

## White Paper

# Modernization: A Flexible Approach to Digital Transformation

Sponsored by: Micro Focus

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### IDC OPINION

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Businesses around the world are engaged in platform modernization initiatives to position their organizations for an era of business transformation, much of which is driven by digital transformation, and for new regulatory environments with such mandates as GDPR and PCI DSS. In other words, businesses *want* to modernize to enable competitive differentiation, and they *need* to modernize, both as a competitive response and for regulatory compliance.

Digital transformation, therefore, is an essential business mandate – one that is meant to help companies maneuver a constantly evolving and challenging competitive landscape. Companies with legacy business models and IT systems are especially at risk of disruption from newer "digitally born" start-ups. For such companies, digital transformation is not just a mandate but also an urgent mandate. Companies must transform themselves digitally so they can compete effectively in the digital era. They must have a plan to conquer challenges that can come in many forms – regulations, security, data, and device deluge, to name a few.

Application, process, and infrastructure modernization are the core avenues via which companies can digitally transform themselves. Alongside the quest to build newer "cloud-native applications," businesses must also undertake initiatives to modernize their legacy applications and enable them to work together. In other words, there is opportunity to overhaul the entire application (and not just parts of the code) to take advantage of new application architectures and application access.

Application modernization initiatives not only are software and hardware centric but also often involve intra- and inter-business unit process overhaul. Application development, upgrade, and operations approaches are overhauled as well and require support and training for the staff involved.

Partnering with a software vendor such as Micro Focus that has built its portfolio in lockstep with this view – application modernization that makes full use of existing application code investments while enabling the introduction of modern development methodologies, architectures, platforms, and enhanced security – is a good starting point. Micro Focus has built its solution portfolio on a holistic view around the "whole application," which is the idea that the application includes not just the application code but also the application access experience and the security measures necessary to manage access and protect data. Its perspective is that customers can approach modernization from a number of different directions on a fit-for-purpose basis, with the aim of providing as much flexibility and choice across the entire modernization process as possible.

## SITUATION OVERVIEW

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### Today's Business Mandate

Many companies face challenging and evolving marketplaces that are being redefined with digital technologies. When it comes to top business goals, businesses see the need to step up innovation, improve efficiencies and, increasingly, build digital twins to the physical business. When asked what their top 5 business goals are in the next five years, business leaders said:

- Innovate or deliver new products or services
- Invest in research and development
- Deliver digital products (versus physical products)
- Improve marketing/promotion of products and services
- Make the workforce more efficient/productive

(Source: IDC's *Cloud and Artificial Intelligence Perceptions Survey*, January 2018)

Looking forward five years, these business leaders expect a nearly 10 percentage point increase in the relative importance of digital platforms to the organization, moving them toward a business model in which 57% of the business depends on digital infrastructure versus physical infrastructure. There is a distinct sense of the potential for disruption, and early adopters are arming themselves against this threat by rapidly adopting new technologies. IDC believes that it is critical for all organizations to build and execute on an evolutionary plan for digital transformation now

To this end, more advanced IT organizations understand that they need to get out in front of the transformational needs of the business, which means leveraging existing as well as newly developed applications and the business' core data for new revenue-generating business models. End users demand new experiences that are easy, immediate, personalized, and flawless. They will shift their loyalties quickly from old, unwieldy platforms to platforms that are designed to empower them. At the same time, security concerns have never been higher, and data protection and cybersecurity are absolutely critical.

IT organizations that aim to deliver on these end-user needs by digitally transforming themselves face a mix of challenges. Security concerns with regard to the business' core data are sky-high. Already, new laws such as PCI DSS and GDPR have come into force to protect consumers from the potential security and data protection pitfalls that have resulted from digital transformation efforts. Budget constraints, as always, force prioritization and compromise – including rapidly growing numbers of applications that compete for resources.

