

**Forbes**  
INSIGHTS

# THE NEED TO BRING A PARADIGM SHIFT IN BUSINESS RESILIENCY

TRANSFORMING THE DELIVERY OF  
RESILIENCY FOR A HYBRID CLOUD WORLD



IN ASSOCIATION WITH:



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# INTRODUCTION

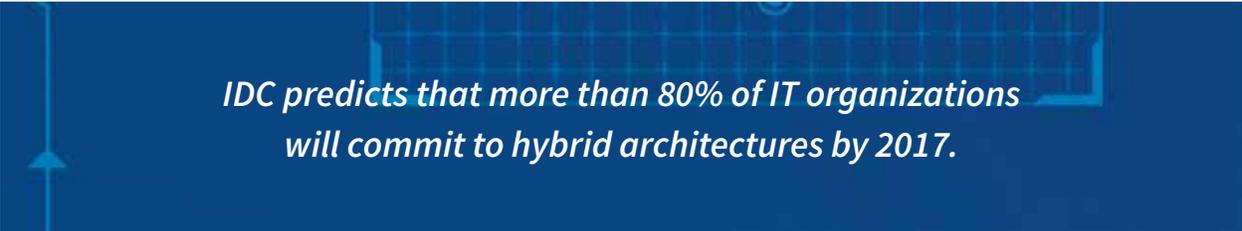
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## IMPROVE DELIVERY OF RESILIENCY IN A HYBRID WORLD

Modern IT operations are undergoing upheaval, brought on by a perfect storm of internal and external forces. While traditional IT services once ran solely from central data centers designed for client/server architectures or mainframes, many IT departments are now turning to hybrid cloud—a blend of traditional and cloud services—for greater agility and flexibility to meet changing business requirements. These valuable resources also provide reliable platforms for running emerging technologies, such as cognitive computing, sophisticated analytics and a new generation of mobile applications. This approach is catching fire: the technology researcher IDC predicts that more than 80% of IT organizations will commit to hybrid architectures by 2017.

With hybrid cloud architectures as a foundation, enterprise workloads can originate from a wide range of sources, including traditional data centers, private clouds, public clouds, SaaS applications and hybrid clouds. The result: organizations run workloads in optimal places, and at the most economical cost, while enabling the IT staff to focus more on innovation to support the business.

But the uncontrolled growth of cloud services is creating new challenges for IT leaders. These multi-sourced environments can become difficult to integrate, manage and secure, and many IT organizations find they're spending far more time and resources maintaining the infrastructure and far less time innovating modern services for the business.



*IDC predicts that more than 80% of IT organizations will commit to hybrid architectures by 2017.*

CIOs face one other significant challenge: traditional business continuity approaches no longer apply in a complex hybrid cloud environment where a consistent and proactive resiliency strategy is required across all cloud and onsite resources. This is leading many enterprises to look at business continuity in a fundamentally new way. For example, the Enterprise Strategy Group (ESG) found 35% of the enterprises it surveyed have a recovery goal of 15 minutes or less. However, when ESG compared these goals with how long it actually takes to recover virtual machines in production environments, it found that backup alone is insufficient to meet recovery objectives. “To really address the dependencies that business units have on their IT resources, a broader

approach for data protection that includes proactive high availability and business continuity mechanisms should be part of a comprehensive approach to IT,” ESG analysts conclude.

So what happens if essential business systems experience a disruption or failure? Depending on the resource, the consequences could be catastrophic in an era where winners and losers are defined by always-on availability. Financial consequences are one reason. According to Ponemon Institute, the average cost of a data-center outage to enterprises is \$740,000, representing a 38% increase since 2010, and the average cost of a data breach went up to \$4 million. Harder to quantify are the long-term consequences that arise when important customers can’t access desired products or services. For example, a nearly daylong outage at a leading Software as a Service provider last spring resulted in a reputation-bashing tweet storm. Many companies don’t get second chances—incidents like these can quickly send customers to competitors and cause long-term economic harm to the business.

How do enterprises create resiliency strategies that hide complexity, handle interdependencies seamlessly—crossing multiple departments, applications, locations, facilities and hybrid cloud environments—and still meet their demanding uptime objectives in an always-on world? Conceptually, the answer is simple. Rather than developing a plan to protect the physical infrastructure, enterprises must design their resiliency strategies to safeguard all of the resources required to execute their end-to-end business processes no matter where these business processes run. **Such an approach requires a paradigm shift.** This report provides guidance on how executives can create the right resiliency strategy for their needs and a new approach that we refer to as a “Resiliency as a Service” framework.

