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Simplifying Data Management

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Transform the way you manage data

Deliver a cloud experience everywhere

Accelerate your digital transformation

Simon Watkins

HPE Special Edition

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by Simon Watkins

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Introduction

In today's world, each and every enterprise is essentially a data business. Everything the enterprise is focused on — from day-to-day operations, to future innovations, even to business model evolution — depends on the ability to unleash the power of data. That's why *digital transformation* is a term you hear a lot, from every corner. Businesses see clearly that they must digitalize rapidly in order to survive and thrive.

But that's easier said than done. This imperative exists in constant tension with the inhibiting complexity and inflexible, siloed resources of today's IT environments. In that context, how do organizations achieve data-driven transformation?

At its core, the digital transformation challenge is all about data management. Organizations must shift away from traditional concepts of managing diverse storage silos and focus on simplifying data management to drive agility and innovation.

In simplifying data management with a cloud operational experience everywhere, enterprises can break through the complexity and roadblocks that beset data and infrastructure management today. They can bring a cloud operational model to wherever apps, data, and infrastructure live, and unify data operations across the data life cycle. The result, as you'll see in this book, is that organizations transform quickly, simply, and seamlessly.

About This Book

This book explains how you can unleash the power of your data with a dramatically simpler data management experience. We begin by examining the ways in which complexity holds organizations back from digital transformation and how the cloud operational experience can change that paradigm in radical ways. We explore data protection — all-important in the era of data — and how a modern approach to data protection as a service can transform your ability to unleash data. Then we take a deep dive into data management and explain how it can drive innovation for your enterprise. Finally, we look in detail at the power of the HPE GreenLake edge-to-cloud platform to simplify data management by truly delivering the cloud operational experience everywhere.

Whether you read this book cover to cover or jump around from place to place, you'll find answers to the following questions:

- Why is data and infrastructure management complexity your core IT challenge, and how can you reimagine your approach to data management? (Chapter 1)
- What does it mean to bring a cloud operational experience to your apps and data wherever they live? (Chapter 2)
- Why is modernizing data protection so important in the effort to achieve data-driven transformation? (Chapter 3)
- How does simplified data management address the myriad challenges of data access and infrastructure complexity — to accelerate innovation? (Chapter 4)
- What are some tips for simplifying data management as you unleash the power of your data? (Chapter 5)

Foolish Assumptions

In writing this book, we've gone out on a limb and made some assumptions about you:

- You're an IT professional who has a basic familiarity with data management practices.
- You're aware of the pain points in your current data management systems.
- You want to approach data management in new ways to protect and empower your business.

Icons Used in This Book

To make it easy to navigate to the most useful information, these icons highlight key text:

Take careful note of these key takeaway points.

Read these optional passages if you crave a more technical explanation.

This icon flags practical advice and insider tips.

Watch out for these potential pitfalls on the road ahead.

Where to Go from Here

The book is written as a reference guide, so you can read it from cover to cover or jump straight to the topics you're most interested in. Whichever way you choose, you can't go wrong. Both paths lead to the same outcome — a better understanding of how to simplify data management across edge to cloud and the approaches and innovations you need to move forward.

IN THIS CHAPTER

- Understanding why data-driven transformation is critical
- Recognizing the obstacles to unleashing your data's power
- Reimagining infrastructure and data management
- Discovering the benefits of simplified data management

Chapter 1
Reimagining Data Management

Every organization wants to unleash the power of its data to drive digital transformation, but storage and data complexity too often create business risk and impede innovation and agility. This chapter uncovers the challenges of infrastructure complexity and introduces a new, simplified data experience that accelerates data-driven transformation from edge to cloud by eliminating silos and complexity across data and infrastructure management.

Using Data to Transform Your Business

Across industries, today's market leaders and aspiring disrupters have one thing in common: They put data at the center of their operations. By using data in unique and innovative ways, they're able to

- Infuse data into supply chains, distribution models, product development, manufacturing, marketing, sales, and more.

- Use data to identify customer needs and incorporate customer insights into product development.
- Create an endless loop of customer input to power unique experiences that continue to evolve as they gather more insight about what customers want and how they're responding.
- Harness data to accelerate revenue, reimagine customer experiences, improve operational efficiency, and speed innovation.

Every company wants to fully unlock the value of data as a strategic asset. But the realities of where most organizations are today, and where they want to go, are far from the same.

Understanding Why Complexity Is the Enemy

Today, data management is typically characterized by a complicated web of fragmented software, infrastructure, manual processes, and administrative tools that span production, disaster recovery, backup, archive, test/dev, and analytics. Even *saying* all that sounds complicated.

According to a recent research survey by ESG, the average organization relies on 23 different data management tools! That's an overwhelming number of disparate hardware and software solutions (not to mention administrators) needed to manage the life cycle of data and data infrastructure. And that management includes everything from how data is accessed, protected, governed, and analyzed to how infrastructure is deployed, provisioned, upgraded, and mobilized. So, it's really no surprise that the same study found 93 percent of IT decision makers felt that storage and data management complexity impeded their organization's digital transformation.

Complexity impacts everyone

Organizations have accepted IT complexity for years — and yet it's precisely what stands in the way of transformation. How so? It comes down to today's approach to data and infrastructure management, which has impacts across organizations:

- **IT firefighting:** For starters, think about storage and the headaches that IT deals with every day. Endless time spent fighting fires up and down the IT stack, from storage to applications, as well as deploying, tuning, maintaining, and upgrading data infrastructure across its life cycle. This is time that they could better spend innovating and driving strategic business initiatives. Provisioning is mostly manual and burdened with guesswork.
- **Infrastructure trade-offs:** Just as problematic are the inevitable infrastructure trade-offs between resiliency, efficiency, and performance. Cloud seems like a potential solution, but data and apps are needed everywhere — from edge to core to cloud.
- **Lack of development agility:** The impact of complexity extends far beyond the IT department. Data innovators — those developers, analysts, and data scientists who turn bits and bytes into new apps and insights — can't get access to data fast enough. And although speed is paramount in agile DevOps environments, red tape and manual processes inhibit data utilization. That puts a brake on the pace and quality of app development and deployment and slows down innovation and time to value.
- **Database management difficulties:** For database owners, complexity stands in the way of rapid innovation. It's simply too manual and arduous to securely provide developers, analysts, and data scientists access to data at the frequency and pace they require. Inadequate data compliance, privacy, and security controls mean that sharing sensitive data also puts it at risk. Data protection processes are too manual, too complex, siloed, and not app-aware. As a result, database owners spend too much time worrying about whether data is protected and quickly recoverable in the context of an increasingly hostile threat landscape.
- **Lack of visibility:** For IT executives and chief information officers (CIOs), complexity creates business risk and resource waste. Organizations lack control and visibility into exactly which data has been stored, copied, and utilized across data infrastructure. Large amounts of "dark data" are routinely excluded from classification, indexing, or tracking. With so much data sloshing across organizations, nobody can answer seemingly simple questions like "What am I storing?," "Why am I storing it?," and "How long do I need to store it?"

> Fragmented visibility into data ownership, location, and lineage creates debilitating compliance, governance, and security risks — to say nothing of the way it encourages copy data sprawl and inefficient storage use.

Doing nothing comes at a cost


REMEMBER

Most organizations have overlooked data management complexity in the past, but ignoring the problem is no longer an acceptable strategy. The ever-increasing volume and value of data in today's systems is driving the problem higher up the strategic agenda.

IT leaders now face unprecedented demands to harness today's wealth of data and apply it to create new value across the entire organization, all with limited time, skills, and budgets. And in today's business world — where the fast eat the slow — an increasing number of executives rightly fear displacement by more data-driven competitors. It's no surprise then that 95 percent of organizations view better data utilization as a top-ten business priority.

Companies recognize that the lack of a holistic approach to managing data places an incredible drag on their transformational velocity. It not only lowers agility, efficiency, and innovation, but also elevates business risk. Plus, it's often painfully clear that the opportunity cost of data can be the difference between winning and losing market share in today's competitive economy.


REMEMBER

According to ESG, 59 percent of organizations say storage and data management complexity is trending in the wrong direction. Simply put, the limiting effects of traditional data management problems — and the impact these problems have on digital transformation initiatives — will only get worse and become harder to rectify if they aren't addressed now.

Taking a New Approach to Data Management

The ability to store, access, protect, analyze, and mobilize data across its life cycle — what we call *data management* — has become the preeminent strategic imperative in many enterprises today. Addressing this situation requires different ways of

thinking about data and infrastructure management and a shift from managing storage to unleashing data.


REMEMBER

By capitalizing on the transformative power of data, cloud agility, and artificial intelligence (AI)–driven insights and autonomous operations, an organization can simplify how it manages data and infrastructure. It can eliminate silos and complexity across people, processes, and technologies to unlock whole new levels of data, agility, and innovation.

