EMA™
IT & DATA MANAGEMENT RESEARCH,
INDUSTRY ANALYSIS & CONSULTING

Prepared for:

Redwood

Data in Motion:

Orchestrating File Transfers and Data Pipelines in the Cloud Era

May 2024 EMA Research Report

By **Dan Twing**, President and COO
Intelligent Automation

Table of Contents

Table of Figures

Executive Summary

Purpose of the Report

This report offers a detailed analysis of the current trends, challenges, and advancements in enterprise data movement, with a particular focus on the integration of multi-cloud environments and the ongoing impact of digital transformation. The study provides insights into how modern enterprises manage the complex landscape of data transfer, emphasizing the evolving role of workload automation (WLA) and managed file transfer (MFT) technologies. The objective is to equip IT executives, data architects, and cloud strategists with the knowledge and tools required to enhance their data movement strategies, ensuring robustness, compliance, and efficiency in response to evolving technological landscapes and business needs.

Key Findings

Widespread Adoption of Multi-Cloud Environments: Enterprises are increasingly leveraging multi-cloud strategies to enhance flexibility, data availability, and disaster recovery efforts. This shift necessitates sophisticated data management strategies to handle the increased complexity and security concerns associated with multi-cloud environments.

Critical Role of Workload Automation: WLA has become pivotal in streamlining complex data transfers, offering significant improvements in efficiency and reliability for managing data across disparate systems. Enterprises using WLA report enhanced capabilities in integrating and automating data flows, crucial for supporting real-time data integration and complex data pipeline management.

Security and Compliance are Paramount: As the complexity of data movement increases, particularly with the adoption of public and hybrid cloud infrastructures, security and compliance challenges come to the forefront. Enterprises are prioritizing advanced encryption methods and robust security protocols to protect data in transit and at rest, aligning with global compliance mandates.

Increase in Data Movement Volumes and Complexity: There is an anticipated growth in the volume and frequency of data transfers as enterprises continue to expand their digital operations. This trend drives the demand for more robust data movement solutions that can handle larger volumes of data efficiently and securely.

Challenges in Integration and Automation: Despite the benefits, integrating and automating data movement across multiple cloud environments and legacy systems remains a significant challenge for many organizations. Issues such as data silos, legacy infrastructure incompatibility, and the lack of skilled personnel hinder the optimization of data workflows.

Future Trends and Predictions

The use of AI and machine learning in WLA to predict and manage data flows more effectively is on the rise. There is a clear trend toward the use of more integrated, service-mesh architectures to facilitate easier, more secure, and more efficient data movement. Continuous adaptation and investment in new technologies are deemed necessary to keep up with the increasing scale and scope of enterprise data demands.

Through this report, we aim to provide strategic insights that enable IT leaders and business stakeholders to refine their data movement strategies, positioning them for success in a data-driven future.

Introduction

In an era when enterprise IT landscapes are continually evolving, the strategic movement of data has become a cornerstone of maintaining agility, competitive edge, and operational efficiency. As businesses pivot toward a data-centric model, the ability to transfer data efficiently and securely across multifaceted and distributed systems has risen to paramount importance. With the integration of cloud services and the imperative of digital transformation, managing the flow of data within and across organizational boundaries has become exponentially complex and critical.

"Data in Motion: Orchestrating File Transfers and Data Pipelines in the Cloud Era" delves into the synergies between managed file transfer technologies and workload automation tools — two traditionally separate domains that are now converging. This convergence is a reflection of the growing need for cohesive and integrated solutions capable of navigating the intricacies of modern data ecosystems, including the cloud's expansive terrain and the push toward modernizing applications as part of the digital transformation journey.

This report takes a comprehensive look at data movement within the contemporary enterprise, analyzing roles of both scheduled and real-time data movement, the impact of cloud services integration, and the use of diverse environments. We then focus on the specifics of moving data in files, highlighting the crucial role of workload automation in orchestrating data workflows. Moreover, we address the critical concerns around security and compliance in data transfer processes, illuminating the methods and practices that secure data movement from end to end.

Our goal is to furnish IT executives, data architects, cloud strategists, and other key stakeholders with an insightful overview of the present landscape, imminent challenges, and emerging trends surrounding enterprise data movement. Through this report, we aim to distill essential trends, highlight common challenges, and project the future direction of data movement strategies amid unceasing technological progress.

Methodology Overview

An online survey conducted in March 2024 captured responses from 264 qualified participants. The insights presented in this report are drawn from a broad cross-section of IT professionals, ensuring a balanced and nuanced view of the current state of MFT integration within data pipelines. The survey respondents encapsulate a significant number of decision-makers and technical influencers from diverse corporate backgrounds, organizational sizes, and geographical locations.

Function in Organization: Reflecting the decision-making fabric of the IT landscape, a substantial 40% of respondents are IT executives, followed by practitioners in IT service management and IT operations, who form the operational backbone of many enterprises. This blend of strategic and functional roles provides a comprehensive view of the industry's inclination toward integrated MFT/WLA solutions.

Company Size: A majority of respondents hails from companies with 500-9,999 employees, suggesting a well-represented midmarket, with a notable 10% from larger enterprises housing over 20,000 employees. This mix underscores the relevance of MFT solutions across a spectrum of business sizes, each with distinct data transfer needs and challenges.

Geographical Distribution: With participants from North America, Europe, and the Asia-Pacific region, the survey captures a global perspective on MFT adoption. The considerable input from the United States and a balanced contribution from Europe and APAC regions provide a varied cultural and regulatory context, enriching the survey's findings.

Annual Sales Revenue: Participants are largely from organizations that report robust annual sales revenues, indicating a financially solid business environment that is capable of significant IT investment, which is crucial for the deployment of sophisticated MFT and WLA solutions.

Annual IT Budget: Reflective of their potential for technological investment and growth, a considerable number of respondents indicate their organization's IT budget ranges between $10 million to $25 million, with a healthy representation across other budget ranges.

IT Budget Change: Exemplifying a trend toward increased IT investment, the largest group of organizations reports a rise in their IT budget by 10% to 25%. This growth suggests a sector buoyant with opportunity and ripe for the integration of advanced data management systems.

Role in Technology Selection: The survey delineates that nearly half of the respondents are technical decision-makers, with a substantial representation from financial decision-makers. This indicates that the insights gleaned from the survey are derived from individuals with substantial sway over IT strategy and purchasing.

Job Functions: Security remains paramount, with half of the professionals involved in collaboration with security and compliance teams, indicative of the heightened focus on data security in MFT solutions.

Digital Transformation in Enterprises

Digital transformation encompasses a comprehensive shift from traditional operations to a modern, digitally enabled business model. At its core, this transformation is characterized by the integration of digital technology into all areas of a business, leading to fundamental changes in how organizations operate and deliver value to customers.

Stages of Digital Transformation

EMA categorized the digital transformation journey into distinct stages, from "None" to "Early" to "Underway" to "Mature" and, ultimately, "Gen 2.0." Each stage reflects the depth of digital integration within the enterprise, with Gen 2.0 signifying organizations in which digital processes are mature to current methods, but these organizations are already looking to the next wave of digitalization.

Cloud Migration and Application Modernization

A pivotal aspect of digital transformation is the migration to cloud environments, which supports increased agility, scalability, and collaboration across the enterprise. This migration often goes hand in hand with application modernization, which involves updating or replacing legacy software with cloud native applications that leverage the flexibility and efficiency of cloud platforms. This modernization is essential not just for enhancing operational efficiency, but also for ensuring that businesses can quickly adapt to market changes and emerging customer needs.

As organizations mature digitally, their reliance on cloud services and modernized applications typically increases. The strategic move to the cloud enables them to leverage data analytics, artificial intelligence, and machine learning more effectively, driving innovation and creating new opportunities for growth.

Impact of Digital Maturity on Data Movement Strategy

With increased digital maturity, businesses often face a growing need for advanced data movement strategies to navigate the complexities of cloud-based ecosystems. This includes the adoption of technologies that facilitate the efficient, secure, and compliant transfer of data across distributed environments.

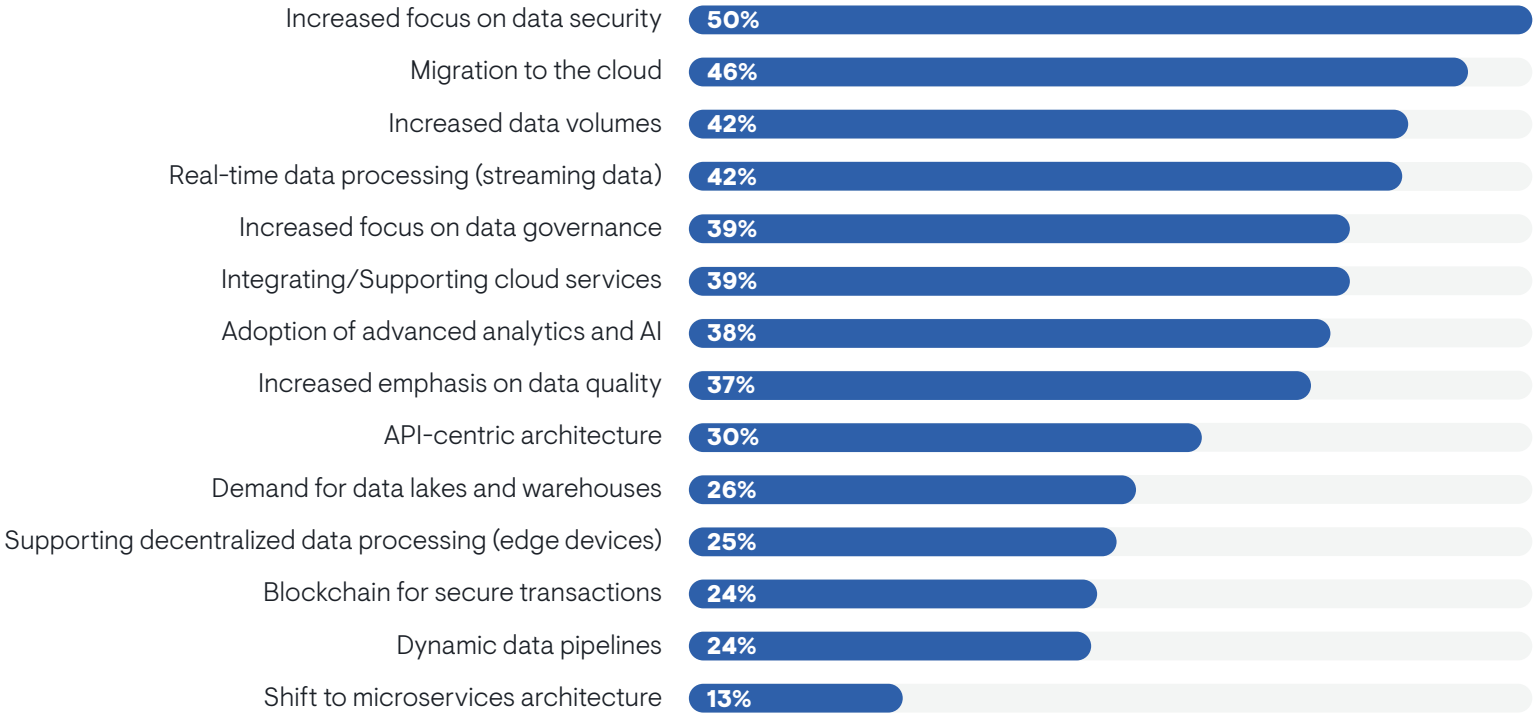
The following section explores the nuances of data movement strategies in the context of digital transformation. We will delve into how enterprises balance the integration of new cloud services with the ongoing value that established technologies, such as EDI, provide and what this means for the future of data orchestration and business operations.

