Understanding the must-haves of data and cyber resilience

Storage edition

IBM

IBM Storage

Why organizations need resilient storage

Data protection requirements have evolved as IT has grown more complex.

Data volumes are growing while IT budgets are not. The cyber security landscape is rapidly evolving, and threats are becoming more sophisticated—and more costly. On average, data breaches are costing organizations $4.24 million per incident. [1] On top of malicious attacks, organizations also contend with data theft or data loss from natural disasters and human error.

Mixed IT environments are the norm and organizations need protection, not just in the data center but across virtualized, containerized and hybrid cloud environments as well. And while preventing data-destructive events remains a primary objective, it's equally important to be able to quickly recover when such an event takes place.

So, where simple backup and recovery used to suffice, organizations now need storage solutions that provide data and cyber resilience. The right resilient storage solutions can transform data protection from an insurance policy to a business-centric solution that enables data-driven transformation.

In this ebook, we'll explore what data resilience storage solutions can provide that backup and recovery solutions cannot, the benefits of a data resilient approach, the necessary capabilities that make those benefits obtainable, and why organizations should partner with IBM on their data and cyber resilience strategy.

What is data resilience?

Data resilience enables you to identify, protect, detect, respond and recover from a data-destructive event. It's an important component of your organization's overall cyber resilience strategy and business continuity plan.

Going beyond data backup and recovery

While traditional data backup and recovery solutions fail to provide the data reduction technology and instant recovery capabilities needed in today's digital world, data resilience ensures your data remains available and uncorrupted while you combat threats and work towards recovery.

The table on the right shows the important differences between backup and recovery and data resilience solutions.

	What you have today: Data backup and recovery	What you need for tomorrow: Data resilience
Replication	Data is being replicated continuously but logical errors are also replicated instantaneously	Scheduled point-in-time copies stored in an isolated, secure location
Error detection	Immediate detection of system and application outages	Regular data analytics on point-in-time copies to validate data consistency
Recovery points	Single recovery point that may be compromised	Multiple recovery points
Isolation	All systems, storage and tape pools participate in the same logical system structure	Air-gapped systems and storage so that logical errors and malicious intruders cannot propagate
Recovery scope	Continuous availability and disaster recovery	Continuous availability and forensic, surgical or catastrophic recovery capabilities

Taking a multi-layered approach

The key to achieving data resilience is taking a "multi-layered approach" and deploying an infrastructure that supports data resilience requirements at the hardware and software level.

Software-defined storage allows you to quickly integrate new features with a simple software installation, upgrading your existing storage. Software-defined storage can be implemented without the need for additional storage devices.

The recovery and backup tools of a software-based flexible storage foundation work with your existing hardware to accelerate data-intensive workloads using less capacity and computing power.

There are many benefits to deploying a multi-layered approach as part of your data and cyber resilience strategy, which we'll cover in the next chapter.

Benefits of a data and cyber resilience strategy

Data resilience solutions enable organizations to handle exponential data growth and diverse workloads, unify data recovery, provide retention and reuse across mixed environments, recover quickly from a data-destructive event and improve the efficiency of analytics and development.

This provides several business benefits, including:

— Better performance and lower costs

— Continuous, efficient and effective business operations

— Reduced risk and unified protection across hybrid environments

Let's explore each of these benefits in more detail.

Better performance and lower costs

As the amount of data in your organization grows, you'll need data protection that doesn't impact performance, requires minimal storage consumption and leverages your existing storage investments. Look for space-efficient snapshots, compression, deduplication and object storage to ensure large data sets aren't as demanding and still readily available when needed.

Continuous, efficient and effective business operations

Organizations need data protection solutions that improve the veracity and efficacy of analytics while also speeding up development and helping to ensure data compliance. To fulfill these objectives, organizations are using data stored on secondary storage for more than just data backup and recovery. In other words, data protection is quickly becoming a source of business efficiency and an enabler of IT innovation.