How do they do that? With a new, unified data operations experience from edge to cloud that upends conventional IT approaches. Such an experience radically streamlines data and infrastructure management across clouds so that organizations can accelerate their data-driven transformation.


REMEMBER

Some of the key characteristics of this new data experience include the following:

- Instead of tuning and maintaining infrastructure, IT managers deploy cloud services with instant application provisioning.
- Instead of waiting days (and days) to access data, developers and data scientists get streamlined access on demand.
- Instead of worrying about threats to data, data managers set protection policies with a single click wherever data lives.
- Instead of worrying about "dark data" compliance risks and copy data sprawl inefficiencies, CIOs get 360-degree visibility into their entire data estate, along with the ability to trace the lineage of all copies of data.

Unpacking This New Data Experience

Simplified data management embraces data, cloud, and AI to reimagine the data experience. This new vision for data has three essential characteristics:

- Data-centric policies and automation
- Cloud-native control and operations
- AI-driven insights and intelligence

The following sections cover each of these.

Data-centric policies and automation

Data has a continuous life cycle spanning test/dev, production, protection, and analytics. It needs to be managed holistically from creation to deletion. Software that can manage only individual parts of that life cycle is inefficient and subject to visibility gaps. A better approach is to apply holistic, data-centric policies and automation that collapse silos and unify workflows across the data life cycle. That means that policies that manage how data is stored, accessed, protected, and mobilized — even how applications are provisioned — are data-centric and automated.

Cloud-native control and operations

WARNING

In many organizations, data and infrastructure management software live on-premises. This is less than ideal for several reasons:

- With data spanning from edge to cloud, visibility and control are limited, and more tools are needed to follow the data.
- On-premises software and supporting hardware need to be maintained, patched, and upgraded.
- Maintaining software requires maintenance windows, making it difficult to adopt new technology.

Complexity creeps in at every stage.

But what if you could stop following the data and just manage it from a single location, regardless of where it actually lives? What if you could leverage cloud-native control and operations to manage all your data and infrastructure, from edge to cloud, through a single pane of glass? The new approach abstracts data and infrastructure control away from physical infrastructure so organizations can manage their workflows from the cloud, orchestrate them wherever data lives, and gain faster access to features through cloud services.

AI-driven insights and intelligence

AI is a critical component of simplified data management and a cloud operational experience from edge to cloud. It's currently transforming every industry with unprecedented intelligence, creating autonomous operations across manufacturing, transportation, and healthcare, to name just a few industries.

Just as you rely on Google Maps to see ahead and reroute you if needed, businesses increasingly rely on AI to be deeply integrated into data operations. Imagine being told you could avoid a disruption by making a network setting change. Imagine you could improve app performance by rebalancing workloads and resources in a specific way. Imagine you could provision applications instantly across your entire fleet without any planning or calculations. That's the power of AI-driven insights and intelligence.

What's in It for the Organization?

Now that you've discovered the key tenets of a simplified data management model, let's look at how it will provide a new and improved data experience across your organization, impacting and benefiting everyone from CIOs to IT to database admins to developers.

REMEMBER

After implementing simplified data management via a cloud operational model, you can expect the following benefits:

- Maximizing IT agility and efficiency by leveraging cloud operations everywhere to eliminate the complexity of managing data infrastructure at scale
- Empowering data innovators — such as developers, analysts, and data scientists — to unlock the value of data with self-service provisioning and streamlined, secure access to production data that accelerates innovation, time to market, and time to insights
- Enabling database and application owners to protect data wherever it lives against threats and disruptions with simple policy-driven automation to meet any service-level agreement (SLA)
- Providing IT executives and line-of-business leaders enhanced data visibility that reduces data compliance and governance risks, lowers operational costs, enables faster decision-making, and powers competitive advantages from data
- Eliminating management silos and complexity across organizations by integrating data operations throughout the data life cycle and across test/dev, production, protection, and analytics

- Ensuring performance and availability for data and apps without disruption for an always-on, always-fast organization
- Bridging every cloud and optimizing where data should be via a unified, edge-to-cloud experience and seamless data mobility


TIP

For more detailed information about realizing the benefits of simplified data management in your organization, check out Chapter 5.

IN THIS CHAPTER

- Bringing the cloud experience to your applications and workloads
- Instantly provisioning workloads at scale
- Consuming storage as a service
- Managing IT resources from anywhere
- Creating cloud operational agility in your data center

Chapter 2
Delivering the Cloud Operational Experience Everywhere

In the last decade, we've all seen the variety of benefits cloud delivers, but perhaps its greatest strength has been the agility of its operational model. Your organization, like many others, likely wants to harness this same ease and simplicity across its operations — on-premises, at the edge, in the cloud — to accelerate transformation.

This chapter examines how storage as a service can bring the agility of cloud operations and the flexibility of the cloud ownership experience to your data, wherever that data lives. We look at how cloud changes your customer experience and streamlines your fundamental pivot from managing storage to managing — and unleashing — data.

Identifying the Key Business Requirements

Cloud sets the standard nowadays when it comes to on-demand agility, elasticity, and as-a-service consumption. Organizations love the simplicity, self-service, automation, and manage-from-anywhere freedom that cloud provides.

As a result, IT admins across industries have been asked to bring that cloud experience to their mission-critical apps — but without sacrificing performance, resiliency, long-term cost management, or data sovereignty. If they're successful, keeping these applications on-premises avoids migration issues related to data gravity and potentially complex application refactoring.

How broad is the desire to bring cloud operations on-premises? A recent study from ESG shows that 91 percent of organizations would like to do so — which begs the question: How can you get cloud operational agility that's self-service and on demand via invisible infrastructure that anyone can manage from anywhere?

Today, only a select few on-premises data infrastructure solutions provide the resiliency, agility, and overall operational experience of the cloud. If you examine them closely, you see that they achieve a cloud operational experience by satisfying three critical business requirements:

- Instantly provisioning workloads at scale
- Providing storage as a service
- Enabling management from anywhere

The rest of this chapter examines each of these requirements and explains how simplified data management meets them.

Instantly Provisioning Workloads at Scale

When your business needs additional storage capacity, you can't afford to wait. But the reality is that provisioning storage today is . . . complex.

On average, it takes 1.5 days for most enterprise IT organizations to provision storage, according to an ESG research study. In a world where speed matters, multiple IT admins typically labor through spreadsheets to determine available capacity and performance headroom across their storage fleet and then compare notes to decide where an application should be deployed to meet relevant workload and application service levels. If that sounds tedious, it's because it is.

If that weren't already cumbersome enough, work tickets must be created and manual handoffs made across the organization to get storage capacity provisioned. It's an extremely complex, time-consuming task for IT teams — and it only gets more problematic as you scale and add more systems to your fleet.

WARNING

The ESG research study crystallizes the reality of inefficient IT operations:

- Eighty-two percent of organizations think that storage provisioning is challenging at scale.
- Initial storage provisioning takes, on average, 2.1 business days.
- Organizations require, on average, 1.5 days to determine the right storage system to support their workloads.

The time element is certainly onerous, but even putting that aside, IT admins provisioning storage also must make sure that they put application workloads on the infrastructure best suited for optimizing service-level agreements (SLAs). Without the right infrastructure, IT admins won't meet their SLAs in terms of availability, performance, and data efficiency. When you're managing a dynamic business environment of multiple systems and ever-changing workloads, unmet SLAs are painful. They have a direct impact on time-to-market and business risk.

Lengthy provisioning periods mean developers can't access storage capacity at the pace they're expected to — which is also the pace they know they could obtain in the cloud. Instead, they find themselves stuck in limbo for a day and a half, delaying application testing and development, slowing down business momentum, and frustrating innovation.

What's the alternative? A self-service data infrastructure that enables instant, intent-based provisioning for IT admins, app owners, and developers — and leverages artificial intelligence (AI) to optimize placement of apps and data for everyone. A true cloud provisioning model would accelerate the app development cycles that today's fast-paced DevOps and continuous integration/continuous delivery (CI/CD) pipeline processes demand without being bogged down by limited provisioning capacity.


TIP

Intent-based provisioning lets users instantly provision on-premises storage — at scale and with the cloud experience. Intent-based provisioning determines where your data should be stored across the entire fleet, optimizing your resources with real-time context into resource headroom and app-specific SLAs. An AI-driven, self-service solution with role-based access control (RBAC) delivers a true cloud provisioning model for app owners and developers without the need for storage expertise. In short, you can say goodbye to complex and time-consuming storage provisioning.

How intent-based provisioning works

Let's take a closer look at intent-based provisioning to see how simplifying data management with a cloud operational experience can play out in the real world.

Intent-based provisioning is radically simple. AI-driven and self-service, all you do is select your workload description. Choose the type of application, the desired capacity and performance, and the host group that needs to access the workloads. The intent-based provisioning service then recommends the best fit — and provisions your workload. Done.