Impact of Digital Transformation

Digital transformation is not a mere buzzword; it represents a profound shift in the way enterprises conduct business, driven by technology's rapid evolution. This evolution has a far-reaching impact on data movement, which is an integral element in the transformation journey. In fact, 88% agree or strongly agree that digital transformation is requiring more from file transfer and data moving software.

Digital transformation is intensifying the requirements for data movement, with half of the enterprises surveyed highlighting an increased focus on data security as their top priority. This surge in security consciousness is concomitant with the shift toward cloud-based architectures, noted by 46% of respondents, which ushers in a broader spectrum of data transit pathways and storage solutions. Moreover, the burgeoning data volumes, reported by 42%, along with the need for streaming data, underscore the escalating demand for more sophisticated, robust, and scalable file transfer and data moving solutions. These factors are compelling enterprises to evolve their IT operations tools, ensuring they can uphold the rigorous standards demanded by modern data governance and real-time business intelligence. This chart provides a quantifiable perspective on the overarching influence of digital transformation on all aspects of IT operations, especially the tools and processes central to data movement and file transfers.

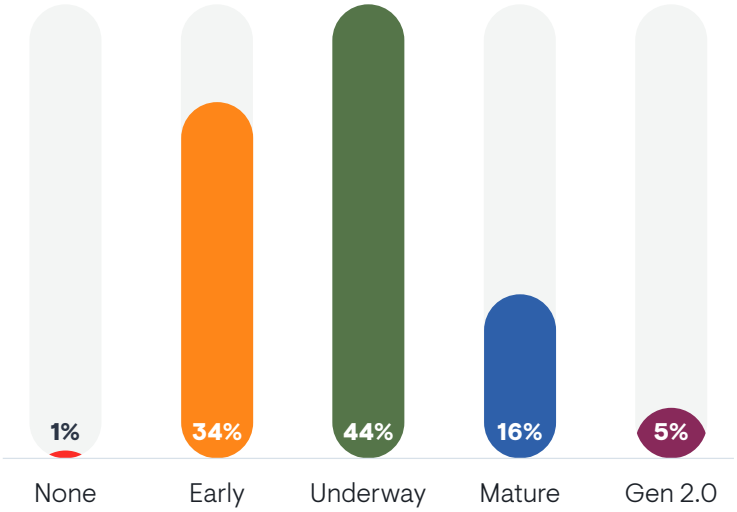
FIGURE 1. HOW IS DIGITAL TRANSFORMATION CHANGING THE REQUIREMENTS FOR MOVING DATA?



Digital Transformation Maturity

The findings draw a digital maturity landscape where most organizations are in the nascent or developing phases of their transformation journey. Specifically, 74% of respondents classify themselves as either in the Early or Underway stages of digital transformation (Figure 2). This suggests that while digital transformation is a common goal, the majority of enterprises are still working out their path toward maturity.

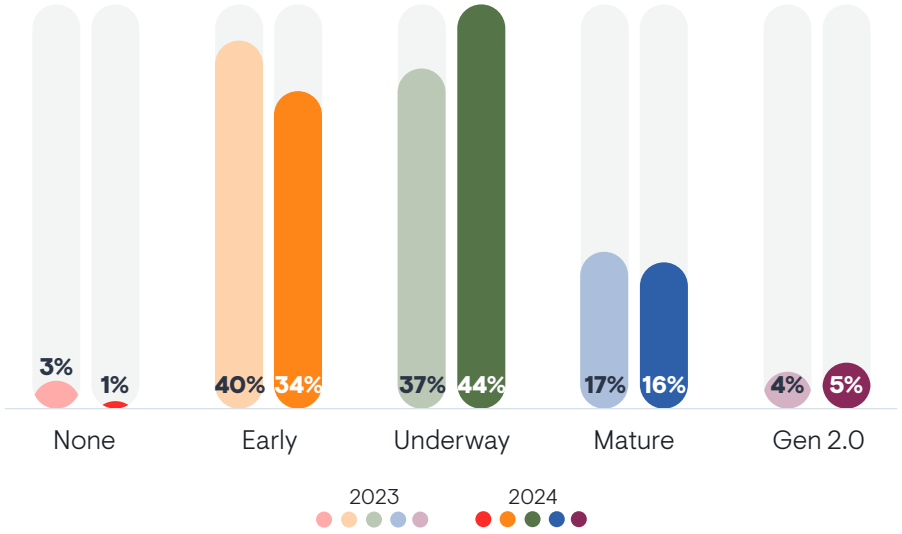
FIGURE 2. STATE OF DIGITAL TRANSFORMATION



Sample Size = 264

EMA started measuring the state of digital transformation in January 2023. Comparing the 2023 results with the results in this study shows a slight increase in digital transformation maturity. There has been a shift from no transformation and Early stages to the Underway category, with a slight increase in organizations reaching Gen 2.0 of digital transformation (Figure 3).

FIGURE 3. STATE OF DIGITAL TRANSFORMATION 2023 VS. 2024

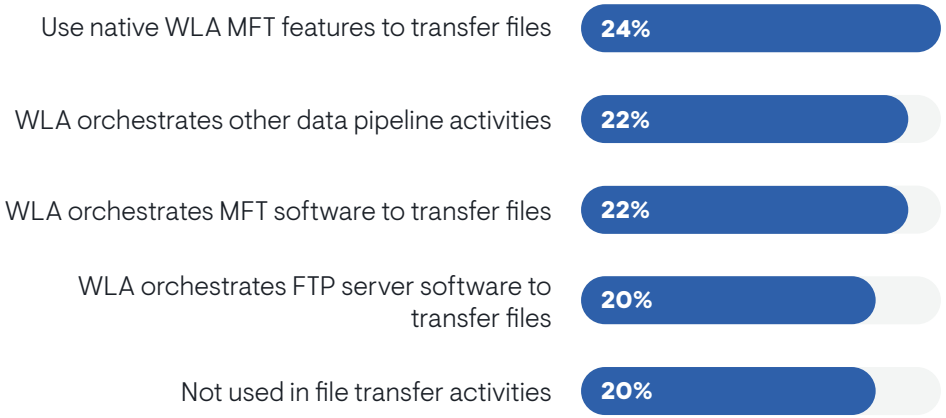


Sample Size = 264

The Evolving Role of WLA

In parallel with the digital transformation journey of an enterprise, workload automation solutions are adapting and evolving. The role of WLA in orchestrating data movement is expanding, with 80% of survey participants indicating the use of WLA in file transfer activities (Figure 4). Among these, 24% are leveraging native WLA managed file transfer capabilities, reflecting WLA's increasing importance in the modern data environment.

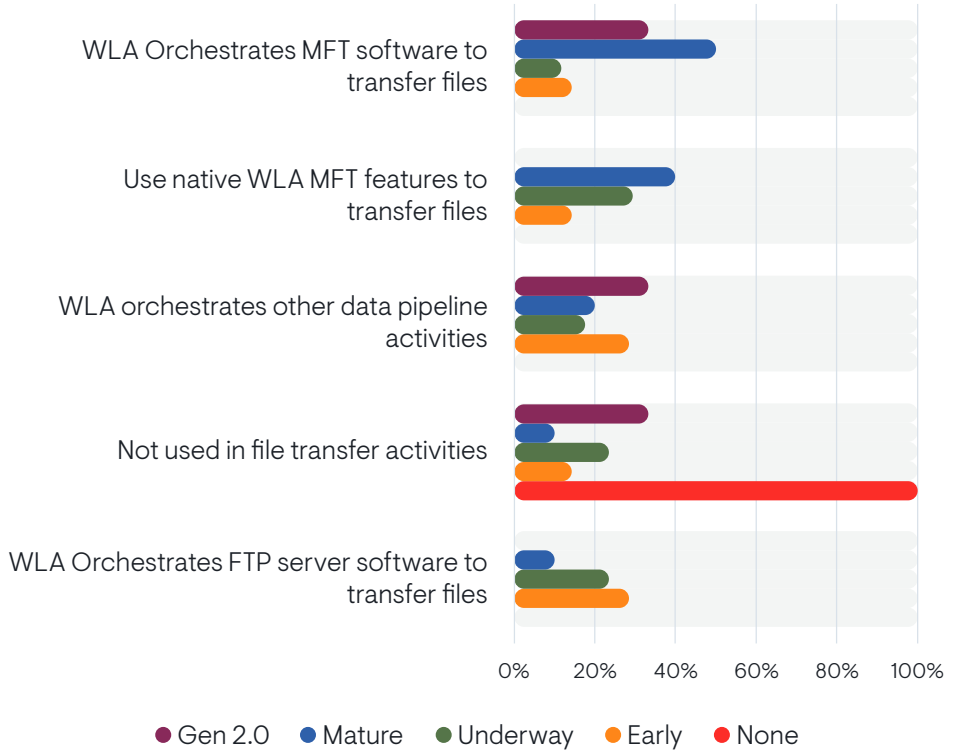
FIGURE 4. WLA ROLE IN FILE TRANSFERS



Sample Size = 111

As organizations progress in digital transformation maturity, they increasingly rely on more integrated, automated solutions. WLA, often seen as the backbone of IT automation, is crucial in this evolution, especially when it comes to streamlining complex data transfer and data pipeline management tasks (Figure 5).

