

# Mainframe Code Modernization Patterns

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Mainframes have been the backbone of enterprise operations for decades. The pressure to deliver digital services faster, respond to constant business changes, and operate with greater efficiency has not bypassed the mainframe. On the contrary, the mainframe sits at the crossroads of innovation, customer experience, and long-term competitiveness, making its modernization of high strategic value. The challenge is how to do this without jeopardizing the stability that mainframes critically provide, keeping the business running.

Critical processes must be streamlined, talent gaps addressed, and the right platforms and architectures selected, all while preserving security, compliance, and operational resilience. Decisions about code transformation, modular design, and the role of AI in accelerating modernization require a careful balance between bold progress and prudent risk management. Organizations that navigate this tension successfully with the mainframe will move faster, operate smarter, and strengthen the reliability that defines their use of these essential systems.

## Research Insights

A recent poll of mainframe operators and developers conducted by Techstrong reveals that mainframe modernization has become a strategic priority for most enterprises. Organizations are embracing hybrid platform strategies, elevating security in decision making, and pursuing modernization to accelerate innovation and improve integration. At the same time, teams remain measured in their approach, balancing large scale transformation with documentation, parallel systems, and emerging AI tools designed to speed understanding and reduce technical debt.

## Analyst View

Enterprise mainframe teams are entering a period of accelerated transformation, and the data shows that modernization is now a fundamental strategic priority.

## Key Takeaways

- **Mainframe modernization is now a strategic imperative.** Three quarters of organizations report active modernization initiatives, underscoring that updating mainframe systems is no longer optional but central to enterprise strategy.
- **Modernization balances deep transformation with operational stability.** Enterprises are converting code, refactoring architectures, and adopting modular designs. At the same time, many still maintain and document legacy systems or run parallel versions to manage risk.
- **Platform decisions most highly prioritize security.** While cost, performance, integration, risk, and talent factors all play meaningful roles, security and compliance stand out as the top drivers for where workloads run.
- **AI accelerates modernization, but adoption remains measured.** AI-powered tools for documentation and code conversion show strong effectiveness and growing use, though a notable share of organizations are still cautious or evaluating deployment.

An overwhelming 76% of organizations report having active application modernization initiatives, a clear signal that modernizing mainframe-based systems is no longer optional, but core to how enterprises plan for the future.

With modernization established as a widespread imperative, the next question is to what degree modernization will determine where these organizations intend to run their most critical workloads. Our poll reveals a fittingly pragmatic mindset. Despite years of cloud-first narratives in the market, enterprises overwhelmingly prefer fit for purpose hybrid strategies, followed by mainframe first approaches. Cloud only strategies lag far behind. This underscores how much modernized mainframe workloads are intentionally placed on the platform where they deliver the most value.



Security and compliance stand out as the main factors in choosing that platform during modernization. No other consideration comes close. Organizations consider cost, performance, interoperability, risk tolerance, and talent when deciding, but security and resilience are by far most often prioritized.

These platform choices set the stage for what organizations hope modernization will deliver. The top expectations are clear and business centric: nearly half aim most for faster innovation and time to market (47%), with cost reduction (43%) close behind and improved integration (36%) also significant. Speed and agility are the primary value propositions, followed by efficiency and operational clarity through better documentation and maintainability. Talent expansion and skills alignment remain important but secondary benefits.

While outcomes and platform strategy shape the broader direction, organizations remain very deliberate in choosing which modules or systems to modernize first. The poll shows that these decisions are strongly driven by business needs: process optimization ranks as the top trigger (37%), followed closely by tight talent markets (34%), changing business rules (32%), and cost pressures (32%). Technical factors like update frequency are relatively lower priorities (22%), highlighting that modernization efforts aim to remove friction from business processes rather than simply react to code churn.

Amid these business driven triggers, the poll further shows that most organizations are undertaking major modernization efforts, often transforming entire applications (50%) or breaking apart monolithic systems into modular architectures (47%). However, a meaningful proportion still prioritizes maintainability and documentation (39%), reflecting the need to balance bold transformation with operational continuity.

