Atos | aws

Modernize with confidence:

Your 10-step executive guide to mainframe modernization

Welcome & Introduction

Why mainframe modernization matters. And why now is the time to act.

For decades, mainframes have been the backbone of enterprise IT: secure, dependable, and deeply integrated into the business. But today, those same strengths can become restrictive. While mainframes remain secure and dependable, they are becoming more expensive to run, harder to scale, and reliant on a shrinking pool of specialist skills.

For many organizations, this is shifting modernization from a purely technical project to a broader business priority.

Cloud-enabled organizations are achieving faster time to market, sharper customer insights, and measurable ESG impact. In many cases, mainframe and public cloud can also co-exist, allowing enterprises to modernize at their own pace while protecting critical workloads. This hybrid reality is now the most common path we see in the market.

Atos and AWS bring decades of modernization expertise and proven frameworks to the table. Using our patented Exit Legacy Gen 4.0 mainframe modernization platform we help enterprises de-risk their transformation, unlock operational agility, and build a platform for continuous innovation. Our Atos CloudCatalyst program with AWS provides benefits and incentives to support the transformation program.

This guide is your executive roadmap, a practical, 10-step framework designed to help you understand the what, why, and how of mainframe modernization. Whether you're exploring options or planning next steps, it will give you the insights, recommendations, and success factors you need to modernize with confidence.

How to use this guide

Practical insights for leaders driving complex change.

We understand the need to balance business objectives, technical complexity, and organizational change, including scenarios where mainframes and cloud coexist.

Which is why this is not a technical manual, but an executive level playbook written with CIOs, CTOs, CFOs, and Heads of Infrastructure in mind.

Use it as a living document to guide discussions with your leadership teams, partners, and stakeholders.

What you'll find inside:

- Strategic considerations for each phase of modernization
- Questions to challenge your teams and shape decision making
- Proof points from real world Atos and AWS client transformations
- Insights into pitfalls to avoid and best practices to adopt

How to navigate:

You can read the guide step by step, following the full modernization journey, or jump directly to areas of priority using the navigation menu. Each section is designed to be self-contained, with clear takeaways you can apply immediately.

The 10 step journey

Your executive blueprint for modernization success.

Modernization is a journey, not a one-off project. This 10-step framework gives CIOs, CTOs, CFOs, and infrastructure leaders a clear path to plan, execute, and scale mainframe migration with confidence. It uses AI throughout – from assessment and data strategy to execution and optimization – to accelerate results and support smarter decision-making

The 10 steps at a glance

in 5 phases

Phase 1: Assessment and strategy

Step 1: Assess your legacy infrastructure: Build a clear baseline

Step 2: Define your transformation strategy: Establish your business goals, then shape a cloud strategy that supports them

Phase 2: Data and application modernization

Step 3: Prioritize data management: Classify, tier, and govern your data

Step 4: Modernize legacy apllications: Maximize value with appropriate modernization

Phase 3: Implementation and security

Step 5: Optimize workloads: Reduce cost and improve performance

Step 6: Strengthen security and compliance: Build trust from the ground up

Phase 4: Business continuity and advanced integration

Step 7: Plan for business continuity: Minimize downtime and risk

Step 8: Integrate AI and analytics: Unlock new insights and capabilities

Phase 5: Sustainability and continuous evolution

Step 9: Drive sustainability: Use cloud to meet ESG goals

Step 10: Prepare for continuous innovation: Make modernization a platform for growth

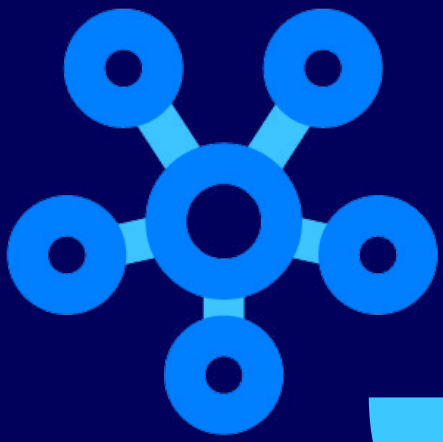
Did you know?

Atos has been named a Leader in all four quadrants of ISG's 2025 Provider Lens™ for Mainframe Services and Solutions in Europe. This means your modernization journey is backed by industry-recognized excellence in:

- **Mainframe Optimization Services:** helping you reduce costs and improve performance.
- **Application Modernization Services:** enabling secure, phased transformation with AI-powered automation.
- **Mainframe as a Service (MFaaS):** offering scalable, hybrid-ready infrastructure tailored to your needs.
- **Mainframe Operations:** delivering reliable, automated services with built-in security and compliance.