And there is more. Technology shifts to hybrid cloud or public cloud, which are essential for digital transformation, may require a rethinking of workload deployment strategies. Meanwhile, there's the conundrum of what to do with a vast number of deeply integrated, highly valuable applications that have been, and continue to be, extremely critical for the business but that may be too costly and potentially risky to rewrite. The key to digital transformation is integrating the platforms that these applications are running on with contemporary platforms so as to ensure maximum yield with application delivery.

Amid these challenges, the quality of applications, both new and existing, must be sufficient to meet the previously mentioned end-user demands. The speed with which applications are modernized or newly developed, delivered, and maintained must meet the requirements of the business. And the cost of modernizing or developing from scratch needs to be within the bounds of the budgetary constraints. To achieve these somewhat paradoxical goals, businesses are increasingly turning to DevOps and Agile. According to IDC, about 60% of businesses today have a repeatable, managed, or optimized DevOps culture in place, with only the "optimized" label representing the required maturity stage. In other words, 40% of businesses are at risk of becoming severely disadvantaged by their lack of a DevOps and Agile culture. Overrepresented in this latter group are the host mainframe application development environments.

## What Businesses with Valuable Existing Applications Need to Address

Businesses that have critical existing host applications, which provide the core operational infrastructure, are not exempt from the digital transformation mandate. In fact, there is a strong incentive to transform in order to leverage the value of their core operational systems – at a minimum, to keep up with innovation taking place elsewhere in the organization and ideally establish these applications as a platform for innovation. However, organizations that consider such a transformation quickly find themselves contemplating whether it might jeopardize the security, availability, and manageability of the core applications.

Digital transformation therefore implies new business models and new engagement models with customers, partners, and other stakeholders. But those models are rooted in the existing business transactional systems. For example, a bank with a new mobile channel to its customers, incorporating an AI-driven conversational interface, still needs to link those conversations back to conventional banking transactions – which must execute securely, reliably, and promptly. So the interface between new transformed business operations, engagement models, and the core operational systems must be maintained and developed in a coordinated, managed fashion. For many, the idea of a "digital twin" is the way to move full speed ahead with digital transformation initiatives while maintaining an enterprise-grade service from the core.

With that in mind, organizations can approach their digital transformation process within the context of three lenses of modernization of their existing systems: application modernization, IT process modernization, and infrastructure modernization.

Application modernization means redesigning the broader application (not just the code) to take advantage of new application architectures and application access – that is, not just by integrating the application with, for example, .NET, Java, or web services but also by bringing in new methods of access, such as web or mobile applications.

IT process modernization is about adopting Agile and DevOps in a systematic way, not selectively or merely in a repeatable way but in a managed and optimized fashion. It also involves using new technologies to build software faster, with higher quality, and using modern integrated development environments (IDEs) next to familiar tools. Because process modernization within the context of digital transformation includes application access via vast numbers of user endpoints, methods and practices for managing security and data protection become extremely critical.

Infrastructure modernization requires determining what technology platforms an application should ideally run on in terms of development, test, and production – in that order – and whether it is a large host system, a distributed environment, the cloud, or a hybrid platform. This translates into implementing fit-for-purpose infrastructure to support traditional applications as well as new applications, whether they are current or cloud-native, next-generation types of applications. Infrastructure modernization also means establishing maximum security around the applications and data so that they can be leveraged in a broader sense and integrated with platforms of engagement for revenue-generating purposes.

## The Connected Host

Many businesses that are involved in digital transformation run their mission-critical, transactional systems of record on large mainframe or server-based platforms, with operating environments such as z/OS or OS 2200, and on distributed platforms such as Unix and Windows. Indeed, for many organizations, the host system environment is Windows, but the same issues apply. IDC believes that these platforms are capable of not just participating in the modernization stages that digital transformation calls for but also, in many ways, becoming the connected hub through which modernization leads to new opportunities for monetization of the core enterprise data that they typically host. These systems are the transactional backbone of the modern world, and over the years, enterprises have made massive investments in the applications, often based on COBOL or PL/I, that they support.

