April 2026

Mainframe modernization: Why insurers can’t afford to stand still

Rising costs, data constraints and customer expectations are forcing insurers to rethink how legacy mainframes fit into a cloud-driven and AI-enabled enterprise

Contents

Mainframes in insurance: A benefit and a risk

At almost any large insurance company, somewhere deep in the building (or more likely, deep in the data center) you'll find a mainframe quietly doing its job — running systems for issuing policies, billing premiums and paying claims.

For decades, these mainframes have been the backbone of insurance operations, supporting everything from life and annuities (L&A) and pensions to property and casualty (P&C) lines. They earned their place through an almost stubborn resilience. No matter the circumstances, the mainframe kept running. And in an industry where downtime is a regulatory, financial and reputational nightmare, for decades that was all it needed to do.

But now, the same systems that once gave insurers their edge are increasingly holding them back, particularly as they look to AI, advanced analytics and real-time decision-making to remain competitive. Indeed, 48% of insurance IT spending goes toward maintaining legacy systems.[1]

The industry is facing a conundrum that CIOs, CTOs and other business leaders can't ignore: The mainframe is both indispensable and constraining. Insurers depend on it for stability, but that dependence makes it harder to move at the speed the market now demands — especially when new AI-driven capabilities require fast data access, flexible architectures and real-time integration.

In the US, for example, 70% of P&C insurers still run business-critical processes on legacy systems, but 82% say these systems limit their ability to innovate.[2] And internationally, 52% of L&A insurers cite their dependency on legacy systems as a top challenge.[3]

This innovation gap is increasingly evident in areas such as AI-assisted underwriting, automated claims handling and predictive risk modeling.

How we got here: Stability first, everything else later

Insurance is a risk-averse business, and this mindset has also influenced the industry's technology choices.

When new regulations emerged, insurers added reporting logic to their existing systems. When they launched new products, they layered these onto the same core platforms. And, as digital channels appeared, their integration was more often bolted on than designed in.

Although all these decisions made sense at the time, over time these clean, centralized systems became dense, monolithic environments with millions of lines of tightly coupled code, customized beyond recognition, with embedded business logic few employees fully understood anymore.

[1] Amazon Web Services. Insurance on the cloud: How AWS is helping insurers address some of their top business priorities. 2023.

[2] Key Management Group. iSeries Modernization for P&C Carriers. 2025.

[3] LIMRA. Success with customer experience: The pursuit of transformative simplicity. 2024.

As a result, data became siloed — a serious limitation when AI models depend on timely, well-structured and easily accessible data — while the customer experience showed signs of strain, changes became increasingly expensive and simple requests turned into projects spanning months. But because insurance claims were still paid and regulators remained satisfied, large-scale core modernization was always deferred.

Now, it's unavoidable.

Insurers face converging pressures that legacy environments struggle to support. These include:

- **Regulatory demands** for transparency and faster reporting
- **Customer expectations** influenced by real-time digital experiences elsewhere
- **Climate volatility** raising the need for more complex, data-intensive risk models
- **Cyberthreats** that exploit aging architectures and integrations
- **Workforce shifts** that make legacy mainframe skills harder and costlier to find

The real challenges aren't just technical

It's worth noting that when insurers talk about mainframe modernization, the conversation is often about technology: COBOL, batch processing and monolithic architectures. Those are real issues, but the deeper challenges are structural:

- **Technical debt** that grows with every regulatory change and product update
- **Siloed data** that limits analytics, AI and real-time decision-making
- **High operational costs** consuming budgets that could be allocated to innovation
- **Inflexible architectures** that don't integrate well with modern platforms, cloud services or AI pipelines
- **Shrinking talent pools** as experienced mainframe engineers retire

These constraints make experimentation risky. Even worse, they slow the adoption of AI-enabled capabilities and increase risk in compliance, security and resilience — business areas of critical importance to the industry.

For insurers, the question is no longer whether these constraints exist but how to address them without disrupting the business.

A pragmatic approach to mainframe modernization

One reason modernization stalls is fear. Many insurers still remember large-scale core replacement programs that ran over budget, underdelivered or failed outright. Those stories cast a long shadow because they reinforce the belief that touching the mainframe is inherently dangerous.