With Atos, you gain a trusted partner to modernize smarter, faster, and with less risk.

Step 1: Assess your legacy infrastructure



Lay the foundation for a confident modernization journey.

Mainframes rarely operate in isolation. They underpin a web of applications, processes, and a thorough IT assessment goes beyond taking inventory to provide a practical roadmap. It examines the full data center, edge, and application landscape, uncovering interdependencies across workloads, processes, and databases.

Mainframes are just one part of this ecosystem, often supporting critical applications alongside other infrastructure. Mainframe Assessment powered by Exit Legacy and AWS Transform enables the development of a transformation roadmap that reduces risk, aligns with business objectives, and sets the stage for scalable, flexible modernization.

What to consider

- **Time window for transformation:** How much time do you have before costs, risks, or support issues become critical?
- **Systems slowing down business innovation:** Where are systems slowing business operations?
- **Hidden dependencies:** Which applications and processes rely on the mainframe?
- **Total cost of ownership (TCO):** What are you really spending on maintenance and licensing?
- **Skills risk:** How exposed are you to mainframe talent shortages?

Questions to ask your team

- Which workloads are mission critical and which can be modernized first?
- Are there legacy systems that no longer add business value?
- What does success look like for this assessment (cost savings, speed, resilience)?
- What are the constraints for moving applications to cloud?

Did you know?

With Exit Legacy's Inventory analysis tool, Atos creates a visual map of your estate, detailing dependencies and performance risks. This evidence-based view helps build a phased, low risk migration plan with AWS, aligning IT objectives with business priorities.

In the real world

A public sector pension administrator managing citizen retirement accounts partnered with Atos to assess its COBOL-based savings system. Using automated tooling, Atos mapped interdependencies, code complexity, and data flows—laying the groundwork for a confident modernization roadmap.

Executive takeaway

A robust assessment provides the strategic baseline for modernization. Without it, you risk migrating blind, overspending, or jeopardizing critical operations.

Readiness Checklist Planner

Mapped dependencies:

☐ Yes ☐ No

Baseline TCO established:

☐ Yes ☐ No

Identified quick win workloads:

☐ Yes ☐ No

Defined success KPIs:

☐ Yes ☐ No

Continue

Step 2: Define your transformation strategy

Align cloud migration with business goals and regulatory requirements.

Modernization used to be about moving workloads. Now it's about choosing technology that supports clearly-defined business objectives. Whether you prioritize agility, cost efficiency, or ESG progress, your cloud model should support your enterprise vision.

Public, private, hybrid and sovereign cloud models each offer unique advantages, but they also require trade-offs. Choosing the right approach demands joint ownership between IT, finance, business, and compliance leaders. Engaging the CFO early helps reshape cost models from CapEx to OpEx while ensuring the board sees clear value in the investment.

What to consider

- **Time frame for cloud transformation:** How quickly do we need to plan, migrate, and realize value?
- **Cloud models:** Public, private, or hybrid? What fits our performance and compliance needs? Is sovereign cloud a factor to consider?
- **KPIs:** Which business outcomes (cost, uptime, emissions, agility) are non-negotiable?
- **Regulatory demands:** How do sovereignty and residency requirements shape our options?
- **Partner ecosystem:** Will the chosen model integrate with our suppliers and stakeholders?

Questions to ask your team

- How will this strategy impact financial reporting and cost governance?
- Are ESG and sustainability targets influencing our technology decisions?
- Do we need a hybrid model to balance innovation with compliance?
- What are our application and data latency requirements?

Did you know?

Atos uses its advisory experience to align cloud models with enterprise goals, leveraging AWS' flexible solutions to create roadmaps that balance compliance, cost, and performance. Atos leverages the incentives and technical support available under the Atos CloudCatalyst program to minimize the cost, time, and risk of transformation.

Step 3: Prioritize data management

Get your data cloud ready while maintaining governance and control.

Data is the lifeblood of your organization. But in many mainframe environments, it's siloed, duplicated, and costly to store. Before you migrate, you need a data strategy that balances performance, security, and cost efficiency.

Tiering data according to its criticality can **reduce storage costs by up to 50%.** Critical 'hot' data can be kept in high-performance storage, while 'warm' and 'cold' data can move to cost-effective archival solutions like Amazon S3 and Glacier. At the same time, strong governance frameworks are essential for ensuring regulatory compliance and controlled access during and after migration.