FIGURE 5. WLA ROLE IN FILE TRANSFERS BY DIGITAL TRANSFORMATION MATURITY

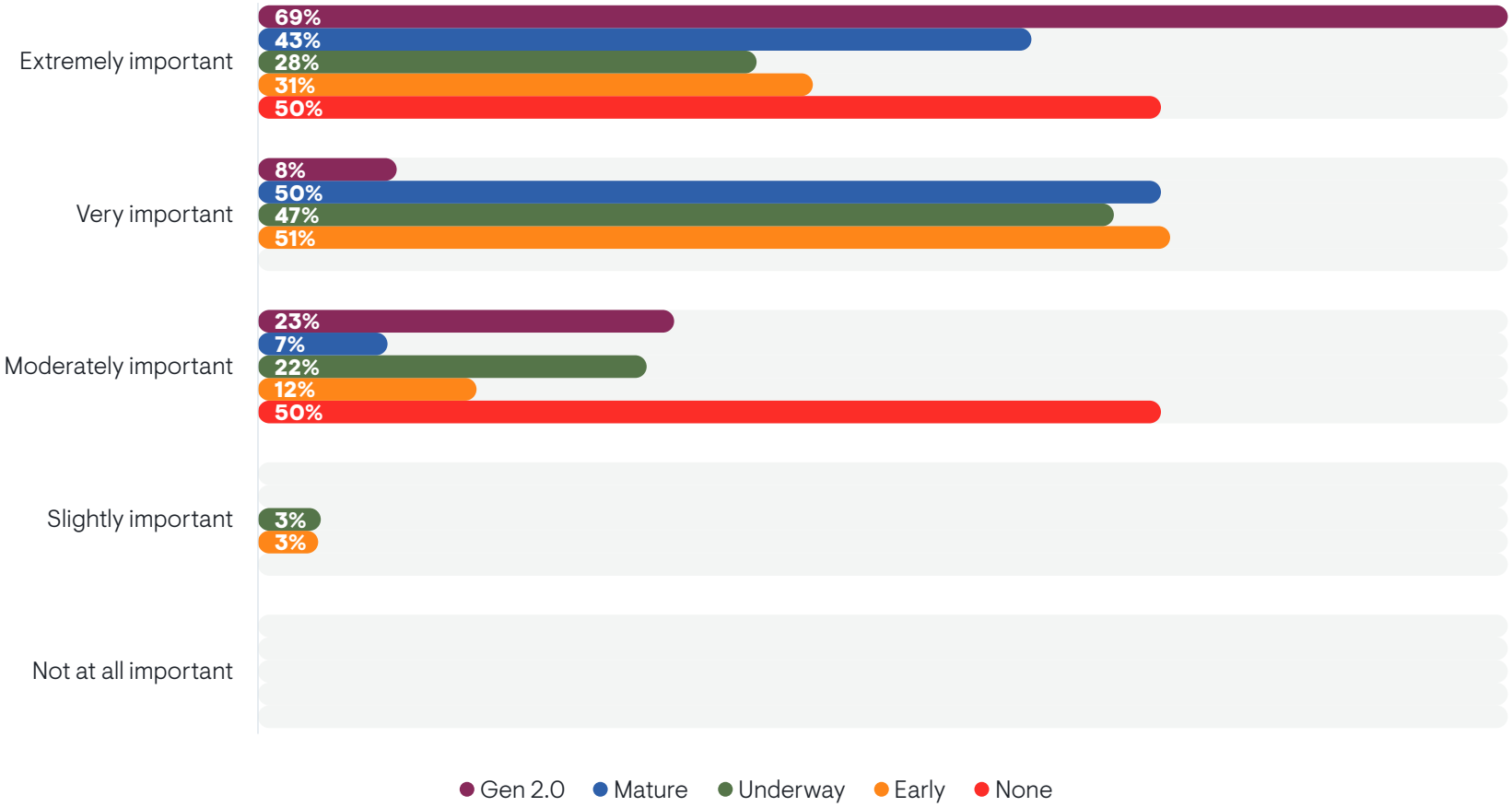


Sample Size = 111

The Enduring Significance of EDI in Digital Transformation

Not everything changes as organizations mature in their digital transformation journey. The significance of electronic data interchange (EDI) not only endures, but increases. This phenomenon is particularly pronounced within Gen 2.0 organizations, in which a substantial 69% rate EDI as extremely important (Figure 6). The commitment to EDI suggests a broader trend: entities that have historically been early adopters of transformative technologies are likely to continually seek out and implement innovations that offer competitive advantages.

FIGURE 6. IMPORTANCE OF EDI VS. STAGE OF DIGITAL TRANSFORMATION



EDI was initially adopted by the automative industry in the US, then expanded into other sectors and regions. By the 1980s, EDI was increasingly common among enterprises. The development of international standards (such as EDIFACT and ANSI X12), further solidified EDI. Such standards facilitated its adoption across global supply chains. By the 1990s and into the 2000s, EDI had become a fundamental component of business-to-business (B2B) transactions, particularly for large retailers, manufacturers, and their suppliers. Its importance has been sustained in the modern era due to its efficiency, speed, and accuracy in handling business communications.

EDI has long been a precursor to what we now term digital transformation, with its origins rooted in the latter part of the 20th century. Characterized by the automatic flow of documents directly into recipient systems—such as an order management system—EDI paved the way for immediate processing and established a legacy of innovation. This ingrained adaptability positioned many of the enterprises with a history in EDI to embrace and drive ongoing digital transformation efforts. As the business world navigates the initial phases of digital change, many of these EDI-experienced enterprises are already forging into the Gen 2.0 era of digital transformation.

Such trends reveal a broader narrative: early integration of foundational technologies like EDI often heralds an organization's capacity to adapt to and shape future technological shifts. These enterprises not only adapt to new tech landscapes with agility, but also frequently pioneer subsequent waves of innovation, using their EDI experience as a springboard for advanced technology adoption and continuous modernization.

The insights from this section reveal the undeniable correlation between digital transformation and the methods employed for data movement. As companies navigate different stages of digital maturity, the tools and processes they use for data transfer evolve correspondingly. WLA's role becomes more pronounced as organizations advance, highlighting its significance in underpinning the data-centric initiatives that are essential to digital transformation strategies.

Current State of Data Movement in Enterprises

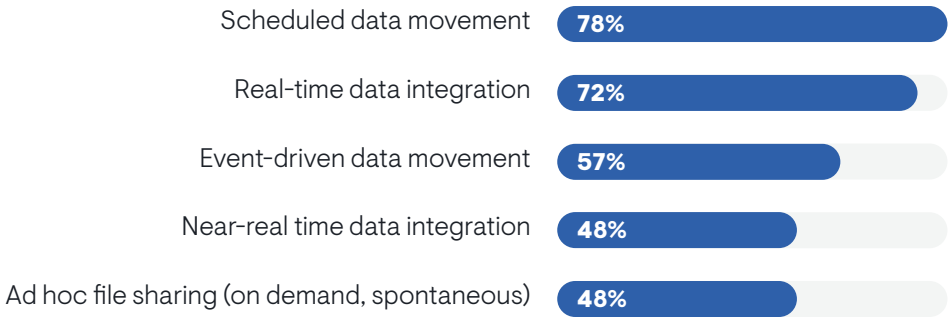
The orchestration of data within enterprises has advanced into a dynamic process that caters to the needs of an always-on, digitally connected global marketplace. This section explores the critical modalities of data movement organizations today employ, as well as the environmental contexts in which this data resides and transits.

Scheduled vs. Real-Time Data Movement

Traditionally, enterprises depended on scheduled data movement, executing transfers at prearranged intervals. This time-honored approach remains a staple, with 78% of organizations employing it to ensure the dependable and routine delivery of data, vital for operational stability and process automation (Figure 7).

Simultaneously, the drive for real-time business intelligence and the urgency for swift decision-making heightened the importance of real-time data integration. Our survey indicates that 72% of respondents have adopted real-time data integration, reflecting the growing necessity for data to be instantly accessible, fostering nimbleness in business operations.

FIGURE 7. TIMING OF DATA MOVEMENT



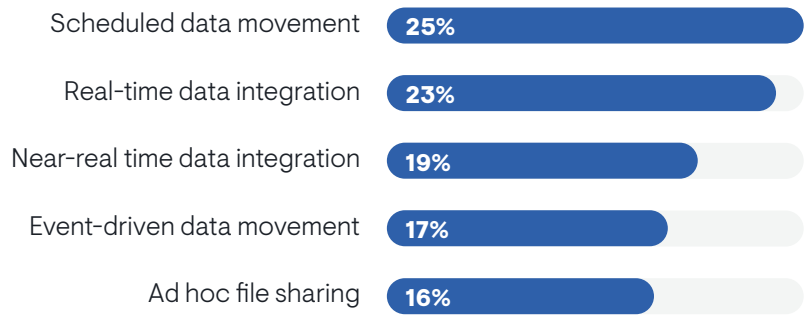
Sample Size = 264

The distribution of data moved by the timing method yields insights into operational preferences and capacities. Scheduled data movement represents 25% of data moved in enterprises (Figure 8). Real-time data represents 23% of data moved in enterprises, reflecting a significant shift toward methods that can immediately act upon and disseminate information, crucial for analytics and live decision-making processes.

Event-driven and near-real time data integration practices show robust utilization, revealing the strategic value enterprises place on responsive and adaptable data movement. These methods serve as a bridge between the predictability of scheduled transfers and the immediacy of real-time integration, underpinning workflows that depend on specific events or conditions.

Ad hoc file sharing serves as the backbone of on-demand, user-initiated data exchange, which is integral to the spontaneous and often irregular needs of business communication. Approximately 16% of enterprise data moves via ad hoc methods, reflecting the necessity for a flexible and immediate mode of file transfer that operates outside the bounds of scheduled or real-time data movement frameworks. The prominence of ad hoc file sharing in enterprises underscores its role in providing users the autonomy to initiate transfers as the need arises, reinforcing its position as an indispensable component in the modern enterprise data movement strategy.

FIGURE 8. DISTRIBUTION OF DATA MOVED BY TIMING OF DATA MOVEMENT

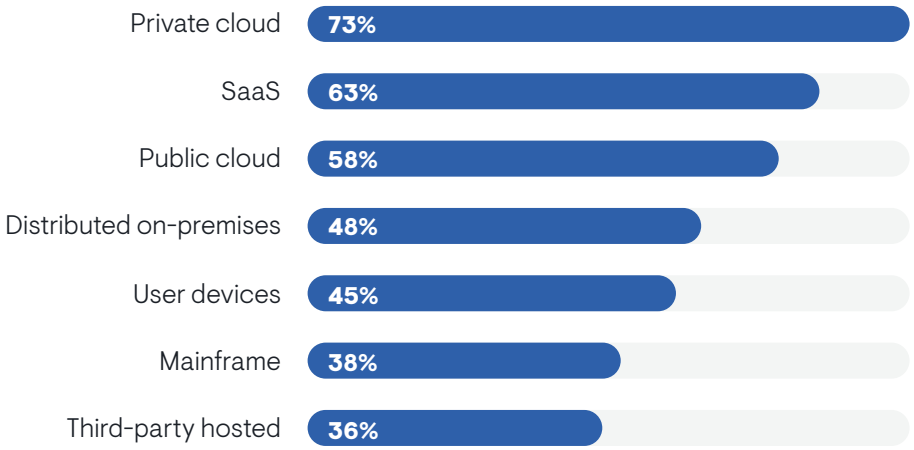


Sample Size = 264

Cloud and Environment Usage

The cloud undeniably reshaped the architecture of enterprise data ecosystems. A significant 73% of survey participants report using private cloud environments, reflecting a strategic move toward leveraging cloud capabilities while maintaining control over critical infrastructure (Figure 9). SaaS and public cloud follow closely, with 63% and 58% usage, respectively. These numbers not only emphasize the omnipresence of cloud services in data movement strategies, but also suggest a nuanced approach to cloud adoption that balances flexibility, control, and cost.

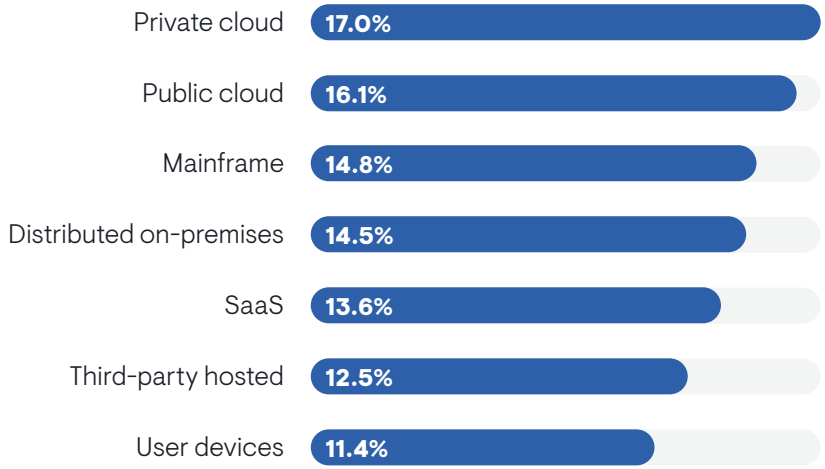
FIGURE 9. ENVIRONMENTS SENDING OR RECEIVING DATA



Sample Size = 264

The flow of data across these environments is noteworthy: 17% of all enterprise data movement occurs to and from private clouds, with the public cloud facilitating just over 16% (Figure 10). SaaS applications are not far behind, generating nearly 14% of data movement. These statistics paint a picture of an intricate multi-cloud tapestry, with data fluidly moving through various platforms and services to support a distributed computing paradigm.

FIGURE 10. DISTRIBUTION OF DATA MOVED BY ENVIRONMENT TYPE



The data underpinning these observations offers a clear indication of the critical role that both time-tested and emerging data movement strategies play in the enterprise landscape. As organizations seek to balance the reliability of scheduled transfers with the immediacy afforded by real-time integration, the cloud environment has become the de facto setting for these complex orchestration tasks. This section sets the foundation for understanding the nuanced interplay of factors that influence how, when, and where data moves within the enterprise domain.