A centralized dashboard can streamline operational tasks by providing a quick view of storage utilization and data protection status, as well as drilldowns and alerts to help with troubleshooting. Moreover, most companies need to protect many different types of workloads. Protecting all workloads with a single platform, including VMs, file systems and applications — whether they reside on bare metal, in VMs, in containers, or in the cloud — can greatly simplify operations.

Reduced risk and unified protection across hybrid environments

Data resilience solutions are designed to mitigate destructive events, including cyberattacks, with features that allow automatic ransomware detection and security notifications. Rock solid data security goes beyond data encryption to provide the ability to physically or logically air-gap data or lock it down on object storage. Storing data on physical and logical tape is a proven strategy for securing backup repositories. Using physical or logical tape to air-gap data increases your data resilience because it ensures backups saved to tape are isolated and protected from cyber breaches that could impact other systems.

Hybrid cloud environments are inherently complex, but a single data resilience solution can extend across an entire IT infrastructure and unify workload protection. Regardless of where data is hosted, the right solution will automate backup frequency, data retention and data reuse across your entire environment. With this, organizations can easily manage data recovery, data copy creation and SLA compliance "under one roof."

In the next chapter, we'll review the capabilities of resilient storage solutions that will help you realize these benefits at your organization.

Considerations for evaluating resilient storage solutions

Resilient storage solutions help your organization protect against and quickly recover from data-destructive events. When evaluating storage solutions, look for the following capabilities to ensure that your storage infrastructure will provide data resilience and support your larger cyber resilience strategy.

Capabilities of resilient storage solutions:

Identity and administrative security

Compromised credentials, malicious insiders and system misconfigurations are at the root of many data destructive events. Your security applications need to be protected and capable of warding off malicious activities and bad actors. The key to ensuring your data and data copies are secure comes down to controlling access and rights to the data while combating malicious activity at the application level.

Identification and monitoring

Artificial intelligence (AI) and machine learning (ML) can help you proactively monitor the activity in your IT environment. AI and ML-powered solutions enable you to identify suspicious activity and scan your data pools for ransomware or malware.

Encryption

Data encryption is the first step to better security. Encryption encodes your data at rest and in transit, so it's unintelligible to unauthorized parties. Only those with an encryption key can access the data and convert it to plain-text.

Multiple layers of backup

Even encrypted data needs a fail-safe. It's crucial to perform frequent backups and create copies that can be stored in an isolated environment. This process takes storage snapshots and secures them in a vault. Once the threat has been eliminated, these snapshots are available for instant recovery. Backup clean copies can also be moved onto secondary storage, another server or to the cloud. These capabilities also provide point-in-time recovery which allows you to restore data from a backup that occurred before the data-destructive event took place.

Air gap and isolation

Although tape is an affordable storage option, it takes longer to recover data stored on tape. Logical data isolation that protects data from modification or deletion is the next step in air gapping. In case of a cyberattack, you can restore your data from the unimpacted copies that have been isolated in this tamper-proof repository.

Automation and orchestration

Automation and orchestration streamline data recovery. These tools instill processes and automated workflows to ensure consistency and reduce complexity when and where you need it most. With the ability to restore your data quickly, you can return to normal business operations before the threat causes major damage to your system.

Rapid recovery

Rapid recovery is achieved through the ability to instantly mount data volumes, with support for storing files in native formats and a searchable global catalog of virtual machines (VMs), databases and files. Data volumes that can mount instantly eliminate the need for data hydration and conversion. These features reduce downtime and restore access to backup data almost immediately. High-performance recovery solutions also provide data isolation and recovery throughout hybrid cloud environments and all-in-one data protection that streamlines operational recovery, data reuse and long-term data retention.

Self-service data access

A self-service portal allows business users to create copies of data needed for analytics and other business purposes. The right data protection solution relies on limited, role-based access control (RBAC) and SLA-based policies to help streamline and secure access to backup data. This process restricts access based on the roles of individual users, while REST APIs simplify application and tool integration. Together, this powerful combination of capabilities improves the speed and effectiveness of development, testing and analytics, and serves as a key component of cyber resilience strategies.

