

FHIR: From Technical Standard to Strategic Business Asset

A white paper on the current state and future of health data interoperability



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About the FHIR Department and the Purpose of This Document

The FHIR Department is a global, community-driven initiative dedicated to strengthening the foundations of health data interoperability through the practical adoption and evolution of HL7®¹ FHIR®² standards. We bring together implementers, clinicians, policymakers, sponsors, vendors, researchers, business and standards leaders who share a common belief: that open, well-governed standards are essential to building effective health information systems that enable the right decisions to be made in real time by the right stakeholders.

At its core, the FHIR Department exists to bring together the diverse communities required to make interoperability successful in the real world. By creating opportunities for both technical and non-technical collaboration, the FHIR Department aims to ensure that strategic business priorities and implementation realities inform one another. Our focus is not simply on what Fast Healthcare Interoperability Resources (FHIR) makes possible in theory, but on enabling the partnerships, governance, and real-world solutions that position FHIR as a strategic business asset delivering measurable value across an integrated healthcare ecosystem.

Our Mission: FHIR - From Technical Standard to Strategic Business Asset.

The FHIR Department³ exists to expand the reach and impact of FHIR by connecting technical innovation with business strategy. While the FHIR community has been exceptionally successful in developing the standards, implementation guidance, and technical capabilities that make interoperability possible, many organizational decisions are ultimately driven by business priorities, strategic outcomes, and measurable value rather than technical architecture alone.

Our mission is to bridge this gap by creating business-focused resources, practical guidance, and collaborative initiatives that help healthcare leaders, executives, policymakers, and implementation teams understand not only *how* FHIR works, but *why* it matters. Through real-world examples, proven use cases, and outcome-driven collaboration, we will position FHIR as a strategic business asset that enables better healthcare delivery, operational efficiency, regulatory success, and improved patient care coordination and outcomes.

Our Audience

The FHIR Department will serve two complementary audiences: business decision-makers who establish organizational priorities and implementers responsible for delivering interoperable solutions.

Business Leaders and Decision Makers

Our goal is to make FHIR accessible and relevant to executive and strategic audiences by:

- Developing business-focused tools, frameworks, and educational resources that clearly articulate the value proposition of FHIR.

- Demonstrating how FHIR supports organizational objectives such as operational efficiency, care quality, regulatory compliance, innovation, and return on investment.
- Creating business cases, executive playbooks, and outcome-based success stories that enable informed investment and policy decisions.
- Providing a forum where business leaders can collaborate with the broader FHIR community to identify strategic priorities and opportunities for industry-wide impact.

Implementers

Our goal is to help implementers demonstrate measurable business value through successful deployments by:

- Promoting real-world implementations that demonstrate tangible organizational and clinical outcomes rather than isolated technical demonstrations or pilots.
- Sharing proven implementation patterns, lessons learned, and collaborative solutions that accelerate adoption across the healthcare ecosystem.
- Supporting initiatives that showcase FHIR as an enabler of business transformation, including improved data quality, workflow optimization, analytics, and patient engagement.
- Advocating for implementers by bringing practical implementation experience and feedback into community discussions, standards development, and policy conversations, ensuring that technical advancement remains aligned with business needs.

Our Aims

The aims of the FHIR Department are threefold.

First, we seek to surface and address the structural challenges facing the FHIR community and the broader health technology ecosystem. While FHIR has dramatically accelerated interoperability, the process of implementing it has also revealed gaps in tooling, governance, funding models, implementation guidance, and long-term maintenance. Many organizations struggle with fragmented specifications, inconsistent conformance expectations, and the cost and complexity of implementation. Our goal is to help the community name these challenges clearly and work collectively toward solutions that support the FHIR standard and improve system integration, and efficiency.

Second, we aim to strengthen collaboration across traditionally siloed groups. Interoperability does not fail because of a lack of good intentions; it fails when incentives, priorities, and responsibilities are misaligned. The FHIR Department works to create shared understanding between standards developers, implementers, vendors, health domains, and governments, so that progress in one part of the ecosystem does not create unintended burdens in another.

Third, we strive to promote a culture of openness, reuse, and continuous improvement. Open standards thrive when they are supported by shared infrastructure, transparent processes, and active stewardship. We advocate for approaches that reduce duplication, improve consistency, accelerate adoption, and make it easier for organizations of all sizes to participate meaningfully in the FHIR ecosystem.

Purpose of This Document

This document is intended to articulate both the challenges and the opportunities facing the FHIR community at this moment in time. We explore the structural issues that slow progress or create friction, while also highlighting the tremendous potential of a more coordinated, intentional approach to interoperability.