The vendors of these hardware platforms have made their platforms suitable – to various degrees – for modern workloads and for making their core functionalities and data available to both internal and external systems. For the businesses that run these systems, the primary goal should be to leverage these investments and de-silo their mainframe, Windows, or Unix systems by opening them up and connecting and integrating them with the rest of the world in a pragmatic way. Key aspects of this strategy would be:

- Providing for web enablement of the applications
- Facilitating self-service access to the system
- Establishing a more flexible platform strategy – for example, introducing Linux and enabling existing applications to run in open source environments
- Creating a hybrid cloud in which the platform interacts with an on-premises private cloud on distributed infrastructure or with a public cloud
- Enhancing application access control and data protection to address modern-day security and regulatory compliance needs
- Enabling internal and external use of APIs to open up the data for new applications developed in-house as well as by third parties
- Involving the platform in DevOps and Agile projects
- Utilizing the system for next-generation application development including managed code, mobile applications, and big data and analytics

IDC believes that platforms that are modernized and integrated in this fashion will be ready to play a crucial role in the digital transformation of the business.

## MICRO FOCUS: A HOLISTIC APPROACH TO MODERNIZATION

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Micro Focus practices what it calls "customer-centered innovation," developing technologies from a user imperative perspective and specifically not from any type of platform bias. The company invests in what customers with significant multiple-year investments in host applications ask it to support as these organizations go through their digital transformation process.

### Whole Application

Micro Focus built its portfolio based on a holistic view of the "whole application," which is the idea that the application includes not just the application code but also the application access experience and the vital component of application security. Micro Focus' perspective is that customers can approach modernization in a number of different ways, incrementally, and with or without the need to change the underlying code – all depending on the level of modernization required as dictated by business requirements and priorities.

Micro Focus aims to bring the issue of core application connectivity to application owners and architects. In other contexts, the OSI model defines the "presentation layer" as an element of the application, but this is not how mainframe host applications were traditionally designed. Except for screen design and navigation, the application experience was essentially one and the same as the device experience. Micro Focus believes it is time to bring "application experience" into the world of host application modernization and, at the same time, address access security and data protection requirements that were not anticipated or addressed in the original application design.

This starts with various solutions to help customers with their application development and DevOps, including their COBOL applications, using Agile life-cycle management steps: analyze, develop, build, test, and deploy. Micro Focus breaks with the notion that if an application is developed in one deployment area, a large host system, a commodity server, or the cloud, then it also needs to be deployed there. For many businesses, this unlinking, which has been a key aspect of Micro Focus' approach through the years, represents a fundamental rethinking of their application life-cycle management.

Now, Micro Focus is adding solutions around application access, giving customers new ways to consume and experience an application and how they can create new workflows to support new business models – an essential aspect of digital transformation. Application access expands upon the original requirement for "terminal emulation" to align with today's imperatives with regard to digital transformation, such as data protection (e.g., GDPR), integration (APIs and web services), and security (e.g., identity management).

The multiple platforms where these solutions can be leveraged include host application platforms such as IBM z and Unisys; operating systems such as IBM AIX, HP-UX, Oracle Solaris, and Windows, with Linux being the more strategic platform for next-generation workload deployment; and cloud service providers AWS and Microsoft Azure.