Here's how that powerful service can make the process so simple.

- **It's intelligent.** Intent-based provisioning leverages AI and real-time context across the entire fleet to deliver predictive analytics, what-if simulations, and automated decisions. It abstracts away all the low-level details traditionally required for storage provisioning that you'd rather not think about, such as specifying RAID type, block size, and data reduction (compression and dedupe).
- **It's predictive.** Even for existing apps, workloads are constantly changing CPU and memory utilization in your

systems. Intent-based provisioning leverages AI for a contextual, real-time understanding of application resource utilization across your fleet and throughout your vendor's installed base. That enables the system to predict how performance and capacity resource utilization will grow by analyzing historical workload patterns and headroom data from across the entire fleet.

- **It's app-centric.** This is where the magic happens. Intent-based provisioning runs new application requirements through what-if simulations across your entire fleet to determine how existing applications and resources will be affected by new applications on existing systems. (Just try that in your head.) The result is a predictive, context-aware recommendation for the right system on which to deploy the new application.

Marveling at the coolness of intent-based provisioning


REMEMBER

Intent-based provisioning represents a paradigm shift in infrastructure management. Applications are *always* deployed and maintained on the right resources to ensure business velocity, data availability, efficiency, and best economics. Gone are the days of worrying about whether storage is provisioned on the optimal array to meet even your most demanding SLAs. Instead of struggling through complexity and guesswork, you deploy storage resources just as you would in the public cloud — with a self-service, on-demand experience. All the planning is done for you. That's how cool it is.

The bottom line is, intent-based provisioning reduces provisioning from days down to minutes. This means time savings for IT admins, as well as faster application cycle time for your developers. Ultimately, that accelerates your data-driven transformation and helps you unleash the power of your data.

Consuming Storage as a Service


WARNING

IT admins may dream about achieving a cloud operational experience, but traditional on-premises IT presents numerous and significant challenges.

The first among them is data. It's no secret that everyone's data is growing at faster and faster rates, challenging IT teams to efficiently manage the infrastructure that stores it. Pair that data growth with the unpredictability of evolving business demands, and it's quite difficult for IT teams to predict the resources they'll need and how much time it will take to procure, configure, and deploy capacity. Even if they could do this, acquiring and integrating additional infrastructure at a moment's notice isn't so easy. And after it's deployed, traditional storage management can be extremely inefficient, slowing down the business and impeding innovation.

So, that's a lot of overhead. But the difficulty doesn't end there: The financial burden of traditional infrastructure can also be intimidating. Large upfront capital expenditures (CapEx) burden finance teams to manage cash flow. Just from a financial perspective, businesses may turn to the cloud for an operating expenditures (OpEx) model that makes infrastructure payments more manageable and leaves more cash available each month for other purposes.

Faced with these challenges, IT needs to shift from owning and maintaining data infrastructure to simply utilizing it on demand and as a service. Storage-as-a-service solutions free up your cash flow and increase financial agility with flexible consumption. As-a-service models that use buffered capacity enable you to instantly scale resources without having to worry about unpredictable new resource demands. This saves you time and money — and frees you to focus on the things that matter most to your business.


TIP

True storage as a service is storage infrastructure with the performance, scale, agility, and efficiency businesses need, delivered entirely as a service. Cost-effective and on-demand, storage as a service offers cloud operations that deploy, provision, manage, and upgrade on-premises infrastructure — and the flexibility to elastically scale on demand.

Managing from Anywhere

Managing the life cycle of on-premises infrastructure is difficult with manual processes, to say the least. But managing the life cycle of a whole fleet of mismatched on-premises systems in

a complex infrastructure is nearly impossible. Imagine multiple silos, across diverse storage resources, supporting the variety of apps a typical enterprise runs in a distributed environment. Sadly, many IT professionals don't have to imagine it, because it's their daily reality. Such an approach results in significant operational challenges and inefficiency at scale. And that's to say nothing of the fact that on-premises infrastructure often requires specialized domain expertise to manage its life cycle, from install to upgrade.

For example, an IT administrator of a regional hospital group may manage more than a dozen different hospitals. To check on the capacity available at each, the admin would have to use a virtual private network (VPN) to access every hospital. In the worst-case scenario, the admin would drive to each site regularly to troubleshoot and upgrade services. Software can help reduce travel requirements, but managing the software that handles these activities for on-premises storage can be mind-boggling. After all, each management tool has its own processes, rules, consoles, and best practices to understand and operate. It's a potentially overwhelming scenario for the storage admin.


TIP

Cloud-native operations change the game entirely by abstracting data and infrastructure management from physical infrastructure and moving it to the cloud. This eliminates silos, reduces complexity, and powers optimum performance across fleets. Because the cloud-native control plane scales automatically with infrastructure, managing and monitoring hundreds of systems across multiple geographies can be as simple as managing one, using a software-as-a-service (SaaS)–based console that's accessible from anywhere and on any device.

This kind of operational freedom is especially important in the new, distributed way of working that's the result of the global pandemic. IT leaders know that their systems can always be accessed and monitored, no matter where their admins are working — in a home office, in a data center, or at the local coffee shop.

Achieving Cloud Operational Agility

With storage as a service, you can bring the agility of the cloud operational model and the flexibility of the cloud ownership experience to your data, across edge and on-premises environments.


REMEMBER

How does this change the customer experience? It's transformative. Storage as a service streamlines your fundamental pivot from managing storage to managing data. Here's a look at the end-to-end cloud experience you can get:

- **Quick quoting:** Configure storage needs online and receive a fast quote.
- **Fast delivery:** Receive infrastructure at your sites in a matter of days.
- **Simplified deployment:** Rack the infrastructure, plug in the power cords, and connect the network cables. In a few clicks, the new system is configured and available in your fleet, ready to serve data for application workloads.
- **Intent-based provisioning:** Shift from logical unit number (LUN)–centric to AI-driven, app-centric storage provisioning. Just select the app workload type, specify the service level and capacity, and let AI-driven intelligence automatically recommend the best-suited system across your fleet to optimize SLAs. No storage domain expertise is required, and no more guesswork. Storage provisioning time is slashed from days or weeks to minutes, and line-of-business owners are empowered with self-service, on-demand provisioning.
- **Unified application programming interface (API) for automation:** Build automation and services with a consistent, unified API — without knowing infrastructure details or duplicating automation implementation across diverse storage models.
- **Invisible upgrades:** Thanks to SaaS-based delivery, new data services instantly become available to customers. Data plane software upgrades are non-disruptive and intelligently matched to a given system.
- **Management from any device, anywhere:** Deploy, manage, upgrade, and optimize your entire fleet of data infrastructure from any device and from anywhere — even from your beach office.

- **Elastic scaling:** Scale up and down with ease and speed. Don't give it a second thought.
- **Pay-as-you-go consumption:** Gain financial flexibility and free up capital with pay-as-you-go consumption, just like the cloud.

Gone are the days when you had to sacrifice the simplicity, self-service, automation, and manage-from-anywhere capabilities of the cloud to achieve the resiliency, long-term cost management, and data sovereignty of on-premises IT. Now you can bring your data innovators, data managers, and IT admins the cloud operational agility they want — right in your own data center.

Bringing cloud agility to data infrastructure wherever it lives tees up the transformational power of your data, empowering your organization to deploy, provision, manage, and scale data infrastructure in far less time.

Cloud agility enables IT to reduce operating costs while optimizing resource utilization. By moving to a generalist model and shifting from managing storage to managing data, you can refocus resources and skills on higher-value strategic initiatives.

TIP

To find out how you can gain a cloud operational experience for your data today, check out Chapter 5.

IN THIS CHAPTER

- Understanding why data protection is so important
- Recognizing the shortcomings of traditional backup and recovery approaches
- Exploring modern backup and disaster recovery with data protection as a service

Chapter 3
Deploying Modern Data Protection

Data is your most critical asset, so the explosive growth of data and ever-increasing ransomware threats mean organizations like yours need modern data protection from edge to cloud. That's how you ensure that data is always available, accessible, and secure — wherever you need it.

This chapter explains why data protection is so important and details the ways in which legacy data protection solutions may be holding back your digital transformation efforts. It spotlights how modern data protection as a service can simplify backup and disaster recovery (DR) wherever your data lives, giving you peace of mind that you're reducing ransomware and other data loss risks, meeting your recovery service-level agreements (SLAs), and preventing financial or reputational costs that can be crippling to a business.

What Makes Data Protection So Important?

Data availability is foundational for any data-driven company looking to unlock agility, innovation, and operational efficiency. Planned or unplanned system downtime can put you at a competitive disadvantage. Even worse, data loss can lead to lost customers, lost revenue, lost opportunity, and lower staff productivity — to say nothing of potential reputational damage to your company.