More importantly, this document lays out a vision for the future in which we work together across organizational, national, and sectoral boundaries to strengthen open standards, modernize our shared infrastructure, and align incentives toward better outcomes. In this future, health information systems are easier to implement and maintain, and more responsive to the needs of clinicians, patients and the healthcare system.

By naming where we are, and where we could go together, the FHIR Department hopes to contribute to a more resilient, collaborative, and patient-centered health technology ecosystem, where systems work better, integrate quicker, data flows more safely and effectively, and the promise of interoperability is fully realized.

Current State of FHIR

Over the past decade, HL7 FHIR has evolved from an ambitious specification into the *de facto* global standard for modern health data exchange. It has become a foundational layer for digital health infrastructure across clinical care, public health, research, and consumer-facing applications. Today, FHIR sits at the intersection of technology, regulation, and community collaboration, bringing both unprecedented momentum and new, complex challenges.

Technical Maturity

From a technical perspective, FHIR has reached a level of maturity that enables broad, production-grade use. Core resources, RESTful APIs⁴, and common exchange patterns are well understood and widely implemented. Stable releases, improved (profile) version awareness and management, and clearer conformance mechanisms have made it possible for organizations to build systems with greater confidence than in the early years of FHIR adoption.

This increasing adoption has exposed the limits of the FHIR specification itself. FHIR is intentionally flexible, designed to support a wide range of use cases and healthcare contexts. That flexibility, while powerful, has led to a proliferation of implementation guides (IG's), profiles, extensions, and localized conventions. In many environments, interoperability challenges no longer stem from a lack of standards, but from the sheer volume and variability of them - a direct challenge to our goal of ensuring continuous interoperability.

Tooling has improved significantly—validators, test servers, reference implementations, and open-source libraries are now commonplace. However, gaps remain in areas such as automated conformance testing at scale, lifecycle management of implementation guides, and long-term maintainability of production

integrations. As FHIR implementations move from pilots to mission-critical infrastructure, questions of operational reliability, performance, and governance have become as important as the specification itself.

In short, FHIR is technically mature enough to support large-scale interoperability, but ecosystems around are still catching up to the demands of real-world, long-lived systems (e.g. Artificial Intelligence).

Regulatory Involvement

Regulatory adoption has been one of the most significant accelerators of FHIR's growth. Governments and public agencies have increasingly embraced FHIR as a policy instrument, using it to mandate access to health data, promote competition, and enable patient-centered innovation. In realms and jurisdictions such as the United States, FHIR has been embedded into regulatory frameworks governing patient access, payer-provider data exchange, and public health reporting, with strong involvement from international government agencies.

This regulatory backing has driven rapid implementation and significantly expanded the number of organizations working with FHIR. It has also shifted FHIR from a “best practice” to a compliance requirement in many settings. As a result, timelines have shortened, implementation decisions are often constrained by regulation, and organizations are required to adopt FHIR even when internal readiness varies.

While regulation has brought clarity of direction, it has also introduced new tensions. Regulatory programs tend to focus on specific use cases and minimum compliance thresholds, which can lead to fragmented or checkbox-driven implementations. In some cases, regulatory requirements outpace the maturity of available guidance, tooling, or shared infrastructure, placing a disproportionate burden on implementers.

Nevertheless, regulatory involvement has firmly established FHIR as a cornerstone

of national and regional health data strategies. The challenge ahead is ensuring that regulatory frameworks continue to evolve in partnership with the community - supporting not just adoption, but sustainability and quality over time.

Industry Participation

Industry participation in FHIR has expanded dramatically. Major electronic health record vendors, cloud providers, medical device manufacturers, digital health startups, and life sciences organizations now routinely build on FHIR as part of their core product strategies. FHIR has lowered the barrier to entry for new innovators while providing established vendors with a common language for integration.

This broad participation has fueled rapid ecosystem growth, but it has also highlighted misaligned incentives. Vendors may interpret or extend FHIR in ways that optimize for speed to market or competitive differentiation, rather than long-term continuous-interoperability. Implementers often face uneven levels of support across products, with variability in API completeness, IG coverage, documentation quality, and conformance rigor.

At the same time, industry-led collaborations—such as accelerators, alliances, and implementation collaboratives—have demonstrated what is possible when organizations align around shared use cases. These efforts have produced reusable artifacts, tested implementation patterns, and real-world feedback that has strengthened the standard itself.

FHIR’s success in industry underscores both its strength and its vulnerability: it is widely adopted because it is adaptable, but that same adaptability requires stronger coordination to prevent its fragmentation and the associated interoperability, data overexposure, and security issues. Sustaining industry trust in FHIR will depend on clearer expectations, better shared infrastructure, and more transparent approaches to conformance and governance.