Sample Size = 264

Software Solutions and Investment

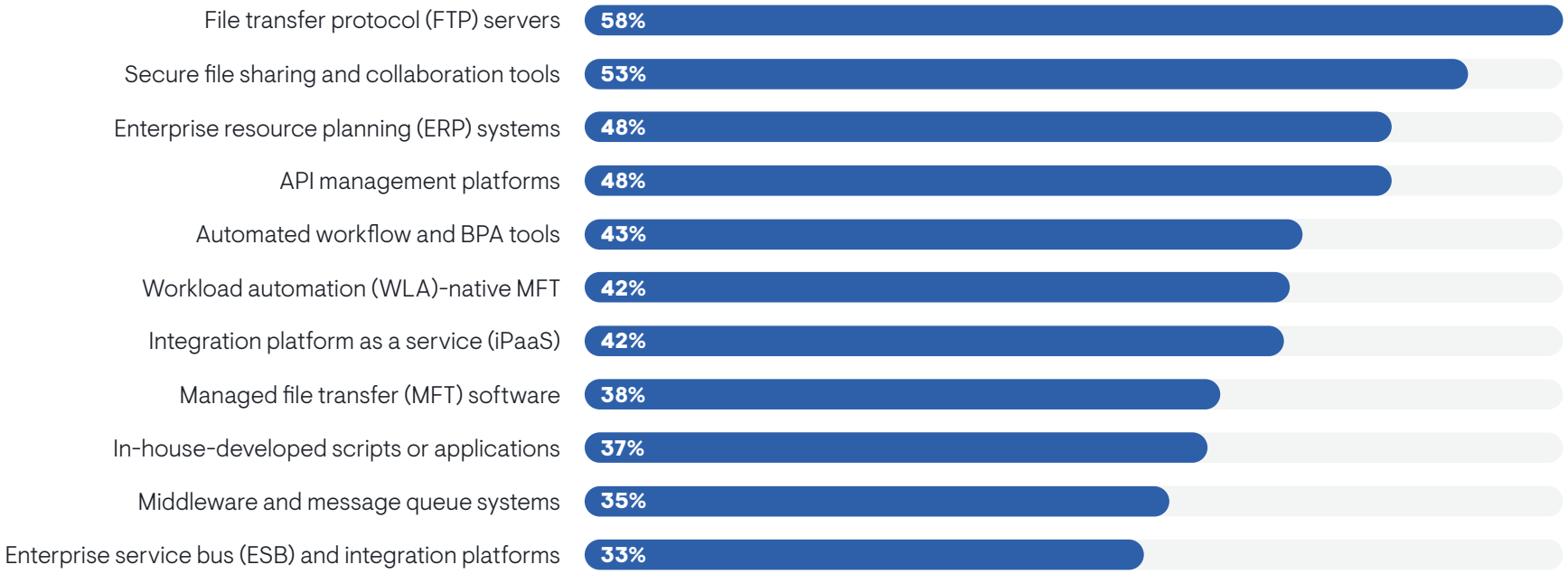
In the terrain of enterprise data movement, the choice of software solutions is a reflection of an organization's strategic priorities. From steadfast mainstays to emerging platforms, the array of tools utilized for transferring data is as varied as it is critical.

Overview of Tools in Use

Enterprises today do not solely rely on a single tool or method for data movement, but rather employ a suite of solutions tailored to their specific operational needs. The survey illuminates this diversity, with traditional FTP servers still the most common tool, used by 58% of respondents. Despite their age, these servers remain a bedrock in data transfer strategies due to their simplicity and wide acceptance (Figure 11).

However, the winds of change are palpable, with 42% of organizations moving toward iPaaS solutions, indicating a shift to more scalable and flexible data movement frameworks. The same proportion also reports the use of WLA-native managed file transfer capabilities, suggesting a trend toward automation and orchestration in managing data transfers.

FIGURE 11. ENTERPRISE USE OF DATA MOVING TECHNOLOGIES



Sample Size = 264

Investment in File Transfer Solutions

The investment in data movement tools is a strategic decision that impacts not only the IT infrastructure, but also the operational efficiency and compliance posture of an organization. This section revisits the financial and operational implications of adopting various data movement technologies, specifically focusing on integration platform as a service, workload automation with native managed file transfer capabilities, standalone MFT software, and traditional FTP servers.

Integration Platform as a Service

iPaaS is increasingly recognized for its pivotal role in digital transformation, offering robust integration capabilities that facilitate seamless interactions between cloud-based and on-premises systems.

Financial Investment: Investment in iPaaS typically follows a subscription-based model, which can vary significantly based on the scale of deployment and the specific features required. Organizations benefit from lower upfront costs and the flexibility to scale services as needed.

Operational Focus: iPaaS solutions excel in dynamic environments where rapid development and deployment of integrations are crucial, such as integrating SaaS applications with existing IT infrastructure.

Security and Compliance: While iPaaS platforms provide strong security features, including built-in compliance controls, they necessitate continuous oversight, especially in regulated industries in which data security and privacy are paramount.

Workload Automation with Native MFT Capabilities

WLA-native MFT solutions integrate the functionality of workload automation and managed file transfer, offering a sophisticated toolset for automating complex data workflows and file transfers.

Financial Investment: The cost for WLA-native MFT solutions is generally higher due to their advanced capabilities, but they provide significant long-term value through enhanced efficiency and reduced manual errors.

Operational Focus: These solutions are ideal for organizations that require reliable, high-volume data transfers with complex scheduling needs.

Security and Compliance: WLA-native MFT solutions are designed with security at their core, featuring robust encryption and comprehensive compliance features, making them suitable for industries with stringent data protection standards.

Managed File Transfer Software

MFT software offers a specialized approach to secure file transfer capabilities, distinct from general FTP solutions, with enhanced security and monitoring features.

Financial Investment: MFT solutions require a significant upfront investment that covers licensing fees, infrastructure costs, and implementation services. This investment is justified by the substantial security and efficiency gains compared to basic FTP servers.

Operational Focus: MFT is particularly beneficial for organizations that transfer sensitive data across networks where security, reliability, and auditability are critical.

Security and Compliance: MFT software provides extensive security features, including end-to-end encryption, secure key management practices, and detailed transfer logs, which help in meeting strict compliance requirements.

FTP Servers

FTPservers represent the most basic form of data transfer technology, widely used due to their simplicity and low cost.

Financial Investment: The cost associated with setting up and maintaining FTP servers is relatively low, making them a popular choice for budget-conscious organizations or those with minimal security concerns.

Operational Focus: FTP servers are suitable for simple, low-volume file transfers and are commonly used in less critical data transfer scenarios.

Security and Compliance: The major drawback of FTP servers is their limited security features, which can be a significant risk factor, especially when transferring sensitive or regulated data. This necessitates additional investments in security solutions to safeguard data transfers.

The Right Technology for Data Movement

Selecting the right technology for data movement involves balancing several factors, including cost, complexity, operational needs, and security requirements.

- iPaaS offers cost-effective scalability and integration flexibility, ideal for environments that require rapid deployment of complex integrations.
- WLA-native MFT combines the robustness of workload automation with the security of managed file transfers, suitable for high-volume, complex scenarios.
- MFT software focuses on secure, compliant, and efficient data transfers, necessary for sensitive or heavily regulated data.
- FTPservers, while economical, require additional security measures to meet compliance standards, making them less ideal for critical data transfers.

These insights underscore the criticality of software solutions in the operational fabric of data movement. As enterprises navigate the complexities of the modern IT landscape, their choice of tools and the investments they make in them are indicative not just of their present capabilities, but also of their future readiness and their commitment to data as a foundational business asset.

Security and Compliance

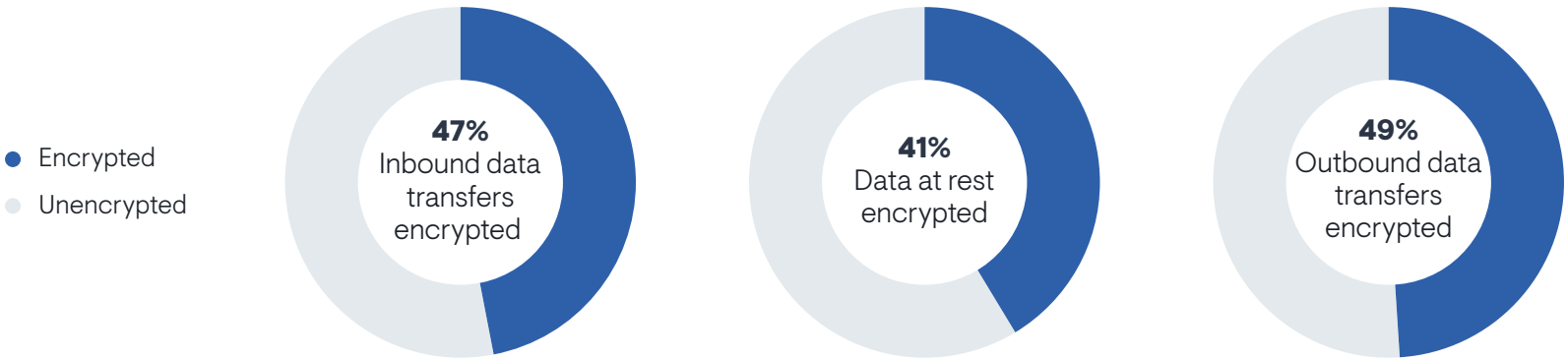
Amidst the digital era's rapid expansion and the ensuing complexity of data ecosystems, security and compliance have surfaced as paramount concerns. They act as both guardrails and guidelines for organizations to navigate the perilous terrains of cyber threats and regulatory demands.

Importance of Compliance

In an environment where data breaches and compliance failures can result in significant fines and reputational damage, adherence to compliance standards is not optional – it's imperative. The survey underscores this reality, with a staggering 90% of respondents deeming compliance requirements extremely or very important. This overwhelming consensus reflects the broad acknowledgment within the enterprise community of the need for compliance frameworks to be deeply ingrained in data movement processes.

Encryption Methods and Challenges

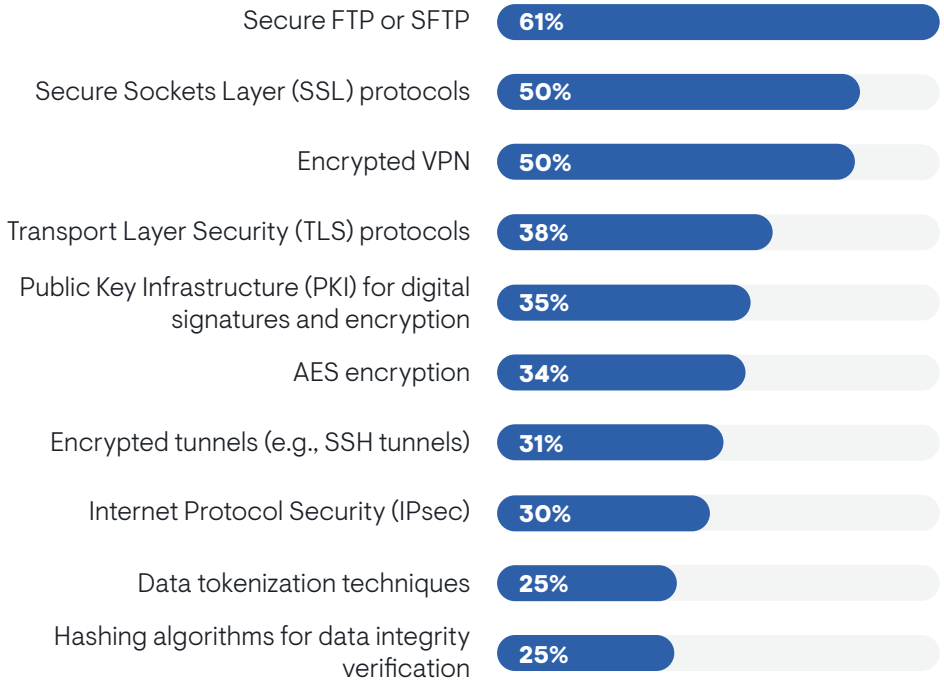
When it comes to securing data in transit and at rest, encryption stands out as a primary defense mechanism. Outbound data transfers are the most often encrypted (49%), followed by inbound data transfers (47%). Data at rest is the least often encrypted at 41%.



