging workflows.
- FHIR adoption is accelerating due to regulatory requirements, patient-access initiatives, AI integration needs, and cross-organizational data exchange.
- Most imaging organizations will require both standards for the foreseeable future.
- Not all interoperability claims are equivalent; implementation maturity often matters more than stated support.
- The best interoperability strategy is determined by operational needs, growth goals, and total cost of ownership—not by which standard is newer.

Chapter 2 — HL7 and FHIR, without the jargon

Health Level Seven (HL7) is the international standards development organization behind both standards this guide is about, which is part of why the naming causes confusion. HL7 version 2.x, first released in the late 1980s, is a messaging standard: it defines how systems exchange discrete messages — an admission, a lab result, an imaging order — as structured segments of data passed between applications.^[1] In clinical practice, that means message types such as ADT (admission-discharge-transfer), ORM (order), and ORU (observation result) still carry most of the order and results traffic moving between a radiology information system (RIS), the hospital information system, and the PACS today.

Adoption was slow and inconsistent in the standard's first decade, shaped more by hospital politics and vendor competition than by technical merit. But by the 1990s, most vendors and hospitals had adopted HL7 in some form, and it has since become the most widely used healthcare data-interchange standard in the world.^[1] Most imaging and hospital systems in production today still run on it — typically somewhere across versions 2.3 through 2.6, often several versions at once within the same enterprise.

FHIR — Fast Healthcare Interoperability Resources — is a newer standard, also developed by HL7, built around a different foundational idea. Instead of point-to-point messages, FHIR organizes healthcare information into discrete, reusable units called resources — a patient, an observation, an imaging study — each defined with a consistent structure that any authorized system can request over a standard, web-based interface.^[2] HL7 built FHIR on more than two decades of lessons learned from implementing HL7 v2, HL7 v3, and the Clinical Document Architecture, aiming for a standard that is simpler for developers to implement without sacrificing the integrity of the underlying information.^[2] That lineage matters: FHIR isn't a clean-slate replacement so much as a distillation of what worked, and what didn't, in the standards that came before it.

In imaging specifically, this shows up in FHIR's ImagingStudy resource, which exposes study-, series-, and instance-level metadata as a queryable clinical resource while pointing back to the same underlying DICOM® study, series, and instance identifiers that PACS and VNA systems already use — so FHIR indexes and describes the imaging encounter without replacing DICOM as the mechanism that actually moves pixel data.^[11]

The honest trade-off

Most vendor materials skip this part, so it's worth sitting with. HL7 v2 is entrenched, reliable, and supported by nearly every system an imaging organization is likely to integrate with — but it operates on a push-based broadcast messaging model that requires custom interface work for each new connection, and its message definitions leave enough room for local variation that “HL7-compliant” rarely means plug-and-play between two different vendors' systems.^[3] FHIR's resource-oriented design is more standardized and more consistently implementable, built for the granular, structured data exchange that patient portals, EHR integrations, and increasingly AI tools now expect.^[3] But FHIR is younger, its real-world adoption is uneven outside a handful of federally driven use cases, and in most deployments today it runs alongside HL7 v2 rather than replacing it.

That last point deserves emphasis: this isn't a story about an old standard being retired. It's a story about two standards that will coexist in most imaging operations for years, doing different jobs.

Chapter 3 — Why FHIR's urgency is rising now

If HL7 and FHIR are going to coexist for years, why does FHIR keep showing up with new urgency in imaging conversations specifically? Three forces are converging.

Regulation

The U.S. Office of the National Coordinator for Health Information Technology's Cures Act Final Rule required that, starting January 1, 2023, certified electronic health record technology support a standardized FHIR-based API for patient and population data access.^[4] The effect has been measurable. The share of hospitals enabling FHIR-based patient access through apps in outpatient settings climbed from under half in 2021 to roughly seven in ten by 2024, according to federal health IT tracking.^[5] Separately, the share of hospitals routinely exchanging, finding, and integrating outside health information — the core federal definition of interoperability — reached 70% of U.S. hospitals engaging in that exchange at least sometimes as of 2023, continuing a multi-year upward trend.^[6] None of this is imaging-specific, but imaging organizations sit inside the same EHR and referral ecosystems these rules govern, and the compliance expectations flow downstream.

AI

Imaging AI tools — for triage, reporting assistance, and workflow orchestration — perform better against structured, well-defined data than against free text or parsed message segments. Radiology informatics researchers have proposed frameworks that pair standardized semantic tagging, maintained by organizations including the American College of Radiology and the Radiological Society of North America, with FHIR resources specifically so imaging findings can move through a practice's systems as structured data rather than unstructured report text. That semantic layer typically pairs RadLex — RSNA's radiology-specific lexicon — and clinical terminologies such as SNOMED CT and LOINC with FHIR's Observation and DiagnosticReport resources, so a given finding is represented consistently regardless of which system produced it.^[7]

Separately, the Radiological Society of North America's own interoperability demonstrations rely on a stack of standards — including FHIR-based synchronization between the EHR, PACS, reporting systems, and AI tools — to let AI applications plug into a radiology workflow at the right point without a bespoke integration for every tool.^{[8] [10]} As more imaging operations add AI to intake, triage, and reporting, the practical case for FHIR-capable infrastructure strengthens independent of any single regulation.