Metadata management for unstructured data

Solutions should provide consolidated visibility into stored data, even as the amount of data stored grows and becomes increasingly unstructured. You will need efficient metadata management tools that can rapidly ingest, consolidate and index metadata for billions of files and objects across on-premises and cloud environments. The right solution will automatically identify and classify sensitive information, immediately differentiate mission-critical business data and give data scientists, IT teams and business users a fast and efficient way to search through petabytes of data.

Data resilience for containers

As containerized applications move into production, organizations are leveraging DevOps processes, container orchestration platforms and volume snapshots to provide developers with persistent container data protection services. Offering self-service container backup and recovery via APIs, such as Kubernetes kubectl, enables fast adoption for application developers. Native integration with Kubernetes enables complete data recovery with a data resilience solution that manages both persistent volumes and Kubernetes resource metadata. For more information, visit our "**Unified Approach to Data Resilience for Containers**" solution brief.

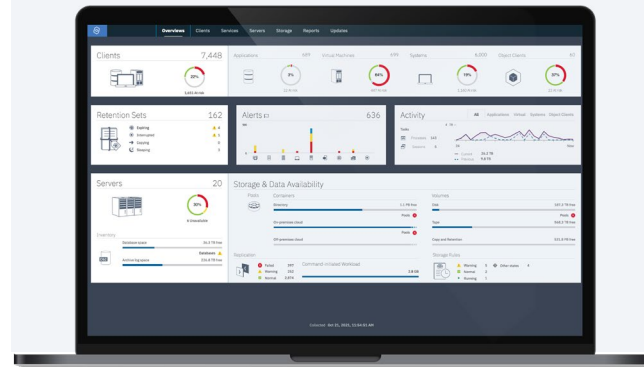# Partnering with IBM to achieve data and cyber resilience

IBM Storage solutions provide effective and innovative data resilience that simplifies protection management across hybrid cloud environments, maximizes business uptime and lowers costs — all while improving resilience against cyber threats.
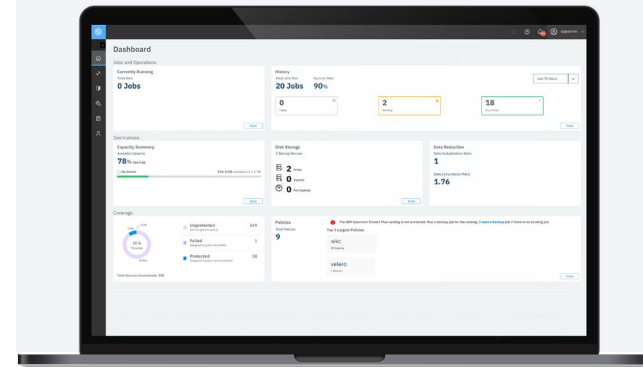
Let's explore IBM's data resilience portfolio:

IBM Spectrum Protect

IBM Spectrum® Protect offers data protection for virtual environments, physical file servers and applications. Its built-in data efficiency capabilities allow organizations to reduce backup infrastructure costs, scale up when needed and copy data to tape, public cloud services and on-premises object storage.
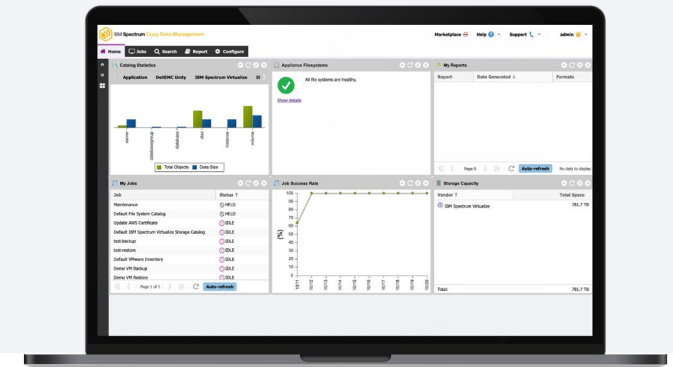
IBM Spectrum Protect Plus

IBM Spectrum Protect Plus has end-to-end processes that leverage existing investments to support long-term data retention and operational recovery. Its native integration with Kubernetes and Red Hat® OpenShift® provides data resilience for containers running in those environments and, as an added bonus, increases developer productivity.

