

NAVIGATING THE FUTURE:

A COMPREHENSIVE GUIDE TO LEGACY SOFTWARE MODERNIZATION



Table of contents

1. [Introduction](#)
2. [Understanding Legacy Systems](#)
3. [Risks and Challenges](#)
4. [Benefits of Modernization](#)
5. [Strategies for Successful Modernization](#)
6. [Best Practices for Modernization](#)
7. [Examples of No-code](#)
8. [Leveraging AI](#)
9. [How Magora Can Help](#)

1. Introduction:

Modernization process of outdated software is initiated when organizations are stuck between servicing old and new expensive equipment. By modernizing legacy applications, you can take better advantage of improved technical features including advanced scalability of your system. This allows you to reduce workflow bottlenecks, increase business responsiveness, and pave the way for growth. Magora's expertise in software and app modernization ensures a seamless transition, optimizing your systems for enhanced performance and future scalability. Here is our comprehensive guide to software and app modernization.

2. Understanding Legacy Systems:

Many great organizations have legacy systems at their core and navigating legacy systems can be a complex challenge. They have pieces of software, applications and IT solutions that are still widely used and fundamental to the overall running of the enterprise, but which are outdated and, in some cases, no longer even supported by the original vendor or software developer.

Legacy systems require modernization. Otherwise, they can be exposed to crashes anytime. That's what happened on Tax Day 2018. Facing technical problems, the Internal Revenue Service couldn't process electronically-filed tax returns. Although the IRS did not specify what went wrong, the fact that many of their IT systems were outdated at that time – two of them being nearly six decades old – might have contributed to the computer glitch.

However, a legacy system is not always defined by its age. It might be due to the lack of support or its inability to meet the needs of a business or organization that a system is considered to be legacy.

3. Risks and Challenges:

Legacy systems are technology, processes, or software applications that are outdated and can pose various risks and challenges to an organization. These risks may include security vulnerabilities, inefficient operations, increased maintenance costs, integration challenges, compliance risks, compatibility issues, and poor performance, among others.

Addressing and mitigating these challenges is crucial to avoid impeding organizational efficiency and growth. In the following paragraphs, we will discuss each of these challenges in more detail, along with examples to help illustrate each point.

1. Security Risks

Legacy systems are more susceptible to security vulnerabilities and attacks because they were not designed to handle modern security threats. They lack the necessary security features and updates to protect against cyber-attacks.

2. Inefficient Operations

Legacy systems often lack the necessary features and capabilities to keep up with modern business demands. They can slow down business operations, resulting in decreased productivity and increased costs.

3. Increased Maintenance Costs

As legacy systems become older, they become more expensive to maintain. Hardware and software components become harder to find, and IT staff with the skills and knowledge to maintain the systems become more scarce.

4. Integration Issues

Legacy systems are often isolated from other systems and applications used by an organization. Integrating them with other systems can be challenging, requiring custom coding and significant resources.

5. Compliance Risks

Legacy systems may not be compliant with modern data protection and privacy regulations, such as GDPR and CCPA. This can result in hefty fines and legal penalties for an organization.

Organizations face a two-fold impact from legacy systems. Although these systems may have been useful in the past, they can create risks and challenges that can impede the organization's progress and achievements.

Risks and Challenges

Security Risks



Inefficient Operations



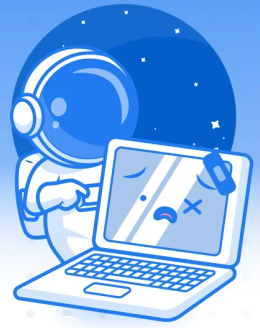
Increased Maintenance Costs



Integration Issues



Compliance Risks



4. Benefits of Modernization:

If your company is using a legacy system, you'll want to know what advantages you could gain from modernizing it. Here are just a small selection of the possible benefits:

Improved efficiency

If you continue using a legacy system, you may find that outdated hardware or software prevents you from adopting new technology and tools that are designed to work with cloud-based systems.

Modernization will allow you to access these tools and reap the benefits of improved functionality, productivity, and efficiency. You'll also experience far less downtime (sometimes zero) as your provider will fix any technical issues.