This step isn't only about storage. It's about building a modern data foundation that makes your information more accessible, secure, and ready for future use cases like AI and analytics.

What to consider

- **Data classification:** Which data is critical to operations? Which is regulatory sensitive?
- **Storage tiering:** Where should hot, warm, and cold data live postmigration?
- **Governance:** Who owns and accesses the data? Are controls in place for compliance?
- **Risks:** Are you addressing shadow data and legacy formats that could be lost or corrupted?
- **Database performance and transformation requirements:** Can we conduct licensing costs comparison?

Questions to ask your team

- Which datasets are essential for day-to-day operations?
- How are we handling data subject to compliance (e.g. GDPR, HIPAA)?
- Can we reduce cost and complexity by archiving low value or historic data?
- Which databases have latency requirements?

Did you know?

Atos uses its Exit Legacy tools and AWS Transform tools to profile and classify mainframe data, combining this with AWS storage optimization services. This provides a clear picture of where each dataset should live, balancing performance needs with cost efficiency and compliance requirements.

In the real world

A public sector pension system modernization included structured data migration, ensuring clean, accessible datasets for the new cloud-native platform. This supported governance, compliance, and future analytics use cases such as contribution tracking and member reporting.

Executive takeaway

Migrating without a data plan creates risk and inflates costs. Classify, tier, and govern your data early to ensure a compliant, cost-optimized migration.

Data Tiering Planner

Click each storage tier (Hot, Warm, Cold) to reveal recommended use cases and AWS services.

01.
Hot data

02.
Warm data

03.
Cold data

Step 4: Modernize legacy applications

Modernize applications for the cloud with minimal disruption.

Not every mainframe application can simply be lifted and shifted. Some will need to be refactored or redesigned to take advantage of cloud platforms and cloud-native services. Others will need to be rebuilt entirely. These decisions require a careful balance between cost, risk, and business value. Refactoring offers long-term benefits, such as reduced transformation risk, improved scalability, faster updates, and easier integration with modern systems, but it must be approached selectively. Over refactoring can inflate costs and delay delivery, while underinvesting may limit the value of your migration. With the right tools and automation, however, transformation can be accelerated without impacting critical operations.

> **“Organizations that modernize legacy applications see up to 40% faster release cycles.”**
>
> **(Source: Gartner, “The Business Value of Application Modernization,” 2023)**

What to consider

- **Rehost, refactor, or rebuild?** Which approach is right for each application?
- **Business value vs. effort:** Which apps deliver the highest return on investment (ROI) post modernization?
- **Operational impact:** How do we refactor without disrupting users?
- **Testing and validation:** How will we ensure functional and performance equivalence post migration?

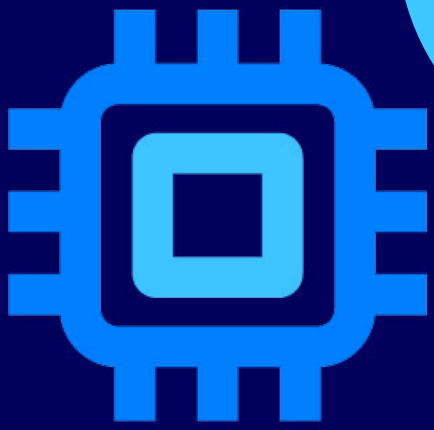
Questions to ask your team

- Which applications are business critical and cannot tolerate downtime?
- Are there apps better suited for a complete rebuild to unlock future innovation?
- How will we phase refactoring to minimize operational disruption?

Did you know?

Atos leverages Exit Legacy and AWS Transform’s automated refactoring suite to streamline code analysis, modernization, and deployment. This reduces risk, accelerates delivery, and ensures applications are cloud ready with minimal business disruption.

Step 5: Optimize workloads with AI



Use intelligent automation to reduce costs and improve performance.

Moving to the cloud unlocks new opportunities for workload optimization using AI and automation. Rightsizing resources, dynamically scaling capacity, and predicting future demand all help avoid overspending and improve operational performance. Yet many organizations fail to optimize postmigration, leading to unnecessary costs and underutilized cloud capacity. By adopting AI driven workload management early, CIOs can maximize ROI while ensuring systems remain resilient and responsive to business needs.

What to consider

- **Rightsizing:** Are workloads over or under provisioned?
- **Scaling:** Can your infrastructure automatically adjust to demand?
- **Forecasting:** Are you using predictive analytics for resource planning?
- **Governance:** Do you have visibility and controls to manage cloud spend?

