Persistent

Re(AI)magining™ Legacy Software in Healthcare with an AI-Driven Approach

The US healthcare system is complex, consisting of multiple commercial-off-the-shelf (COTS) products and home-grown software, creating a patchwork with high interdependency across call centers, portals, electronic health records (EHRs), and billing systems. The reliance on outdated software that cannot be efficiently supported or upgraded is concerning, especially when efficiency, accuracy, and timely access to clinical information are paramount.

A 2023 study found that outdated technology costs US hospitals an average of $52,000 per physician per year in lost productivity. Another study found that 73% of healthcare providers still use outdated legacy systems. Healthcare organizations, many of which are saddled with outdated systems, are also a top target for hackers, and the average cost of a healthcare data breach was $9.77 million in 2024.

Here is the really scary part — in an industry where the absolute worst-case scenario is grievous harm to a patient, the reliance on outdated software that cannot be supported efficiently or upgraded is potentially life-threatening.

Fortunately, rapid evolution and adoption of AI tools across the industry is providing an alternative way forward, with the potential to reduce or eliminate areas of waste and risk, if deployed properly. In this white paper, we examine strategies, including an AI-driven approach, to reduce the risk posed by legacy software and unlock additional security and value for stakeholders across the healthcare ecosystem.

The impact of legacy software on healthcare

Whether you work in healthcare, or are simply a patient, your life is touched by healthcare's inherent IT complexity. How much exposure to this complexity depends on your role within the ecosystem. Figure 1, for example, represents a typical patient journey from pre- to post-treatment; each of these stages is supported in some way by legacy software that contains innate inefficiencies and vulnerabilities, which is a danger not only to patient care but to protecting confidential patient information and providing quality care.

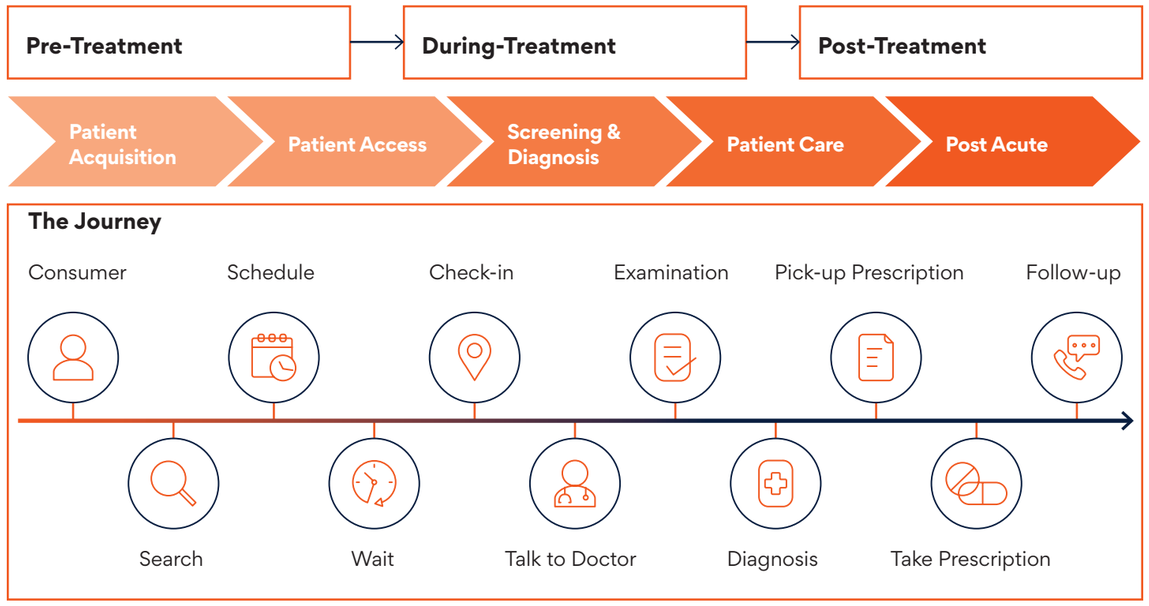

Figure 1: A typical patient journey from pre- to post-treatment.

Figure 2 provides an even more expansive view of the wide sprawl of IT systems involved in the healthcare ecosystem — and when viewed in this light, it's easier to comprehend the inherent challenges of managing and securing healthcare-related systems.