Community Engagement

Community engagement remains one of FHIR’s greatest strengths. The global FHIR community - anchored by HL7 International - includes thousands of contributors who develop specifications, author implementation guides, test interoperability, and share lessons learned. This open, consensus-driven model has enabled rapid evolution and broad participation across regions.

Working groups, connectathons, accelerator programs, and online forums provide venues for collaboration and continuous learning. Many of the most impactful improvements to FHIR have emerged directly from implementer feedback and real-world experience. The community has proven capable of adapting FHIR to new healthcare domains, from genomics and imaging to public health and social determinants of health.

However, community engagement also faces sustainability challenges. Participation often depends on volunteer effort or project-based funding, leading to uneven capacity and burnout. Knowledge is often distributed across mailing lists, repositories, and informal networks, making it difficult for newcomers to navigate. As the ecosystem grows, maintaining coherence and shared understanding becomes increasingly complex.

There is a growing recognition that community collaboration - and the Implementation Community in particular - must be supported by durable structures: clearer stewardship models, better funding mechanisms, and shared platforms for knowledge management. Strengthening the Implementation Community is not just a social concern—it is essential to the long-term health of the standard.

Inter-system Interoperability

The working groups work diligently to ensure standardized FHIR formats and APIs

are used across different inter-system environments such as hospital, pharmacy, laboratory and insurance systems. As a result, clinical, public health and payer information is securely exchanged in a structured, standardized and near real-time manner contributing to greater health system efficiency and effectiveness, as well as improving the clinical and public health decision-support systems.

Looking Ahead

The current state of FHIR can be summarized as one of proven value, accelerating adoption, and emerging growing pains. Technically, FHIR is ready for prime time. Regulators have embraced it as a policy lever. Industry has invested heavily in its success. And the community continues to innovate and adapt at remarkable speed.

The next phase of FHIR's evolution will depend less on new features and more on coordination: aligning incentives, strengthening governance, investing in shared infrastructure, and supporting the people who make interoperability work day to day. Addressing these challenges collectively offers an opportunity not just to improve FHIR, but to build a more resilient, collaborative, and patient-centered health technology ecosystem. To achieve this end our systems will need to perform across an integrated ecosystem of healthcare organizations. The standard for solutions and technology stacks must extend beyond point-in-time interoperability to one where continuous interoperability is required.

FHIR has changed how health data moves. The work ahead is to ensure it continues to do so in a way that is sustainable, equitable, and worthy of the trust placed in it by patients, clinicians, and health systems worldwide.

A Vision for the Future of FHIR

FHIR has reached a pivotal moment in its evolution. Its success as a modern interoperability standard is no longer in question - it is embedded in regulation, embraced across the healthcare industry, and supported by a growing global community.

The challenge ahead is no longer driving adoption, but maximizing the value that adoption delivers. As healthcare organizations increasingly view interoperability as a strategic capability rather than a technical initiative, the conversation must evolve beyond implementation to focus on measurable business outcomes. The next phase of FHIR's evolution is to ensure that the standard not only enables the secure exchange of data, but also empowers organizations to improve patient care, streamline operations, accelerate innovation in areas like clinical research and public health, and make better-informed business decisions. Achieving this requires moving beyond technical implementation alone and positioning FHIR as a strategic business asset that creates lasting value across the healthcare ecosystem.

From Technical Standard and Specification to Strategic Business Asset

Achieving this vision requires more than implementing the FHIR specification. It requires a mature ecosystem that enables organizations to adopt FHIR consistently, scale implementations with confidence, and realize measurable business outcomes. This requires shared governance, reusable implementation assets, practical guidance, and common implementation patterns to reduce unnecessary variation, lower implementation costs, shorten time-to-value, and increase trust in the quality and consistency of interoperable data.

As FHIR becomes foundational digital infrastructure, success will increasingly depend

on collaboration across technical and business communities. Business leaders, policymakers, clinicians, implementers, architects, and standards experts all play essential roles in ensuring that interoperability investments deliver lasting value. By aligning strategic priorities with implementation realities, the community can accelerate adoption of proven practices, improve operational maturity, and ensure that FHIR continues to evolve in ways that support real-world healthcare needs.

Ultimately, the future of FHIR is not measured by the number of APIs deployed or implementation guides published. It is measured by the business outcomes it enables - improved patient care, more efficient operations, better regulatory compliance, faster innovation, and trusted data that can be shared and used across the healthcare ecosystem. The technical standard remains the foundation, but its greatest value is realized when it becomes a strategic business asset that drives organizational performance and healthcare transformation.