Sample Size = 264

Our survey indicates SFTP as the most popular encryption method for data movement, employed by 61% of respondents, while SSL and encrypted VPNs follow at a 50% adoption rate each (Figure 13). These methods are cornerstones in ensuring data is unintelligible to unauthorized entities during transfer.

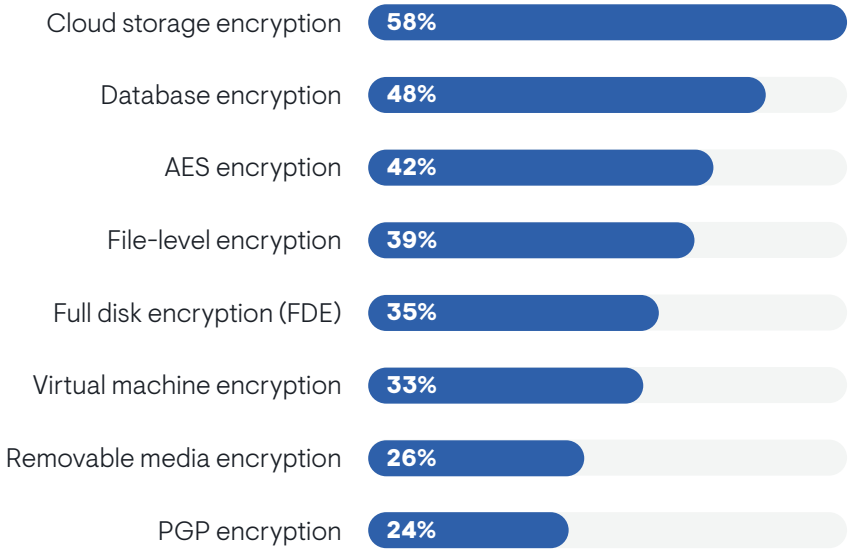
FIGURE 13. ENCRYPTION METHODS USED DURING DATA TRANSFER



For data at rest, cloud storage encryption takes the lead, used by 58% of participants, signaling trust in cloud providers' ability to safeguard data (Figure 14). Despite these measures, less than half of the data is encrypted either in transit or at rest, which raises questions about the challenges organizations face in balancing security with operational efficiency and usability.

Sample Size = 264

FIGURE 14. ENCRYPTION METHODS USED FOR DATA AT REST



The insights from this section not only emphasize the non-negotiable nature of security and compliance in today's enterprise data strategies, but they also shed light on the practical encryption methods organizations deploy. Moreover, the insights reflect on the inherent challenges in implementing the encryption measures, striking the necessary equilibrium between robust security and operational performance.

Sample Size = 256

Challenges in Data Movement

The landscape of data movement technologies is diverse, encompassing a range of tools from traditional FTP servers to advanced workload automation with native MFT capabilities. Notably, satisfaction levels among these various methods are high, indicating that despite the challenges they may present, they largely meet organizations' needs. Measuring satisfaction as those claiming Very Satisfied or Satisfied, iPaaS solutions lead at 96%, followed closely by MFT software at 93%, WLA with native MFT at 91%, and FTP servers at 90%. These scores reflect a strong endorsement of the current file transfer solutions by enterprises that value the reliability and performance they deliver.

Despite these high satisfaction rates, each method comes with its own set of unique challenges that can impact operational efficiency and risk management. Understanding these challenges is essential for organizations as they strive to optimize their data movement strategies and ensure they can handle the increasing volume and value of data in today's digital economy.

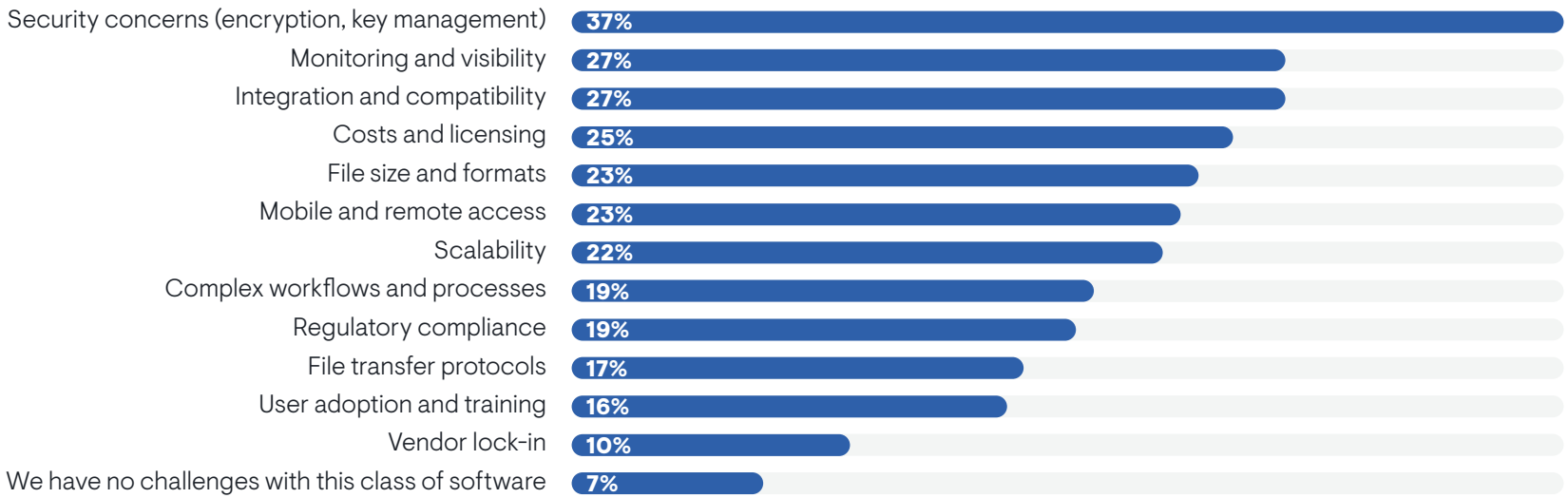
File Transfer Challenges

While enterprises express a high degree of satisfaction with their file transfer solutions, they still encounter notable challenges that vary depending on the technology used. This section provides an overview of the difficulties associated with traditional FTP servers, MFT software, WLA with native MFT capabilities, and iPaaS.

Traditional FTP Servers

For traditional FTP servers, security concerns top the list of challenges, reflecting the need for robust encryption and key management practices. Monitoring and visibility, along with integration and compatibility, also pose significant difficulties, indicating the inherent risks and operational complexities associated with maintaining older technologies (Figure 15). These challenges underscore the necessity for vigilant security practices and the potential benefits of migrating to more modern, integrated solutions.

FIGURE 15. TOP THREE CHALLENGES OF FTP SERVERS

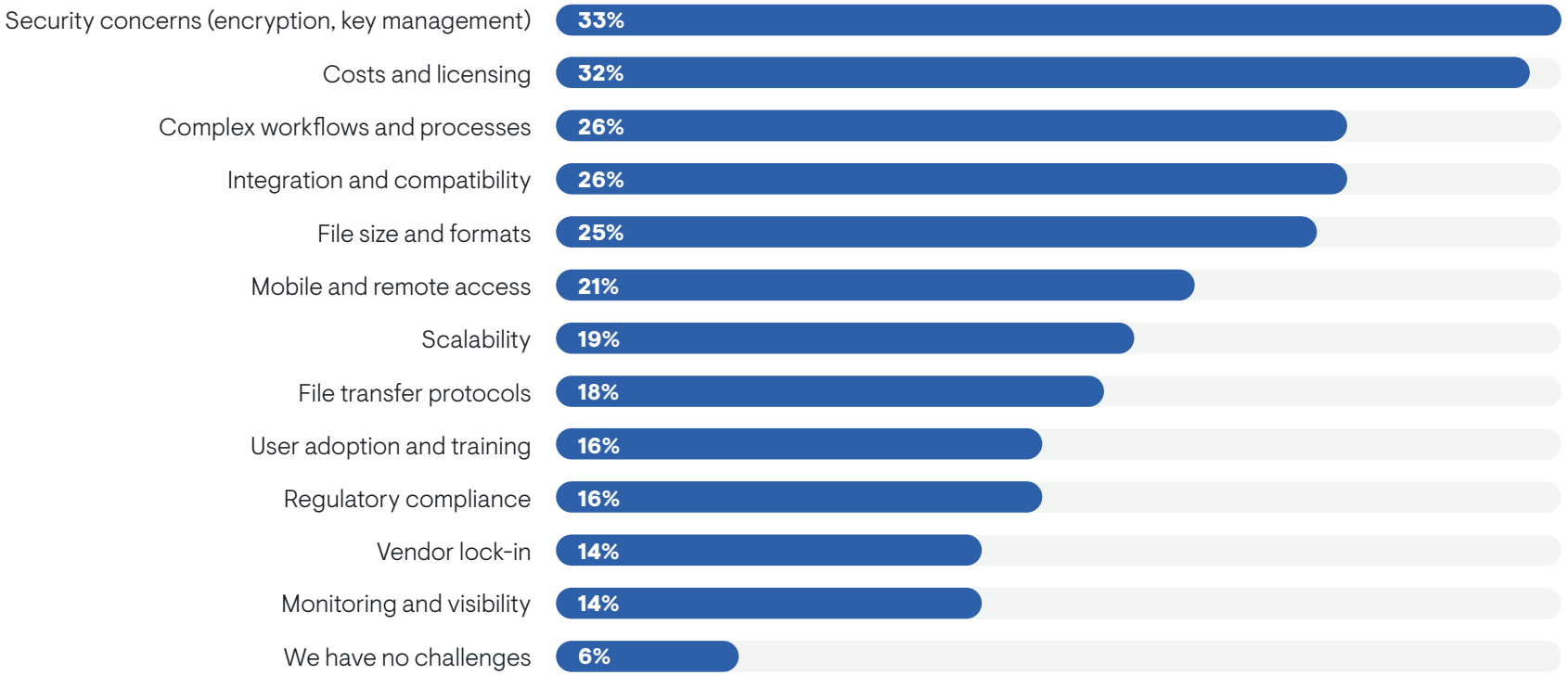


Sample Size = 154

Managed File Transfer Software

Managed file transfer software users primarily cite security concerns, cost and licensing complexities, and challenges with complex workflows and processes. The emphasis on security demonstrates the critical nature of protecting data in transit, while cost considerations highlight the financial implications of maintaining high-quality MFT solutions (Figure 16). Complex workflows indicate a need for streamlined processes that can accommodate the sophisticated capabilities of MFT software.