Questions to ask your team

- Are we using automation to manage performance and cost?
- What KPIs will we track to measure workload efficiency?
- How do we prevent 'cloud sprawl' as we scale?

Did you know?

Atos integrates AWS Auto Scaling and AI driven optimization tools into postmigration environments, enabling continuous monitoring and adjustment. This helps **reduce costs by up to 30%** while improving system responsiveness.

“AI driven workload optimization delivers up to 30% cost savings.”

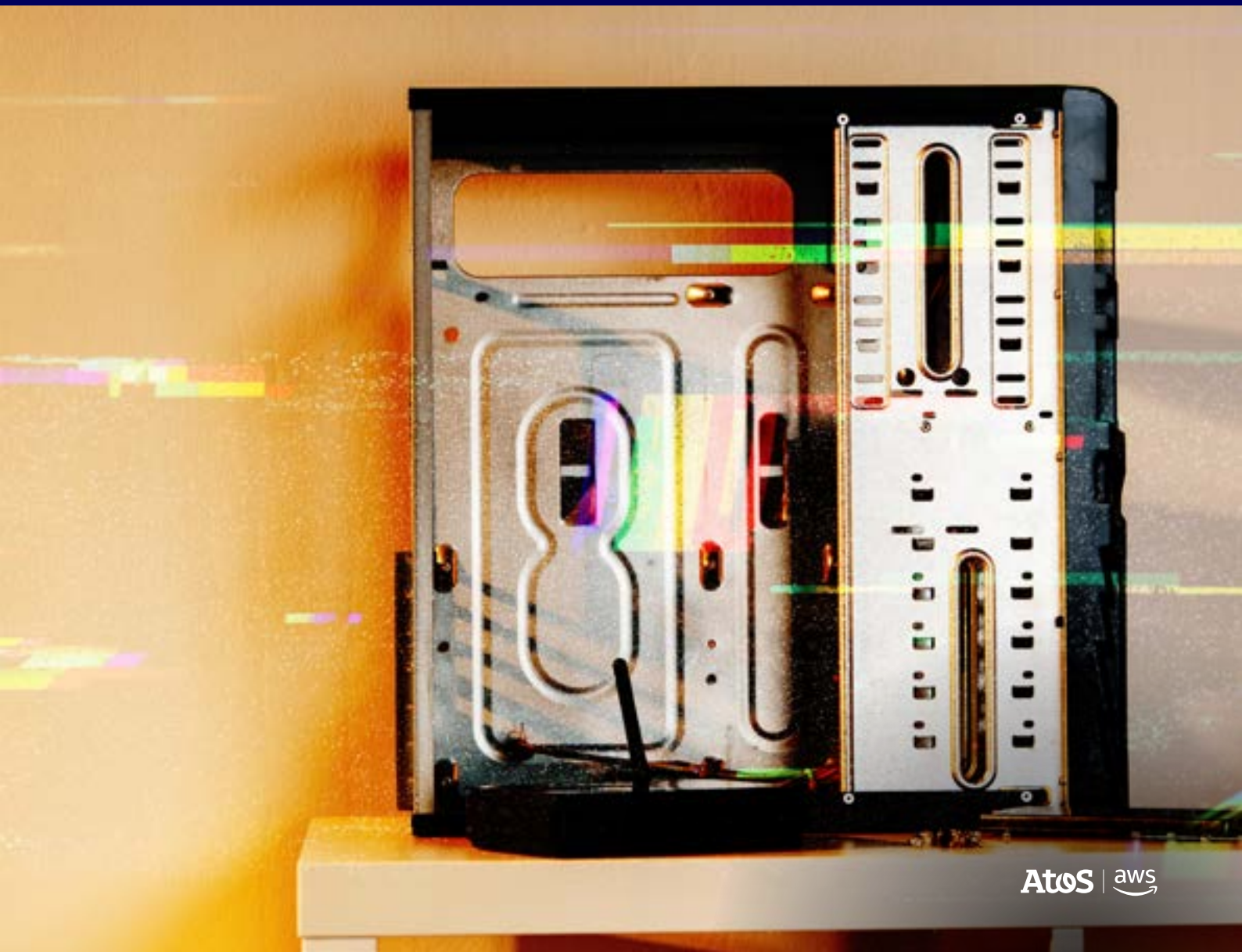
(Source: Forrester, “Optimizing Cloud Workloads with AI,” 2023)

In the real world

An industrial client’s rehosted environment enabled future workload optimization through scalable cloud infrastructure. The organization gained the ability to dynamically allocate resources and reduce overprovisioning, setting the stage for AI-driven performance tuning and cost control.