# KEY TAKEAWAYS

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**As businesses capitalize on digital innovation, data is becoming a valuable, strategic asset and is the key to unlocking new business opportunities.**

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**IT services are now being delivered from a wide range of sources, including traditional data centers, private and public clouds, through SaaS applications or via hybrid cloud models.**

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**As cloud computing continues to mature, more and more workloads running across diverse environments will continue to make this landscape even more complex.**

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**Leading enterprises are expanding the scope of their resiliency strategies. Instead of focusing primarily on IT resources, these organizations now think in terms of overall business resiliency, which includes all the business processes, workflows, technology and policies that support always-on availability of products and services.**

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**Some enterprises are extending this approach even further by trying to proactively avoid, rather than rapidly recover from, disruptions.**

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**To address modern business-resiliency needs, organizations will look to advanced and innovative comprehensive solutions that combine advanced resiliency capabilities, cloud services and industry expertise with newer technologies, such as automation, orchestration and brokerage services, to protect all aspects of complex business environments.**

## NEW DEMANDS FOR HEIGHTENED RESILIENCY

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To expand resiliency beyond keeping servers and applications up and running to include all physical and virtual layers of the enterprise, IT leaders must think more broadly, ensuring that the entire organization is fully protected across all business processes. Resiliency as a Service combines proven disaster-recovery and backup technologies and methodologies with the new approaches needed to deliver end-to-end resiliency.

### **Resiliency as a Service can benefit enterprises in a number of important ways:**

- Reduces the complexity of managing disaster recovery across hybrid environments as clients are shifting portions of workloads to cloud
- Elevates end-to-end resiliency to the business process level—protecting the end-to-end business process dependencies across applications, data and infrastructure components
- Enables organizations to more accurately assess their tolerance for risk to devise the right resiliency strategy
- Determines the business criticality of all corporate resources, from both a business and IT perspective
- Proactively addresses impending failures to avoid, rather than limit, damage to the business
- Advanced analytics can run trend reports against replicated data so it provides value even when it's not needed in an emergency

# IBM SOFTWARE DEFINED RESILIENCY FRAMEWORK FOR RESILIENCY AS A SERVICE

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Along with industry expertise and cloud services, IBM's Software Defined Resiliency framework presents a paradigm shift in technology that promises to address the resiliency challenges in hybrid cloud environments. It combines automation, orchestration, analytics and cognitive computing, for faster, more cost-effective disaster recovery across hybrid cloud environments to keep daily business operations running, and to support businesses in their transformational digital journey. "Software Defined Resiliency will help clients achieve better RTO/RPOs at a reduced cost, resulting in a disaster recovery experience that is smarter, more tailored and more agile than ever before, up to application level and business process workflow," says Laurence Guihard-Joly, general manager, IBM Resiliency Services.

**To fully benefit business processes, applications and infrastructure, Resiliency as a Service should be based on four core principles:**

- 1. Improving the User Experience**
- 2. Leveraging Analytics to Define the Resiliency Strategy and RTO/RPO objectives**
- 3. Implementing, Automating and Orchestrating the Hybrid Cloud Environment**
- 4. Enabling Ongoing Testing and Maintenance**

## **1. Improving the User Experience**

One of the main priorities of the IBM Software Defined Resiliency framework is to improve the everyday user experience. Many disaster recovery and business continuity managers perform this role as a "side job" to their daily operational responsibilities. This makes it essential that they have tools for quickly ensuring that the systems and business processes they oversee are fully protected. At the same time, these managers require simplified management and monitoring of recovery environments, along with having a clear understanding of associated costs.

IBM's Software Defined Resiliency framework addresses these needs with a front-end, centralized portal that provides visibility across the resiliency environment. This includes a centralized interface and an executive dashboard-level view showing backup and disaster recovery activities, along with communications and planning tools for analytics and reporting. In the Digital Age, where people can manage everything from their bank accounts to the temperature of their homes

through websites and applications, IT professionals expect similar conveniences for managing their enterprise resiliency environments.

## **2. Leveraging Analytics to Define the Resiliency Strategy and RTO/RPO Objectives**

One of the biggest challenges companies face is determining which assets to protect and how to best protect them. Fundamental questions include, “Do we really need that business process available within 15 minutes of an outage, or can we wait longer?” and “Which applications and underlying technology components are required for the business process to be operational?”