Enhanced security

In the information age, data can be more valuable than gold dust to businesses and complying with the laws and regulations pertaining to its use is essential.

Luckily, migration to the cloud offers enhanced security for your data (though it should be noted that it's your responsibility to configure services to meet your needs). Data stored in the cloud is more secure due to higher levels of encryption and less access by human staff to the data warehouses.

Remember to take steps to protect your data during the migration process, as this is often when it's most vulnerable. This is especially important during [insurance legacy system transformation](#) for example, where the data in question can be extremely sensitive.

Scalability and flexibility

Older legacy system hardware and software often have limitations that can be a barrier to scaling up a business. For example, growth might only be possible with extra investment in infrastructure.

Following modernization, however, you will have the scalability and flexibility to easily grow your business (or even scale down when needed). This is because you won't be limited by physical hardware. Therefore, your computing system can be tailored to ever-evolving requirements and changing business demands.

Reduced costs

Legacy systems often involve a lot of costs, from ongoing maintenance to investment in new hardware and software.

If you modernize, you remove these costs and only pay for the services and resources you're actually using.

With monolithic architecture costs rising annually, modernizing means you should see significant savings year after year.

An improved user experience

You want your customers to be happy, and that means providing them with the best possible user experience. With a legacy system, there are limits to how you can improve this, but with modernization, the sky's the limit. You can better store and protect customer data and develop applications and tools to make their journey smoother and more enjoyable.

Benefits of Modernization

Improved efficiency



Enhanced security



Scalability and flexibility



Reduced costs



Improved user experience



5. Strategies for Successful Modernization:

Embarking on a legacy software modernization journey requires meticulous planning and strategic considerations. Here are key strategies for a successful modernization process:

Comprehensive Assessment:

- Conduct a thorough assessment of the existing legacy system, identifying pain points, security risks, and performance bottlenecks. Understand the business processes supported by the software and evaluate its alignment with current organizational goals.

Effective Planning:

- Develop a detailed modernization plan that outlines goals, timelines, and resource requirements. Prioritize functionalities and features based on business value and potential impact. Establish clear milestones and performance metrics to track progress.

Stakeholder Collaboration:

- Engage stakeholders, including end-users, IT teams, and decision-makers, throughout the modernization process. Solicit feedback and involve key stakeholders in decision-making to ensure alignment with organizational objectives and user expectations.

Incremental Upgrades vs. Full Replacements:

- Evaluate whether incremental upgrades or a complete system replacement is more suitable. Incremental upgrades allow for continuous improvement with minimal disruption, while full replacements may offer a fresh start with the latest technologies. The decision should align with business goals and constraints.

Technology Stack Considerations:

- Choose a modern technology stack that aligns with current industry standards and future scalability. Consider factors such as security, compatibility, and support for emerging technologies. Implementing cloud-native solutions can enhance flexibility and efficiency.

Continuous Monitoring and Iteration:

- Implement monitoring tools to track system performance, user satisfaction, and security. Regularly iterate on the modernized system based on feedback and evolving business requirements. Continuous improvement ensures that the software remains adaptive to changing needs.

Successful legacy software modernization hinges on a holistic approach that integrates technical expertise with effective communication and collaboration. By assessing, planning, and involving stakeholders, organizations can navigate the complexities of modernization and unlock the full potential of their IT systems.

6. Best Practices for Modernization:

A successful IT or legacy app modernization requires a thorough evaluation of your organization's needs, resources, as well as careful planning and implementation. In this section, we will look at some of the steps that need to be considered when conducting a successful software modernization. Some of these steps may require specific expertise, and it is advisable to seek external assistance if needed. Engage with stakeholders, including IT teams, business leaders, and end-users, to gather input and build a modernization strategy that aligns with your unique circumstances.

Assessment of your current systems:

The first step is to conduct a thorough assessment of the existing systems. Identify the weaknesses, bottlenecks, and security risks in your legacy systems. Analyze the requirements of the users, IT, and other stakeholders to define the objectives of the modernization.