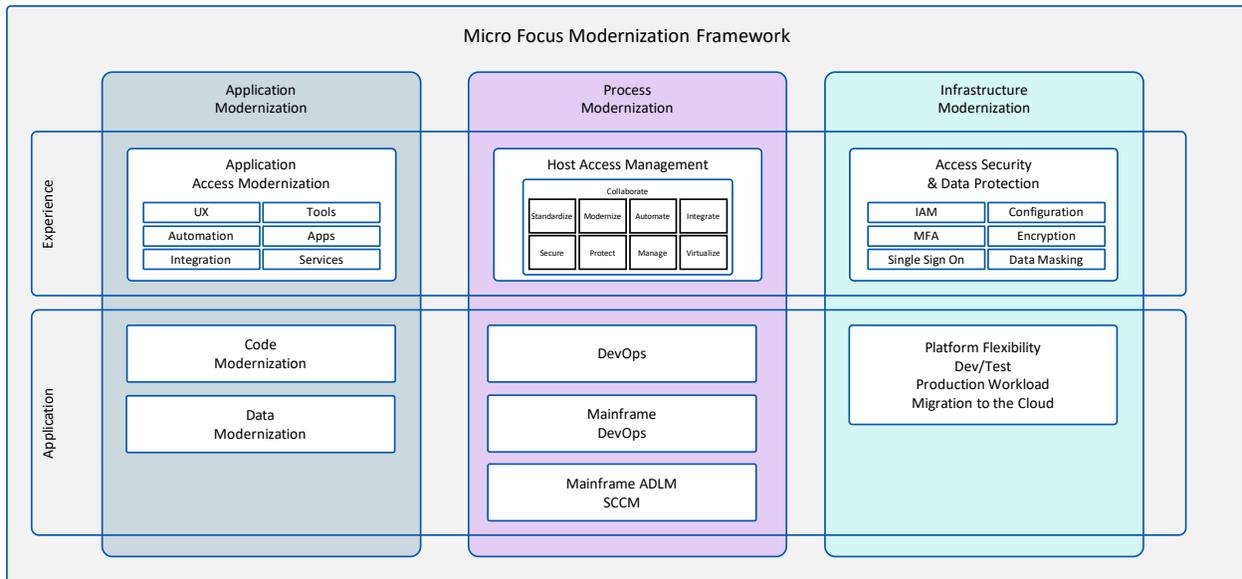
Micro Focus' traditional customer base runs valuable host applications that provide the core operational infrastructure, and that run on COBOL, whether on a mainframe or on distributed infrastructure. These customers view their applications as highly strategic with long life spans and, as a result, are planning to begin modernization projects around those applications. The question is: How to do it the right way?

The major variables are whether applications may need to acquire new functionality, the extent to which development of new code to support new functionality will need to take place much faster than traditional application development, the deployment environment where the application runs may need to change, and the methods of application access and security may need to change.

Micro Focus' framework for modernization moves across three dimensions: application modernization, process modernization, and infrastructure modernization. The application delivery and application experience angles previously discussed essentially cut across each of these dimensions. The framework is shown in Figure 1.

**FIGURE 1**

**Micro Focus Modernization Framework**



Source: Micro Focus, 2018

**Application Modernization**

There are various reasons for application modernization, which can require changing the code and how the application is consumed. One reason might be to widen the access scenarios to the application. Another might be that a digital instance of the application needs to be set up. Or it might be necessary to move the application to new IT infrastructure or to a new API-based architecture. Whatever the scenario is, the system of record must operate in sync with other application systems that are being built using, for example, Java or .NET.

Application modernization can refer to a range of initiatives that can be implemented incrementally based on needs, priorities, and budget:

- Modernizing the application experience
- Modernizing the access method – for example, virtualizing the method and delivering it through the cloud via a thin-client browser or mobile application
- Driving integration and automation to create new workflows around the application – for example, robotic process automation using APIs and web services
- Modernizing the application code itself with analytical tools to understand the application program structure and business rules in order to enable code modularity and reuse, increase programmer productivity, and improve application performance
- Externalizing the functionality of a monolithic application and making it available to a web service or extracting specific functionality and making it available as a microservice
- Modernizing the application development methods and platforms for development, test, and production either for individual applications or as part of a composite application and leveraging new business models with COBOL investments

Whichever application modernization scenario an organization may be involved in, Micro Focus provides a comprehensive application development platform and tools that include test and runtime environments, with solutions around:

- Integrated development environments
- Application front-end builders
- Mining business rules and exposing them as a service (via an API interface) or as part of a newly structured application architecture
- Creating a managed code framework in which processes and applications access each other seamlessly

These solutions are essentially the same for distributed and mainframe COBOL applications, but with specific features added to address mainframe development, testing, and deployment requirements, while allowing the solutions to function in a modern digital environment or a managed code environment.