Technology Development: From Specification to Infrastructure

In the future, FHIR will be understood not merely as a specification, but as part of a broader interoperability stack. While the core standard has proven its value, the next phase of progress requires deeper investment in the surrounding technical ecosystem.

This infrastructure must also work seamlessly across inter-system environments - hospital, pharmacy, laboratory, and payer systems alike. Today, standardized FHIR formats and APIs already enable secure, structured, near real-time exchange across these settings. The future extends this same rigor into the infrastructure layer itself, so that inter-system exchange is not an exception requiring bespoke integration work, but a native property of a shared, well-governed FHIR ecosystem.

One of the most significant hurdles today is fragmentation. Thousands of

implementation guides, profiles, and extensions exist, often overlapping or diverging in subtle but meaningful ways. In the envisioned future, shared tooling and governance mechanisms help reduce unnecessary variation. Canonical models, reusable profiles, and clearer guidance on when and how to extend FHIR become the norm rather than the exception.

Technology development must also address lifecycle realities. FHIR implementations are no longer short-lived projects; they are long-running production systems that must be maintained, upgraded, and governed over many years. This future includes better tooling for version management, backward compatibility, automated regression testing, and impact analysis. Implementers can confidently evolve their systems without fear that incremental change will silently break interoperability.

Another critical hurdle is conformance at scale. Today, validation is often manual, inconsistent, or limited to narrow test cases. In the future, conformance testing is automated, transparent, and continuous—integrated into development pipelines and supported by shared reference environments. This shifts conformance from a one-time hurdle to an ongoing quality focused practice.

Finally, the future of FHIR technology embraces performance, security, and operational reliability as first-class concerns. As FHIR becomes core infrastructure, expectations rise. The community invests in reference architectures, scalability patterns, and operational guidance that make FHIR reliable not just in principle, but in practice.

Equally critical to this infrastructure vision are the connective mechanisms that allow participants to join and interact with trust. Scalable Registration must move beyond manual, one-off onboarding toward automated, verifiable processes that can accommodate thousands of endpoints without becoming a bottleneck. Verifiable Identity establishes who is transacting - a patient, clinician, provider organization, device, or system acting on their behalf - and feeds directly into Evolving Trust

Frameworks, which continuously validate the credentials and obligations of participants and the organizations they represent, so that trust is dynamic and enforceable rather than assumed. Robust Management of Consent ensures that data flows reflect patient and organizational intent in a granular, auditable, and portable way, while Data Provenance provides a verifiable record of where that data originated and how it was handled along the way. Together, these five capabilities - Registration, Identity, Trust, Consent, and Provenance - reduce the barriers to true interoperability while preserving the accountability that a trusted health data ecosystem depends on.

Regulation & Policy: From Mandate to Stewardship

Regulation has been a powerful catalyst for FHIR adoption, but the future requires a more nuanced relationship between policy and standards. One of the key hurdles today is the tension between regulatory timelines and ecosystem readiness. Mandates often focus on *what* must be exchanged, but not *how* exchange can be sustained over time.

In the future, regulators act not only as enforcers, but as stewards of the interoperability ecosystem. Policy frameworks are developed in closer partnership with standards bodies, implementers, and providers, ensuring that requirements align with available guidance, tooling, and infrastructure. Regulation becomes more iterative, incorporating feedback loops that allow programs to adapt as real-world challenges emerge.

Another critical shift involves moving beyond minimum compliance. Early regulatory efforts have understandably focused on ensuring basic access and data availability. The next phase emphasizes quality, consistency, and usability. Policies begin to reward meaningful interoperability - data that is complete, computable, and fit for purpose - rather than mere endpoint availability.

This shift is already visible in CMS⁵ quality measurement work. USCDI⁶ includes data elements that are important for electronic clinical quality measures, but some of these elements remain early in real-world implementation and are not always captured consistently, populated completely, or made available in a computable form. That gap illustrates a larger truth: interoperability cannot be achieved by specification alone. Policy, industry, and the standards community must mature together so that required data is not merely present, but trusted, computable, and useful in practice. When policy expectations, vendor implementation, workflow adoption, and data quality guidance evolve in concert, healthcare data can move beyond exchange and become a true asset for measurement, care improvement, research, public health, and better decision-making.

This future also recognizes the global nature of FHIR. While healthcare systems differ, many interoperability challenges are shared. Greater international coordination reduces duplication of effort and helps align national programs around common patterns and best practices. Organizations such as HL7 International play a central role in convening regulators and implementers across borders.

