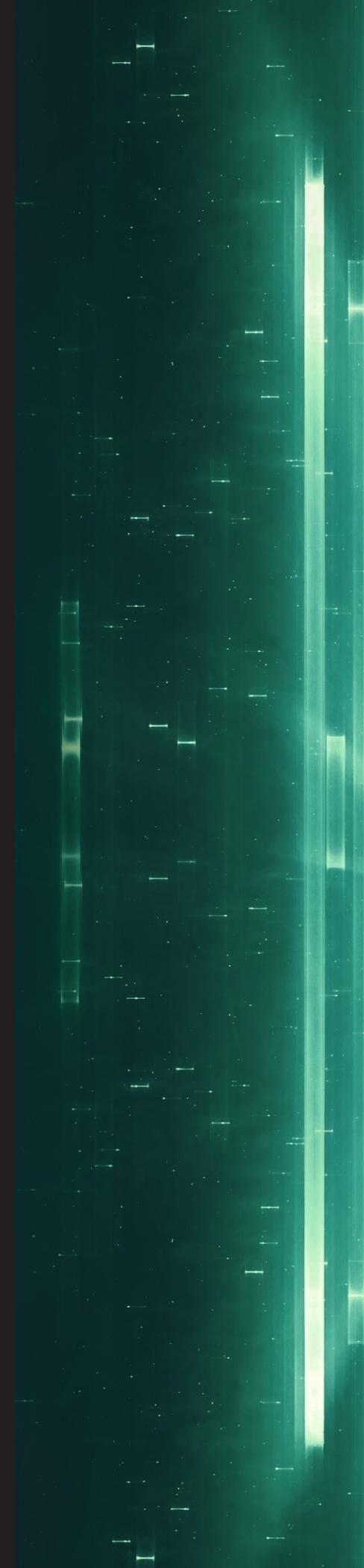


# **CIO'S GUIDE TO DATA & APPLICATION MODERNIZATION**

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01

# INTRODUCTION

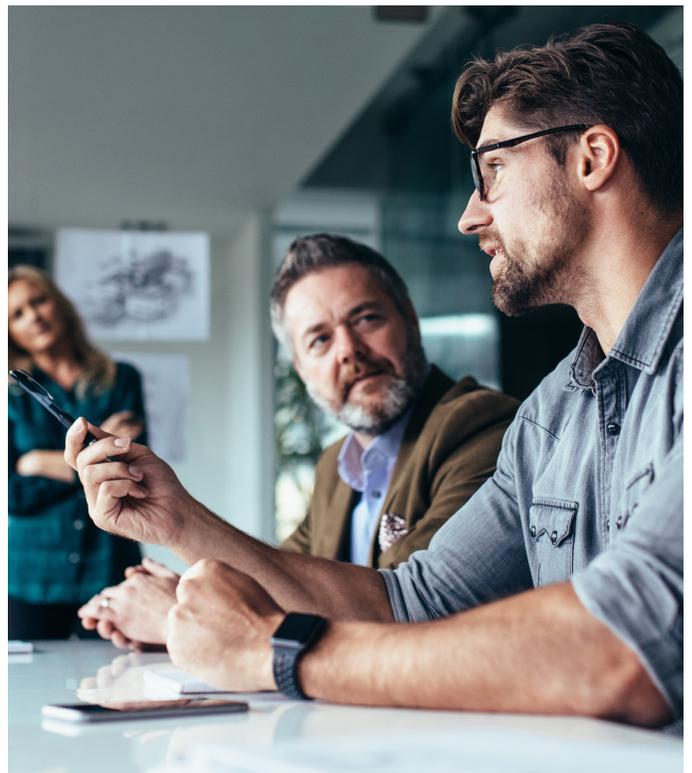
**After years of orchestrating digital transformation in support of agile business, companies are now prepping for the next wave of change: Unlocking the value of their data to fuel better insights and business outcomes.**

**What's driving this transformation? The need to:**

- Deliver new and differentiated customer, employee, and/or partner experiences
- Gain a competitive edge, capture new market share, and drive revenue growth
- Digitize the physical world to gain insights for optimizing operations and creating new efficiencies
- Create new innovative products and services with an emphasis on digital
- Disrupt existing markets or define new ones.