FIGURE 16. TOP THREE CHALLENGES OF MFT SOFTWARE

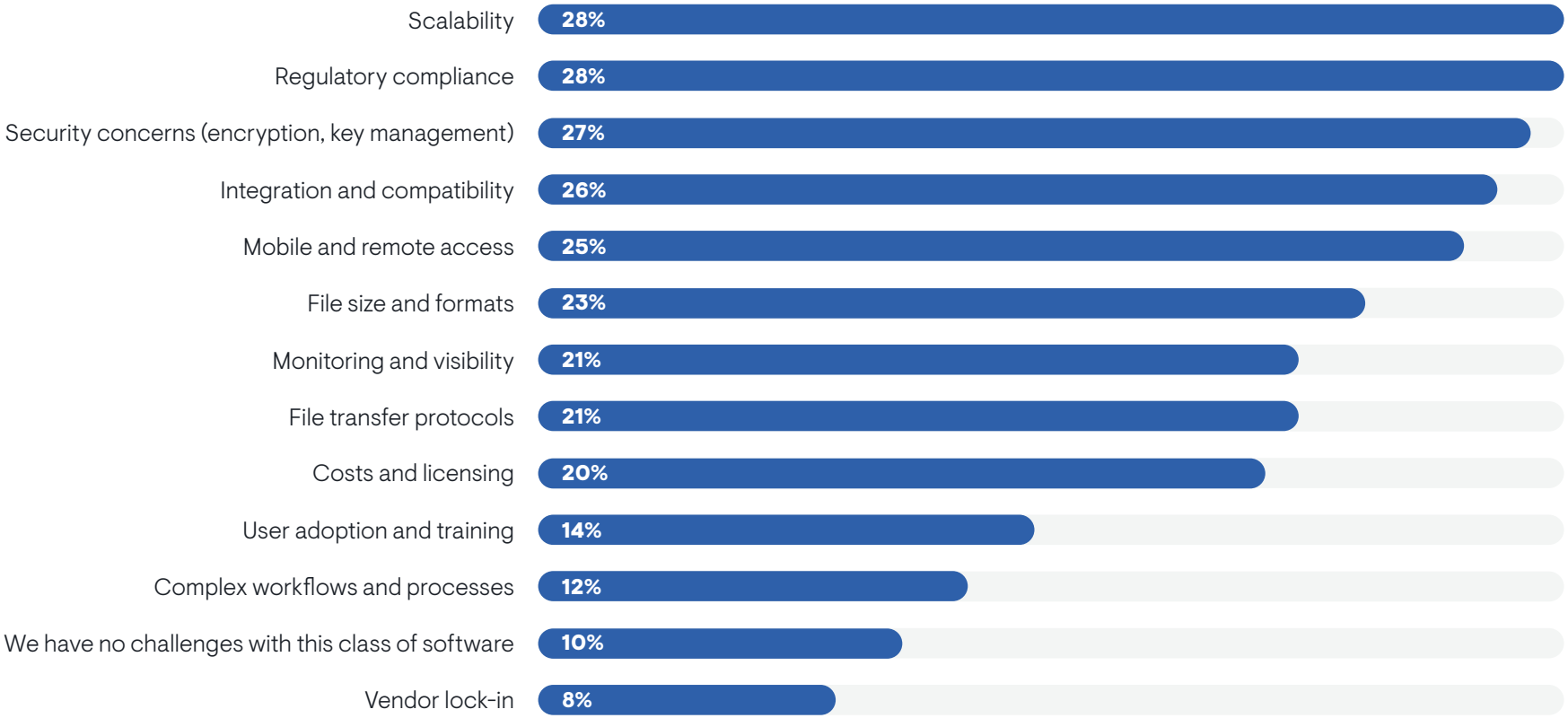


Sample Size = 100

Workload Automation with Native MFT Capabilities

Enterprises using WLA with native MFT capabilities report scalability and regulatory compliance as their top challenges, closely followed by security concerns. The focus on scalability reflects the growing data demands enterprises face, while regulatory compliance underscores the importance of adhering to stringent industry standards. Security remains a critical consideration, reinforcing the need for WLA solutions that incorporate strong encryption and key management features (Figure 17).

FIGURE 17. TOP THREE CHALLENGES OF WLA-NATIVE MFT



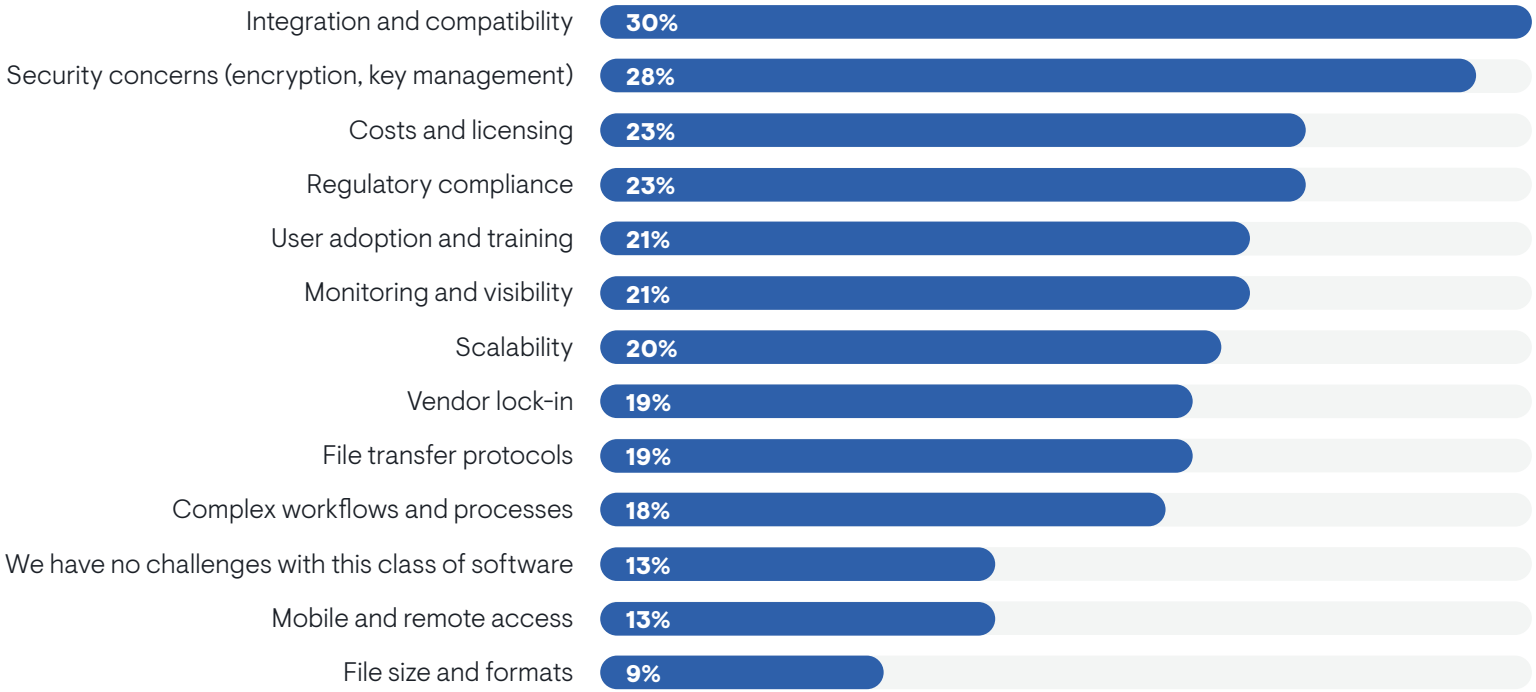
Sample Size = 111

Integration Platform as a Service

iPaaS emerges as the method with the highest satisfaction, yet it is not without challenges. Integration and compatibility are the most significant concerns, alongside security and the costs and licensing associated with iPaaS solutions. The emphasis on integration indicates the complex interplay between various cloud services and on-premises systems that iPaaS must navigate, while the focus on security and cost reflects the broader concerns shared across all file transfer methods (Figure 18).

Despite high satisfaction rates across all file transfer methods, each comes with its unique set of challenges to address to ensure efficient and secure data movement. In digitally mature enterprises, a blend of these technologies is often in use, leveraging the strengths of each to meet diverse operational needs. The choice of file transfer method is a strategic decision that considers the specific advantages and associated challenges. Continuous evolution in data transfer tools and practices is required to overcome these challenges effectively, ensuring that enterprises can manage and move data with resilience and adaptability.

FIGURE 18. TOP THREE CHALLENGES OF FTP SERVERS



Sample Size = 110

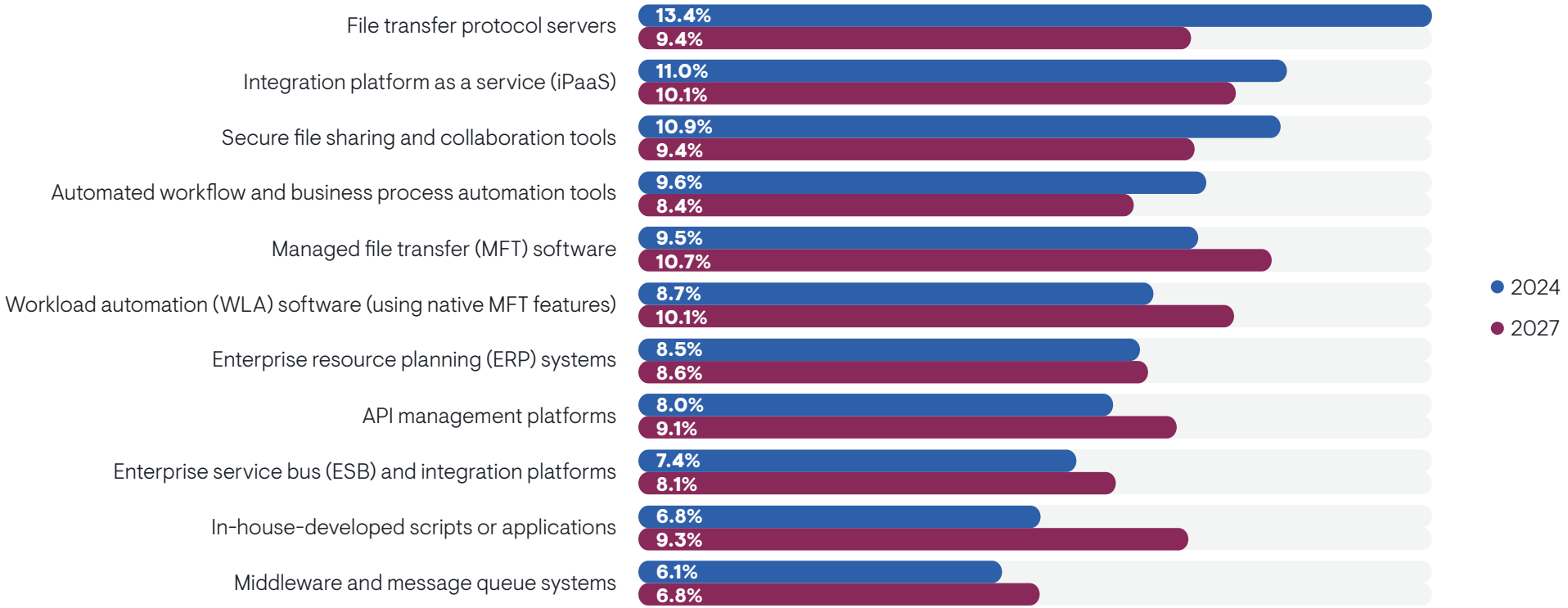
Future Outlook and Trends

The landscape of enterprise data movement is not static. Evolving technologies, shifting market demands, and the relentless pace of digital innovation shape it. Peering into the future, enterprises not only need to anticipate changes, but also prepare for the transformative trends that will define the trajectory of data movement.

Expectations for Future Data Movement

As organizations look to the horizon, the anticipation for change is evident in their expectations for data movement. The projected outlook sees a reduction in the use of traditional FTP servers and an uptick in more advanced solutions, like MFT and WLA with native MFT capabilities (Figure 19). These trends suggest a move toward systems that offer enhanced security, automation, and integration capabilities.