Your data is highly valuable, and demand for that data has never been greater. Yet your data volumes — all of which need to be protected — continue to increase at an accelerated clip, both at the edge and across hybrid environments. IDC research shows that data is growing at a more than 40 percent compound annual growth rate (CAGR) in large-scale enterprises, which means the total volume of data will double approximately every two years.

To make the data protection picture even more urgent, there is also a growing demand to back up more frequently and restore data in less time. Increasing data availability requirements and the growing cost of data loss or downtime are driving more aggressive SLAs via recovery point objectives (RPOs) and recovery time objectives (RTOs). They typically offer little to no tolerance for interruptions when it comes to platform, application, and data availability.

Given all this, it's hardly surprising that protecting data against threats and disruptions is a top priority for a majority of IT organizations. That's backed up by a recent IDC survey report, in which 53.7 percent of companies indicate that data protection modernization is "very important" or "critical" to their digital transformation and IT transformation projects.

Security threats and data loss risks diversify and grow

WARNING

Let's turn for a moment to some of the headache-inducing threats to your increasingly vulnerable data. The numbers speak for themselves: According to IDC, cyberattacks surged early in the COVID-19 pandemic by more than 288 percent, with 95.1 percent of organizations having suffered a malicious attack within the

past 12 months and 36.6 percent of respondents having suffered more than 25 attacks during that time! Many of these attacks were successful — 80.3 percent of organizations indicated that at least one attack resulted in data corruption. Of even greater concern, 43 percent of companies have experienced unrecoverable data within the past 12 months, and 63 percent of organizations have suffered a data-related business disruption within the same time period.

Ransomware attacks proliferate


WARNING

Few contemporary cyber threats are more feared than ransomware. Vastly different from traditional viruses and malware, ransomware today is managed by well-funded criminal organizations with squads of full-time developers. It has become a lucrative business for many.

You know the story: Cybercriminals lock users out of their own systems, demanding exorbitant payment in Bitcoin or gift cards. Ransom demands in the millions of dollars are not uncommon. What's worse, there's no guarantee your organization will regain access to your data even if you *do* pay the ransom.

In 2021, ransomware damage costs are forecast to reach $20 billion. A new victim is attacked by hackers every 39 seconds, for an average of 2,244 times a day. Despite this, as many as 50 percent of IT professionals don't believe that their organizations are ready to defend against a ransomware attack.

No business or industry is immune from the threat of ransomware, and the potential impacts can be devastating. Small to medium-size businesses, large global enterprises, retail businesses, schools, hospitals, and even governments are targeted every day. In the United States, as of this writing, the most recent major incident was the attack on the systems of Colonial Pipeline, which led the company to shut down its pipeline from Texas to New Jersey, impacting fuel supplies up and down the East Coast.

So, for your business, the question is no longer *if* but *when.* And the question you must ask yourself is: "Will I be prepared when the ransomware attack occurs?"

Why Traditional Backup and Recovery Can't Cope

With data protection assuming renewed importance in the wake of the pandemic, and given the relentless pace of ransomware attacks, it's concerning that the basic process for backing up and recovering critical systems, applications, and data hasn't changed much for the past few decades. As the IT landscape evolves and business requirements continue to change, traditional backup and recovery solutions haven't kept pace with the speed of innovation. They continue to come up short in terms of preventing data loss or downtime from modern threats like ransomware.

WARNING

Despite the potentially severe consequences of data loss or disruption discussed earlier, many IT organizations are spread too thin to meet their data protection needs. They rely on outdated technology and contend with substantial legacy infrastructure complexity. As a result, they've had to accept data loss and downtime as unavoidable, with business leaders still apparently unprepared for the risk of an outage or data loss that could cost the business millions of dollars.

The problem is pervasive. Putting together surveys from ESG and IDC, we see widespread concern across industries:

- 89 percent of organizations view complexity impeding data security and protection.
- 59 percent of organizations view complexity trending in the wrong direction.
- 51 percent of organizations view enhancing data protection and security as the number-one priority.
- 48.7 percent of organizations plan to supplement or replace their backup and DR systems within the next three years.

Consider the following shortcomings of traditional data protection solutions, which together make data management and availability a serious challenge for IT organizations to provide.

Inadequate ransomware recovery processes

The common data protection technologies in use today are not able to reduce the RPO and RTO to the levels data-driven organizations need to rapidly recover data from ransomware attacks. A key reason for data loss from ransomware is that the *backup gap* — the length of time between backups — is simply too long. In most organizations, backups are only performed nightly (that is, once every 24 hours), with incremental snapshots perhaps occurring throughout the day. This means that despite the costly impact of downtime and data loss, RPOs and RTOs for critical business systems and data are still defined in hours and days.

Unreliable backup systems are also a common challenge when it comes to recovering from a ransomware attack. IDC found that backup and recovery systems failed at a critical moment for nearly 45 percent of respondents. Despite growing investments in backup systems, many businesses have relatively low confidence in their ability to recover their critical systems and data accurately and quickly when they need it most. Only 15.3 percent of respondents expressed 100 percent confidence in their backup system's ability to recover data, and only 20.4 percent have 100 percent confidence in their DR solution to recover data.


TIP

We'll state the obvious: Organizations need to deploy more reliable backup systems with more frequent and more granular backups to eliminate the top reasons for unrecoverable data from ransomware attacks.

Too complex and expensive to manage

IT organizations spend far too much time managing data protection infrastructure and policies in an often futile attempt to meet every SLA and protect against ever-evolving threats. Most traditional data protection vendors don't offer a "Swiss army knife" solution to address diverse backup and recovery scenarios and ensure data recovery in the event of any failure. Instead, enterprises must resort to a hodgepodge of complex and costly software and hardware tools for the backup and restoration of systems, applications, and data on-premises and in cloud environments, as well as for disaster recovery and archiving.

You're probably thinking, "That sounds complicated — and expensive." And you're right. Deploying multiple fragmented point solutions for backup and disaster recovery makes it difficult to balance demanding SLAs like near-zero RTOs and RPOs, rapid recovery, and long-term retention while at the same time maintaining compliance with regulatory and governance requirements.

In addition to increasing cost and complexity, adding multiple backup software and hardware tools — which may not be interoperable, let alone integrated — often requires additional specialized IT staff and time to operate and maintain, potentially leading to exponential increases in management overhead.

Modernizing with Data Protection as a Service

Imagine how your business focus and priorities would change if you could

- Rely on instant recovery for all disruption scenarios — from ransomware attacks and natural disasters, to hardware failures and human errors, to outages.
- Leverage policy-based orchestration and automation to remove the complexity of protecting data and applications at scale.
- Reduce costs with consumption-based pricing, ultra-efficient data reduction technologies, and long-term retention in the cloud.

Having the peace of mind that your data is protected, rapidly recoverable, and always secure — that's transformational.

To get there, vendors today offer powerful and flexible new approaches to data protection. One of the most exciting is data protection as a service (DPaaS) — a suite of cloud services designed to back up, protect, and mobilize all your data.

The leading DPaaS solutions provide a blend of backup, DR, and data mobility across on-premises, hybrid, and multi-cloud environments designed to meet your data protection SLAs and your compliance objectives. You can leverage DPaaS to eliminate risk of data loss, mitigate ransomware threats, and deliver rapid data recovery everywhere.

JOURNAL-BASED CONTINUOUS DATA PROTECTION

TIP

Keep an eye on the term *journal-based continuous data protection* (CDP). It's a technology that enables you to move quickly from recovery to availability and from restore to resume. Delivering the lowest RPOs (down to just seconds) and fastest RTOs (we're talking minutes), CDP drastically reduces the potential for data loss and downtime, regardless of cause, while slashing and simplifying time to recovery.

CDP enables organizations to continuously capture and track data modifications using software-based replication, which automatically saves every version of the data that the user creates locally or at a target repository. Writes are saved to a journal file along with corresponding file changes. By utilizing Change Block Tracking (CBT), CDP virtually eliminates the backup gap (discussed earlier as a primary cause of data loss), enabling users and administrators to create thousands of restore and recovery points, only seconds apart, and thus restore data to any point in time with remarkable granularity.

Industry-best DPaaS offerings should be capable of instantly recovering from ransomware attacks, cyberattacks, and other unplanned disruptions. They should be able to bring data back to its state just seconds before an attack or disruption — and minimize the impact on the business. The following sections look at what a DPaaS system should bring to the table.

Defense against ransomware attacks

Data protection is a critical line of defense against ransomware, because it enables organizations to recover data and applications without being held hostage. But to truly minimize data loss from cyber criminals, down-to-the-second granularity is a must. Systems achieve real-time data protection by providing the granularity to recover precisely to just seconds before an attack. Your data protection should be flexible enough to recover only what's needed: a few files, virtual machines (VMs), or entire applications. Even better, you should have application-consistent recovery that enables accelerated RTOs with quick and consistent recovery even for complex, multi-VM applications.