This next wave of transformation hinges on the ability to deliver the flexibility and agility of a cloud experience to applications and data regardless of where they reside, whether on-premises or across public, private, and multi-clouds.

This next wave also demands novel ways of working and relies on completely new technology- and business-related skills sets. Companies that can adapt their culture, align with strategic partners, modernize applications, and industrialize their data and analytics operations will be well positioned for success in the age of insights, both today and well into the future.



02

# A COMPLEX LANDSCAPE

**Organizations are embarking on the next chapter in their digital transformation journeys, bridging business and IT to maximize productivity, amidst a sea of emerging trends**

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## **It's a hybrid, multi-cloud world.**

Moving to the cloud is not an either/or one-off proposition. Organizations need to be thoughtful about which applications and workloads are best suited for migration to public cloud while opting for others to remain on-premises for reasons related to enterprise inertia, data gravity, legacy debt. They are also leveraging multiple public clouds, mapping usage to individual business, application, or workload requirements. The goal: To modernize with the right mix of hybrid cloud to optimize cost, performance, security, and agility.

## **Application modernization in motion.**

To capitalize on the advantages of the cloud experience, companies are grappling with complex modernization strategies that offer many possible paths. Companies need to weigh whether to create cloud-native systems or transform non-cloud native apps without rearchitecting, all with the goal of building applications once – so they can be deployed anywhere and in any model as business requirements change. Modern application development is very different from past practices, requiring new competencies and behaviors that are scarce or altogether lacking in many IT organizations.





## Data is at the heart of everything.

Data is the fuel for driving insights that will help deliver on core business goals. Yet delivering effective and efficient access to growing data stores is challenging – for many reasons. Data sources are increasingly varied and distributed across the cloud and at the edge, and they exist in a range of formats. Silos, data quality, integration headaches, privacy, and latency issues are just some of the key hurdles.

## Cost models changing from CapEx to OpEx.

Increased use of public cloud has whet the enterprise appetite for IT as-a-service models, especially as they relate to cost optimization. With budgets in flux, companies want to avoid large capital expenditures on IT infrastructure and pay only for resources and capacity used. They also want the flexibility, agility, and self-service advantages associated with as-a-service cloud experiences. On top of that, there is little interest in managing infrastructure or stacks—IT organizations want team members focused on transforming the business, not on the day-to-day housekeeping of patching and coordinating updates.

## Upping the IT skills game.

A hybrid, multi-cloud world fueled by modern apps and artificial intelligence (AI)- and machine learning (ML)-infused workloads requires a leveling up of both technical and business analysis skills. Organizations also need change management expertise—all competencies that can be elusive in a traditional IT lineup. Companies need a plan to shore up expertise and/or address key competency gaps.

## Cultural issues.

Organizations need champions at both the executive and grassroots level to foster the cultural change necessary for advancing next-level digital transformation and modernization. Case in point: 92% of respondents to a [recent survey](#) by New Vantage Partners attribute the “principal challenge to becoming data driven” to people, business processes, and culture.

# A CHALLENGING ROAD AHEAD

**Companies are hungry for the flexibility, speed, and agility of public cloud—in particular, the ability to easily scale servers, storage, compute, and network capacity up and down based on demand. But not every workload is appropriate for public cloud, some due to security, compliance, and performance concerns, others because they are too complex and entangled to migrate.**

In response, companies are gravitating to a hybrid model, where workload placement is determined based on need. Yet that model invokes new challenges related to integrating, managing, and achieving visibility across a varied IT infrastructure, and the application migration process can be confusing, lengthy, and complex.

“When you shift to a hybrid model, everything is different,” says Matt Maccaux, global field CTO - HPE Ezmeral Software at HPE. “The operating model, the principles used, the way you set up and pay for resources—all the foundational business and operational processes are different and that’s most problematic.”