But modernization today doesn't look like it did 20 years ago. The industry has learned that ripping and replacing core systems in one fell swoop is rarely the answer.

A more pragmatic, risk-managed approach has emerged instead: Modernize in place, selectively and incrementally. This means some workloads will stay on the mainframe, at least for now.

Therefore, instead of abandoning their mainframes, insurers are changing how those systems fit into the broader ecosystem. They are:

- **Stabilizing everything that must remain**, optimizing performance and cost
- **Decoupling business logic** to limit the ripple effects of changes
- **Exposing data and functions through application programming interfaces (APIs)**, rather than batch files, to support real-time access and AI consumption
- **Migrating selected workloads** in areas where cloud delivers clear value
- **Using automation and AI** to analyze, refactor and modernize code at lower risk

In this way, they create a hybrid environment where legacy and modern platforms coexist and evolve together. This lowers risk, preserves continuity and creates space for innovation.

Innovation delayed: An insurer with legacy constraints

A midsized insurer wants to launch a new usage-based insurance product. The analytics team has a model ready. Marketing is eager, and the business case is solid. Then IT gets involved.

The underwriting logic lives on the mainframe. Pricing updates require batch cycles, and policy administration systems only refresh overnight. The data needed for real-time scoring is locked behind rigid interfaces. Integrating a cloud-based analytics platform means weeks of custom work — and every change carries regression risk.

Suddenly, a product launch that should only take weeks takes a year. By the time it's live, the insurer's biggest competitor is already making money on their version of the product.

The system did exactly what it was designed to do. However, that no longer matches what the business needs.

Innovation rewarded: An insurer doing modernization right

Another insurer faces the same pressures to bring a new usage-based insurance product to market. Instead of starting with a full replacement, they assess their application portfolio. Some systems are stable and low-change — they stay. Others are change-heavy and data-hungry, making them candidates for modernization.

The insurer decouples claims intake and moves it to the cloud, enabling real-time triage and AI-assisted routing. They also expose policy data via APIs, making it accessible to digital channels and analytics platforms. Batch cycles are reduced, and reporting becomes faster and more transparent.

The insurer's customers don't even notice the transition, but inside the organization, teams are moving faster. The business no longer requires major changes to their technology architecture in order to bring new ideas into production.

How cloud and AI change the equation

For insurers, cloud platforms offer elasticity, ease of integration and speed — something their legacy environments struggle to provide. It becomes easier to scale analytics, deploy AI models and support real-time interactions.

More importantly, cloud changes how systems are built and connected in ways that support AI. API-first design replaces point-to-point integrations, event-driven architectures replace overnight batches, and data is accessible without being duplicated endlessly.

More than 70% of P&C insurers globally[3] now report investing in cloud-based policy administration systems to make underwriting more efficient and process claims faster.

This doesn't eliminate the mainframe, which becomes one component in a broader, more flexible architecture — still reliable and secure but no longer a bottleneck.

Another major advance in modernization is tooling. Automated code analysis can now map dependencies that once took months to understand. AI-assisted code refactoring can reduce risk and speed up migration, while cloud-native platforms simplify integration and governance.

These tools don't remove the need for expertise, but they change the economics. What was once slow and risky becomes manageable and repeatable, making incremental modernization both safer and faster.

[2] Market Growth Reports. P&C Insurance Software Market Size, Share, Growth, and Industry Analysis, By Type (Cloud-Based, On-Premise), By Application (Claims, Underwriting, Operations, Others), Regional Insights and Forecast to 2035. January 19, 2026.

New technologies don’t eliminate all complexity

Yet even with these advances, mainframe modernization remains a significant undertaking. AI-powered tooling can dramatically speed up code analysis, dependency mapping, refactoring and testing, but it does not eliminate architectural complexity that has accumulated over decades.

Core insurance systems often contain deeply embedded business rules, product variations layered over time and integrations that were never formally documented. Understanding the business implications still requires experience, judgment and careful sequencing.