Developing a modernization strategy:

Based on the assessment, you can develop a comprehensive modernization strategy. Define clear goals, milestones, and the scope of the modernization. Decide which aspects of the software need to be updated, such as the platform, programming languages, databases, or user interfaces. It is important to prioritize the systems to be modernized and to identify dependencies.

Selection of the right technologies:

Identify the appropriate technologies or technology stacks and the tools required for modernization. Consider factors such as future-proofing, scalability, security, integration capabilities, and user-friendliness. A detailed technical plan and roadmap are helpful in making the right decisions.

Implementation of modernization:

Implement the planned modernization steps. This may involve updating code, migrating data, integrating new components, or developing new features. Ensure that adequate testing and thorough quality assurance are conducted to minimize errors and downtime. Such a comprehensive project should ideally be carried out in an agile manner.

Training and change management:

Consider the impact of modernization on employees and other stakeholders. Provide training and support to ensure that the teams can effectively manage and use the new systems. For larger user groups, it helps to train multipliers, who can then train their colleagues in the new systems. Implement a change management program to ensure acceptance and a smooth transition to the modernized software.

Monitoring and continuous improvement:

After modernization, it is important to continuously monitor the performance and efficiency of the new software. Gather feedback from users and team members and make adjustments as needed. Implement regular updates and upgrades to keep the software up to date.

IT modernization is an iterative process that requires ongoing adjustments and improvements. The question now is, when is the right time to embark on such a project?

7. Examples of No-code low code usage in Legacy software modernization:

Legacy software modernization has proven to be beneficial for many organizations across a wide variety of industries. Here are some examples of how they achieved their modernization goals and improved their business outcomes:

The Museum of Modern Art – Modernizing Membership Management and Ticket Verification

The Museum of Modern Art successfully modernized its legacy system using [LANSA](#). They implemented an integrated Windows and web-based membership management system, as well as a point-of-sale solution for ticket verification using wireless PDAs. This transformation enabled MoMA to streamline its operations, improve productivity, and improve the visitor experience.

Kawasaki – Revolutionizing Warehouse Management

Kawasaki, a leading manufacturer of motorcycles and heavy equipment, leveraged LANSA to modernize its warehouse management system. Kawasaki needed a set of mobile apps for the iPad that could integrate with the corporate ERP system and access an external scanner. Using LANSA LongRange, they were able to develop the apps in-house and saved \$3,500 per day in labor and safer assembly lines.

Braum's Ice Cream and Dairy Stores – Enhancing Mobile App Capabilities

Braum's, one of the world's largest dairy operations, used LANSA to enhance their mobile app capabilities. The company's district and area managers gained real-time access to critical business reports, which allowed them to make informed decisions on the go. LANSA also facilitated the revamp of Braum's maintenance system, resulting in streamlined inventory management and cost savings.

8. Leveraging AI in Legacy Software Modernization:

AI has made and continues to make significant contributions to the modernization of legacy applications, including data analysis to help identify areas for improvement in legacy applications, automation of manual tasks, such as testing and deployment & so much more. As businesses seek to unlock new opportunities and stay competitive, one technology stands out as a game-changer: AI. Its remarkable ability to mimic human intelligence and automate complex tasks is revolutionizing the way legacy applications are modernized.

- Automated Code Refactoring:

The application of generative AI in automated code refactoring has revolutionized the way businesses manage their development. The technology provides developers with a convenient way of maintaining code quality by automating the process of restructuring and optimizing code. Software development

teams are no longer burdened with time-consuming, repetitive and monotonous tasks associated with code refactoring, since automated code refactoring tools powered by various generative AI models do the job for them.

- Intelligent Data Migration:

When modernizing legacy applications, organizations often face the challenge of migrating data and functionality to new platforms or architectures. AI helps assist in this process by automating the analysis of legacy code, identifying dependencies, suggesting strategies for migration and ensuring integrity. ML techniques support code refactoring and optimizing the performance of the migrated application. If you're in need of comprehensive legacy software migration services or are looking for a legacy software migration agency, Magora is the one you can trust for a smooth and efficient transition to modern solutions.

- Predictive Maintenance:

AI-powered predictive maintenance can help businesses identify potential issues before they occur, reducing downtime and improving application reliability. By analyzing data from sensors and other sources, businesses can identify trends and patterns that can help them take preventive action to avoid issues.