That balancing act is even more apparent in the code transformation strategies organizations use. While aggressive approaches such as refactoring (39%) or code conversion (37%) are prominent, many still take documentation heavy approaches (34%) or maintain parallel versions (33%) to safeguard stability. Documentation and the parallel-version approach often serve as foundational steps in the modernization process. Building on that groundwork, some organizations use AI-powered tools for both documentation and code conversion (37% and 27% respectively), indicating the dual desire to innovate rapidly while mitigating talent and technical debt constraints.

Finally, even though AI adoption in modernization shows promising momentum, it is with measured enthusiasm. Three quarters of organizations find AI-driven code conversion tools moderately to highly effective, yet a notable share remains cautious, reporting limited benefits or no current

adoption. This underscores the reality that while AI is becoming a powerful accelerator for modernization, enterprises continue to evaluate its risks, maturity, and reliability before applying it at scale.

## Recommendations

Modernization has evolved from a technical project to a business mandate. Yet the data reveals gaps in strategy, execution readiness, and platform decision-making that could slow progress or introduce unnecessary risk. Here are key actions mainframe and technology leaders should take to reliably make modernization intent provide measurable business advantage.

- **Treat mainframe modernization as an enterprise-wide transformation—not a series of technical updates.** The poll shows 76% of organizations are modernizing, but many still approach efforts in isolated pockets rather than as coordinated strategic initiatives. Leaders should elevate modernization to a formalized enterprise priority, with executive sponsorship, shared KPIs, and a unified roadmap that links code, architecture, platform strategy, and business outcomes.
- **Anchor modernization prioritization in business value, including the costs of unnecessary disruption.** Organizations cite process optimization, shifting business rules, and talent shortages as their top triggers. Update frequency isn't considered a business priority, and this should guide priority-setting. Modernization efforts must be tied to where the business gains the highest net positive impact on time, efficiency, or clarity. Focus first on modules and processes that directly constrain innovation, customer experience, or operational throughput.
- **Balance deep architectural change with disciplined risk management.** Enterprises are frequently pursuing major transformations like full code conversion or modularization, yet many also maintain legacy code or run parallel versions. This duality is not a weakness; it's a

strength and should probably be even more common. Leaders should formalize their own “accelerate and safeguard” model with the use of parallel applications, incremental refactoring, and staged releases to modernize while minimizing destabilization risks.

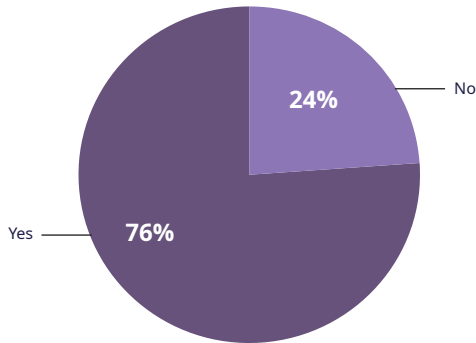
- **Make platform strategy a security-first decision, not a cloud-first assumption.** With security and compliance dominating platform considerations and hybrid/mainframe-first models clearly preferred, leaders should resist the pressure to migrate workloads simply for cloud alignment. Instead, they should place each workload on the platform where it can be secured, governed, and scaled most effectively, then focus modernization on integration, interoperability, and agility.
- **Start AI deployments where they will reduce technical debt fastest.** AI-powered documentation and code conversion tools are proving effective, but adoption remains cautious. Leaders should start where AI has immediate business impact: accelerating understanding of legacy systems, reducing backlog, and freeing skilled staff for higher-value modernization work. But they must pair this with proper validation, governance, and testing frameworks to avoid overreliance on early-stage outputs.

Modernization rewards bold action when anchored in business priorities and executed with discipline. By elevating modernization to a strategic initiative, grounding decisions in business value, protecting security posture, and using AI to accelerate (not override) sound engineering processes, organizations can modernize with confidence and strengthen the core systems that drive their competitiveness for the decade ahead.