Executive takeaway

Optimization is not optional. Use AI and automation to control costs, ensure performance, and unlock sustainable value.



Step 6: Strengthen security and compliance

Build trust through secure, compliant modernization.

Security and compliance are non-negotiable in mainframe migration. From sensitive data handling to regulatory adherence, this step ensures your modernization strategy builds trust with customers, regulators, and the board.

Modern cloud architectures support Zero Trust models, identity and access management (IAM), encryption at rest and in transit, and built-in compliance frameworks. But successful implementation requires strategic alignment across security, legal, and IT teams.

What to consider

- **Frameworks:** GDPR, HIPAA, PCI DSS: Which apply to your workloads?
- **IAM:** Do we have strong access controls and monitoring in place?
- **Encryption:** Is all data encrypted at rest and in transit?
- **Auditability:** Can we demonstrate compliance to regulators at any time?

Questions to ask your team

- Have we embedded security in every step of the migration plan?
- What's our process for auditing compliance in real time?
- Are we confident our controls meet board level risk expectations?

Did you know?

Atos combines industry-specific compliance expertise with AWS security tools to create secure, audit-ready cloud environments. This includes automated compliance reporting and continuous monitoring.

In the real world

A government pension agency embedded security into every phase of its modernization, including interface rewiring and rigorous testing. The new system met regulatory standards such as data residency and auditability, ensuring data integrity across all modules.

Executive takeaway

Security is not a bolt-on. It's the foundation of trust. Build it in from day one to protect operations and reputation.

Compliance standards

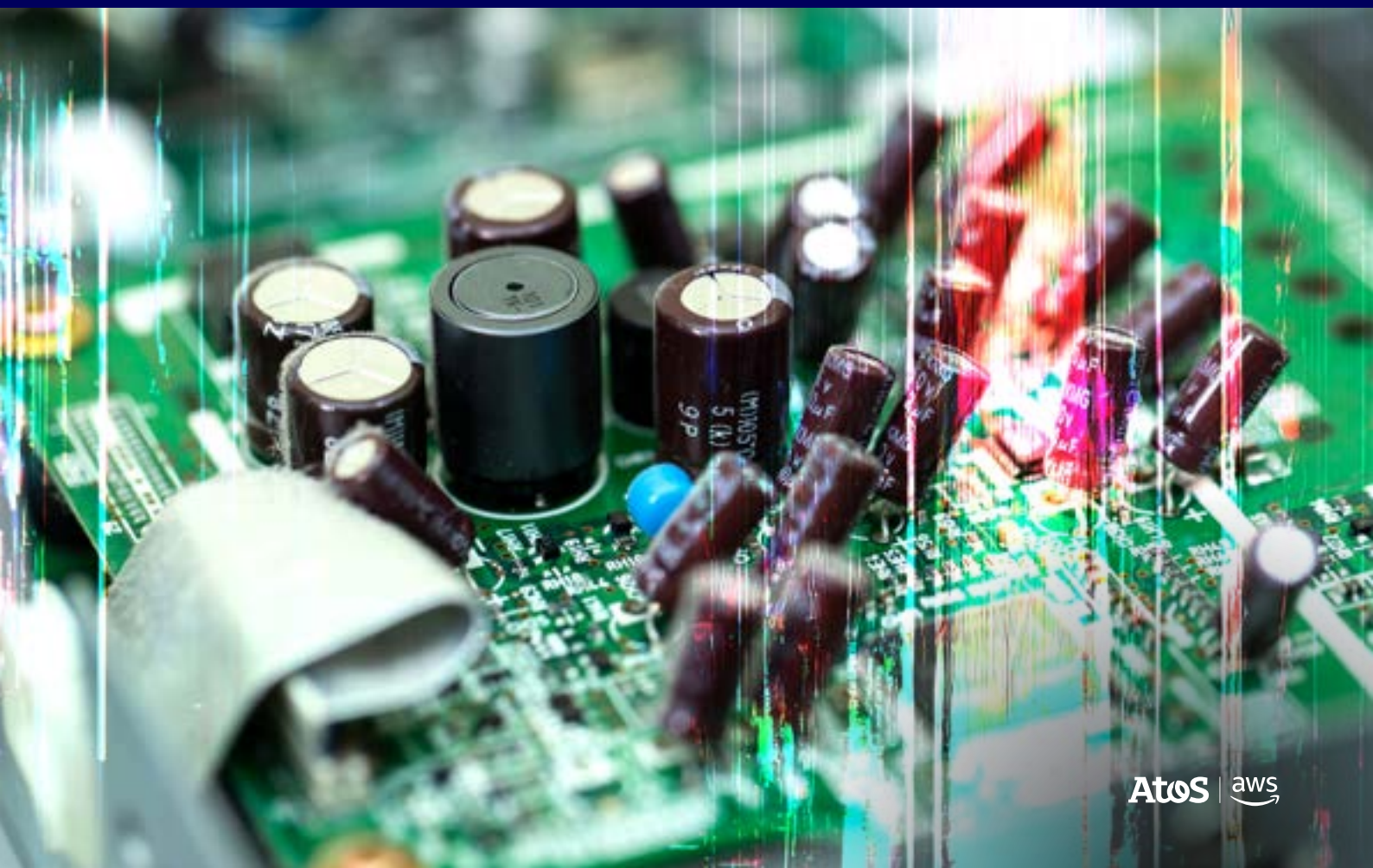
Click each storage tier to reveal compliance standards.