Sales and Marketing	Products	Member Mgmt.	Patient Services	Care Delivery	Claims	Value-based Care
Campaigns & Outreaches	Product Strategy	Eligibility	Appt. Mgmt.	EMR	Claims Configuration	Care Mgmt.
Reputation & Brand Mgmt.	Product Design	Enroll / Disenroll	Admits & Discharges	Imaging & Diagnostic	Intake & Editing	Care Coordination
Agent & Broker Mgmt.	Product Build	Premium Billing	Prior Auth & Referrals	LIS	Adjudication	Disease Mgmt.
Lead & Opp. Mgmt.	Product Config.	Payment Mgmt.	MTM	HIE	Pricing & Repricing	Risk & Contracts
CPQ	Product Maintenance	Member Portal	Patient Portal	Surgeries	COB	SDoH
		Member Education	Patient Education	Telehealth & Remote Monitoring	Prior Auth	Contracts, Incentives, Payout
				Clinical Decision Support		Home Care

Billing & Finance	Ancillary	Provider Mgmt.	Customer Service	Analytics & Reporting	Enterprise Service
AR & AP	Appeals & Grievances	Network Mgmt.	Member Services	VBC Payment Analytics	Infra Mgmt.
Disbursement	Dental	Credential Mgmt.	Provider Services	PHM Analytics	HRMS
EFT & Checks	Vision	Provider Data Mgmt.	Employee Helpdesk	Clinical Analytics	Integration & Interop
Premium Recon	PBM	Contracting	Broker Services	Operational Analytics	Cyber-Security
Payment Recon	OTC	Directories	Correspondence	FWA Analytics	Facility Mgmt.
Broker Commissions	Wellness	Fee Schedule		Star, HEDIS, etc.	Time Mgmt.
RCM	BHC	Provider Compensation		HCAHPS	Purchasing
Patient Billing	Rehab / PT	Training		Third-party Reporting	Supply Chain
Collections & Delinquency		Collaboration			

Figure 2: A bird's eye view of all the processes and systems across the healthcare system with potential for AI-usage.

With this context, here are some of the most common impacts of legacy software within the industry, approaches to addressing legacy software's inherent challenges, and key factors for legacy modernization success — many of which are rooted in the proliferation of AI tools that can accelerate modernization efforts and present new ways to transform healthcare IT systems.

Impact of legacy software

Increased healthcare costs and inefficiencies

Legacy systems have poor user interfaces, scale poorly, and lead to slow performance and limited flexibility. This results in high maintenance costs and operational inefficiencies which only add to higher healthcare costs and further strain a system that, in some extreme cases, is already falling apart.

Poor interoperability

Legacy software often operates on outdated protocols, creating compatibility challenges with modern EHR systems and other technologies. This disrupts continuity of care and increases manual work for already overloaded healthcare professionals and reduces focus on patient care.

Barriers to innovation and tech modernization

Legacy systems inhibit the integration of new tools and the deployment of AI and innovative apps, limiting the ability to make real-time patient care decisions.

Data security and privacy vulnerabilities

Legacy systems lack essential security features, making them susceptible to hacking and data breaches including real-time threat detection and response.

Non-compliance with regulatory and compliance mandates

Healthcare is among the most regulated industries. Legacy software often lacks the flexibility to meet regulatory requirements, putting healthcare entities at risk of non-compliance.

Strategies to minimize legacy software's impact

Rip and replace

In some situations, healthcare companies invest in a complete replacement of legacy systems with modern, best-in-class packages that can be customized and integrated with other software.

Adopting cloud-based solutions

Cloud platforms offer scalability, remote accessibility, and reduced maintenance costs, making them a viable alternative to legacy systems.

Gradual migration delivered through phased modernization

Incrementally replacing legacy components can be more practical, prioritizing critical software for modernization and minimizing disruption to operations.

Deploying integration software for improved interoperability

Middleware platforms can function as a bridge between legacy and modern systems, helping integrate patient portals with EMR, RCM, Practice Management, and other systems.

Keys to ensuring legacy modernization success

Invest in modern tools

This is an area wherein AI-driven tools can add tremendous value across the software development lifecycle, and provide critical capabilities that many healthcare organizations lack, through reverse documentation, automatic code conversions, and testing and deployment.