Scale

Multi-site consolidation, teleradiology, and value-based care arrangements all increase how often an imaging organization's data needs to move to systems it doesn't own: a referring physician's EHR, a health information exchange, a payer's utilization-review system. Each of those exchanges is easier to build and maintain on a standardized, resource-based interface than on a custom HL7 interface negotiated site by site. This is precisely the gap that IHE's Cross-Enterprise Document Sharing for Imaging (XDS-I.b) profile was built to close, giving affiliated sites a standardized way to publish, find, and retrieve imaging studies and reports across organizational boundaries rather than negotiating a bespoke interface with every partner.^[12]

The counterpoint that keeps this honest

None of this means FHIR has arrived everywhere. Coverage remains concentrated in the use cases regulation has directly targeted — largely patient access — and much of the clinical and operational data that keeps an imaging practice running day to day, including orders, scheduling, and results delivery, still moves over HL7 v2 today. The accurate read is that FHIR's urgency is rising fastest at the edges of imaging operations — patient access, AI integration, cross-organization exchange — while HL7 v2 continues to carry the operational core. Planning for both isn't hedging. It's accurate.

Chapter 4 — The buyer's dilemma: how to evaluate any platform's interoperability claims

Every vendor conversation about interoperability eventually produces a confident answer. The trouble is that “we support FHIR” and “we support HL7” can each mean several very different things depending on what’s actually running underneath. Before signing anything, it’s worth pressing every vendor — including the ones an organization already works with — on the same five questions.

1. Is FHIR support native to the platform, or delivered through a third-party translation or middleware layer?

Middleware isn’t automatically disqualifying, but it adds a maintenance dependency, a cost line, and another vendor relationship to manage through every future upgrade.

2. Is HL7 v2.x support mature enough to handle order management, scheduling, admission/discharge/transfer, and results delivery without a custom interface build for every new connection?

Ubiquity doesn’t guarantee simplicity — ask specifically about interface build time and cost against your current systems.

3. How is image and file routing handled? Does it depend on a dedicated DICOM router and VPN infrastructure the organization has to provision and maintain, or is routing managed by the platform itself?

This is a total-cost-of-ownership question as much as a technical one.

4. What is the vendor's actual FHIR roadmap — documented and dated, not a general statement of support?

Ask which resources are implemented today versus planned, and ask to see it in writing.

5. How does the platform's interoperability posture map to information-blocking compliance obligations, and can the vendor point to how current customers meet those obligations today?

A short, factual aside, in the interest of transparency: RamSoft is one example of a vendor that offers organizations a genuine choice between these two paths — an HL7-driven platform and a FHIR-enabled platform — rather than a single, one-size answer. That’s worth naming, because it means these same five questions apply as much to us as to anyone else under evaluation.

What strong answers sound like

A strong interoperability answer should include:

- Specific standards and versions supported
- Current capabilities versus roadmap commitments
- Typical implementation timelines
- Customer examples
- Upgrade and maintenance approach
- Written documentation

If a vendor cannot clearly distinguish between current functionality and future intentions, buyers should proceed carefully.

Interoperability Readiness Assessment

Answer **Yes** or **No**:

We currently support FHIR APIs across our imaging environment.	YES	NO
We have an interoperability roadmap documented for the next 24 months.	☐	☐
We can onboard a new referral source without significant custom interface development.	☐	☐
We have a strategy for AI workflow integration.	☐	☐
We can retrieve prior reports from external providers consistently.	☐	☐
We can demonstrate compliance with interoperability requirements.	☐	☐

Scoring

- 5–6 Yes: Mature interoperability posture
- 3–4 Yes: Moderate risk of future integration constraints
- 0–2 Yes: Significant interoperability gaps may limit scalability and flexibility

Chapter 5 — Interoperability in practice: four operational scenarios

Protocol discussions stay abstract until they're tested against a real operation. Four patterns recur across imaging organizations, regardless of platform.

The hospital system

A regional hospital's imaging department doesn't operate in isolation. It feeds data into the enterprise EHR, exchanges records with referring physicians across an affiliated network, and answers to the same information-blocking obligations as the rest of the health system. For this organization, native FHIR support isn't a future nicety — it's how the imaging department stays inside the health system's broader compliance posture, rather than becoming the one department that needs a separate integration project every time the EHR vendor updates its API.

The teleradiology group

Prior-report retrieval remains one of the most persistent, least-solved problems in imaging interoperability. A radiologist finalizing a read needs prior reports for comparison, but those reports often live in a referring hospital's system, inaccessible through standard HL7 feeds because of data silos, inconsistent gateway infrastructure, or a referring site that simply lacks the technical capacity to push structured data out. Neither HL7 nor FHIR fully solves this today; it remains, industry-wide, as much a workflow problem as a protocol problem.