01. **GDPR**

02. **HIPAA**

03. **PCI DSS**

> **"94% of enterprises say cloud security is now a board level priority."**
>
> **(Source: Gartner, "Cloud Security Priorities for Executives," 2023)**



Step 7: Plan for business continuity

Ensure resilience before, during, and after migration.

Modernization cannot come at the expense of uptime. For many organizations, downtime costs millions per hour, making business continuity planning a non-negotiable part of migration. Cloud environments offer powerful disaster recovery (DR) options, from **Pilot Light** setups that keep essential systems running at minimal cost to **Warm Standby** and **Full Redundancy** models for near instant failover. Choosing the right DR strategy depends on cost, complexity, and recovery time objectives (RTOs).

> **"Unplanned downtime costs enterprises an average of $9,000 per minute."**
>
> **(Source: Ponemon Institute, "Cost of Data Center Downtime," 2023)**

What to consider

- **Recovery objectives:** What are your Recovery Time Objective (RTO) and Recovery Point Objective (RPO) targets?
- **DR options:** Which model balances cost and resilience for our critical workloads?
- **Testing:** How often are we simulating outage scenarios?
- **Ownership:** Which teams are accountable for recovery processes?

Questions to ask your team

- Which workloads require near instant recovery?
- How much downtime can we tolerate without significant business impact?
- Have we stress tested our DR plan under real-world conditions?

Did you know?

Atos works with enterprises to design tailored DR architectures using AWS tools like AWS Backup and multiregion replication. These solutions deliver cost-effective resilience with full transparency and governance.

Step 8: Integrate AI and advanced analytics

Unlock new business value beyond infrastructure modernization.

Modernization is not only about cost savings and efficiency, it's about enabling innovation. Migrating to AWS gives enterprises access to advanced AI, machine learning (ML), and analytics tools that can drive competitive advantage. With services like Amazon SageMaker, Redshift, and Kinesis, organizations can build predictive models, analyze data in real time, and gain insights that were previously out of reach on legacy systems. For many enterprises, these capabilities become the true driver of ROI post-migration.

> **"82% of enterprises say AI adoption has delivered measurable ROI within the first year."**
>
> **(Source: McKinsey, "The State of AI in 2023," 2023)**

What to consider

- **Use cases:** Which business functions benefit most from AI/analytics (e.g., fraud detection, predictive maintenance)?
- **Data readiness:** Do we have clean, structured data to feed into these systems?
- **Talent:** Do we have the skills to leverage AI/ML at scale?
- **Integration:** How do these tools connect to existing systems?

Questions to ask your team

- Where can analytics deliver quick wins for our business?
- Are we using AI to enhance customer experience, operations, or both?
- What metrics will measure the impact of these tools post-migration?

Did you know?

Atos helps enterprises rapidly deploy analytics and Machine Learning (ML) use cases using AWS services. From real-time fraud detection in banking to predictive maintenance in manufacturing, we enable organizations to unlock new revenue streams and optimize operations.

In the real world

An industrial client unlocked legacy data for real-time analytics by migrating to PostgreSQL and integrating visualization tools. The organization gained new insights into operational performance and customer behavior, driving smarter decision-making across supply chain and finance.