Modernizing applications is a critical part of next-level digital transformation, but it requires a shift away from

traditional waterfall processes to agile development. Also needed: new skills in areas like containerization and Kubernetes. For applications with fewer dependencies, lower data gravity, or less stringent security and performance requirements, migration to the cloud is relatively easy. But for many, there are too many technical and cost risks, which ends up stalling the migration and modernization progress.

Nevertheless, nearly two-thirds (63%) of enterprises are planning to modernize or update existing mission-critical apps, with 46% remaining on-premises, according to data from HPE.<sup>1</sup> What’s required is an approach that allows packaged and custom applications to take advantage of containerized, cloud-native infrastructure and experiences, both on-premises and in the public cloud.

Of course data, the new business differentiator, lies at the epicenter of transformation, but data silos and incomplete data strategies are impeding speed to insights. Legacy architectures, existing infrastructure complexity, lack of IT resources, and limited integration with third-party systems and platforms are preventing organizations from realizing data’s full value. Moving

# TODAY'S IT CHALLENGES

Companies are struggling with:

68%

Managing data infrastructure

67%

Handling data growth

67%

Resolving data operations management silos

60%

Lack of visibility and hybrid cloud complexity

Source: IDG<sup>2</sup>

data around is time consuming and expensive, often opening doors to unnecessary security risks. What's preferable: leaving data where it resides while leveraging capabilities that allow for full access and greater insights.

Moreover, with nearly three-quarters (74%) of operational data acquired, analyzed, and acted on at the edge, according to IDC, organizations need to rethink infrastructure to accommodate data processing and storage closer to where insights will have the greatest impact on decision making.

Consider a real-world plant floor scenario where data from goods coming off the line is collected and analyzed, allowing operators to detect flaws and halt production to fix the problem before too many defective products are shipped. There may be a large gap between the quantity of data captured and the amount of data that

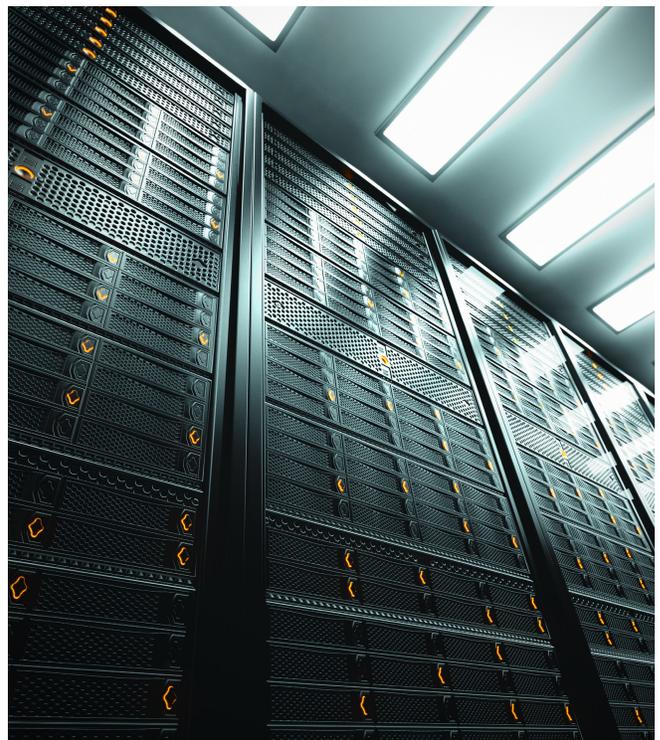
can be analyzed or operationalized as some corporate data remains dark, not adequately cataloged, or inaccessible for analytics-driven insights.