- NLP combined with OCR for Documentation:

OCR extracts words from the scanned images by the process of segmentation. In this process word lines, words and characters are isolated from the background image to extract machine-readable text. This is pre-processing of documents. After OCR is completed, NLP will identify OCR mistakes by understanding context which OCR on its own cannot. Further, if data is not readily available, missing, not in the right place or text is not legible, OCR will usually ignore the information, However, with data capture automation, such exceptions are either automatically handled or can be moved to human processing for further inputs and this leads to higher accuracy. With NLP, we can give computers the ability to not only understand the meaning of individual words but also understand intent and sentiment. This technology lets us create innovative and intelligent applications designed to help streamline customer support, organise documents, annotate videos and more.

- Machine Learning for System Optimization:

Machine learning, in this regard, is being considered as a key to transforming business operations into modern business operations. Machine learning is deemed an effective solution that can help business organizations not only manage the deluge flow of data but also draw significant insights from them to make sound decisions.

Here are a few benefits that could be derived by leveraging the potential of Machine learning:

1. Detecting the unusual

For the equipment responsible for production, to work properly, strict vigilance is required. Assigning this job to humans can be not only erring but tedious. Computer visions are put to use to enhance quality control. Defects can easily be detected without errors and this is one of the most efficient ways to improve accuracy and quality control.

1. Making improvements in operational efficiency

Operational efficiencies and optimizations are made based on real-time events. Business organizations cannot afford to be reluctant when it comes to managing real-time data and risk management.

- Cognitive Computing for UI Enhancement:

Cognitive Computing revolutionizes data processing with the help of simulating human-like understanding. Combining NLP, Machine learning and Pattern Recognition, it interprets unstructured information, making informed decisions. It impacts span industries, enhancing training, healthcare and business operations. As technology continues to advance, cognitive computing's transformative potential maintains to reshape the digital landscape.

Advantages

- **Data Mastery:** Cognitive systems excel at coping with and comprehending unstructured information.
- **Complex Decision-Making:** They assist in making informed decisions by analyzing difficult information styles.
- **Efficiency:** Automating duties that could be time-consuming for humans enhances productivity.
- **Personalization:** Offering personalized reviews by understanding individual behaviors.

- AI-Powered Testing and QA:

AI can be leveraged to transform your business and accelerate the testing process. It can also be used to crawl the software for automatically generating a test suite with test data and analyze software output to spot errors and bugs that are not easily found with traditional functional tests.

The role of AI in automated quality assurance can also be seen in the testing tools where the tests are enhanced with AI-powered visual verifications, which, in turn, give out a range of different outcomes.

AI-powered testing tools can mimic human behavior and allow testers to move from the traditional manual mode of testing towards an automated and précised continuous testing process.

- Continuous Monitoring and Improvement:

AI-based system monitoring tools can offer numerous advantages over traditional system monitoring tools, such as improved accuracy, scalability, and efficiency. These tools

- 1) can reduce false positives and false negatives by applying advanced algorithms and models to filter out noise and focus on relevant signals.
- 2) They can also handle large volumes and varieties of data from different sources and systems, and automate repetitive tasks.
- 3) AI-based system monitoring tools can provide deeper insights into the root causes, impacts, and trends of system issues, as well as suggest possible solutions and improvements.
- 4) These tools can shorten the time to detect and resolve issues by alerting the right people at the right time, and executing or facilitating actions through integrations and workflows.

9. How Magora can help with legacy software modernization

With our legacy system modernisation services, we help you achieve transformational business success.

Discovery:

- Analyze business processes and align with organizational goals.
- Assess regulatory compliance and enhance data security.
- Plan for scalability and future growth.

Code Refactoring:

- Implement automated testing for reliability.
- Introduce containerization and orchestration for deployment efficiency.
- Set up CI/CD pipelines for automated updates.
- Improve code documentation and track code quality metrics.