Executive takeaway

Cloud is more than an infrastructure upgrade. It's a launchpad for innovation. Use AI and analytics to drive meaningful business outcomes.

Step 9:
Drive sustainability

Use cloud migration to advance your ESG strategy.

Beyond transformation, modernization offers an unmissable opportunity to deliver measurable progress on sustainability goals. Migrating workloads to AWS allows enterprises to **reduce energy consumption, lower emissions, and improve reporting transparency.**

AWS data centers are powered by a growing share of renewable energy and use optimized infrastructure that significantly outperforms traditional on-premises systems in energy efficiency. Combined with Atos' sustainability advisory services, organizations can quantify and report their ESG impact post-migration.

> **"AWS data centers are up to 5x more energy efficient than the average enterprise data center."**
>
> **(Source: AWS Sustainability Report, 2023)**

What to consider

- **Carbon impact:** How much energy and emissions reduction can we achieve by moving off mainframes?
- **Regulatory alignment:** Are we meeting regional ESG disclosure requirements?
- **Measurement:** Do we have tools in place to track post-migration carbon performance?
- **Stakeholder value:** How do we communicate these improvements to the board and investors?

Questions to ask your team

- Are we incorporating ESG metrics into our cloud strategy?
- What benchmarks are we using to track decarbonization progress?
- How do we integrate cloud transformation into our broader sustainability reporting?

Did you know?

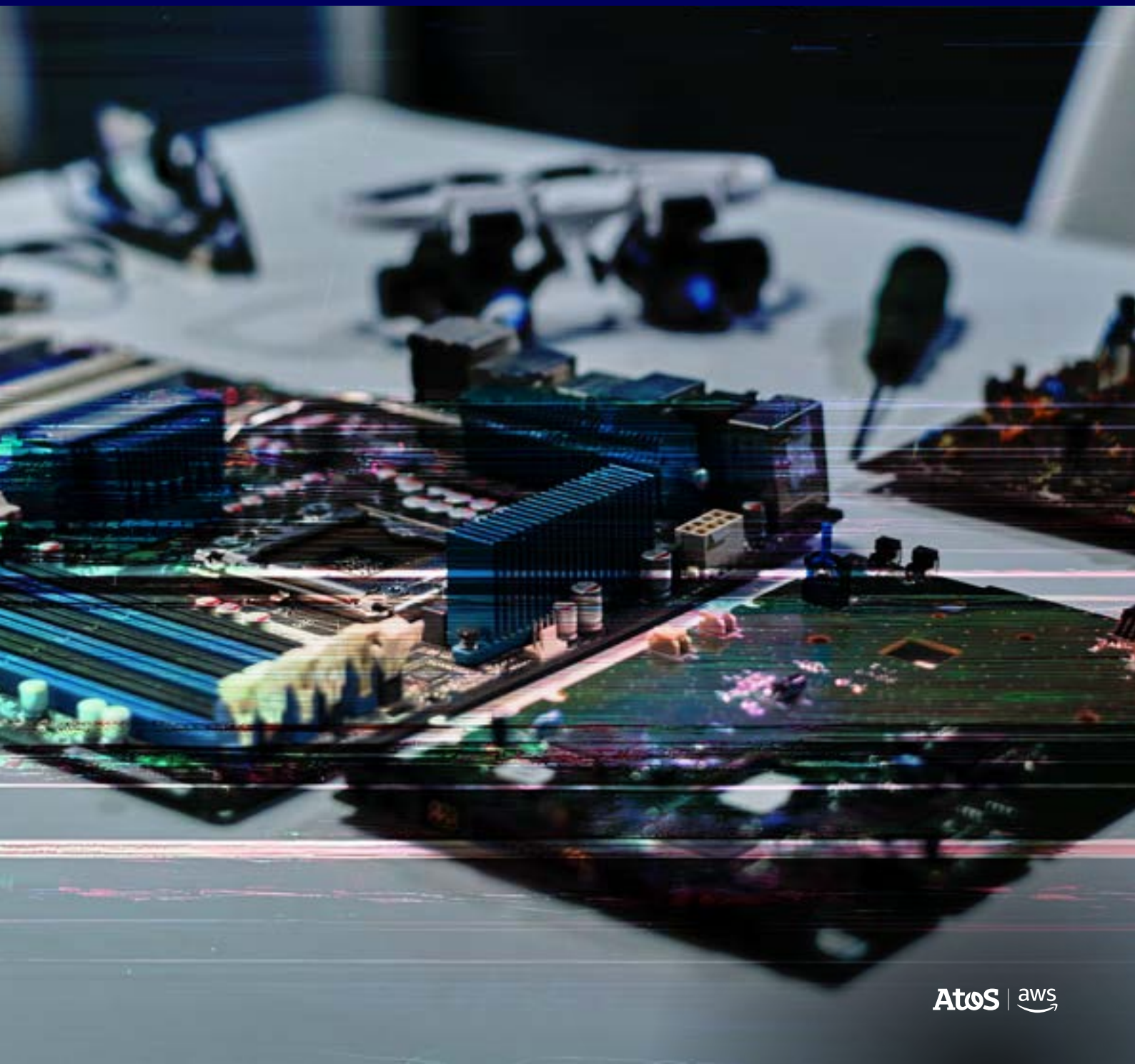
Atos helps organizations leverage AWS' Carbon Footprint Tool and its own decarbonization frameworks to model pre and postmigration emissions, embedding ESG into modernization plans.