<sup>1</sup> Source: <https://www.hpe.com/us/en/resources/software/application-modernization.html>

<sup>2</sup> IDG, March 2021, Research "HPE State of Data Management"

<sup>3</sup> Source: <https://www.hpe.com/us/en/resources/solutions/forrester-ops-ml.html>

<sup>4</sup> Sumit Pal, Sr Director Analyst, Gartner, "Don't Stumble at the Last Mile: Leveraging MLOps and DataOps to Operationalize ML and AI"



## Other obstacles hampering next-stage transformation

### Specialized IT talent is hard to find.

A new IT model demands a litany of new IT skills in technical areas like cloud services, integration, DevOps, containerization, open source packages and frameworks, along with AI and ML – all of which are in short supply in many IT organizations. According to the IDG 2021 State of the CIO report, technology integration and implementation skills are in great demand, cited by 47% of respondents, while soft skills in areas like change management (36%) and strategy building (34%) are lacking.

Organizations are also looking to maximize IT resources, freeing them from non-strategic work to focus on high-value activities. In fact, 76% of respondents to 451 Research's Voice of the Enterprise: Data & Analytics, Data Platforms 2021 survey indicated they expect to be using on-premises, third-party-managed private cloud infrastructure for data and analytics workloads within a year, and 87% expect to be doing so within three years.



Expect to use on-premises, third-party-managed private cloud infrastructure for data and analytics workloads within a year



Expect to be doing so within 3 years

Source: 451 Research's Voice of the Enterprise: Data & Analytics, Data Platforms 2021

### The need for an IT consumption model that spans cloud and on-premises.

Organizations need the flexibility, agility, and self-service advantages of an as-a-service model that will both work across a hybrid, multi-cloud landscape and apply to the full IT stack, including software and management services.

### Data security in the crosshairs.

Security is a top priority when modernizing applications and architecting a hybrid cloud foundation where data is ingested and managed across multiple sources and locations. This is especially true for highly-regulated industries and in light of escalating cyber attacks on large and small enterprises alike.

### Companies are struggling with moving from pilot to production.

While AI and ML efforts are part of advanced transformation efforts, companies are struggling with marshalling experimental ML pilots into predictable and repeatable production systems and processes.

A recent Forrester study<sup>3</sup> found that 98% of IT leaders are bullish on ML Ops as a means of automating many of these processes to increase profitability and deliver competitive advantage, but a paltry 6% are confident in their firm's maturity in this competency. Without proficiency in AI/ML and without an ML Ops game plan to automate and operationalize efforts at scale, cutting-edge data science initiatives are at risk of failure. In fact, Gartner<sup>4</sup> estimates that 80-85% of data science projects are unsuccessful, putting a huge dent in digital transformation outcomes.

# WHAT SUCCESS LOOKS LIKE

**Companies at the forefront of next-level digital transformation are delivering on the agility, elasticity, and economic promises of public cloud while also ensuring the security and performance of on-premises IT.**

These leading companies are centralizing operations, providing consistency, ensuring enterprise-grade controls, and delivering insights across a hybrid estate of private and public clouds. At the same time, these trail blazers are freeing up capital resources and achieving financial flexibility through as-a-service IT models that allow resources to be scaled up and down with ease while only charging for capacity used.

Companies riding the next wave are already capitalizing on the true business value of data. They are unlocking insights by creating intelligent data strategies through which data is no longer siloed, but rather accessible everywhere, from edge to cloud, without having to move data around the organization. Analytics workflows are automated, available on-demand, and updated through self-service. By revamping IT service models, changing culture, and aligning with partners and platforms that foster a cloud-like experience

anywhere, these organizations are elevating customer and employee experiences, delivering more innovative products and services, and optimizing operations to reduce costs, gain efficiencies, and achieve competitive advantage.



# FORTUNE 1,000 GLOBAL FINANCIAL INSTITUTION

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## Challenge

A large, global retail bank had a pressing need to increase use of the Splunk platform to improve its compliance and security posture. The problem? Its existing footprint wasn't robust enough to handle additional data volume nor did it have interest in managing or building out costly infrastructure to ingest and analyze multiple streams of data.