Finally, to ensure data integrity and enable restores in the event of an attack, well-executed DPaaS effectively isolates backup data, making it inaccessible to ransomware attacks. It also offers built-in security via scanning, threat detection, and encrypted backups on-premises and in the cloud — all of which keep your data secure wherever it lives.

Recovery from any disruption

The best DPaaS systems enable instant data recovery via industry-leading RPOs of seconds and RTOs of minutes for all data and applications. That capability is powered by always-on CDP and journal-based recovery. DPaaS also reduces the time, cost, and network bandwidth for backup and recovery with highly efficient source-side deduplication, change-block tracking, and advanced compression.

More broadly, by seamlessly composing the right blend of data recovery, backup, and data mobility based on your RTO and RPO settings, DPaaS gives you the flexibility to provide instant restores, rapid recovery on-premises, or cloud backups for compliance and long-term retention that meet your ever-demanding SLAs at the right cost for each workload.

Protection without complexity


TIP

All this recovery performance wouldn't be worth much if it were difficult to manage. But DPaaS can also bring the agility, speed, and simplicity of the cloud operational model at scale to data protection across the life cycle of your data. It lets you easily and centrally manage your hybrid cloud backup and DR operations from anywhere via a single, cloud-native console. Think about that: With DPaaS, you can unify backup, DR, and application mobility management silos under a single web interface with global visibility and a common data protection experience for all workloads across on-premises, hybrid, and multi-cloud environments.

Just imagine this from your legacy data protection infrastructure: DPaaS protects your data and applications within minutes — with no software to deploy, manage, or maintain. Self-service, on-demand data protection, a pay-as-you-protect model, and elastic scale simplify operations and free up capital, aligning infrastructure with your actual use and giving you time to focus on business priorities.

But wait, there's more! With DPaaS, built-in intelligence should give you a single comprehensive view of multi-site, multi-cloud environments via dashboards and reports that deliver real-time analysis of protection status across data and applications. And backup and DR policies, orchestration, and automation should provide simplicity, enterprise scale, and agile data protection that eliminate the need for legacy point solutions, reduce human error, and save time, resources, and costs.

Seamless hybrid and multi-cloud app and data mobility

Organizations are increasingly hybrid when it comes to IT. They need a cloud-everywhere experience, in which data and applications flow seamlessly to wherever their data lives — or needs to be. The right DPaaS enables this experience, with seamless hybrid and multi-cloud application and data mobility and continuous replication across clouds.

Appreciating the True Power of DPaaS

REMEMBER

Businesses understand that the future of data and infrastructure management will be cloud-centric. Organizations like yours will increasingly leverage cloud-native control and operations to underpin every single process, initiative, or value chain as they journey to become data driven and digitally resilient. It's just a matter of time. DPaaS for hybrid, multi-cloud environments collapses silos and unifies workflows across the data protection life cycle, serving as a crucial pathway for that journey.

With the right DPaaS offering, you get robust backup, DR, and data and application mobility as-a-service capabilities — for any storage device, any app, any cloud, and any recovery SLA. At the highest level, that gives your business key advantages in the race to unleash the power of data. You can

- Ensure rapid recovery of your data and applications while mitigating data loss and countering ransomware and other cyber threats.
- Eliminate complexity and simplify data protection.
- Protect your data wherever it lives and recover it anywhere.

- Protect all your applications from VMs to containers.
- Move your data and apps where they need to be with seamless mobility across hybrid and multi-clouds.


TIP

To harness a modern data protection solution that helps simplify data management with a cloud operational experience from edge to cloud, check out Chapter 5.

IN THIS CHAPTER

- Understanding the roadblocks to innovation at your organization
- Addressing the challenges of data access and infrastructure complexity
- Accelerating data-driven innovation with an edge-to-cloud data platform

Chapter 4
Driving Innovation with Simplified Data Management

Innovation is the DNA of the world's most successful companies, and data is the currency of that innovation. But data innovators at many organizations — those developers, analysts, and data scientists who turn bits and bytes into new apps and insights — can't get access to data fast enough. Speed is paramount in agile DevOps environments. Red tape and manual processes inhibit data utilization, putting a brake on the pace and quality of app development and deployment and slowing innovation and time to value.

This chapter looks at the many obstacles that stand in the way of the free flow of data at organizations like yours. It explains how simplifying data management with a cloud operational experience everywhere empowers your data innovators. It enables them to unleash your data's value through self-service provisioning and streamlined and secure access to production data. These capabilities ultimately accelerate innovation, time to insight, and time to market.

Identifying Your Roadblocks to Innovation

Application development is a key driver of innovation and differentiation for every successful company in today's highly competitive, app-driven business landscape. Faster and more agile time to market for new apps and services enables market leaders to capture new business opportunities, take market share, and future-proof their businesses.

If only it were that simple! In reality, many organizations face myriad data and infrastructure management roadblocks that prevent the rapid app development cycles that today's fast-paced DevOps and continuous integration/continuous delivery (CI/CD) pipeline processes demand — and time to market suffers as a result.

Here are some of the roadblocks that keep development teams from fully succeeding. How many of these can you identify as issues in your own organization?

Lack of data access

Any time you're developing applications, data can be your biggest opportunity and potentially your greatest challenge. An organization can't hope to carry out the app-driven digital transformation initiatives that give them competitive advantages without streamlined, fast, and automated access to compliant data across development and test teams in a DevOps environment.

However, in many organizations, data access and availability remain a set of ticket-driven manual processes controlled and managed via database administrators (DBAs) who are encumbered by too many repetitive and low-value tasks. In this context, it becomes impossible to provide data to those who need it, where and when they need it, and in real time. Developers and testers wait too long for the data they need, and your DevOps initiatives slow to a crawl.

If you can't provide data at speed, you'll soon be in a situation where developers file multiple service tickets for every data set they need because it's so hard to get data. Or they end up testing very old data and rarely refreshing test dev environments because

it's just too onerous and slow to get access to better-quality data. This is how organizations get left behind.

Data growth and complexity

The data access problem is compounded by the data landscape's growing complexity and sprawl problem. Even as the amount of data grows exponentially each year, companies demand that data be made increasingly available to people and teams in all corners of the business. That data is generated across the enterprise, including databases, data warehouses, data lakes, customer relationship management (CRM) tools, and enterprise resource planning (ERP) systems.

With more data and data sources come more challenges. Imagine you have thousands of databases, applications, and developers, all needing access to data. Managing that complexity with a manual approach? Effectively impossible. So, you end up with slower processes, less effective people, and failed initiatives that impact the bottom line. This is the situation innumerable companies find themselves in: Their data delivery at scale is slow, expensive, risky, and painful.

Lack of data visibility

To make matters worse, most companies lack even basic inventories of their data. The absence of global insights and visibility into data ownership, location, and lineage makes it difficult — or in many cases impossible — to manage, govern, and protect data across its life cycle. This makes data less usable than it could be, and, of course, makes it difficult for your teams to find the right data.

Worse still, poor data visibility can also lead to a situation in which you have terabytes of unprotected or noncompliant data. Or, to take just one unhappy example, to a situation in which a developer finds out the salaries of everyone who works in marketing because your company doesn't mask its HR data. Ultimately, when it comes to data, you simply can't manage what you don't understand.

Data infrastructure complexity

Data infrastructure provisioning in the context of the public cloud sets the standard for agility and ease of use, but organizations have been frustrated in trying to achieve the same experience on-premises for workloads that simply can't or shouldn't run in a public cloud. It's not really a surprise why. Legacy infrastructure is difficult to automate and requires specialized, domain-specific expertise to provision and maintain effectively. So, IT organizations remain tied down by the cumbersome details of each and every provisioning action the DevOps teams need.

Eliminating Those Roadblocks with a New Data Experience

As we've seen, the complexity involved in data and infrastructure provisioning isn't just a data management issue. It can be seriously detrimental to business efficiency, productivity, agility, and data security. Complexity challenges are far from trivial to address, but any modernization strategy has to be based on a foundational change in how data is accessed, managed, secured, and leveraged across the enterprise.


TIP

To drive real value from new data-driven applications, you need streamlined data and infrastructure management that's agile and automated.

Simplifying data management with cloud operational agility slashes the complexity of data provisioning. It enables self-service access to data, accelerating data-driven application development and decision-making. It addresses your data challenges head on, empowering you to treat your data as an asset rather than a liability.

Perhaps you're wondering how all this works across the organization. Here are the key points.

Putting your teams on a single platform

As companies demand that more data be made available in more places, data friction emerges because data managers — such as

database administrators (DBAs) — aren't meeting the requests of data innovators — developers, analysts, and data scientists.


TIP

Simplifying data management with a cloud operational experience brings those two key audiences together as one team. It provides a self-service data platform that frees data flow and enables data innovators to access and control the right data, at the right time, in the right place.