FIGURE 19. DISTRIBUTION OF DATA MOVED IN A TYPICAL MONTH: 2023 VS. 2027 EXPECTATIONS



Sample Size = 264

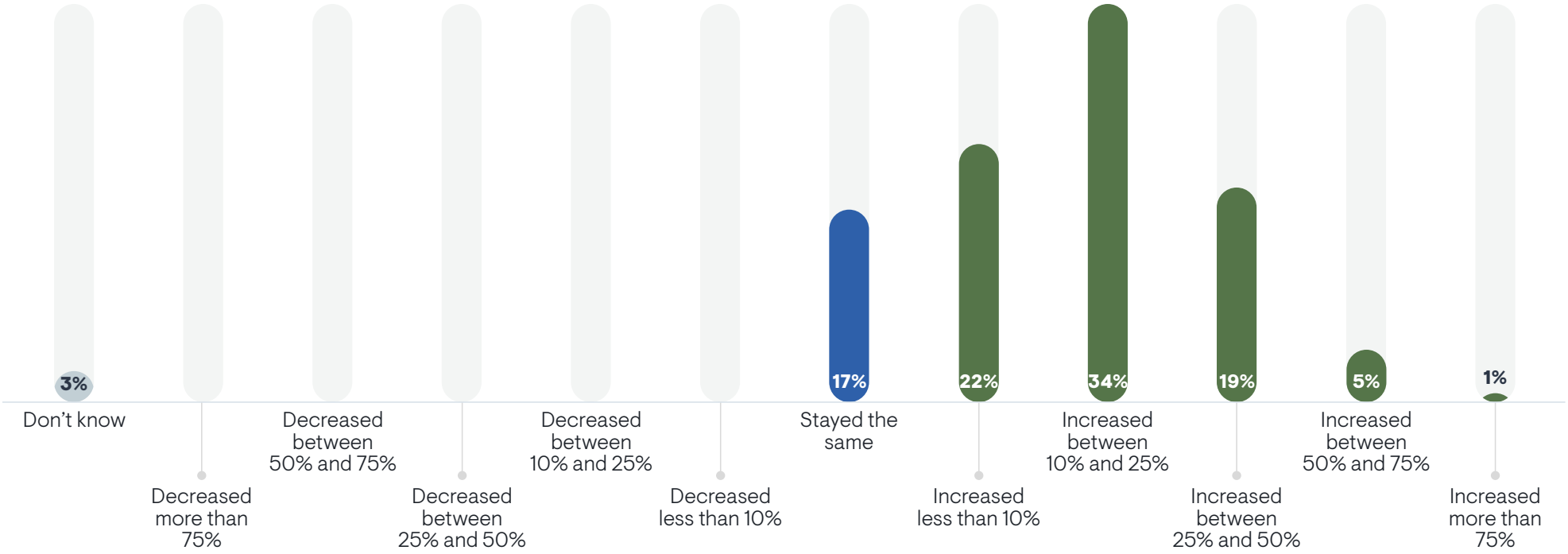
Moreover, the expectation for future data distribution highlights the growing reliance on in-house-developed scripts or applications, which may indicate a trend toward more customized data movement solutions. The need for more tailored automation and a response to specific organizational challenges could drive this.

Anticipated Growth in Data Movement

The volume of data moved within and outside of organizations is anticipated to grow, with 34% of respondents predicting an increase of between 10% and 25% (Figure 20). This expected growth is not only indicative of expanding business activities, but also reflective of the increasing centrality of data in enterprise operations. No respondents reported a decline in file transfer volumes, further underscoring the trend of burgeoning data movement needs.

The contemplations in this section of the report lay the groundwork for enterprises to proactively plan for the future. Insights on expected trends and growth in data movement are vital for IT decision-makers as they architect their data infrastructure to be robust, secure, and agile. Preparing for these shifts will enable organizations to not just weather the changes, but harness them for competitive advantage and operational excellence.

FIGURE 20. GROWTH IN FILE TRANSFERS



Sample Size = 264

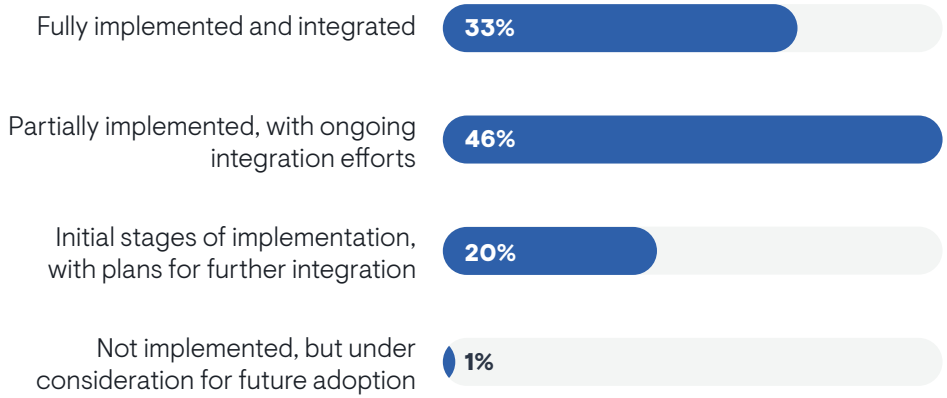
DataOps and Data Pipeline Orchestration

In the quest for agility and responsiveness, DataOps emerges as a beacon, guiding enterprises through the intricacies of modern data management. This approach, with its emphasis on communication, collaboration, and automation, plays a pivotal role in data pipeline orchestration, directly impacting the effectiveness of data strategies.

Adoption and Integration of DataOps

DataOps is not just a practice. It's a culture shift that encapsulates the agile and process-oriented methodology applied to the data analytics lifecycle. The survey indicates that while 33% of organizations have fully implemented DataOps, a significant 46% are still in the partial implementation phase, actively integrating it within their operations (Figure 21). This reflects an ongoing journey toward embedding DataOps principles to enhance the quality and reduce the cycle time of data analytics.

FIGURE 21. IMPLEMENTATION OF DATAOPS PRACTICES



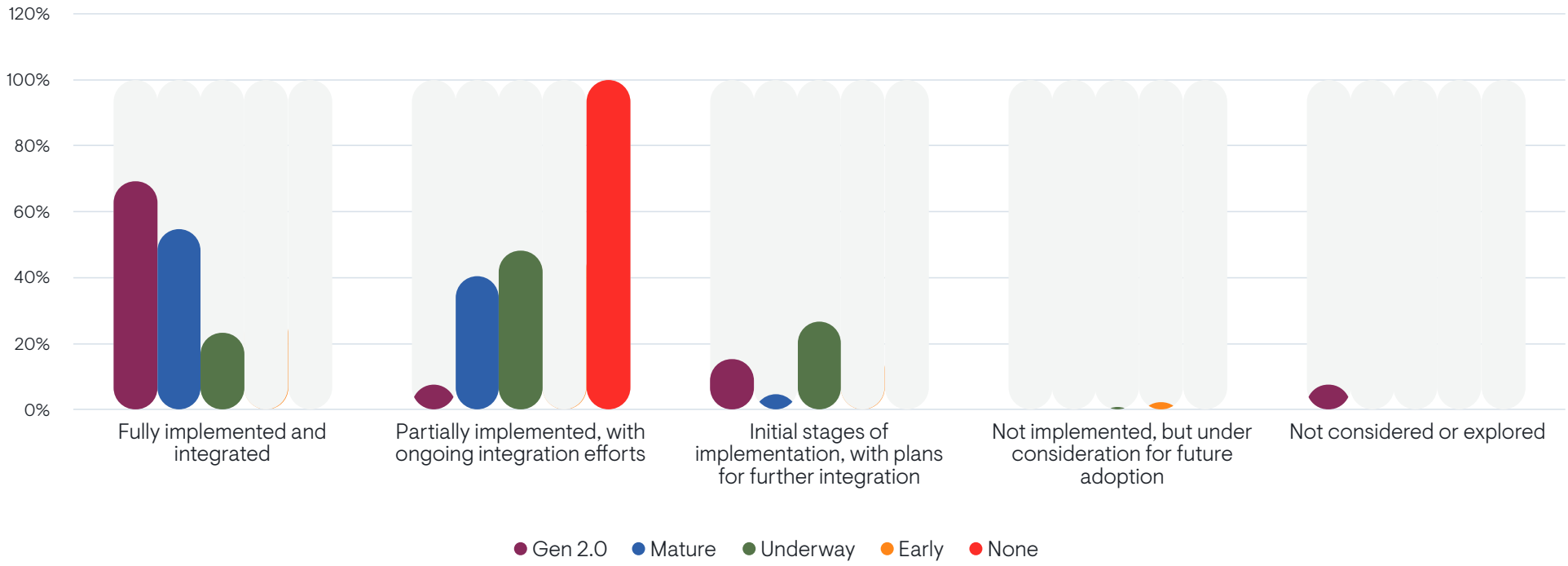
Sample Size = 264

DataOps and Digital Transformation

As enterprises deepen their digital transformation initiatives, the correlation with DataOps maturity becomes increasingly apparent. The survey illustrates a notable trend: organizations that are advanced in their digital transformation journey—those in the Gen 2.0 and Mature stages—are more likely to have fully integrated DataOps practices (Figure 22).

This alignment is not coincidental, but indicates that the principles of DataOps, such as iterative development, continuous deployment, and collaborative cross-functional teams, are integral to realizing the objectives of digital transformation. As such, companies that are further along in embedding digital technologies into their operations tend to exhibit more sophisticated DataOps implementations. This maturity not only underscores their commitment to a data-centric culture, but also amplifies their ability to leverage analytics and insights for competitive advantage. Consequently, as digital transformation reshapes IT operations, the adoption and integration of DataOps practices are increasingly recognized as fundamental to orchestrating data management and enabling the agility required to thrive in today's fast-paced business environment.

FIGURE 22. IMPORTANCE OF DATAOPS VS. DIGITAL TRANSFORMATION MATURITY



Sample Size = 264

Challenges in DataOps Implementation for Data Pipelines

As organizations advance toward DataOps maturity, they face specific challenges in orchestrating their data pipelines. Security and compliance emerge as paramount concerns, with nearly half of the respondents (49%) identifying them as their biggest challenge (Figure 23). These concerns highlight the critical need for robust governance and protection mechanisms in an environment where data is a prime target for cyber threats.

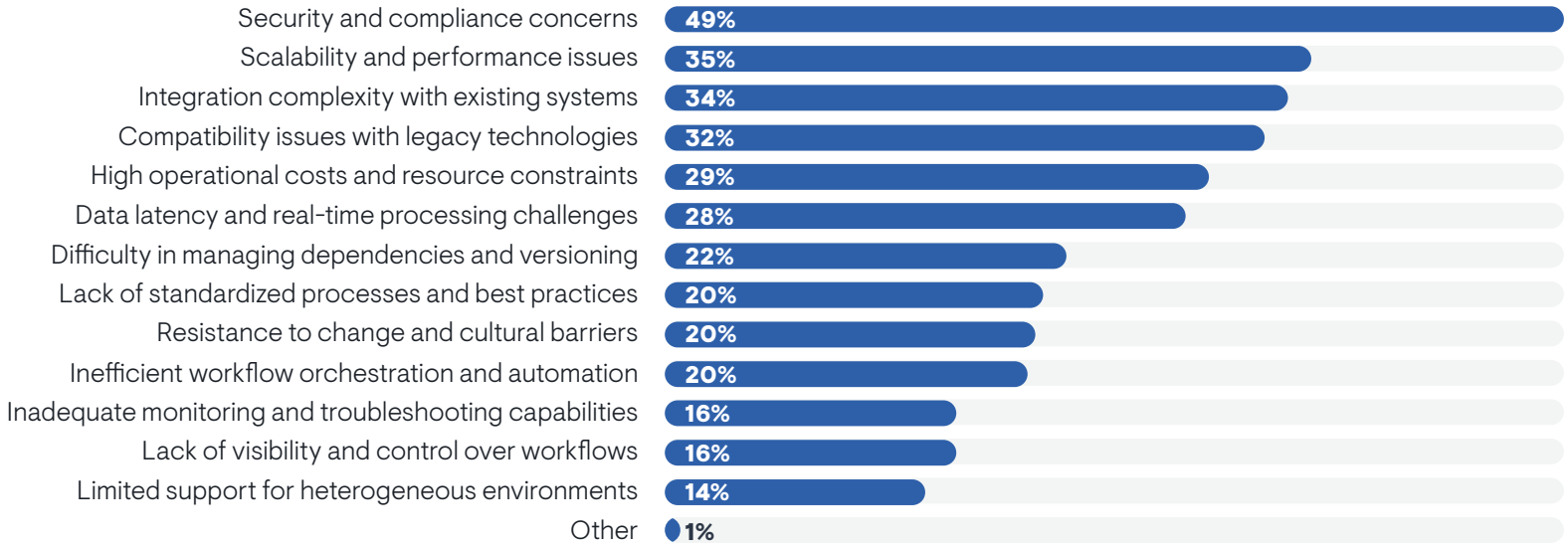
Scalability and performance issues are also significant, experienced by 35% of respondents. As the amount and complexity of data grow, so does the necessity for data pipelines to perform efficiently at scale. This demands not only more powerful computing resources, but also smarter, more scalable architectures.