## Solution

Splunk is a leading provider of data ingestion and analysis tools addressing the key challenges of ingesting data at scale—from how to deal with disparate infrastructures to deployment costs and management overhead. The HPE Ezmeral software portfolio tackles the complexity of containerization via a suite of services covering container orchestration and management, data analytics, and AI-driven security.

The pair joined forces to increase the level of integration between their platforms, empowering customers like the global financial institution to implement data initiatives at scale with agility and flexibility. The result is a container-based platform-as-a-service optimized for Splunk that leverages the power of HPE Ezmeral Runtime and HPE GreenLake consumption-based cloud services. The joint solution enables daily index rate to scale from a typical 150 GB to over 10.4 TB per server, all while reducing the number of physical servers by 90%.

For more on the HPE/Splunk collaborative offering, click [here](#).





# GLOBAL PROVIDER OF MEDICAL IMAGING SYSTEMS

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## Challenge

Improving quality and accuracy is the lodestar for a leading global provider of medical imaging solutions, and thanks to a new HPE partnership for ML and AI-as-a-service, the provider is well on its way to building next-generation healthcare services.

## Solution

Leveraging HPE GreenLake for ML Ops, a ML-optimized cloud service powered by HPE Ezmeral, as well as HPE Pointnext AI services, the new offering will enhance X-ray solutions and workflows for both medical professionals and patients. HPE GreenLake cloud services help the medical imaging systems provider embrace hybrid cloud while laying the foundation for federated learning—the aggregation of anonymized ML data across multiple provider facilities.

For a closer look at what HPE GreenLake is doing for healthcare organizations, click [here](#).

# UNDERSTANDING THE TECHNOLOGY TERMS

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## **AI/ML Ops**

AI/ML Ops automate and streamline AI/ML projects, allowing them to seamlessly scale to production via a platform that addresses all aspects of the lifecycle, from data preparation to model building, training, deployment, monitoring, and collaboration.

## **As-a-service model**

A fully-managed, scalable IT consumption model where organizations only pay for capacity used. The HPE as-a-service portfolio spans infrastructure (e.g. storage, networking, compute), platforms (e.g. containers, databases, private cloud), and workloads (e.g. ML Ops, VDI, SAP).

## **Containerization**

The practice of encapsulating an application and its required dependencies and configurations so it can be more easily deployed and moved.

## **Data fabric**

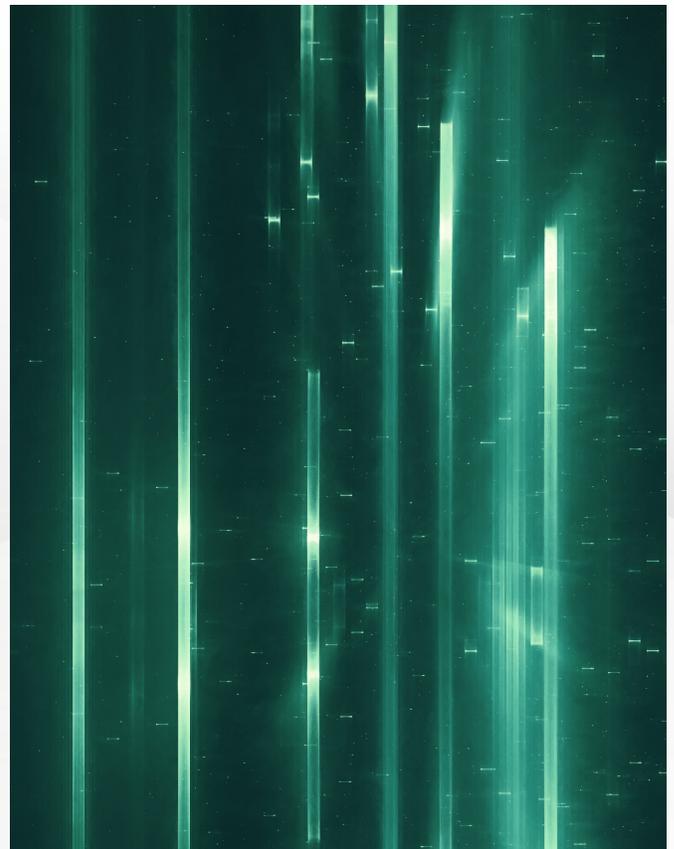
As an architecture and set of data services, a data fabric simplifies and integrates data management, providing consistent capabilities across hybrid environments spanning on-premises and multi-cloud – both private and public.