IHE's XDS-I.b profile — and its cross-community variant, XCA-I, for organizations outside a shared affiliation — was built specifically to standardize this kind of cross-enterprise study and report retrieval, but a profile's existence doesn't guarantee two specific sites have actually implemented and connected through it; that gap between published standard and deployed connection is exactly what a teleradiology group needs to probe before committing to a platform. ^[12]

Any teleradiology operator evaluating a platform should ask pointedly how it handles this specific gap rather than accepting a generic interoperability pitch.

The multi-site imaging center

Growth usually starts with HL7 — a scheduling feed from a practice-management system into the PACS, an admission/discharge/transfer feed from a referring clinic. That's typically sufficient at two or three sites. Interoperability gets harder as a network grows past that point and starts touching a wider range of distinct systems, each with its own local dialect of the standard. This is generally the point at which FHIR's stricter standardization starts to outweigh its relative youth.

The emerging or non-traditional care provider

A maternal health clinic, a mobile imaging operation, or a multi-clinic network that doesn't fit the traditional radiology mold usually doesn't need FHIR sophistication at all. What it actually needs is often simpler: a referring clinician who can open a study and its report without a second login, and a scheduling feed that doesn't require a dedicated interface engineer. HL7 write-back and a browser-based viewer solve most of that problem on their own.

The lesson generalizes across all four scenarios: match the integration investment to the actual operational gap, not to whichever standard sounds more current.

Chapter 6 — Where imaging interoperability is headed

Three trends are worth watching over the next few years.

From polling to push

FHIR is shifting from a request-response model toward an event-driven one. The Subscriptions framework, published as part of the FHIR specification by HL7 International, lets a system register interest in a specific type of event — a new imaging result, a patient admission — and receive a notification the moment it happens, instead of repeatedly checking for updates.^[9] Applied to imaging, this could mean a referring physician's system is notified the instant a report is finalized, rather than checking on a fixed schedule. Adoption of Subscriptions specifically is still early, but the direction of travel is clear: less polling, more event-driven exchange.

Both, not either

Expect sustained pressure on every PACS, RIS, and VNA vendor to support both standards indefinitely, rather than phasing one out in favor of the other. The realistic planning horizon for most imaging organizations is "HL7 and FHIR," not "HL7 then FHIR."

AI built on structured data

AI orchestration across intake, acquisition, interpretation, and reporting is increasingly designed around structured, FHIR-shaped data as an input, even in workflows that still run on HL7 underneath.^[8] Organizations planning their next few years of AI adoption have a practical reason to build FHIR readiness now, even where it isn't compliance-urgent today — not because HL7 is going away, but because the tools imaging teams will want next are being built around FHIR's data model.

Chapter 7 — Conclusion: choosing your integration path

None of this resolves into a single recommendation, and that's the point. The right integration strategy depends on an organization's existing environment, interoperability requirements, growth plans, and future technology priorities—not on which standard sounds newer.

The organizations that make the best interoperability decisions are rarely the ones chasing the newest standard. They're the ones aligning interoperability investments with operational realities and long-term goals.

For most imaging organizations, the future isn't HL7 or FHIR. It's HL7 and FHIR.

HL7 v2 will continue to support much of the operational backbone of imaging workflows for years to come. At the same time, FHIR is increasingly shaping how healthcare data is exchanged, accessed, and integrated with emerging technologies such as AI. The goal isn't to choose a winner. The goal is to ensure today's platform decisions can support tomorrow's requirements.

Interoperability has quietly become a leadership decision because its impact extends well beyond technology. It influences scalability, efficiency, partner connectivity, patient experience, and an organization's ability to adapt as healthcare evolves.

The question is no longer whether interoperability matters. The question is whether the decisions being made today will support the workflows, integrations, and opportunities an organization will need tomorrow.

We're publishing this because we operate on both sides of this decision every day: building for organizations running HL7, organizations running FHIR, and plenty running both. If it would help to talk through what any of this means for a specific environment, our team is glad to have that conversation — no platform pitch required to start it.

Appendix — A note on how we approach this

This guide was written to be useful on its own, regardless of which vendor an organization ultimately chooses. In the interest of full disclosure: RamSoft® builds imaging technology, and the platform portfolio reflects the same two-path reality described throughout this guide. **PowerServer®**, the established RamSoft cloud-based PACS suite, communicates over HL7 v2.x. **OmegaAI®**, the RamSoft cloud-native, zero-footprint RIS/PACS/VNA platform, supports FHIR natively. Neither path limits access to AI orchestration across imaging operations — that capability runs across both.

Readers who want the fuller, vendor-specific comparison — including a feature-by-feature breakdown and a framework for matching platform to infrastructure — can request platform comparison material from the RamSoft Sales team.

[Learn More](#)

ENDNOTES

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