For L&A insurers in particular, modernizing their policy administration platforms frequently involves migrating large volumes of in-force policy data and complex books of business, some of which may date back decades. These policies often contain nuanced contractual features, riders, actuarial assumptions and historical transactions that must be preserved with absolute accuracy.

For these reasons, mainframe modernization remains a strategic, multiyear effort that demands rigorous assessment and planning. AI and automation accelerate the journey but do not replace disciplined portfolio analysis, business case validation, phased execution and robust governance.

Aligning technology with business reality

Modernization initiatives often stall because they’re framed as infrastructure programs rather than an evolution of the business. When success is measured only in terms of platforms migrated or code refactored, it becomes difficult for business leaders to see clear value or to stay engaged once the need for hard trade-offs arises.

Grounding modernization in outcomes such as reduced time to market, improved underwriting accuracy or faster regulatory responses helps create shared ownership between technology and the business.

This alignment also provides a practical way to prioritize. Not every system needs to be modernized at the same pace or in the same way. By focusing first on areas where architectural rigidity creates the most friction — whether that’s launching new products, accessing data for analytics or integrating with partners — insurers can direct investment where it delivers immediate impact.

Over time, this outcome-led approach reduces risk and ensures that modernization efforts remain closely tied to the realities of how the business operates and competes.

Experience and expertise streamline modernization

The early consequences of delayed modernization are subtle: Operating costs slowly rise, release cycles become longer and skills gaps widen. Regulatory responses may slow, and innovation could start shifting elsewhere.

Then, one day, a competitor launches faster or a regulator demands more transparency. Perhaps a serious cyberincident exposes architectural weaknesses. Suddenly, modernization switches from being a strategic endeavor to a reactive exercise — the most expensive way to change.

To avoid being compromised in this way and to modernize their business-critical systems as efficiently as possible, insurers need access to proven expertise, particularly spanning mainframes, cloud platforms, AI and regulated insurance environments.

What NTT DATA and Amazon Web Services offer

NTT DATA has decades of hands-on expertise in modernizing mainframe environments in insurance and other highly regulated sectors. Working closely with Amazon Web Services (AWS), we help insurers design low-risk modernization strategies that recognize the realities of their core systems while unlocking the benefits of cloud architectures.

Our services cover everything from optimizing and retaining mainframe workloads to rehosting, replatforming and rearchitecting applications as needed, backed up by automated code analysis, proven migration frameworks and deep domain knowledge.

Most importantly, we focus on business outcomes: Faster change, better data access and lower risk. It's how we lay the foundation for AI, smart analytics and everything else that comes next.

Working together, NTT DATA and AWS have reduced insurers' mainframe operations costs by 50% to 80% and sped up their modernization efforts by 30% to 50% through our AI-supported delivery frameworks, tools, intellectual property and accelerators. Other benefits include improvements in customer experiences, regulatory responsiveness, security and resilience.

5 practical steps to start with

The answer to mainframe modernization in the insurance industry isn't "replace everything." The goal isn't to escape the past altogether but rather to stop being constrained by it.

NTT DATA takes a pragmatic approach to breaking down the issues and building an appropriate solution. Here's what we can help you achieve:

1. Understand your landscape — applications, data, dependencies and risk.
2. Quantify the business impact, not just the technical complexity.
3. Prioritize incrementally, focusing on high-value and high-friction areas.
4. Design for coexistence, not immediate perfection.
5. Learn, adapt and scale using repeatable patterns.

How we enable pragmatic, AI-ready mainframe modernization

We use a platform, tools and accelerators to address three interrelated challenges at the heart of insurance modernization:

1. How work actually gets done — across people, systems and AI
2. How deeply embedded legacy code and business logic can be modernized without disrupting the business
3. How and where workloads should run to balance stability, scalability and cost

AI-driven work orchestration for insurers

NTT DATA helps insurers change the way they get work done by coordinating people, AI agents and core insurance systems in a more natural way.

Built to operate across cloud platforms within an insurer’s architecture, our purpose-built platform, known as **Agentic AI Workplace for Insurance**, acts as a shared control layer that pulls business processes out of rigid legacy systems and routes work, insights and decisions to the right place — an underwriter, a claims adjuster, an AI agent or an enterprise application.