## **Data gravity**

Data gravity is the notion that data and applications are attracted to one another. Data gravity presents challenges because as data sets expand, they become harder to move, which stratifies applications between cloud and on-premises, creating silos.

## **DataOps**

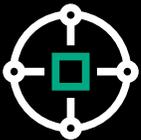
Considered the next-generation vision for data quality, remediation, integration, data models, and real-time analytics-driven apps, DataOps promotes collaboration across data experts and operations to manage and facilitate the flow of data across pipelines.



## 05

# MAPPING THE COURSE

Steering an organization to be data-driven by reimagining IT infrastructure and services to deliver cloud-like flexibility and agility is a continuous journey. But there's a recommended course of action that ensures businesses remain on track.



### Take stock of business goals

and take a top-level view of how to translate the power of data to achieve specific goals such as developing products faster or providing better service to customers. As part of this exercise, IT needs to collaborate closely with line of business stakeholders as well as developers and data scientists.



### Determine where data resides

and data dependencies in pursuit of an intelligent data environment that provides frictionless access to data as part of a cloud-like experience. Throughout the exercise, organizations need to address key governance and lifecycle management issues while offering seamless data access across a hybrid and multi-cloud landscape.



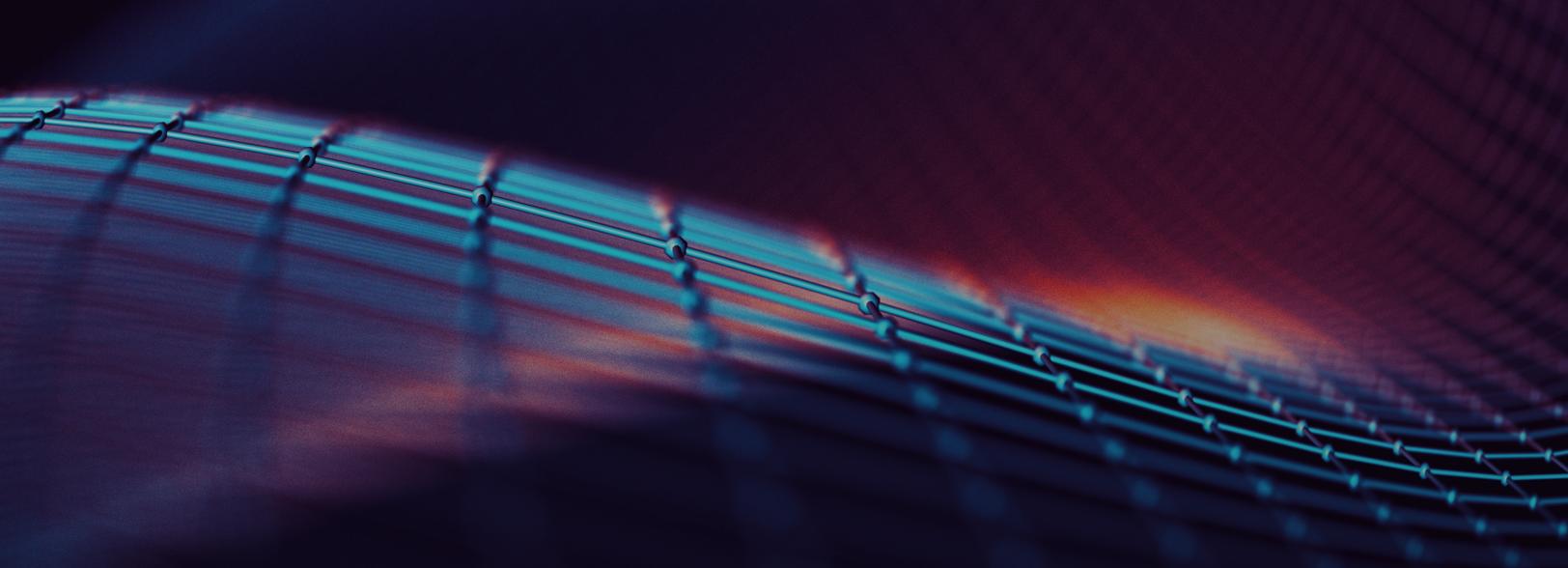
### Determine the right mix for your modernization strategy,