## Research Results

### Mainframe Modernization Is a Critical Strategic Initiative

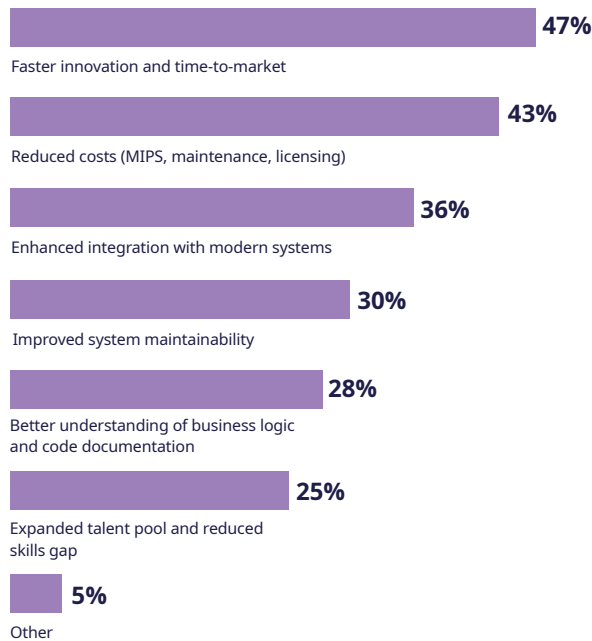
Does your organization currently have an application modernization initiative in place?



Mainframe modernization is now a mainstream priority: 76% of organizations report having an active modernization initiative, underscoring that modernizing legacy applications is no longer optional but a core strategic focus.

### Time-to-Value Leads Mainframe Modernization Expectations with Cost and Integration Close Seconds

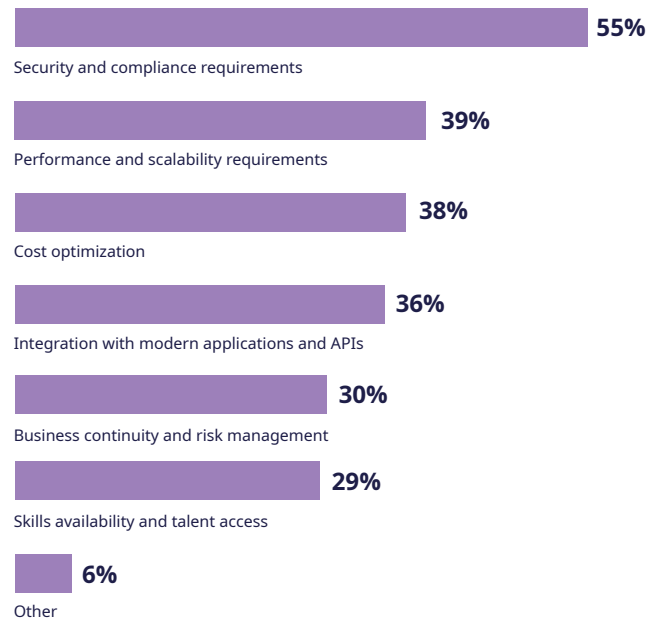
What are the TOP TWO benefits your organization expects from mainframe modernization?



Mainframe modernization is primarily an agility play. 47% of respondents expect faster innovation/time-to-market as a top benefit. Efficiency gains follow, with reduced costs (43%) and enhanced integration with modern systems (36%). Improved maintainability (30%) and better understanding/documentation (28%) are solid secondary goals. Talent expansion (25%) trails, suggesting organizations seek rapid business impact first, with workforce and knowledge benefits accruing alongside.