Moreover, 34% of respondents point to integration complexity with existing systems as a hurdle. This challenge speaks to the difficulties enterprises face when integrating modern DataOps practices with legacy systems that may not have been designed with current data volumes or structures in mind.

Operational costs and resource constraints (cited by 29% of respondents) further complicate the picture, implying that budgetary limitations and the availability of skilled personnel are key considerations in the successful implementation of data pipelines within a DataOps framework.

These challenges are not isolated, but interlinked, creating a complex web that enterprises must navigate to optimize their data pipelines. Strategic planning, resource allocation, and a commitment to continuous improvement are essential to overcome these obstacles and realize the full potential of DataOps in the management of data pipelines.

FIGURE 23. CHALLENGES ORCHESTRATING DATA PIPELINES

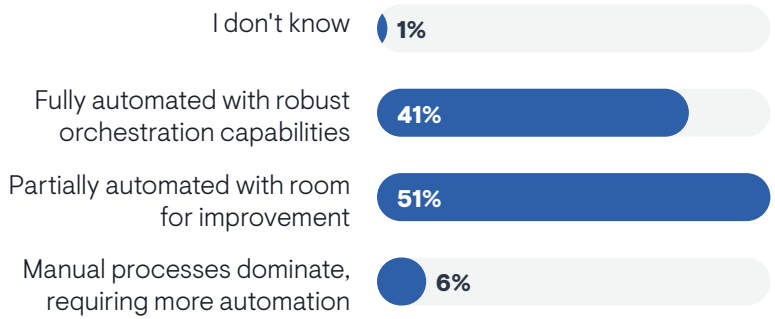


Sample Size = 235

Automation in Data Pipelines

Data pipelines are widely adopted by 49% of enterprises, with another 43% relying on data pipelines for specific departments or projects. Automation in data pipelines is a cornerstone of DataOps, facilitating the flow of data through automated processes and robust orchestration capabilities. The data reveals that a promising 41% of enterprises have achieved fully automated data pipelines. Yet, 51% still find themselves in a transition state with partially automated systems, and a notable 6% are operating with manual processes (Figure 24). These figures underscore the critical need for continued investment in automation technologies to refine data pipeline management.

FIGURE 24. DATA PIPELINE AUTOMATION

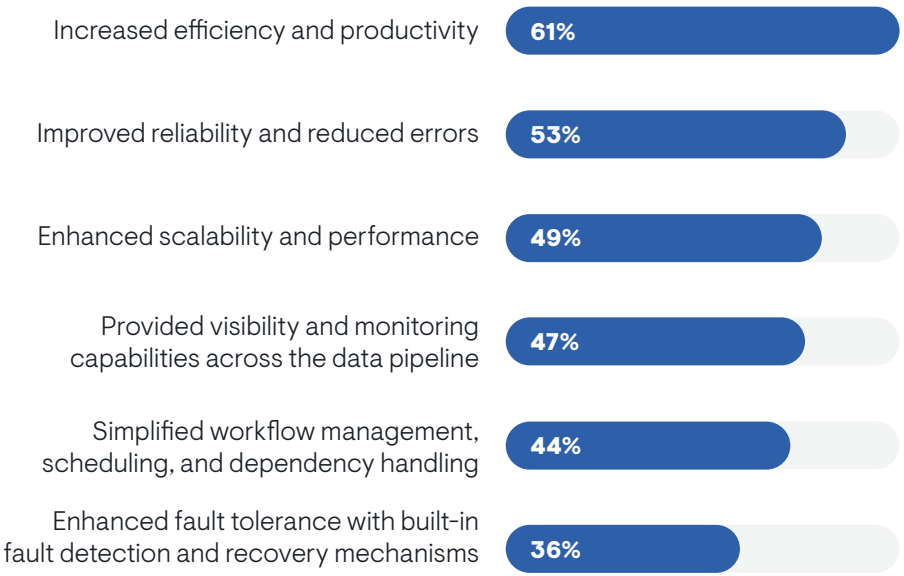


Sample Size = 235

The Impact of Automation on Data Pipelines

Automation and orchestration significantly enhance data pipeline processes. A significant 61% of enterprises report increased efficiency and productivity as the foremost benefit of automation (Figure 25). Moreover, 53% have observed improved reliability and a reduction in errors, which speaks to the enhanced quality controls that automation introduces. Performance gains are not far behind, with 49% of organizations noting better scalability to manage growing data volumes. Perhaps just as crucial is the enhancement of visibility and monitoring capabilities, acknowledged by 47% of respondents, which contributes to streamlined workflow management and dependency handling. These advancements collectively empower enterprises to better manage their data assets, forming a solid foundation for data-driven decision-making and sustaining a competitive advantage in an increasingly digital business environment.

FIGURE 25. THE BENEFITS OF AUTOMATION IN DATA PIPELINES



Sample Size = 217

The exploration of DataOps and data pipeline orchestration in this section spotlights the imperative for robust, automated, and well-integrated data processes. As enterprises aim to harness the full potential of their data assets, the insights gathered here underscore the need for a concerted effort toward the adoption of DataOps philosophies and the automation of data pipelines. This strategic direction is critical for organizations to achieve the agility and efficiency required for data-driven decision-making in the digital age.

Functional Impact Across the Enterprise

The functional implications of data movement extend far beyond IT departments, influencing various aspects of organizational operations. As enterprises continue to digitize their processes, the dependency on file transfers and data movement becomes a critical element in ensuring operational continuity and efficiency across all business areas.

Enterprise-Wide Dependence on File Transfers

File transfers are not just a technical necessity, but a business imperative, with different functional areas relying on this capability to varying degrees. Our survey highlights this dependence, showing that IT operations, application development, and service management are among the top sectors within organizations that heavily rely on file transfers and data movement, as shown in Figure 26.

The data movement's functional impact underscores the interconnected nature of modern enterprises in which data flows freely between departments, supporting everything from customer relationship management and financial reporting to supply chain operations and beyond. As such, ensuring the efficiency and reliability of file transfers is paramount, not just for IT teams, but for all operational facets within an organization. This widespread dependency also highlights the potential risks and disruptions that can occur if data movement is hindered, further emphasizing the need for optimized and secure data transfer solutions across the enterprise landscape.

FIGURE 26. BUSINESS FUNCTIONS' RELIANCE ON FILE TRANSFERS

Degree to which functional areas rely on file transfers and data moving (High or Very High)		Somewhat or Very proactive in sponsoring new file transfers or data moving initiatives	
80%	IT Operations	95%	IT Operations
76%	Application Developers	91%	Application Developers
67%	Service	85%	R&D/Engineering
64%	R&D/Engineering	82%	Finance
61%	Supply Chain	82%	Service
59%	Sales	80%	Sales
58%	Finance	80%	Supply Chain
56%	Sourcing and Procurement	80%	Sourcing and Procurement
55%	Asset Management	79%	Asset Management
54%	Country/Region-specific		

Sample Size = 264

EMA Perspective

Through this comprehensive survey, "Data in Motion: Orchestrating File Transfers and Data Pipelines in the Cloud Era," EMA distilled vital insights that reflect the current complexities and forthcoming trends in enterprise data movement. As organizations navigate their digital transformation journeys, the need for robust, scalable, and secure data movement strategies becomes increasingly apparent. Next, we summarize the key findings from the survey and provide strategic recommendations tailored for IT decision-makers, product managers, and marketing strategists.

Summary of Key Findings

Widespread Digital Transformation Efforts

A significant shift toward advanced data movement solutions like iPaaS and WLA-native MFT is evident as enterprises progress in their digital transformation stages, moving from traditional FTP servers to more secure, integrated, and automated solutions.

Prevalence of Security and Compliance Challenges

Security issues dominate the concerns associated with data movement, compounded by stringent compliance demands across industries. This underscores the need for enhanced security protocols and compliance adherence.

Persistent and Emerging Challenges

Enterprises report high satisfaction with current data movement methods, yet face challenges such as integration difficulties, high costs, and complex workflows, particularly with older technologies, like FTP servers, and even with modern solutions, like MFT.

Increasing Data Movement Volumes and Complexity

There is an anticipated growth in data movement volumes, with enterprises expecting to handle more extensive data transfers and at greater frequencies, necessitating more robust data management and transfer capabilities.

Functional Impact Across Enterprises

Data movement is critical across all functional areas within enterprises, with IT operations, application development, and finance departments being the most reliant on effective data transfer processes.

Recommendations

For User Organization IT Decision-Makers

Invest in Automation and Integration: Leverage automation technologies such as WLA to streamline data transfers. This not only enhances efficiency, but also reduces the potential for errors and security breaches.

Prioritize Data Security: Adopt advanced encryption standards and secure data transfer protocols. Regularly update these measures to combat emerging security threats and meet new compliance regulations.

For Product Managers

Plan Comprehensive Roadmaps: Include features that address the top challenges in data movement, such as enhanced security features, integration capabilities, and user-friendly workflow designs.

Focus on Scalability and Flexibility: Ensure that data movement products can scale effectively with growing enterprise needs and are flexible enough to accommodate complex and varying data ecosystems.

For Go-To-Market Teams and Marketers

Understand Messaging and Value Proposition: Highlight the ability of products to secure data effectively, integrate seamlessly with existing systems, and streamline operations. Stress on compliance adherence and the potential for cost savings and risk mitigation.

Showcase Peer Successes and Address Challenges: Use case studies and testimonials to demonstrate how similar enterprises successfully implemented your products to overcome their data movement challenges.

By aligning data movement strategies with these peer-driven insights and forward-looking recommendations, organizations can significantly enhance their operational efficiency and data security posture. For product teams, understanding these trends will guide the development of more responsive, robust, and feature-rich data movement solutions. Meanwhile, marketers can better communicate the critical value propositions that resonate with potential customers, emphasizing how these solutions address specific pain points highlighted in the survey.

In conclusion, the insights from this EMA research report should serve as a strategic toolkit for navigating the complex landscape of data movement and harnessing its potential to foster business growth, innovation, and competitive advantage in the digital age.


TAX

About Enterprise Management Associates, Inc.

Founded in 1996, Enterprise Management Associates (EMA) is a leading IT analyst research firm that specializes in going "beyond the surface" to provide deep insight across the full spectrum of IT management technologies. EMA analysts leverage a unique combination of practical experience, insight into industry best practices, and in-depth knowledge of current and planned vendor solutions to help its clients achieve their goals. Learn more about EMA research, analysis, and consulting services at **www.enterprisemanagement.com** or follow EMA on **X** or **LinkedIn**.

2770 Arapahoe Road, Ste 132 - 544, Lafayette, CO 80026 +1 303.543.9500 www.enterprisemanagement.com

4420.051324