Ultimately, regulation evolves from a blunt instrument into a stabilizing force, one that supports long-term investment, shared infrastructure, and consistent expectations across the ecosystem.

Industry Participation: From Adoption to Alignment

Industry has embraced FHIR enthusiastically, but the future depends on deeper alignment of incentives. One of the most persistent hurdles today is that market dynamics can reward partial, proprietary, or inconsistent implementations. While FHIR lowers technical barriers, it does not automatically align business interests.

In the envisioned future, industry participation is shaped by clearer norms and shared accountability. Vendors compete on usability, performance, and innovation,

not on idiosyncratic interpretations of the standard. Transparent conformance practices and shared benchmarks make it easier for customers and regulators to assess interoperability claims.

This future also recognizes that interoperability has real costs. Sustainable business models emerge to support shared services, testing infrastructure, and long-term maintenance of specifications and tooling. Rather than treating interoperability as an unfunded mandate or a loss leader, organizations collectively invest in the foundations that benefit the entire ecosystem.

Industry collaboration deepens through domain-focused initiatives and implementation collaboratives. These efforts continue to translate abstract standards into tested, real-world solutions, feeding lessons learned back into the standard itself. Importantly, participation extends beyond large incumbents to include small vendors and innovators, enabled by better documentation, onboarding pathways, and open tooling.

The result is an industry ecosystem that views FHIR not just as a requirement, but as shared infrastructure worth investing in, protecting, and improving together.

Community Engagement: From Passion to Sustainability

The FHIR community has always been its greatest strength, but also one of its greatest risks: burnout and fragmentation. Much of the progress to date has relied on volunteer effort, informal networks, and project-based funding. The future demands a more sustainable model.

One hurdle is accessibility. As FHIR has grown more complex, it has become harder for newcomers to engage. In the envisioned future, community participation is supported by clearer pathways: better onboarding materials, curated knowledge

repositories, and mentorship opportunities that help contributors navigate the ecosystem.

Another challenge is coordination. Valuable insights are scattered across working groups, accelerators, issue trackers, and chat channels. The future includes shared platforms and practices that capture institutional knowledge, reduce duplication, and make decision-making more transparent.

Community engagement is recognized as infrastructure, not overhead. Funding models evolve to support stewardship roles, maintainers, facilitators, and technical leaders who provide continuity across release cycles. This reduces reliance on heroics and ensures steady, inclusive progress.

The future community is more diverse. It includes not only technical experts, but clinicians, patients, policymakers, operational and business leaders whose perspectives shape more usable and impactful standards. Their participation ensures that FHIR continues to serve real-world, value-adding needs rather than abstract technical ideals.

Working Together Toward a Shared Future

Across all four focus areas, a common theme emerges: coordination. The hurdles facing FHIR are not primarily technical; they are structural. They arise when technology advances faster than governance, when regulation outpaces readiness, when incentives diverge, and when community capacity is stretched thin.

The vision for the future is therefore one of intentional collaboration. Technology development is guided by operational reality. Regulation reinforces sustainability rather than fragmentation. Industry invests in shared foundations. And the community is supported as a long-term steward of the standard.

In this future, FHIR fulfills its promise not only as a modern API, but as a stable,

trusted backbone for the digital health system. Systems are easier to integrate, data is more reliable and reusable, and the burden of interoperability is shared more fairly across the ecosystem. Most importantly, patients and clinicians benefit from systems that work better together—quietly, consistently, and at scale.

Achieving this future is not automatic. It requires deliberate choices, shared responsibility, and sustained investment. But the opportunity is clear: by working together to overcome today’s hurdles, the FHIR community can build an interoperability ecosystem that is resilient, inclusive, and worthy of the central role it now plays in healthcare worldwide.

End Notes

- ¹ **Health Level Seven International** (HL7) is an ANSI-accredited, nonprofit standards-developing organization - <https://hl7.org>
- ² **Fast Healthcare Interoperability Resources** (FHIR) - is an HL7 standard for exchanging healthcare information electronically - <https://hl7.org/fhir>
- ³ **FHIR Department** - The FHIR Department is an organization dedicated to building a community to unlock the value of FHIR in healthcare <https://www.linkedin.com/groups/14439457/>
- ⁴ **RESTful API** is an architectural style for designing networked applications that allows two computer systems to exchange information securely over the internet.
- ⁵ **CMS** - US Health and Human Services Centers for Medicaid and Medicare - <https://www.cms.gov/>
- ⁶ **USCDI** - United States Core Data for Interoperability) is a standardized, foundational set of health data classes and elements maintained by the HHS Office of the National Coordinator for Health IT - <https://isp.healthit.gov/united-states-core-data-interoperability-uscdi>

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