Meanwhile, data managers are able to support the business at scale by:

- Eliminating ticket-driven IT requests
- Automating data copying and encryption masking
- Reducing developer dependence on them to provision high-quality data sets

Simplifying data collaboration with data protection

Designing and establishing key security practices is integral in today's data-sharing economy for both internal and external purposes. Data breaches and privacy lapses can irreparably damage your company's brand, and regulatory fines can cripple your ability to invest in necessary innovation. Clearly, you can't play fast and loose with your customer data, but the natural reaction — locking down access — only serves to put critical transformation initiatives at risk.


TIP

The right way to empower users with the data they need is to proactively identify and mitigate risk within that data. Unifying data management enables you to take a comprehensive approach to data security. You can

- Identify sensitive data.
- Continuously mask that data in a simple and repeatable manner by replacing confidential information with fictitious yet realistic values.
- Apply governance measures to control data access.
- Provision secure data copies to any target environment and stay in compliance with privacy regulations.

Streamlining with a single point of control

Your organization — like most modern enterprises — likely depends on a heterogeneous set of data sources rather than a single source. Provisioning heterogeneous data for all use cases across the data life cycle (including development, testing, and reporting) often requires complex processes to allow data sets to flow to where they're needed.


TIP

Again, complexity is the culprit. But with streamlined data operations across teams, enterprises can implement a standardized approach to managing, securing, and moving data across myriad sources via a platform that supports all the data sources your various teams depend on.

Increasing speed and agility via self-service IT

Enterprises have been searching for ways to bring the ease and simplicity of the public cloud to their on-premises environments, and most have found that deploying self-service infrastructure is an ideal way to achieve this.

Self-service infrastructure is a key goal for IT organizations looking to scale DevOps initiatives quickly and cost-effectively. With self-service infrastructure, product teams and application owners can rapidly and reliably provision and maintain IT infrastructure for their applications without depending on IT operations teams.

To successfully deliver a self-service model, IT organizations must first overcome the challenges of their traditional infrastructure and simplify management complexities across their data centers. IT leaders must reimagine on-premises infrastructure without the expense and inflexibility of legacy infrastructure.

To do this, you need cloud-native control and operations to manage on-premises data and infrastructure through a SaaS-based control plane that abstracts data and infrastructure control from physical infrastructure. This architectural approach eliminates the complexity, fragmentation, and costs of managing and maintaining on-premises software, and makes the deployment,

management, scaling, and delivery of services invisible to organizations. Additionally, this approach automates management at scale through single-click policies and application programming interfaces (APIs) across globally distributed data infrastructure.


REMEMBER

Need a stat to convince your colleagues of the need for self-service IT? According to Gartner, by 2023, 90 percent of enterprises will fail to scale DevOps initiatives if shared, self-service platform approaches aren't adopted. So, there's no time to waste!

Powering faster app development life cycles

Simplifying data management with cloud operations increases your business agility and enables faster time to value for new apps. It calls for an API-first data services platform that combines data compliance and data delivery to make the sharing of data possible across teams, testing, and other IT processes.

Bottom line, your IT teams will have more time and flexibility to innovate for the business because a cloud operational experience eliminates friction in coordinating work across database management, infrastructure management, and security management.


REMEMBER

On the development side, your testers will have access to accurate, up-to-date data in minutes instead of the multiple hours it would take via traditional methods of copying data (which are slow, expensive, and frustratingly manual). Meanwhile, your developers will spend less time waiting for data and more time building software. With these improvements, your company will see a considerable reduction in development cycles, which will leave more time for coding.

This approach also translates into a number of additional business benefits:

- More business insight and improved decision-making
- New and innovative application-driven business capabilities
- Greater cost reduction and operational efficiency
- Reduced risk
- Increased cross-functional alignment

Making Simplified Data Management a Reality

To unlock all the power of your new data experience, it's important to have an infrastructure platform that spans from edge to cloud. Done right, that data platform should

- Accelerate app development life cycles.
- Unlock data insights.
- Empower data innovators with self-service infrastructure.
- Deliver data as code to provide self-service access to production data instantly and securely.

Let's look briefly at how an edge-to-cloud data platform makes it possible for any organization to benefit from the simplified data management model.

Harnessing an edge-to-cloud, self-service infrastructure

We all know that, for years, cloud has set the standard when it comes to agility. Line-of-business leaders and DevOps teams value the simplicity, self-service, automation, and manage-from-anywhere capabilities that the cloud experience gives them. In particular, they appreciate how easy it is to stand up a workload in the cloud, with all the underlying infrastructure management abstracted away.

An edge-to-cloud data platform powered by simplified data management brings cloud agility to data infrastructure wherever it's located — be that on-premises, at the edge, or in the cloud. It does this by separating the control plane from underlying hardware and moving it to the cloud. This abstraction of control enables a suite of cloud infrastructure services that radically simplifies how customers manage infrastructure at scale and across the life cycle.

Elevating management simplicity

Here's just one example of those transformative cloud services. Intent-based provisioning is a unique service that automates and optimizes app deployment, eliminating guesswork and

spreadsheets by ensuring workloads are always deployed on the right resource across a global fleet. Forget the old logical unit number (LUN)–centric, manual process of storage provisioning. Intent-based provisioning takes an artificial intelligence (AI)–driven approach that leverages real-time context into resource headroom and application-specific SLAs to optimize where your data is stored *automatically.*

Intent-based provisioning, combined with role-based access control (RBAC), enables self-service provisioning without the need for storage expertise. It means developers can deploy applications more quickly by shortening data infrastructure provisioning times from days to minutes. In turn, this accelerates application development cycles and makes possible the effortless app-provisioning experience that today's fast-paced DevOps processes demand.

Automating operations at cloud speed and scale

Another well-learned lesson from public cloud-based infrastructure adoption is that application developers appreciate infrastructure programmability via an all-inclusive API. On-premises storage infrastructure automation may be implemented tactically in corners of the data center, but traditional on-premises storage infrastructure struggles to measure up as deployments use element managers with isolated management stations — each introducing a separate set of APIs at different revision levels. Even *saying* that sounds uncomfortable.

Your edge-to-cloud data platform, on the other hand, should feature a highly extensible cloud-native control plane with a fully programmable, unified API across edge-to-cloud infrastructure. That single API endpoint for the entire infrastructure will enable developers to automate self-service operations at cloud speed and scale without worrying about API versions, feature compatibility, or multiple scripting — which, in other words, is profoundly empowering.

Getting self-service access to secure data

Legacy approaches to test data management can be a huge inhibitor for modern quality assurance (QA) practices that promise higher quality and faster releases. But when you pair simplified data management with an edge-to-cloud data platform, you can easily automate the rapid provisioning of test data — based on developer needs. At the same time, you can still observe all modern data security practices, with capabilities like masking nonproduction data. This combination has the effect of accelerating data delivery and reducing delays in the DevOps life cycle.

In short, simplified data management and an edge-to-cloud data platform provide the critical cloud operational experience and cloud-native data infrastructure that organizations need to accelerate data-driven transformation and unleash the full power of your data. Now it's up to you to innovate.


TIP

To build your innovation strategy based on simplifying data management with a cloud operational experience, check out Chapter 5.

IN THIS CHAPTER

- Making an edge-to-cloud data platform the cornerstone of your strategy
- Delivering the cloud experience everywhere
- Powering your data with cloud-native data infrastructure
- Ensuring always-on, always-fast apps with AI-driven intelligence
- Making the move to storage as a service

Chapter 5
Ten (or So) Tips for Simplifying Data Management

Ask yourself if this story sounds familiar: Your organization wants to accelerate transformation, but data and infrastructure complexity slow you down. Disparate software and hardware, manual processes, and organizational silos result in a piecemeal approach and a cascade of fragmentation, operational inefficiency, and business risk — all coming at the expense of agility and innovation.

That's quite a list of challenges to confront — but it can be done. To succeed, you need a radically different approach: a new data experience that harnesses data, cloud, and artificial intelligence (AI) to deliver data-centric policies and automation, cloud-native control and operations, and AI-driven insights and intelligence in radically streamlined data and infrastructure management.

HPE captures that new data experience with a vision for simplified data management that delivers the cloud experience everywhere via the HPE GreenLake edge-to-cloud platform. Let's build out your modernization strategy based on five key ideas — and see how HPE GreenLake can help get you there.

Build Off an Edge-to-Cloud Data Platform

The foundation of your data management strategy should be a data platform that can seamlessly power apps and data across your environment. Assembling a data platform on your own is not for the faint of heart, but you don't have to stress about it. The HPE GreenLake edge-to-cloud platform can make your data-driven transformation a reality.

A unique cloud-native architecture, HPE GreenLake brings cloud operations to all your apps and data and provides a foundation for unified data management. The platform connects applications to infrastructure, innovators to data, and automation to policies in a seamless, unified cloud experience. It eliminates silos across people, processes, and technologies while unleashing data, agility, and innovation across the organization.