Instead of asking insurers to rip and replace their core systems, this platform runs alongside them. It integrates with systems such as Guidewire, Duck Creek and Salesforce, as well as third-party data providers, using prebuilt APIs and Model Context Protocol (MCP) adapters.

At its core are AI agents trained specifically for insurance. Grounded in an insurance-specific ontology and fine-tuned language models, they understand policy language, claims narratives and regulatory nuance. They can reason based on unstructured data, bring in third-party information and surface insights in real time, with a clear chain of evidence that supports explainability and governance.

Through a conversational, generative interface, underwriters and claims teams can explore data directly, run what-if scenarios and get proactive recommendations without being limited to static dashboards or manual data preparation.

The results are tangible. Routine, time-consuming tasks are handled by AI agents, while humans remain in charge of the decisions that matter. This means faster underwriting and claims handling, more consistent outcomes and lower operating costs.

Just as importantly, the platform lays the groundwork for insight-driven, AI-enabled operations, helping insurers modernize their core legacy mainframe platforms at their own pace without destabilizing the systems they rely on.

AI-driven application and mainframe transformation

Our application and mainframe transformation capabilities help insurers modernize without destabilizing these core business systems.

Rather than forcing a single modernization pattern, we focus on reducing risk, improving transparency and creating optionality. Insurers gain a clearer understanding of their application landscape, the embedded business logic within it and the safest paths to evolve each system, whether that means stabilizing it, moving it or transforming it more extensively over time.

Understanding legacy applications before changing them

Uncertainty is a critical barrier to modernization. Decades of accumulated code, undocumented dependencies and tightly coupled business rules make even small changes feel risky. NTT DATA uses AI-assisted analysis to accelerate modernization activities such as dependency mapping, business rule discovery and extraction, and impact assessment — activities that used to take months and relied heavily on scarce skills. This gives technology and business leaders a shared, evidence-based view of how the applications actually behave, what they cost to run and where modernization will deliver the greatest value with the least disruption.

Specialized accelerators, including NTT DATA's **IntelliMod**, support this process by applying AI to large, long-lived codebases, helping teams move from assumption-driven decisions to informed, sequenced action.

A fast, low-risk path to stability and lower cost

Many insurers' first priority is not transformation for its own sake but cost control and operational resilience. Some workloads are stable, change infrequently and may remain well suited to their existing architectures but not to their current cost structures.

Through rehosting and replatforming, these workloads are moved to modern infrastructure with minimal code change, preserving proven business logic while reducing run costs and infrastructure risk. NTT DATA's **UniKix** mainframe rehosting software suite enables this transition to AWS while maintaining compatibility with existing COBOL, customer information control system (CICS), information management system (IMS) and batch environments.

This creates immediate financial and operational headroom, freeing up more capacity to invest in modernization.

A reasonable alternative to "big bang" transformation

Taken together, these capabilities provide a measured, outcome-led alternative to traditional core replacement programs. Insurers are no longer forced to choose between accepting growing technical debt or betting the business on large, disruptive transformations.

Instead, they can modernize selectively and continuously by stabilizing what works, transforming what constrains them and building an architecture that supports cloud and AI adoption at a pace aligned to their business priorities.

AWS: Mainframe Modernization for life insurance

Through their Mainframe Modernization program and AWS Transform, AWS offers insurers a structured path to unlock value from long-standing mainframe systems — preserving business continuity without sacrificing stability or regulatory confidence.

AWS Transform brings automation and AI-driven acceleration to the modernization journey. It orchestrates the assessment of legacy code and the refactoring of business logic using built-in AWS tools, proven design patterns and industry-specific blueprints.

By modernizing mainframe workloads on AWS, insurers gain easier access to legacy data and can apply advanced analytics to improve insight, responsiveness and decision-making. In practice, this supports outcomes such as faster product launches, simpler compliance and reporting, and improved self-service for policyholders and insurance customer-support employees.

Modern, cloud-native platforms also make it easier to connect with partners, insurtech and distribution ecosystems, helping insurers grow profitably without adding proportional headcount or operational complexity.