Enterprises must determine what data needs to be protected and what policies and processes are needed to provide and maintain the proper levels of protection. In addition, because environments change constantly, enterprises need solutions that keep up with those changes.

IBM Software Defined Resiliency framework combines consulting methodologies with analytical technologies as well as discovery tools to help create an accurate picture of when business processes must be available, and which applications, IT components, data and environments are needed for optimum resiliency.

A key part of this approach is ensuring that the business team is involved during the assessment stage. The business view is critical for identifying how long business processes can function without information technology and how long operations can continue without the business process before causing irreparable damage to the company. Many vendors lead with their products, but it's more important for them to first discuss how the client's business is changing and its priorities. The conversation shouldn't focus on technology until much later in the process.

In addition, the right tools must be incorporated within the Software Defined Resiliency solution. There are many different discovery tools on the market today, but few of them can pull information and show the interdependencies among a wide range of sources, including the network ports, servers and middleware that communicate among various other servers.

By using tools for discovery, mapping methodologies and analytics, organizations see the key risks across all the layers of the enterprise to respond more effectively to any potential threats. This step is important to determine the resilience implications that arise as applications are being shifted to the cloud in either public cloud or hybrid implementations.

With IBM's Software Defined Resiliency framework, companies can develop a clear understanding of what business processes and IT components must be protected across their enterprise and how long the company can tolerate downtime for each area.

### **3. Implementing, Automating and Orchestrating the Hybrid Cloud Environment**

Once IT leaders have a clear understanding of what needs to be protected, how long they can tolerate business process outages and how much data they can afford to lose, it's time to put a resiliency solution in place. Resiliency solutions can include a mix of backup, recovery, communications and data-center solutions. Consultants and architects who specialize in resiliency can help organizations find the right solution for their level of risk tolerance, as well as defining desired outcomes and devising regimes for testing, governance and compliance.

IBM Brokerage Services offers a number of business benefits during the implementation and automation phase. First, they enable IT managers to identify the right target environment for their production and resiliency workloads. Then, companies can create service catalogs with on-demand, private and public cloud options, and SaaS-based applications. IBM Brokerage Services can also alert users to which workloads will be best supported by traditional on-premise IT environments, and which ones will be right for the cloud. In this way, IBM Brokerage Services help enterprises balance their entire IT portfolios for speed and flexibility, as well as for cost effectiveness and scalability.

In addition, senior leaders can embed policies for meeting all corporate and regulatory standards within the catalog. So when department managers define a new environment, they may be required to include specific backup and recovery capabilities. Rather than having resiliency be a second thought, the platform makes sure it's a priority right from the start.

Once the strategy and target environment are identified, automation is key. An automation layer mitigates difficulties and shortens launch times for implementing all the resiliency services and workloads across hybrid environments.

## ORCHESTRATION: IBM'S ANSWER TO DR COMPLEXITY

Managing an effective disaster recovery plan in a hybrid environment is challenging, as private and public environments must co-exist and interact as one. In this environment, traditional approaches to business continuity and disaster recovery are becoming obsolete and mandating new approaches to ensure continuous availability. While disaster recovery automation procedures have decreased RTO/RPO windows, business process dependencies have increased across dispersed environments. Disaster recovery orchestration is necessary to deliver a consistent and predictable DR experience.

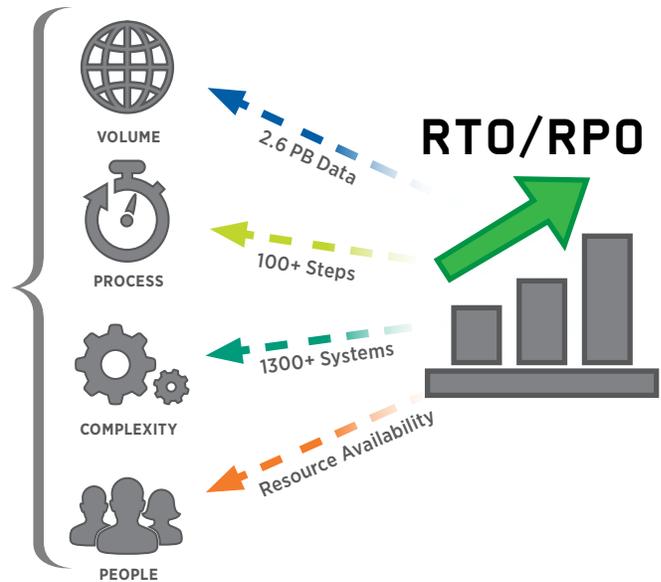
“Automation has brought significant efficiencies, but it is still lacking the overall understanding that is truly required to failover a client’s environment, without extensive manual intervention. Even more in a hybrid environment. In our Software Defined Resiliency stack, orchestration sits higher, overseeing the entire process and ensuring the coordination of all required activities. This step change allows fully automated site failover with limited human intervention,” says Laurence Guihard-Joly, general manager, IBM Resiliency Services. With an easy-to-use orchestration dashboard to monitor the production and recovery environments for consistency, and manage disaster recovery control, automation and replication capabilities, IBM can perform a seamless failover within minutes, limiting potential disruption to the business.