Develop a robust vendor ecosystem

Stakeholders throughout the healthcare ecosystem should conduct periodic reviews and amass a group of strategic vendors that can bring scale, speed, and engineering prowess to mitigate the impact of legacy software.

Invest in in-house enterprise architecture and governance teams

Investing in an enterprise architecture team that reviews existing technologies, scans for fresh solutions particularly AI-enabled ones, and sets necessary standards for technology use ensures consistent service and support levels throughout an organization and provides a conduit to ongoing modernization.

The Persistent Approach — AI-driven legacy modernization powered by SASVA™

We are a trusted Digital Engineering and enterprise modernization partner, serving 125+ healthcare and life sciences clients globally. SASVA, our flagship AI-powered platform, revolutionizes software engineering with Generative and Deterministic AI across stakeholders and phases:

Phase	Stakeholders	SASVA Benefits
Planning	o Business Leaders o Project Managers	Create. Plan and help manage backlog and releases.
Development	o Developers o Testers o Tech Writers	Gain knowledge about workstream, past releases, code generation, test cases, test plans, documentation, etc.
Operations	o Deployment Team	Get assistance with build, CI / CD, localization, etc.
Support and Services	o Professional Services o Tech Support	Get assistance with installation, diagnosis, visibility, RCA, etc.

SASVA delivers productivity at every stage to modernize legacy software in healthcare.

- Co-Pilot and CodeWhisperer deliver better results and have higher adoption, but their productivity reduces with complexity in mid-to-late-stage engineering.
- SASVA delivers over 25%-40% productivity in such scenarios.

>20-30%	~25-35%	~40%
Gain in Early Stage	Gain in Mid Stage	Gain in Late Stage

Legacy software presents a significant challenge in the healthcare sector, affecting everything from patient safety, operational efficiency, communication, security, and interoperability. As healthcare organizations strive to provide high-quality, patient-centered care, it is essential to address the limitations imposed by outdated technology as soon as possible. Although upgrading legacy systems can be complex and costly, there are effective strategies to minimize their impact, including gradual migration, AI-driven tools, middleware integration and cloud-based solutions.

By partnering with the right vendors, healthcare organizations can proactively address issues associated with legacy software and better position themselves to meet modern demands, such as deployment of AI-enabled use cases, superior consumer experience, increased interoperability, and others. This not only enhances operational efficiency but also supports better patient care, setting the foundation for a healthcare industry that can evolve and thrive in a digitally driven future.

Author

Amar Prasad

Head — Healthcare Strategy and Solutions

Re(AI)magining™ the World

About Persistent

Persistent Systems (BSE & NSE: PERSISTENT) is a global services and solutions company delivering Digital Engineering and Enterprise Modernization to businesses across industries. With over 23,900 employees located in 19 countries, the Company is committed to innovation and client success. Persistent offers a comprehensive suite of services, including AI-enabled software engineering, product development, data and analytics, CX transformation, cloud computing, and intelligent automation. The Company is part of the MSCI India Index and is included in key indices of the National Stock Exchange of India, including the Nifty Midcap 50, Nifty IT, and Nifty MidCap Liquid 15 as well as several on the BSE such as the S&P BSE 100 and S&P BSE SENSEX Next 50. Persistent is also a constituent of the Dow Jones Sustainability World Index. The Company has achieved carbon neutrality, reinforcing its commitment to sustainability and responsible business practices. As a participant of the United Nations Global Compact, Persistent is committed to aligning strategies and operations with universal principles on human rights, labor, environment, and anti-corruption, as well as take actions that advance societal goals. With 327% growth in brand value since 2020, Persistent is the fastest-growing IT services brand in the 2024 Brand Finance India 100 Report.

USA
Persistent Systems, Inc.
2055 Laurelwood Road, Suite 210
Santa Clara, CA 95054
Tel: +1 (408) 216 7010
Fax: +1 (408) 451 9177
Email: info@persistent.com

India
Persistent Systems Limited
Bhageerath, 402
Senapati Bapat Road
Pune 411016
Tel: +91 (20) 6703 0000
Fax: +91 (20) 6703 0008

Persistent

www.persistent.com