AWS supports this journey through ongoing investment in automation, AI and GenAI, along with tools such as AWS Transform that embed proven modernization strategies and continuously enhance the transformation process.

As an AWS Premier Tier Services Partner with deep mainframe and insurance expertise, NTT DATA works alongside AWS to help insurers modernize with confidence and realize tangible business outcomes faster.

Mainframe modernization in action

From mainframe to cloud in four markets

NTT DATA helped a German multinational financial services and insurance provider undertake a large-scale modernization program across four markets.

The program involved moving decades of business-critical workloads off legacy mainframe and on-premises systems and into the AWS cloud without disrupting the business. The scope was significant and complex, spanning 6,500 MIPS of processing capacity, more than 20,000 software artifacts, over 500 servers and 1,750 application components.

NTT DATA worked with the insurer to design and execute a structured migration that balanced stability with transformation, with core insurance operations running smoothly at all times.

The transformation is on track to deliver a reduction of more than 20% in annual operating expenses by the end of the transformation program in 2028. Just as importantly, the move has enabled the insurer to bring new products and capabilities to market around 30% faster, turning what was once a rigid, infrastructure-constrained environment into a more flexible platform for innovation and business growth.

> "Insurance companies don't have to choose between the reliability of their mainframes and the flexibility of the cloud. With AWS and NTT DATA, they can modernize at their own pace — protecting the systems that keep their businesses running while opening the door to better data, smarter insights and innovation. It's about reducing risk, cutting complexity and turning core platforms into a foundation for growth."

Jayme Hart, AWS Global Head of Insurance Industry Development

An upgrade in delivery and innovation through the cloud

NTT DATA helped a European insurance provider take their first major step to the cloud by designing and operating a modern application environment on AWS for their P&C business. They wanted to move away from on-premises infrastructure and speed up the delivery of new insurance applications, but without taking on the operational burden or regulatory risk of running cloud platforms themselves.

We implemented their managed DevOps platform as a ready-to-use blueprint, combining cloud infrastructure, automation and insurance-specific operational controls. This allowed the insurer to deploy a new core application environment in the cloud quickly and securely while meeting strict regulatory requirements. All data remained hosted within Europe.

As a result, the insurer achieved a fast, cost-efficient transition to the cloud with measurable operational gains. A complex insurance application was successfully delivered in just 10 months, supported by a highly automated, scalable and secure AWS-based platform.

With NTT DATA operating both the cloud platform and the applications as a single, integrated service, the insurer now benefits from 24×7 support, rapid deployments completed in minutes and a high-quality, cost-effective delivery model.

The new cloud foundation positions the business to adopt cloud-native innovations with confidence. Their internal teams can focus on serving more than 1.3 million customers while remaining compliant and ready for what comes next.

Enabling autonomous service at scale with NTT DATA and AWS

Autonomous service requires more than automation. It also demands cloud-scale infrastructure, advanced AI capabilities and governance frameworks leaders can trust.

Through an expanded strategic collaboration, NTT DATA and AWS combine deep service transformation expertise with AWS's secure, resilient cloud and advanced GenAI and agentic AI services. Together, we enable organizations to redesign high-volume service journeys, embed AI as an execution layer and orchestrate outcomes end to end.

Built on AWS's elastic digital foundation and guided by NTT DATA's industry expertise, data and governance capabilities, autonomous service can:

- Scale without linear workforce growth
- Maintain resilience during peak demand
- Improve continuously through real-time insight into completion rates, exceptions and performance patterns
- Embed governance, security and compliance by design

The result is a shift from human-executed services at scale to software-delivered operations by design — secure, responsible and measurable in economic impact.

For leaders ready to move beyond incremental optimization, NTT DATA and AWS provide a structured path from vision to enterprise-scale execution.

Take the next step

Mainframes aren’t quite going away, but the era when they sit at the center of everything in the insurance industry is ending.

As AI, real-time risk modeling and ecosystem-based distribution become standard, the cost of architectural rigidity will keep rising, and insurers will need architectures that bend without breaking.

Modernization is how they get there.

Read more about NTT DATA’s Cloud services and visit our Insurance industry focus to explore modernization that doesn’t disrupt the systems that run your business.


NTT DATA