IBM Spectrum Copy Data Management

IBM Spectrum Copy Data Management makes copies available to data consumers when and where they need them, without creating unnecessary copies or leaving unused copies on valuable storage. This "in-place" copy data management software automates processes and workflows to ensure consistency and reduce complexity while rapidly deploying as an agentless VM for faster time to value.

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The IBM FlashSystem family

The IBM FlashSystem® family, built on IBM Spectrum® Virtualize software, is the primary storage platform designed to simplify hybrid cloud environments with speed, enterprise-class resilience and security features such as cyber resilience, disaster recovery and high availability capabilities. For a full end-to-end data lifecycle management solution, combine these solutions with other members of the IBM data resilience portfolio.

IBM TS7700 Virtual Tape Library

IBM TS7700 Virtual Tape Library is the disaster recovery solution for your mainframe environments, and it optimizes data protection and business continuance for IBM Z® data. Built into an 8-way communication grid for superior business continuance, the TS7770 – the latest generation of this family – eases the support to your IBM Z mission-critical hybrid cloud backup and archive infrastructure with virtualized tape storage, now with an all-flash cache option for high performance workloads.

The IBM DS8900F family

The IBM DS8900F family is the fastest, most reliable and secure storage system for IBM Z and IBM Power®. Built with the most advanced processor technology, this family of enterprise data systems provides next level performance, data resilience and enterprise availability to build faster, more secure operations and make smarter decisions to turn data into business opportunities.

IBM LTO 9

IBM LTO 9 tape storage solutions offer more energy-efficient storage capacity than ever, keeping data safe, secured and protected against cyber threats. This reliable tape storage technology also provides end users with air gap, long-term retention, immutability with WORM tape cartridges, cyber resilience and energy efficiency at a lower cost than other media.

Want to learn more?

To learn more about how **IBM Storage solutions** can drive date resilience, **schedule a consultation with our storage experts** or contact your IBM Business Partner today.

In the next chapter, we'll look at examples of how different customers have improved their organization's data and cyber resilience by partnering with IBM.

Client stories: The real-world impact of data and cyber resilience

Here are just a few examples how businesses have improved their data and cyber resilience by leveraging IBM Storage solutions and the benefits they've realized:

Shibuya

Read the case study →

Industry: Systems hardware

Delivers exceptional service continuity by building on

100% availability

Enables nonstop, versatile IT services to support

24x7 customer operations

"We take advantage of IBM Spectrum Storage tools to simplify management of data across our infrastructure … Integrated into IBM FlashSystem storage, IBM Spectrum Virtualize gives us a single point of control so that we can move data easily and securely. IBM Spectrum Protect gives us scalable data protection for our entire environment, supporting our backup services."

Christian Wibeck
Head of Business Development
Shibuya

RNG Teknoloji

Read the case study →

Industry: Computer services

40% lower costs on average

6x faster backups achieved through data compression and deduplication

"IBM Spectrum Protect Plus offers data compression and deduplication features that help customers reduce the size of the data that they send to either our data center or other locations. They can reduce 20 TB of transmitted data to only 8 TB – 9 TB of data ... IBM Spectrum Protect Plus gives us a 'true' forever incremental backup. With other tools, 'incremental' means you take a full backup every two weeks. But with the Spectrum Protect Plus, we take a full copy only the first time. Then we only backup the changes that have occurred. Between that and the data compression, it saves a lot of time."

Behreng Nami
Founder and Owner
RNG Teknoloji

Ceramfix

Read the case study →

Industry: Industrial products

80% drop in data process timelines

Increased reliability with cross-site replication and automated failover

75% faster backup times

"A truck — a tractor trailer — crashed into a utility poles outside one of our offices ... The insurer had to be called. We were outside taking pictures to demonstrate what happened. It was a mess. But HyperSwap worked exactly as you would like. We kept our processes running, even though our fiber line was on the ground. Since then, I can relax knowing that we have a reliable, comprehensive and highly available solution."