Our Case Studies:

Focalyx: In the realm of prostate cancer treatment, Focalyx recognized a pressing challenge. They needed a robust solution to streamline the process of gathering, analyzing, and tracking patient data, medical history, AI software analysis, and treatment results. The goal was to establish the overall effectiveness of prostate cancer focal treatment and the Focalyx software. However, this task posed significant logistical and data management hurdles. During the Discovery phase, Magora played a pivotal role in shaping the project's direction. We conducted a series of user interviews with doctors and staff, gaining invaluable insights into their needs and pain points. This user-centric approach allowed us to fine-tune the product scope and roadmap to align with Focalyx's goals. We defined a clear and concise product statement to guide development, provided a thorough analysis of competitors and helped identify unique features and advantages for the Focalyx solution. Got insights from user

interviews shaped the app's functionalities, ensuring it met the specific requirements of doctors and staff. Prioritized scope of work and provided Product Rollout Roadmap. The Discovery phase was a vital step in aligning the project with Focalyx's objectives. The scope evolved based on real-world insights, and the project is now in the planning phase, poised to enter development.

Organic Response :

This project is an integrated solution consisting of two mobile apps and a web portal for [Organic Response](#) - the leader and pioneer of the world's smart lighting industry. Organic Response already had a foundation for the mobile apps used to control the lighting levels remotely. The company was looking for a new long-term development partner to implement multiple new features and improve the performance of the applications after receiving feedback from their users. Magora was happy to take part and hit the ground running, introducing several significant updates to both iOS and Android applications. Magora's work on the mobile apps for Organic Response involved adding new features such as personal presets and relay settings, maintaining the existing code base and making some UX improvements. We implemented complicated logical solutions on the software level while working with the actual hardware like IR dongles that transmit the signal and the light sensors that receive it. The QA department conducted rigorous testing ensuring that the apps connectivity with the sensors was flawless. One of the challenges here was detecting and fixing bugs that sometimes appeared after adding new features to the existing code base. In regards to the Web Application, our design and front-end team has dived into the project head first. After a personal visit to the Organic Response office our specialists proceeded to develop the UX and UI design. We then continued to create the full front end of a cutting edge lighting management portal.

Vessel Performance Solutions :

Our clients, co-owners of a large shipping analysis company based in Denmark, approached us with the following problem: how to schedule cargo ship maintenance to avoid unnecessary downtime and squandering of the fuel, induced by sea organisms that contaminate the propeller and the bottom of the ship? Sea vessel's hull is susceptible to marine incrustation because of shell and weed that accumulate on its surface and slow the ship down. The same factors impact the propeller, creating vibration and wear, and causing significant damage. As a result, marine transport requires regular servicing and cleaning. During these expensive procedures the vessel cannot perform its functions, entailing losses on the ship operator. Magora's development team enhanced the Vessel Performance Solutions web app by structuring data and employing mathematical skills to refine fuel consumption forecasts. Our designers created an intuitive interface, integrating hundreds of reports for easy readability. During a two-week on-site visit, our representative delved into the client's technical aspects, ensuring a deep understanding of sensor data collection from ships' hulls.

The complex data, originally stored in Excel spreadsheets, was streamlined by Magora's experts into a user-friendly interface. The resulting system, developed with .NET technology, enables:

- Monitoring overall vehicle condition

- Collecting statistical data for each ship type
- Predicting fuel consumption for individual ships and the entire fleet
- Identifying critical peak levels
- Notifying of weariness, incrustation, and contamination

This performance monitoring system provides a comprehensive view of the fleet's productivity and risk levels. By analyzing operational data, it helps minimize maintenance and fuel costs, offering cost-efficient solutions for ship servicing.

Conclusion

Digital transformation has made it imperative for companies to modernize their existing outdated systems. Even though most companies are already on the pathway to digital transformation, this trend is expected to grow further as businesses that have implemented digital improvements are already getting more revenue. The outdated technologies are not only expensive to maintain but also unreliable, insecure, and incompatible with modern technology.

Therefore, modernization is important in improving flexibility and reliability, and for minimizing operational risks, and reducing IT costs. While there are many modernization strategies, every business should assess its underlying system, available resources, and outline its business goals before choosing a suitable approach. Once the new system has been deployed, it should be evaluated, monitored, and constantly upgraded to meet ever-changing business needs.