Innovations in orchestration are shown to help organizations achieve more stringent recovery time. Historically, companies have been successful at automating the data layer to successfully bring up platforms and recover data. But the last mile of the recovery process remained dependent on a manual runbook execution that requires people to execute on a set of sequenced steps to manage applications.

IBM’s Software Defined Resiliency improves the orchestration of resiliency functions to create more intelligent workflows. IBM’s approach uses deep insight into each organization’s unique IT infrastructure, dependencies, business processes, regulations and threats—all to deliver a more contextual and proactive response. An example: failing over an entire data center that is composed of multiple applications and subcomponents, while fully addressing all dependencies and external influencers.

IBM’s orchestration layer also includes access to an architectural pattern library, which provides previously developed plans for deploying recovery environments for popular technologies and applications along with a centralized way to connect all the discrete components that compose the overall resiliency posture.

# RESILIENCY AS A SERVICE



## HOW IS ORCHESTRATION DIFFERENT FROM AUTOMATION?

Automation codifies a set of manual steps via the creation of scripts that drive singular actions at independent component levels. For example, creating a script to automate the shutdown of a database. By contrast, orchestration creates an intelligent workflow comprising individual automated actions with an awareness of the entire process. Orchestration simplifies the management of disaster recovery automation with real-time disaster recovery readiness validation.

*“Orchestration ensures successful resiliency plan execution and provides much needed reliability and scale in hybrid clouds. It reduces the production downtime requirements significantly and minimizes business exposure to outages. Organizations with orchestration in place perform DR tests successfully, with very few staff, and often realize up to 80% reduction in DR test windows,” says Chandra Pulamarasetti, founder/CEO of Sanovi Technologies. “The most mature orchestration solutions in market today work across physical, virtual and cloud environments, and have deep application awareness. Orchestration-based resiliency strategies are key for modern enterprises that are adopting cloud environments, as self-service and low SLA parameters are the clear expectations of end-users from cloud services,” adds Pulamarasetti.*

#### 4. Enabling Ongoing Testing and Maintenance

*It's 5:50 a.m. The night shift is nearing an end at a large private bank that serves over half a million customers. Suddenly, a call comes from CIO James to Amy, the head of operations, to initiate an Unplanned DR Drill on Treasury applications. An Unplanned DR Drill is a mechanism with which organizations simulate outage conditions and test their systems for readiness. This is a best practice when you feel ready! Confident of her IT DR plan and systems, Amy instructs her shift lead to initiate the operation. A few minutes later, all Treasury applications start running from the DR Site, powered by the intelligent Resiliency Orchestrator that James and Amy put in place a few months ago.*

Imagine your organization having such predictable and confident resiliency preparedness, and being able to test the controls effortlessly. This is what automation and orchestration can provide to transform and improve testing.

In a traditional approach, once the resiliency strategy has been implemented, the long-term work begins. Resiliency must be managed alongside the production environment to ensure that all production changes are quickly reflected in the recovery environment. Testing must occur regularly, often annually, and today this normally takes significant time away from operational activities for test planning, execution, reporting and remediation. Allowing more testing will improve the resiliency posture of an organization.

Automated run books, developed for use in an actual recovery situation, are leveraged for testing activities in the Resiliency as a Service approach. Using these run books, companies can minimize support needed from their operational staff and run tests more efficiently. Using cloud-based Resiliency as a Service, disaster recovery technicians can remotely execute the pre-developed automated run books, perform their DR tests and make any necessary adjustments to the same automated run book that would be used in a real disaster. Enterprises no longer depend on paper-based plans that are subject to human error.