Daivid Thomaz
Founder and Owner
RNG Teknoloji

Sonalika International Tractors, Ltd.

Read the case study →

Industry: Industrial products

Performance boost of key back-office processes while accelerating data access

99.999% availability

Improved scalability

"We are running our SAP processes much faster now, and the new IBM Storage delivers a remarkable performance improvement. My staff is much happier now that they aren't waiting on the infrastructure … Reliability is also important for us, and to make sure our system is up and running 99.999%, we chose IBM … Intel platforms offer a lot of vulnerability, but the IBM technology delivers disk security and stability that will let us avoid downtime and related operating losses."

Swapan Gayen
Chief Information Officer (CIO)
Sonalika International Tractors, Ltd.

Huhtamaki

Read the case study →

Industry: Consumer products

4x availability

(reduced backup and recovery time from 12 to 3 hours)

Minimized administrative workload and expanded IT capacity without adding personnel

Reduced global server migration time by standardizing across workloads

"The backup window for our systems has gone down around four times from where it used to be, and there's been a significant improvement in the overall time it takes for server migrations … Now we have a much more reliable and easily managed solution that can get the big stuff done more efficiently and future-proof our data protection as our IT infrastructure continues to evolve to meet the data growth, security, and compliance needs of our locations around the world."

Aki Kemppi
Group IT Manager
Huhtamaki Oyj

Tamilnadu Newsprint and Papers Limited

Read the case study →

Industry: Industrial products

2x
increase in end-user application performance

66%
faster reporting

66%
faster backups

"The combination of IBM Power servers and IBM Storage offers us the flexibility we need to support a fast-growing business. On the server side, as our number of users, analytics volumes and IoT workloads grow, we can scale up gradually by activating dormant processor capacity within the system. On the storage side, we can operate a mix of solid-state and hard-disk drives in a single, compact footprint — helping us to deliver low-latency performance without sending costs soaring. And with IBM Spectrum Protect managing our backups, we have the peace of mind that our critical business data is always safe."

Manoharan K
Chief Information Officer
Tamilnadu Newsprint and Papers Limited

Department of the Treasury of Puerto Rico

Read the case study →

Industry: Government

100%
of the Treasury's applications and data are protected in the event of an outage

Improved customer satisfaction by enabling greater service continuity

Protected government revenues by minimizing disruption to tax collection processes and guarantees reliable operation of payroll for government employees

"Today, most of our application landscape is protected by IBM technology. With effective availability measures in place, it's a huge weight off our minds at the Treasury. We never know when another hurricane may hit Puerto Rico, but at least we know that we're now better prepared to absorb the impact and recover quickly. For our citizens, this means less disruption to public services and the ability to submit their tax information, while the government can return to business-as-usual sooner."