In the real world

By exiting the mainframe and moving to AWS, a manufacturing company significantly reduced its infrastructure footprint. The shift to cloud-native operations aligned with sustainability goals, cutting emissions and improving energy efficiency through optimized workloads and modern data centers.

Executive takeaway

Cloud migration is a powerful ESG lever. Use it to accelerate decarbonization and create tangible value for stakeholders.



Step 10: Prepare for continuous innovation

Make modernization the foundation for ongoing growth.

Mainframe modernization is not an endpoint. Cloud native technologies like serverless computing, Internet of Things (IoT), and ML enable organizations to adapt rapidly to market changes and explore new revenue opportunities. This makes it an invaluable platform for continuous innovation. But realizing its full value requires more than just technology adoption. It calls for a culture of ongoing optimization (CloudOps, FinOps, DevSecOps) and strong partnerships to futureproof investments.

> **"High maturity cloud organizations are 2.7x more likely to launch new digital products faster than their peers."**
>
> **(Source: Forrester, "Cloud as an Innovation Catalyst," 2023)**

What to consider

- **Emerging tech:** Which AWS innovations (e.g., serverless, AI, edge) can drive competitive advantage?
- **Culture:** Are we enabling teams to continuously improve and iterate?
- **Governance:** How will we monitor and manage costs as we innovate?
- **Roadmap:** What is our 12–24 month post-migration innovation plan?

Questions to ask your team

- How are we building innovation KPIs into our IT strategy?
- Which emerging technologies should we pilot in the next 12 months?
- Do we have the operating model (skills, processes, governance) to sustain continuous transformation?

Did you know?

Atos provides ongoing advisory and CloudOps services to help organizations continuously adopt new AWS innovations. This ensures modernization becomes a living process, not a one-off project.

In the real world

A manufacturing enterprise implemented a 24-month roadmap to support continuous innovation, including serverless workloads and AI-enabled decisioning. This led to faster service delivery, improved agility, and positioned the organization for future growth in digital operations.

Executive takeaway

Modernization is a starting point for transformation. Build a roadmap for continuous innovation to stay competitive and resilient.

Get in touch

Start your modernization journey with Atos and AWS.

You now have a clear framework for planning and executing mainframe modernization. The next step is turning insight into action.

Atos and AWS are ready to support you. Whether it's a high-level strategy consultation, a detailed mainframe modernization assessment, or full end-to-end execution, our experts guide you at every step, helping you modernize workloads on cloud, mainframe, or a hybrid combination that fits your business needs.

What we offer:

- Executive strategy sessions tailored to your organization
- Atos CloudCatalyst assessments to map dependencies and prioritize workloads
- End-to-end modernization programs with risk managed delivery

Contact and Resource Hub

Book a consultation

Download additional resources (case studies, whitepapers)

Register for a modernization workshop

Ready to lead your organization into the future?

About Atos

Atos Group is a global leader in digital transformation with c. 72,000 employees and annual revenue of c. € 10 billion, operating in 68 countries under two brands — Atos for services and Eviden for products. European number one in cybersecurity, cloud and high-performance computing, Atos Group is committed to a secure and decarbonized future and provides tailored AI-powered, end-to-end solutions for all industries. Atos is a SE (Societas Europaea) and listed on Euronext Paris.

The purpose of Atos is to help design the future of the information space. Its expertise and services support the development of knowledge, education and research in a multicultural approach and contribute to the development of scientific and technological excellence. Across the world, the Group enables its customers and employees, and members of societies at large to live, work and develop sustainably, in a safe and secure information space.