## HOW PUBLIC CLOUDS BENEFIT RESILIENCY STRATEGIES

Enterprises are combining Resiliency as a Service with public clouds to gain flexibility, scalability and cost controls as they mix and match resiliency capabilities. This comes as public clouds become an increasingly important part of the enterprise hybrid cloud model. Public clouds are also becoming viable resiliency platforms for applications and workloads whose disaster recovery requirements lend themselves to technical and commercial attributes. Public cloud options expand the enterprise's choice of recovery environments, allowing IT managers to more effectively balance price and performance based on recovery objectives and the overall budget for resiliency resources.

## A MODERN STRATEGY FOR ENHANCED RESILIENCY

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The rise of cloud and hybrid deployments, combined with specialized traditional applications, creates complexities that CIOs and business leaders alike must negotiate. Fortunately, best practices are emerging to address complexity and help enterprises turn choice into opportunity.

### **Cultivate CEO/board-level commitment to a comprehensive resiliency strategy**

Comprehensive business resiliency requires a clear understanding of all potential points of failure across the enterprise and should be driven by business owners who have an in-depth understanding of what is needed to keep operations running and customers happy. It's no longer IT on one side and business operations on the other—now they need to be linked together to ensure resiliency. Because resiliency is now a business issue, line of business managers and the C-suite must sponsor an end-to-end Business Continuity Management program within their organization and drive the requirements.

C-suite involvement is essential for defining the enterprise's tolerance for risk, which is a key step for reducing risks to acceptable levels. "It's just as concerning for business owners to overspend on resilience and have no risk, as to underspend and face high risk," says Daniel Witteveen, vice president, global strategy and offering portfolio, IBM Resiliency Services. "Companies must find the right balance that's appropriate for their businesses."

With the pressures of daily operations, it is up to the C-suite to make resiliency a priority for the business and employees, to ensure resiliency plans are kept up to date and ready in an emergency.

## ***Develop the business case for Resiliency as a Service, with targets for ROI, risk-reduction goals and other business benefits***

Resiliency investments used to be compared with an insurance policy. We pay in significant amounts of time and money and hope to never face an actual disaster. In the new era of Resiliency as a Service, companies can develop a business case that shows reduced costs when compared with traditional resiliency solutions, and even an opportunity to increase ROI. For example, UmbraGroup, a privately held supplier of high-precision aerospace components based in Italy, serves leading airlines throughout the world with the help of a unified ERP system and a comprehensive strategy for business resiliency. “We knew we needed to put our ERP system in a disaster recovery environment with geographic redundancy,” says Enrico Castiglionesi, UmbraGroup CIO.

Thanks to its cloud-based geo-redundant disaster recovery environment, the company is now seeing high availability of its systems with no data loss, and can resume operations after an outage in a matter of hours—not days or weeks. Further contributing to a return on this investment, the decision is helping the company optimize IT staffing resources “[since] now our solution does not require any dedicated personnel,” Castiglionesi reports.

## **AVOID UNNECESSARY COSTS**

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The use of hybrid clouds in Resiliency as a Service and the opportunity to use a brokerage service can help optimize investments. For example, with cloud-based disaster-recovery services, companies pay only for the computing power and storage volumes they actually use for recovery operations. By using brokerage services, companies can identify the right landing zone and the best costs for their resiliency workloads.

The ability to reduce upfront capital expenditures for servers and storage systems helps companies avoid making tradeoffs that in the past forced them to limit backups and recovery to only the most critical Tier 1 assets. Predictable operating expenses associated with the cloud make it easier to financially justify backups for less critical workloads, which in turn broadens resilience coverage and provides added protection against disruptions.

In the past, overprovisioning of onsite hardware was a common—and expensive—strategy to accommodate anticipated future growth. The scalability of IT as a Service and hybrid environments can eliminate this added expense.

Other savings may accrue from taking advantage of declining costs for storage hardware, which have been trending downward in recent years. Often, public cloud providers pass incremental savings on to customers to stay competitive. By contrast, enterprises using storage in traditional

data centers miss out on price reductions for on-site storage systems until it's time to replace the resources.

## LIGHT UP THE BENEFITS OF “DARK DATA”

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Resiliency as a Service also brings new value to replicated data. “Dark data” is costly data. It provides a backup repository of critical information, which in the event of production system failures, becomes the go-to resource for bringing the business back to full strength. However, during normal operations this data often sits dormant in expensive storage systems, providing little value to the enterprise. In reality, corporate data has value beyond when it's needed to actually recover the business. Unfortunately, many organizations may not understand how to use this data or even that it exists.