Raúl Cruz Franqui
CIO
Department of the Treasury of Puerto Rico

State of Ohio

Read the case study →

Industry: Government

100%
success rate of daily backups for hundreds of VMs

Near-instant data recovery enables high service levels

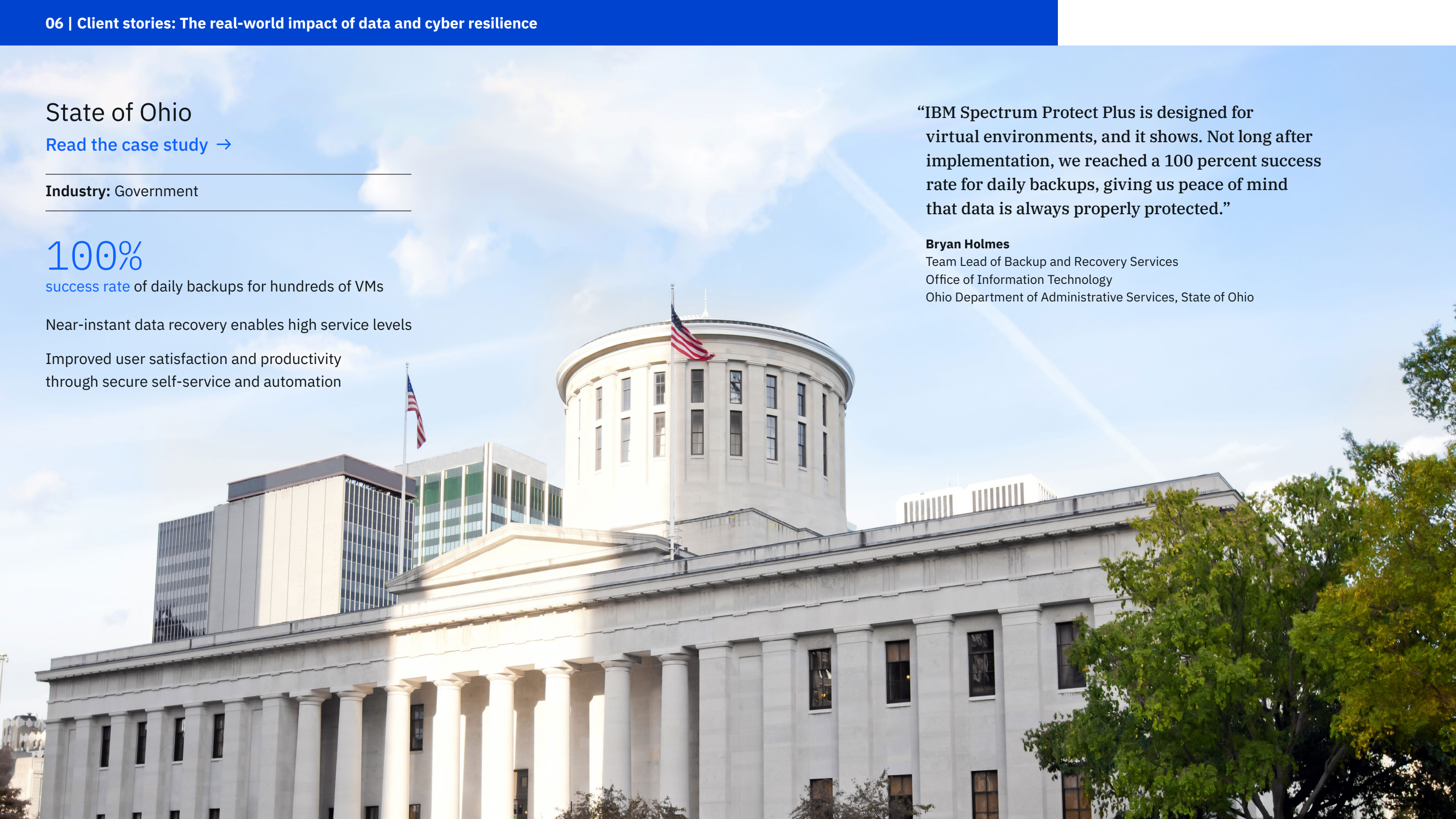Improved user satisfaction and productivity through secure self-service and automation

"IBM Spectrum Protect Plus is designed for virtual environments, and it shows. Not long after implementation, we reached a 100 percent success rate for daily backups, giving us peace of mind that data is always properly protected."

Bryan Holmes
Team Lead of Backup and Recovery Services
Office of Information Technology
Ohio Department of Administrative Services, State of Ohio

Next steps

IBM Storage solutions provide holistic data protection that delivers simplicity, scalability and the unified management needed to protect and recover data across cloud environments — all while helping organizations leverage secondary data for improved analytics, reporting and competitive business advantages.

To learn more about IBM's portfolio of data resilience solutions, **schedule a consultation with our storage experts** or contact your IBM Business Partner today.

To assess your current state of data and cyber resilience, **take the IBM cyber resilience assessment**. This assessment is free and provides an easy way to measure gaps, strengths and weaknesses against National Institute of Standards and Technology (NIST) Cyber Security Framework best practices.

Resources:
1. "Cost of a Data Breach Report 2021," featuring research by the Ponemon Institute, IBM, July 2021.

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