The HPE GreenLake edge-to-cloud platform brings together cloud data services, cloud infrastructure services, cloud-native infrastructure, and AI-driven intelligence — all delivered as a service. Here are the key benefits it brings to the table (er . . . platform):

- **Cloud data services:** Cloud data services are a comprehensive set of services with the power to automate and orchestrate data workflows from edge to cloud and across the data life cycle — from data protection to test dev to analytics. Unified data services work wonders to facilitate and streamline data access, protection, visibility, governance, and mobility.
- **Cloud infrastructure services:** In parallel to cloud data services, cloud infrastructure services deliver cloud operational agility for data infrastructure across its life cycle — from deployment to provisioning to upgrade. By managing infrastructure through an abstraction of actual physical infrastructure — that is, by separating the data plane and the control plane of edge-to-cloud infrastructure — HPE radically

simplifies and automates management at scale and delivers it through a single pane of glass and a unified application programming interface (API).

- **Cloud-native data infrastructure:** This is data infrastructure that's purpose-built for cloud operations and for consumption via cloud-native control. It brings the cloud experience to every workload — ensuring a seamless experience from edge to cloud. And it's got the architectural flexibility to address any application workload and service-level agreement (SLA), without the complexity of traditionally siloed storage management.
- **AI-driven global intelligence:** Advanced AI powers autonomous data operations and optimizes performance, availability, and resource management across clouds. Real-time application and resource context, as well as edge-to-cloud visibility, mobilizes data where it needs to be, ensures nondisruptive business continuity, and makes infrastructure and data operations invisible.
- **Delivered as a service:** The entire platform is comprised of simple, scalable, pay-per-use infrastructure that's either managed for you or under your control. That makes it simple for you to meet your SLAs, free up IT resources, and deliver financial flexibility via consumption-based economics and dramatically lower total cost of ownership (TCO).

Focus on Cloud Everywhere and Unified Management

Every organization hopes to unleash the power of its data to drive digital transformation. But being able to overcome fragmented data management tools, manual processes, and infrastructure silos across clouds will determine which enterprises can accelerate data-driven innovation and agility while minimizing business risk.

Key to eliminating this complexity is Data Services Cloud Console from HPE. An intuitive software as a service (SaaS)–based console available through the HPE GreenLake edge-to-cloud platform, Data Services Cloud Console delivers a suite of cloud data services

designed to enable cloud operational agility for data infrastructure everywhere — and to unify data operations across the data life cycle.


REMEMBER

Data Services Cloud Console is built on a unique, cloud-native architecture that automates and orchestrates infrastructure and data workflows from edge to cloud. It transforms complex data operations into a streamlined data management experience. In effect, it provides unified data operations as a service.

With Data Services Cloud Console, you can bring the agility of the cloud operational model to data infrastructure wherever it's located — whether on-premises, at the edge, or in the cloud. You'll enjoy unified management via a single web interface that delivers global visibility and a consistent experience from edge to cloud.

Leverage cloud agility to simplify your operations

At the heart of Data Services Cloud Console is HPE Data Ops Manager, a cloud data service that enables both global management and monitoring of data infrastructure from any location, on any device. It also enables intent-based provisioning, which provides a long-sought paradigm shift in storage provisioning from logical unit number (LUN)–centric to AI-driven and app-centric.

Here's a look at some of the key features of HPE Data Ops Manager:


TECHNICAL STUFF

- **Global data infrastructure management:** Eliminate the inefficiency of using disjointed, domain-specific data infrastructure management tools. HPE Data Ops Manager provides 100 percent cloud-managed infrastructure, which means you have everything you need at your fingertips to globally deploy, manage, upgrade, and optimize your entire fleet — wherever it is in the world — from any location and on any device. The cloud-native control plane scales autonomously with infrastructure, so managing hundreds of systems across geographies is as simple as managing one.
- **Intent-based provisioning:** This powerful tool automates and helps optimize app deployment. Think of eliminating all the guesswork and spreadsheets you use to ensure workloads are deployed on the right resource across a global

fleet. Intent-based provisioning transforms storage provisioning from a LUN-centric, manual process to an AI-driven approach that leverages real-time context into resource headroom and application-specific SLAs to automatically optimize where your data is stored. Infrastructure admins only have to specify the workload type, capacity, and number of volumes and host groups that need access to a particular workload. Intent-based provisioning does the rest, abstracting away all the traditional low-level details such as specifying RAID types, block size, and data reduction parameters for compression and dedupe.

- **Self-service experience:** This is where intent-based provisioning, combined with role-based access control (RBAC), enables self-service provisioning without the need for storage domain expertise. When data infrastructure provisioning drops from days to minutes, fast-paced DevOps teams can deploy apps at speed — accelerating the app development cycle.
- **Automation at scale:** Data Services Cloud Console is a highly extensible control plane with a fully programmable, unified API across edge-to-cloud infrastructure. What does that mean? With this single API endpoint, your infrastructure now allows you to automate self-service operations at cloud speed and scale without worrying about API versions, feature compatibility, or multiple scripting.
- **Operational dashboard:** Get an at-a-glance summary of your entire fleet of storage systems, volumes, and host servers, including capacity and performance summaries and any reported issues. From this single dashboard, your storage admins can readily gain visibility into the health and utilization of their global fleet, determine how resource utilization will grow across performance and capacity based on historical workload patterns, and zero in on specific systems that require their immediate attention.

Enjoy effortless built-in data protection

HPE GreenLake for data protection delivers built-in disaster recovery (DR) and backup cloud services as seamless extensions to your primary storage. From rapid recovery to ransomware protection to long-term data retention, these next-generation cloud services help you modernize your data protection capabilities, either

on-premises or in the public cloud, with operational simplicity and the ability to meet every SLA at the right cost. You can

- **Confront ransomware head on.** Industry-leading DR as a service from Zerto, an HPE company, leverages Continuous Data Protection (CDP) technology with journal-based recovery to let you recover in minutes, at scale, to a state just prior to a ransomware attack. Zerto provides best-in-class restore times without impacting business operations for all recovery scenarios.
- **Secure your data from edge to cloud.** HPE Backup and Recovery Service offers backup as a service designed for hybrid cloud. Delivered through the Data Services Cloud Console and policy-based orchestration and automation, it lets you protect your virtual machines (VMs) with three simple steps in less than five minutes and manage your backups effortlessly across on-premises and hybrid cloud. There are no media servers, appliances, or targets to manage. You can recover instantly on-premises, retain cost-effective long-term backups in the public cloud, and enjoy the security of backups that are protected against ransomware attacks. HPE Backup and Recovery Service can lower the cost of protecting your data with consumption-based pricing and ultra-efficient data reduction technologies.

Rely on a proven platform

Data Services Cloud Console is new, but its foundational building blocks are market-hardened technologies you're probably familiar with. It's powered by the proven, trusted technology of Aruba, which today has several years in the field, serving 90,000 customers and millions of end devices connected to clusters deployed around the world.

This foundation provides the secure management of global infrastructure and data services that you get on-premises, but with all the simplicity and agility of the cloud that enterprises want. And there's more: Multilevel advanced security capabilities include encrypted connectivity to data infrastructure, multifactor authentication, fully audited actions, RBAC policies, intrusion detection, and a wealth of compliance and certification standards.

The cloud console is structured as a framework of microservices and workflows that enables new services to be rapidly developed, deployed, and scaled with a consistent user experience. This framework provides the basis for a portfolio of services that are seamlessly available and continuously updated for you within the cloud.

Move faster with software as a service

Because Data Services Cloud Console is delivered as a service, there's no software to deploy, manage, or maintain. Customers automatically stay current on the latest software features without needing to take any action. It's dead simple. Even better, you can move from an ownership model to an access model and enjoy the agility and convenience of a flexible subscription.

Unify data management

From the perspective of IT modernization, a critical benefit of Data Services Cloud Console is that it provides a suite of cloud data services that enables a unified experience for your data managers and data innovators to access, protect, search, and mobilize data across data infrastructure from edge to cloud. That alone makes it game-changing.

How does this work? Integrated, automated, and policy-driven data services enable data orchestration across the data life cycle — from dev/test to production, protection, and analytics. This has the effect of collapsing data silos and helping eliminate the complexity of traditional data management operations. Your organization gets the one data experience you need to accelerate data-driven innovation, protect data everywhere, and intelligently move data across clouds.

Power Your Data with Cloud-Native Data Infrastructure

To bring the cloud experience to every workload, you also need a new approach to data infrastructure — one that's cloud-native by design. Cloud-native architecture, being purpose-built for cloud operations and as-a-service consumption from edge to cloud, exploits the advantages of the cloud computing delivery model to ensure IT resources are always on and instantly available.