### Security First, Platform Decisions Are Multi-Factor

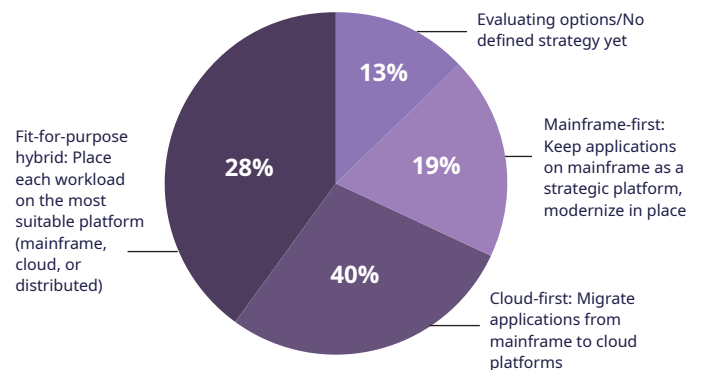
What factors MOST influence your organization's platform decisions for mainframe applications?



Platform choices are driven by a multi-factor calculus (averaging 2.3 factors per decision), but security and compliance dominate at 55%. This underscores the mainframe's unmatched risk management strength. Secondary influences such as performance and scalability (39%), cost optimization (38%), integration with modern apps (36%), business continuity/risk (30%), and skills access (29%) show that organizations balance economics and interoperability with regulatory and resilience priorities when deciding where mainframe workloads should run.

### As Usual, the Mainframe Endures—Hybrid Leads, Cloud-First Lags

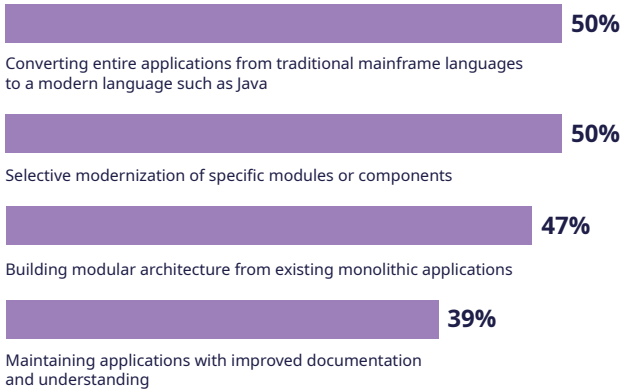
What is your organization's strategic direction for mainframe applications over the next 3-5 years?



Enterprises are not abandoning the mainframe. Most organizations favor fit for purpose hybrid or mainframe first strategies, with limited appetite for wholesale cloud migration. A smaller group is still evaluating options, reinforcing that modernization is being pursued pragmatically, placing workloads where they run best rather than moving everything to the cloud.

### Most Organizations Are Undertaking Major Modernization of Mainframe Applications

What is your organization's primary approach to modernizing mainframe applications? (Average number of primary approaches used: 1.8)

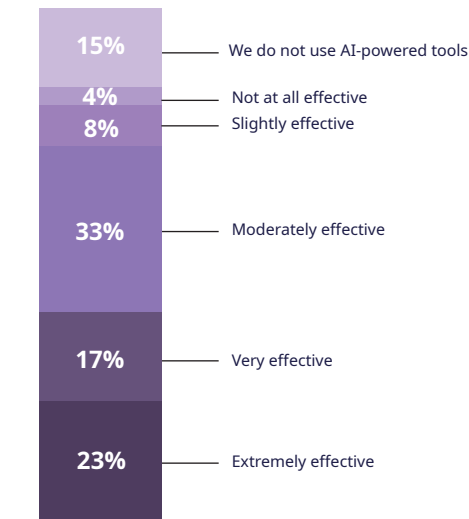


Most organizations are pursuing major mainframe application modernization efforts. Half are converting entire applications and half are rebuilding monolithic systems into modular architectures. Thus, the data shows that many enterprises view modernization as a broad architectural transformation, not just selective refactoring.

A significant share of enterprises, about one in two, are taking the bold step of converting entire applications to modern languages as their primary modernization strategy. At the same time, the much smaller but still significant showing for "maintaining with improved documentation and understanding" (39%) highlights that a meaningful portion of the Smart Batch/DevOps audience continues to prioritize incremental modernization and enhanced maintainability.