## IT Process Modernization

IT has been putting significant effort into changing the processes for application development over the past several years with DevOps and Agile approaches, which has had a significant and positive impact on the application development process. Nevertheless, in many organizations, the software development life cycle for host-based applications is still too slow relative to the pace of development on other platforms with which these applications need to integrate. Essentially, a kind of hybrid approach to application delivery has resulted.

There are applications with relatively low business value that have simple build and delivery process requirements using a small number of component parts, running perhaps in a distributed environment. These might take a few weeks based on Agile and Scrum. Then there are critical, high-value host applications that run on the fault-tolerant systems (often mainframes) that require much more regimented procedures and delivery cycles. The latter may be on an annual or 18-month delivery cycle, involving long lists of new capabilities and functionalities. They make up multiple program elements that require more sophisticated release management, in particular for regulated multinational organizations operating globally 24 x 7.

This kind of bimodal delivery process is not serving the needs of the business because the systems of record on the large host platforms need to be delivered more quickly. One aspect that contributes to the slow development pace is software change management (SCM), which is a vital aspect of passing audit requirements, as well as delivering 99.999% availability requirements. If Agile or DevOps processes are implemented incorrectly, business continuity may be disrupted because higher rates of application change will lead to a greater risk of business outages.

Micro Focus has taken the point of view that the advantages of DevOps – delivering applications with the speed that the business requires – must be extended to all applications, whether they have low or high value and wherever they are run (platformed) – from host to edge devices. The company's solutions address the key bottlenecks, such as team collaboration, the physical availability of application delivery resources such as full function test regions (sandpits) off the mainframe for application and functional testing, or quickly spinning up a test production environment for full system testing without having to wait for a mainframe partition to be made available. Also included is a set of proprietary and open source tools for building a flexible DevOps toolchain, as well as enterprise-level SCM software to help remove the SCM bottleneck from the application delivery process.

Ultimately, what Micro Focus aims to provide is a high level of choice, enabling customers to build and test host system applications either on or off the host, depending on their business needs, resources, and skill sets. Organizations that believe their DevOps solutions have to work the same way for large host system deliveries and distributed infrastructure deliveries have been leveraging these solutions for several years.

In addition to modernizing the application delivery process, digital transformation and regulatory compliance also create the imperative to introduce new methods of application access management and access security management. Device proliferation means more application endpoints and greater access security requirements to cope with the scale and to anticipate the potential threats associated with digital commerce. This creates requirements for centralized identity-based control over what software and automation privileged end users are allowed to deploy to access applications.

## Infrastructure Modernization

With end-user platform refreshes running at a cycle of once every 3-5 years, an organization's delivery platform of choice can be up for renewal at any given time. Large host systems such as mainframes may have a life span of 10-20 years. But oftentimes, the applications they support continue to outlive multiple platform refreshes, such is their enduring business value. As a result, there is a constant, cyclical reevaluation of a business' core systems – the applications and the platforms upon which these applications are developed, tested, and deployed. Historically, "platform flexibility" was focused on TCO benefit, but with the advent of digital transformation and supply chain/partner ecosystems, the ability to move applications across domains and provide cross-domain application access and integration to create new business models has become possible and is, in fact, critical. Today, for a business that wonders whether or not it might be able to run a valued COBOL application somewhere else, the answer is, it can, regardless of the new platform it is considering.

Platform moves that business are evaluating include (but are not limited to):

- Moving from a mostly on-premises environment to a hybrid cloud model
- Moving to a virtualized and/or containerized environment
- Moving from a proprietary Unix platform to Linux on commodity hardware

- Maximizing the capabilities of the Linux portion of an IBM z
- Leveraging a mainframe-based or alternative cloud infrastructure
- Moving to a more secure thin-client access model
- Adopting a managed code (.NET or JVM) deployment model

The questions that these businesses aim to answer is: What is the best mix for our application deployment model based on the needs of the business as well as on the fit for purpose of an environment? A large bank running on z/OS, for example, will not be inclined to move its mission-critical business off that platform. But it might consider moving some of the banking workload that does not require mainframe-like fault tolerance to another platform for a particular business outcome.