Cloud-native data infrastructure is underpinned by intelligence, effortless to manage, and available as a service, so you can instantly respond to any demand. In practice, this means you have the power to run any application, from traditional to modern, without the complexity of traditional storage management. And you're able to break down silos between clouds via seamless access to data and a consistent experience that maximizes resources across on-premises infrastructure and public cloud.

HPE Alletra is a portfolio of cloud-native data infrastructure solutions designed to power all your data, from edge to cloud. Along with Data Services Cloud Console, HPE Alletra delivers a cloud operating and consumption experience wherever data lives. So, for the first time, you can get the same agility, the same simplicity, and the same consistent experience for every single app, across each app's life cycle.

Think about it this way: HPE Alletra is a paradigm shift for data infrastructure from edge to cloud, because now you can

- Shift from owning and maintaining data infrastructure to simply accessing and utilizing it on demand and as a service.
- Run any app, from traditional to modern, and meet any SLA with the right performance, the right resiliency, and the right efficiency.
- Unleash the true potential of hybrid cloud with consistent data services and seamless data mobility across clouds.

Maximize your agility with a cloud experience for every app

HPE Alletra strips away all the complexity. In eliminating up to 98 percent of your operational time, it enables you to drive cloud speed and agility. By abstracting the data infrastructure control plane from the data plane and moving it to the cloud, it gives you a single, consistent operational experience. And instead of managing dozens of on-premises storage devices from various interfaces, with Data Services Cloud Console you get one consistent experience for HPE Alletra, which looks like this:

- Plug-and-play in minutes. A new system only has to be connected to the network to begin automatic discovery and configuration.
- Effortlessly provision at scale by shifting from storage provisioning based on a LUN-centric, manual process to an intent-based, AI-driven approach in which applications are always deployed on the right resources.
- Manage data infrastructure across its life cycle from anywhere, on any device, with an intuitive SaaS-based user experience.

Here's another crucial aspect of the agility HPE Alletra enables: You're not bogged down with the hassles of ownership and maintenance fees. As-a-service consumption enables you to free up cash flow and increase financial agility. With HPE GreenLake for storage, you can pay per use, scale up and down, or opt for a complete turnkey solution to take all the weight off your shoulders.

Run any app without compromise

Because today's data and infrastructure requirements are incredibly diverse, HPE Alletra is designed and built for every application, from traditional to modern. Workload-optimized systems deliver architectural flexibility without the complexity of traditional data infrastructure. This means you can meet any SLA with the right performance, resiliency, and efficiency to match the specific needs of each application.

There are currently two models available in the HPE Alletra portfolio: HPE Alletra 9000 and HPE Alletra 6000. Both are proven and tested all-NVMe systems that are built from the DNA of HPE Primera and HPE Nimble Storage.

- **HPE Alletra 9000** is optimized for 100 percent availability to meet and exceed mission-critical workload demands. It's designed for unconstrained scalability and built on a unique, multi-node, all-active architecture and the best set of built-in data protection capabilities for any recovery time objective (RTO) or recovery point objective (RPO) requirement, including automatic site failover across active sites with active/active peer persistence. With a standard 100 percent

availability guarantee, HPE Alletra 9000 is ideal for consolidating large-scale traditional and next-generation extreme latency-sensitive applications like online transaction processing (OLTP), database workloads, containers, and mixed workloads.

- **HPE Alletra 6000** is optimized for best price performance on a resilient system that businesses can count on. It's built on an ultra-efficient architecture designed to deliver fast, consistent performance with industry-leading data efficiency. Always-on data services and app-aware intelligence eliminate performance and efficiency trade-offs. For the past decade, HPE Nimble Storage has delivered unrivaled capacity efficiency with 6x9s of proven availability measured across the entire installed base. HPE Alletra 6000 carries on this tradition and is ideally suited for business-critical databases or medium scale VM and container farms.

Free your data and unleash hybrid cloud

Cloud-native data infrastructure needs to deliver a consistent experience across private, public, and hybrid clouds. HPE Alletra does exactly that, unleashing the true potential of hybrid cloud with one platform across edge to cloud. This means you can elevate your hybrid cloud flexibility to support each stage of your application life cycle. You can also drive better business outcomes by moving on-premises data and applications to the cloud and back again without egress costs. In mobilizing data across clouds, you get the best of every cloud to power your innovation.

Make your investments timeless

We're all tired of dealing with the unpleasant surprises that come with data infrastructure, such as unplanned downtime, forklift upgrades, and ever-increasing support costs. HPE Alletra enables you to leave these legacy maintenance cycles behind and switch to a radically simpler storage experience without the headaches. It's an experience, called Timeless Storage for HPE Alletra, that stays simple even as your business grows and your needs evolve — including freedom from forklift upgrades, flat support pricing

with direct access to experts, and technology refreshes to make sure your investments get better with age.

Power It All with AI-Driven Intelligence

According to IDC, more than 90 percent of problems affecting applications occur *outside* of storage, which means storage resiliency and performance alone aren't enough to protect your business. With countless variables and potential issues across the infrastructure stack, ensuring applications stay up and fast requires an intelligence with visibility and insight that's simply beyond what humans can handle. And that's where AIOps becomes invaluable.

HPE Alletra cloud-native data infrastructure is powered by HPE InfoSight, the industry's most advanced AI for infrastructure. Since 2010, HPE InfoSight has analyzed more than 1,250 trillion data points from over 150,000 systems across the infrastructure stack — saving more than 1.5 million hours of lost customer productivity. Leveraging advanced machine learning to predict and prevent 86 percent of problems before you even realize you have an issue, HPE InfoSight's global intelligence goes beyond storage to provide deep end-to-end insights across your IT stack, including the app layer. It delivers AI-driven recommendations that improve application performance, drive higher availability, and optimize resource utilization and planning.

That's not all. HPE InfoSight also enables HPE Alletra to redefine white-glove support with predictive support automation that delivers a support experience unlike anything you're familiar with. Typical tiered support models can take a long time to resolve problems. As customers are passed from one support engineer to another, they're often made to provide the same information multiple times, wasting everyone's time. HPE InfoSight's predictive support automation enables HPE Alletra to eliminate Level 1 and Level 2 support, giving you direct access to expert Level 3 HPE Alletra support engineers. That removes time-consuming and frustrating escalations and results in fewer support tickets, less time spent resolving storage-related trouble tickets, and faster time to resolution for events that necessitate Level 3 support.

REMEMBER

Since first transforming IT operations from break-fix to predict-and-prevent a decade ago, HPE InfoSight has continued to lead the way as the industry's most mature and advanced AI for infrastructure. Storage competitors have seen the impact of HPE InfoSight and tried to emulate it. They may imitate the messaging, but they don't come close to matching HPE InfoSight's breadth of telemetry, full stack visibility, applied machine learning, and prescriptive actionable recommendations. HPE InfoSight is truly one of a kind.

Finally, HPE GreenLake customers can take advantage of the instant, data-driven insights of HPE CloudPhysics, a SaaS service that enables them to optimize application workload placement, procure right-sized infrastructure services, lower costs, and maximize time to value.

Move to Storage as a Service

When it comes to your on-premises environment, how are you making the move from IT operator to provider of consistent cloud services that your business now expects? IT organizations face some common headwinds in this transformation. Long procurement cycles and upfront capital costs can slow down your business. Over-provisioning is costly, but under-provisioning with limited transparency increases risk. And of course, in every business, ongoing, routine tasks consume IT's time and attention. Ultimately, you need to eliminate these challenges, drive agility, and bring the cloud experience to all your apps.

If that's you, it's worth considering storage as a service. Flexible consumption models will free up cash flow and give you financial agility. Vendor capacity buffering will enable you to scale up and down as needed.

An experienced partner can operate on-premises infrastructure for you and allow you to pay only for what you use. This is where partners like HPE fit in. HPE GreenLake for storage offers storage as a service — bringing cloud operational agility and a

pay-as-you-go cloud ownership experience to wherever your apps and data live. This lets you not only focus less on administration and more on innovation, but also delivers business outcomes faster and helps you unlock the full potential of your data.


TIP

If you want to learn more about how HPE can help you achieve a simplified data management experience that collapses silos across people, process, and technology in order to unleash data, agility, and innovation throughout your organization, visit HPE GreenLake at `www.hpe.com/us/en/greenlake/storage.html`.

Unleash the power of your data

These days, an enterprise's success depends on data-driven modernization to move forward, faster. But growing data complexity is inhibiting digital transformation. In response, organizations need to radically simplify the ways in which they manage data by delivering a cloud operational experience wherever apps, data, and infrastructure live — across edge to cloud. This book looks at how simplifying data management with cloud operations enables you to unleash the power of your data and dramatically accelerate your transformation journey.

Inside...

- Discover why data complexity requires reimagining data management
- Learn the value of radically simplified data management
- See what it means to leverage a cloud operational experience everywhere
- Explore the benefits of modern data protection for digital transformation
- Uncover the steps to simplifying your own data management

Hewlett Packard Enterprise

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