Resiliency as a Service changes that by allowing enterprises to apply sophisticated analytics to replicated data. The best approach is to feed the data into analytics engines to provide insights about business and market trends. Leading vendors provide analytics packages for many industries that can be customized to provide companies with the most relevant information for their business.

### **Move from recovering applications and infrastructures to business process resiliency**

When there is a widespread IT outage, the recovery of a single device or application will likely have little impact on helping the business become operational again. And recovery of devices and applications in the wrong order can cause preventable delays to making business processes available.

The answer is to plan resiliency at the business process level. By bringing up end-to-end business processes, in the right sequence, companies can make critical operations available more quickly and reduce downtime in the most critical revenue-producing and customer-facing areas of the business.

### **Consider adding new roles and responsibilities**

Progressive enterprises are hiring new types of specialists, such as chief resiliency officers or directors of resiliency. With a deep understanding of business resiliency and all its interdependencies, they're the point people for ensuring business continuity and for handling incident responses across all layers of the enterprise and beyond, such as issues that touch suppliers and partners. These new officers can also play a pivotal role in enhancing collaboration between CIOs and business managers for improved business resiliency.

## WHAT'S NEXT FOR RESILIENCY AS A SERVICE

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Resiliency as a Service is continuing to evolve and grow, taking advantage of technological advancements to improve convenience and flexibility in resiliency management.

### **Cognitive computing**

Cognitive applications can be used to analyze data and make predictions about potential disruptions, warning stakeholders in time to determine if they should take the necessary steps in advance to avoid downtime.

One data source could be a Backup as a Service solution that receives support tickets stemming from backup failures. The individual failures may result from a variety of causes, ranging from a broken LAN connection to a storage array, to a file left open at the time of the backup. Cognitive applications can use this information over time to help enterprises avoid similar situations. “With cognitive, companies can start proactively solving problems in an automated fashion as opposed to just addressing one at a time; this moves organizations to proactive resiliency,” says Witteveen. “If a company knows ahead of time when a backup or system has a high chance of failing, steps can be taken to avoid the disruption as opposed to reactively fixing it once it occurs.”

Cognitive computing can also be applied to help enhance efficiency. If a large percentage of data lies dormant on production systems, IT managers will learn it may be time to move it to a more economical archive environment. “When you proactively manage your data and data protection strategies, oftentimes you find you need less production storage capacity and infrastructure and fewer backup resources, which then naturally improves your resiliency posture,” says Witteveen.

### **Predictive analytics**

Predictive analytics can address this last-mile challenge for greater

resiliency. For example, an enterprise may run two production data centers in separate geographical regions to reduce the likelihood of a regional event causing an outage. If a hurricane approaches one of the regions, analytics can assess the outage risk and, if it's high enough, launch an automated process that shifts the facility's operations to the alternate data center before a disruption occurs.

## A FOUNDATION FOR THE FUTURE

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Modern enterprises face conflicting demands in today's dynamic business world. On one hand, customers across all industries expect always-on availability to products and services and are ready to turn their attention elsewhere if their demands aren't immediately met. But achieving high levels of business resiliency is more challenging than ever, thanks in part to the complexities that arise when enterprises mix on-premise, public cloud and hybrid cloud resources.

The solution is anything but turnkey. With the help of resiliency experts, organizations can define their business needs, gather the right tools and craft new resiliency strategies that address all aspects of business and IT operations. Resiliency as a Service brings all these pieces into a comprehensive solution that meets today's business resiliency needs and creates a foundation for future improvements.

**Learn more about IBM's approach to Resiliency as a Service at  
[ibm.com/services/resiliency](https://ibm.com/services/resiliency)**

## ACKNOWLEDGEMENTS

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Forbes Insights and IBM would like to thank the following individuals for their time and expertise:

**Laurence Guihard-Joly**, General Manager, IBM Resiliency Services

**Enrico Castiglionesi**, CIO, UmbraGroup

**Chandra Pulamarasetti**, Founder/CEO, Sanovi Technologies

**Joe Damassa**, Vice President of Strategy & Offerings for Systems Services in IBM Global Technology Service

**Daniel Witteveen**, Vice President, Global Strategy and Offering Portfolio, IBM Resiliency Services

**Mijee Walker**, Global Strategy Leader, IBM Resiliency Services

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