The following examples of Micro Focus customer use cases illustrate clearly what types of infrastructure transitions organizations go through to modernize:

- One Micro Focus customer intends to embrace the cloud so as to achieve a more flexible IT model. Paradoxically, over time, the customer found itself investing more and more in its mainframe – for good reason. The company is working with Micro Focus to move various workloads that do not necessarily need to run on z/OS to other platforms. This way, the customer is saving mainframe headroom, which enables it to invest in new lines of business, generating new value. By moving non-mission-critical workloads onto Linux or cloud-based infrastructures, its investment in the mainframe is yielding a greater return because the application value on the mainframe is higher, which is the type of flexibility that the customer was looking to achieve.
- A retail business that was launching an international expansion program wanted to move into new markets more quickly. The company was evaluating standing up a duplicate mainframe footprint in a new region at significant expense and with an expected commissioning time frame that was longer than the business called for. Micro Focus helped this organization replicate the COBOL IMS VSAM systems it needed in the new region in a matter of weeks, running them unchanged on an IBM Power Systems AIX platform, which was the platform the customer preferred.
- A third example relates to access security within a major U.S. federal agency. As a result of the well-publicized data breach within the U.S. government's Office of Personnel Management that affected over 22 million people, Homeland Security Presidential Directive 12 was enacted. A 30-day cybersecurity sprint took place that required all agencies to further protect federal information, improve the resilience of their networks, immediately patch critical vulnerabilities, review and limit the number of privileged users with access to authorized systems, and accelerate the use of strong authentication, especially for privileged users. Micro Focus' desktop access and security management solutions were selected to provide a uniform approach to access security for 40,000 end users across 20 mission-critical applications. Micro Focus enabled the agency to leverage its current Active Directory and PKI infrastructure and use the existing Personal Identity Verification (PIV) cards and PIN codes to enable multifactor authentication, in addition to eliminating the requirement for passwords.

The basic philosophy is that businesses benefit when they can be platform agnostic and use the optimal mix of application deployment models. They can deploy core applications where they are needed and replicate those applications on a mainframe, on distributed infrastructure, or in the cloud. This allows them to find the best mix of capex and opex investment strategies for infrastructure as well as match the commissioning of new environments – in a new region, for example – to the business needs in terms of speed.

## Mainframe and COBOL Portfolio

Micro Focus' COBOL and mainframe product portfolio aims to provide support across the application delivery life cycle, and while it can very much be deployed as a holistic solution, it comprises products designed specifically for the key technical phases involved.

- **Analyzer technology** is an automated solution that provides the ability to abstract business rules and understand application design and logic to simplify, introduce modularity, increase agility in response to application change requests, and improve production CPU efficiency. The products are:
  - COBOL Analyzer (for distributed applications)
  - Enterprise Analyzer (for mainframe-based applications)
- **Development technology** is for new user interfaces or for re-architecting with web services or for cutting code in a modern IDE; Eclipse and Visual Studio developers can cut COBOL and PL/I code alongside Java, C#, or any other code. The flagship products for core application development and delivery are:
  - Visual COBOL (for distributed applications)
  - Enterprise Developer (for mainframe-based applications)
- Flexible **mainframe testing technology** supports teams that are looking for a more flexible mainframe testing capability that does not incur additional time or resources on the mainframe. The product is:
  - Enterprise Test Server (for mainframe-based applications)
- **Micro Focus deployment technology** supports COBOL environments for application execution and deployment across a range of supported platforms, including cloud instances, Linux, Unix, Windows, or z/OS on the mainframe. Flagship products are:
  - COBOL Server (for distributed COBOL application execution – supports native and all managed code interfaces [.NET and JVM])
  - Enterprise Server (for mainframe application execution – provides mainframe compatibility and emulates JCL, CICS, IMS, DB2, and other IBM mainframe subsystems)
- **Application delivery management and control technology** is for mainframe software change management that has as its key strength Change Package architecture that in turn supports enterprise-level release management, integrated with a broader DevOps strategy. The products are:
  - ChangeMan ZMF
  - Enterprise Sync

The Micro Focus technology for COBOL application development and delivery represents a cornerstone investment by Micro Focus, which was founded in 1976 with the foundational business plan of making COBOL available across (all) microprocessors.