mapping applications to business services and identifying SLA, compliance, and latency requirements as well as the workload's relationship to core business needs. Consider services that help determine the best endpoint for applications using automation and a data-driven approach; they can also help identify potential first-mover applications and accelerate overall migration.



### Evaluate your IT talent bench

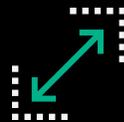
to identify key competency gaps, shoring up expertise through upskilling and reskilling of internal employees along with targeted hiring. Partners and consultants can also deliver the requisite competencies and skills at critical junctures as short-term capacity, which can be more cost-effective than investing in expensive full-time resources.



**Leverage automation** to simplify complex operations across hybrid environments and to standardize and scale ML workflows. Through adoption of ML Ops platforms and processes, organizations can create an “auto-mated assembly line” for producing applications enabled by AI/ML models, reducing the time and resources required to deploy intelligent applications.



**Identify executive sponsors** who can foster top-down and bottom-up support for new initiatives while promoting the organizational and cultural changes required for transformation. At the same time, enlist key stakeholders both inside and outside the organization to help drive change.



**Take an open approach** by leveraging technology that is flexible to accommodate future growth while also adaptable as business needs evolve. Adopt a flexible, open architecture that lets you change directions deliberately and tap partners that can help you manage continuous improvement and upgrades.

**Bring the DevOps mindset to machine learning and data science workloads, which up until this point, have been very manual,” said Matt Hausman, HPE Ezmeral Go-to-market at HPE. “By streamlining the user experience, a data scientist can go through the iterative lifecycle using tools and libraries in a way that’s seamless and get models into production.**

06

# THE HPE SOLUTION

Leveraging the full breadth of its technology, partners, services, and expertise, HPE brings IT and business together to tackle today's data challenges. The HPE portfolio of solutions connect, protect, analyze, and allow data to be acted upon throughout all corners of the business, from edge-to-cloud and at enterprise scale, with the simplicity and agility of the cloud experience.

## The HPE portfolio unlocks the full potential of data by:

- ✓ Delivering frictionless access to data regardless of where it resides in public cloud, hybrid cloud, on-premises, or at the edge.
- ✓ Accelerating analytics through modernization of workloads, including ML Ops for automating and industrializing AI/ML models at scale.
- ✓ Supporting open platforms and ISV ecosystems that deliver greater choice, repeatability, and flexibility for application and workload modernization.
- ✓ Ensuring enterprise-grade controls via integrated and native data security across the hybrid, multi-cloud landscape.
- ✓ Creating agility and speeding time-to-insights via a common as-a-service model for hybrid environments spanning data centers, cloud, and the edge.
- ✓ Meeting intended business outcomes via a shared-risk model and SLA-driven partnerships.

# THE BOTTOM LINE



Today's enterprise needs insights on demand – at any scale and at any location, data must be processed and analyzed from every edge environment to multiple clouds in a safe and secure way.

Partnerships and platforms rooted in a consistent cloud experience across a hybrid landscape can pilot organizations through this next wave of digital transformation, delivering the flexibility and agility for data-driven business success.

For more information, visit:

[hpe.com/greenlake](https://hpe.com/greenlake)

[hpe.com/ezmeral](https://hpe.com/ezmeral)