### Positive Results as Well as Caution on AI Code Conversion

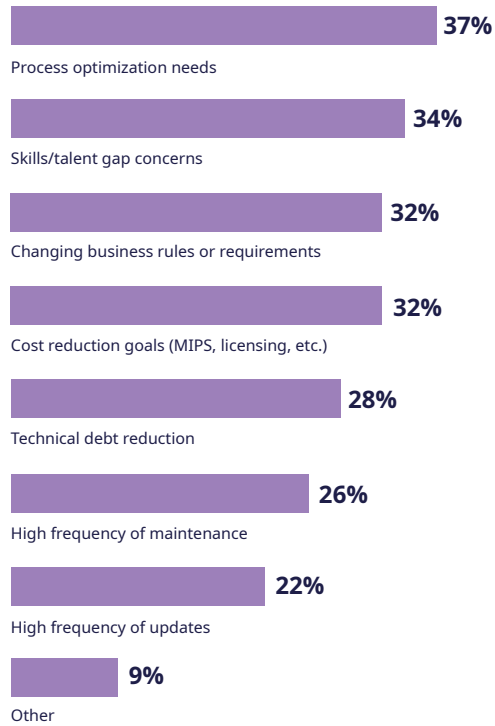
How effective have AI-powered tools for code conversion been in your modernization efforts?



When asked about using AI-powered tools in modernization efforts, the results skewed favorably. 40% of respondents rated AI code conversion tools highly effective (23% extremely, 17% very) and another 33% find them moderately effective, meaning roughly three quarters (73%) see solid value. However, caution persists. 8% report only slight effectiveness, 4% see no benefit, and 15% haven't adopted these tools at all, signaling ongoing evaluation and selective use rather than blanket deployment.

### The Modules Chosen for Modernization Are Business-Driven

What TWO factors MOST OFTEN drive your organization's decisions to modernize specific mainframe modules?

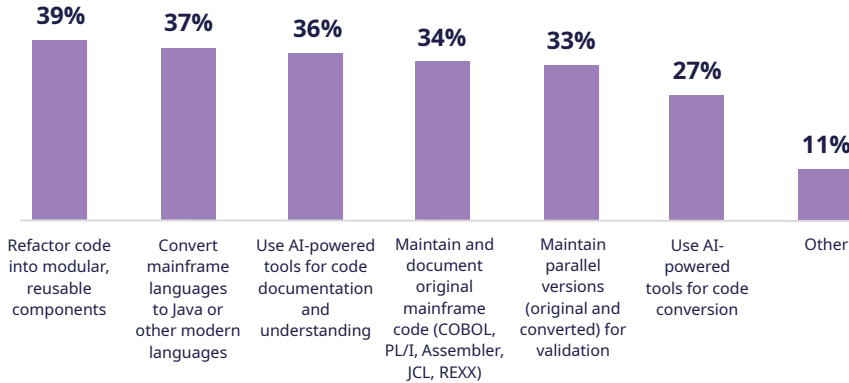


Decisions to modernize mainframe modules are primarily business driven. The top trigger is process optimization (37%), with skills/talent gaps (34%) and technical debt/cost/efficiency pressures close behind (32%). Operational churn (e.g., high update frequency) ranks lower, indicating organizations modernize selectively to remove process friction and align with business goals, rather than reactively to code change volume.



## Code Transformation Strategies Reflect Both Acceleration and Caution

What strategies does your organization use for mainframe code transformation?



Organizations are pursuing a wide mix of code transformation strategies, with recoding and refactoring emerging as the most dominant approaches. 37% of respondents convert code and 39% refactor it into modular components, reinforcing the trend toward deeper modernization rather than simple maintenance.

Yet caution remains, with many organizations still maintaining and documenting legacy code (34%) or running parallel versions (33%) to preserve stability during transformation. In an interesting contrast, AI-powered tools are seeing strong adoption. 36% of respondents use AI tools for documentation and 27% for code conversion, suggesting that while some teams hedge their bets by retaining legacy code, a similarly large share is accelerating modernization through AI. This is reflective of both growing confidence in transformed code, the urgency to address skills shortages, as well as technical debt.

This Techstrong PulseMeter is sponsored by BMC.

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