The following aspects of the Micro Focus COBOL technology are worth noting:

- The Micro Focus compiler and execution environment design ensures COBOL can be portable (it can move unchanged) across a significant number of platforms. Micro Focus supports dozens of variants of the market-leading environments (e.g., Windows, Unix, Linux, Docker, AWS, Azure, Linux on IBM Z) and over the decades has supported more than 500 such environments, thereby insulating customers' application assets from their platform decisions.

- Micro Focus has a strong presence in the distributed space, serving large numbers of customers on Unix, Linux, and Windows.
- Micro Focus has been a historic contributor to the relevant committees and standards bodies responsible for updating the COBOL standard. Major implementations such as 1985 and 2002 were presided over by committees that included Micro Focus.
- Micro Focus' solution for mainframe delivery puts the mainframe at the center of the workflow but decouples the work from the mainframe such that user-intensive activities such as analysis, development, debugging, and unit testing can be performed without being connected to the mainframe thanks to full emulation of the IBM Z environment. This offers development teams the ability to rapidly update and verify application change without needing mainframe resources (which incur cost and can cause delay). Rapid application delivery, especially in a DevOps context, is a central tenet of the Micro Focus solution.
- Micro Focus remains an important proponent of skills renewal in the COBOL skills market. With contemporary COBOL IDE technology accessible to a new generation of Visual Studio and Eclipse developers, application knowledge tools, plus a program in partnership with academia and recruiters, Micro Focus aims to provide the platform whereby organizational skills concerns can be quickly mitigated.

## Host Connectivity Portfolio

Micro Focus solutions for accessing host applications have long since moved beyond the origins of "terminal emulation." It is now about modernizing application access from user experience, security, and data protection perspectives. The company's mantra is to make host applications easy to use, easy to integrate, easy to manage, and more secure.

The Micro Focus Host Connectivity portfolio has also extended well beyond traditional "mainframe" systems to support the application investments that organizations make in Unix and midrange systems and now the cloud. The common objective is about modernizing and connecting core, business-critical applications to the rest of the organization, instead of replacing them, to create new value such as through digital transformation.

Micro Focus organizes its Host Connectivity portfolio into three groups of solutions: access, integration, and management and security.

### Access

Made up of the desktop "thick client" brands of **Extra!**, **Reflection**, **Rumba**, and **InfoConnect** that collectively illustrate the acquisition history of Micro Focus (principally Attachmate and NetManage), this group of solutions demonstrates the commitment of Micro Focus to continue to support the products its customers have purchased.

Several of these products have benefited from technology being shared across the Access portfolio. Examples of these products are the "Plus" layer that enables organizations to introduce a fully graphical experience on top of a traditional "green screen" interface, data masking to prevent personally identifiable data from being presented on the screen, the integration of Visual Basic for Applications (VBA) to support more robust automations via a scripting environment very familiar to power users, and .NET API support to enable more sophisticated developer-oriented integration capabilities than the traditional limitations of HLLAPI.

An example of this might be an automated workflow platform performing complex, multiscreen actions on behalf of users (such as in a call center). The Reflection .NET API can be used to enable the workflow platform to interact programmatically with host applications more efficiently and with greater resilience. The .NET API approach also eliminates the complexity, risk, and skill requirements associated with rewriting host applications to create integrations.

More recently, Micro Focus has introduced new "thin client" access products – Reflection ZFE, which enables "zero footprint" browser access to host applications, and Reflection Mobile, which delivers access via a mobile application experience.

## *Integration*

In addition to the integration capabilities offered within the desktop Access products, Micro Focus provides **Verastream**, which models entire multiscreen application workflows and delivers them back as web services.

For example, a telco in the United States has built up over 200 Verastream models to enable access to mainframe application functionality as a "platform" service to developers. Over 15 years, the company is estimated to have saved millions of dollars in development and maintenance costs through the elimination of custom programming associated with mainframe integration.

The combination of the .NET API and Verastream web services provides a range of options to address new use cases arising from digital transformation, such as robotic process automation and the integration of host applications with new cloud-based systems of engagement such as CRM (e.g., Salesforce.com).

## *Management and Security*

The proliferation of end-user automation and integration introduced through the use of macros can represent a significant security challenge for many organizations if left unmanaged. Equally, the introduction of new regulatory requirements for data protection and the occurrence of high-profile data hacks are drawing attention to the vulnerabilities of host applications.

Micro Focus **Host Access Management and Security Server (MSS)** seeks to address the following security and management imperatives:

- **Access control and encryption.** From a security perspective, identity access management for host applications (IBM mainframe, Unix, etc.) introduces additional levels of security and protection, including identity-based authentication and authorization, multifactor authentication, automated sign-on, and encryption. This includes the ability to prevent a user from even getting to a log-on screen before the user has been authenticated, fine-grain data protection levels for various managerial layers (operator, supervisor, etc.), and integration into an organization's broader strategy for identity access management.
- **Endpoint lockdown.** On the management side, endpoint lockdown provides the ability to centralize, standardize, and control what users are allowed to do at the desktop, such as only connecting to the host system via approved host access solutions and only using IT-sanctioned session configurations and macros for tasks such as computational processes, scans, screen captures, and downloads. Another key capability is the centralized deployment of encryption certifications to enable rapid implementation of TLS 1.2 and its successors.

## CHALLENGES/OPPORTUNITIES

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### For Businesses

As digital transformation mandates sweep through organizations in every industry, IT in businesses with large host systems faces constant pressure – often from non-IT, C-level tiers in the company – to "do something" about these platforms. The lure of the cloud and its budget-friendly opex model is a potent factor, as is the seemingly low capex for distributed infrastructure. The attractive user interfaces that make modern platforms seem more accessible play a role as does the flexibility with which modern applications can be written and adjusted to take advantage of new business opportunities. These characteristics are indeed appealing.

Yet, at the same time, the core applications that run on these host systems are typically the very foundation of the business. Changing them, replatforming them, including them as part of a DevOps and Agile strategy, and making them accessible as part of a digital transformation strategy are critical undertakings but may seem unsurmountable. Yet the tools to do so in a very flexible and tailored fashion exist, as this white paper shows, and when done right, bringing large foundational host applications into the digital era can deliver tremendous new value to enterprises.

### For Micro Focus

By combining Agile development and DevOps tools with application access solutions into a "whole application" approach and selling choice rather than a fixed approach to customers with core applications on large host systems, Micro Focus is offering organizations a way out of a tough dilemma: how to modernize while retaining and indeed further exploiting the immense value that resides in these large business-critical applications. There are many businesses that need such an unbiased, surgical, and highly flexible approach to guide their existing applications into the digital era, which is the opportunity for Micro Focus.

The challenge for Micro Focus is that by offering choice and flexibility, the company will need to not just keep up with customer demand for new tools that allow core applications to exist and flourish in a modern world but also stay ahead of that demand by embracing emerging technologies and have them ready to be integrated by the time customers start asking for them. Anticipating whether a new technology will become a "must-have" is never easy, yet that's what Micro Focus will need to continue doing as it aims to help customers across a significant range of modernization strategies and challenges. If Micro Focus manages to make these calls accurately, the opportunity to support thousands of enterprises with its digital transformation over an extended period is extremely promising.

## CONCLUSION

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IDC is seeing a shift from a "rip and replace" approach toward modernization strategies that are aimed at gaining significant business value in the form of agility, new business capabilities, and a reduction in TCO and risk. What's more, there is an emerging realization that modernization can and needs to take many forms. Micro Focus represents that kind of flexibility with a portfolio of solutions that allows customers to implement the most valuable approach to modernization based on their specific needs.

## About IDC

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