



# IBM Cloud Paks Streamline Next-Generation Digital Business Development and Resiliency

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# IDC Opinion

During the past year, many enterprises have struggled with global economic disruptions and the pivot toward conducting more business online and virtually. Commerce is becoming more omni-channel and data-driven, enabled by powerful new AI/ML technologies, chatbots, and natural language recognition. Open source innovation around more flexible container and cloud-native infrastructure has helped accelerate innovation built on distributed, hybrid, and multicloud architectures.

These business and technology changes are profound and are expected to have impacts that last well beyond the pandemic itself. IDC's research shows that the extent to which organizations are investing in digital resiliency for the future is having a direct impact on how quickly they are recovering from the crisis and how well they are positioned for future growth. In late 2020, IDC's **COVID-19 Impact on IT Spending Survey** found that 65% of "digital disruptors," organizations that have historically been more aggressive investors in technology for digital resiliency and transformation, were already moving forward to innovate more proactively for the future. By comparison, about 60% of "digital resisters" (which have typically had lower levels of investment in digital resources) were still focused more on immediate, tactical recovery issues.

Digital disruptors recognize that cloud and automation are fundamental to innovation and resiliency. The challenge for many organizations, however, is that the deployment, configuration, ongoing support and integration of multiple clouds, and distributed data sources and workloads can be complex and time-consuming. Developers often find they are spending more of their time dealing with infrastructure and integration issues than on software coding and innovation. IT operations and cloud SRE teams struggle

to maintain configuration and security controls as applications become more distributed and agile and infrastructure becomes more ephemeral and dynamic.

Kubernetes container platforms offer developers a standardized infrastructure and API environment that can be deployed, secured, and managed in a coordinated way across dedicated on-premises datacenters and edge computing locations, as well as in public cloud infrastructure services. Continuous integration/continuous delivery (CI/CD) toolchains have emerged to pre-integrate and standardize application development, test, and deployment life cycles. The missing element for many organizations, however, is a framework for ensuring that applications can efficiently share data and analytics, integrate workflows, align with security policies, and make use of automation in a consistent and unified way across this diverse, distributed infrastructure environment.

This white paper considers the challenges and opportunities facing today's cloud-native developers and operations teams as they deploy containers, hybrid cloud, and AI to ensure business resiliency and fuel innovation. It also considers the way that IBM is addressing this emerging set of requirements with the IBM Cloud Pak framework for open hybrid cloud integration and portability.

# Digital Business Imperatives and Challenges

Modern business is becoming more data-driven, contactless, and online. The shift toward data-intensive digital business strategies was well underway prior to the pandemic but has been quickened dramatically in the past year. Demand for remote work and school, omni-channel online shopping, telemedicine, AI-powered customer service, and many other transformations will remain strong and continue to grow in the coming years. As a result, IDC estimates that by 2022, fully 65% of global GDP will be tied to digitalized business. This in turn is expected to fuel \$6.8 trillion of IT spending from 2020 to 2023. Fully 41% of that spending is expected to be cloud-related.

IDC forecasts that worldwide technology spending on projects initiated due to the pandemic will increase over 18% in 2021 and 17% in 2022. Much of this investment will be targeted at programs that will increase overall business resiliency and improve organizations' ability to adapt more quickly to unexpected circumstances.

As shown in Figure 1, IDC identifies the following as some of the top priority areas for digital investment over the next two years:

- ▶ **Business operations resiliency programs:** Investments in automation and augmentation technologies to adapt your operations faster to market disruptions
- ▶ **Digital trust programs:** Investments in security, privacy, and compliance technologies to improve your organization's risk posture
- ▶ **Customer experience programs:** Investments in ecommerce, contact center, customer support, marketing, and sales automation to create an empathetic relationship between customers and brands
- ▶ **Digital infrastructure resiliency programs:** Investments in cloud, converged, and container infrastructure as well as autonomous IT operations to create more responsive, scalable, and resilient infrastructure
- ▶ **Data optimization programs:** Investments in data management, analytics, and ML/AI to enable better visibility and improved decision making
- ▶ **Workplace transformation programs:** Investments in collaborative workspaces, talent development, and management tools to increase employee experience and productivity

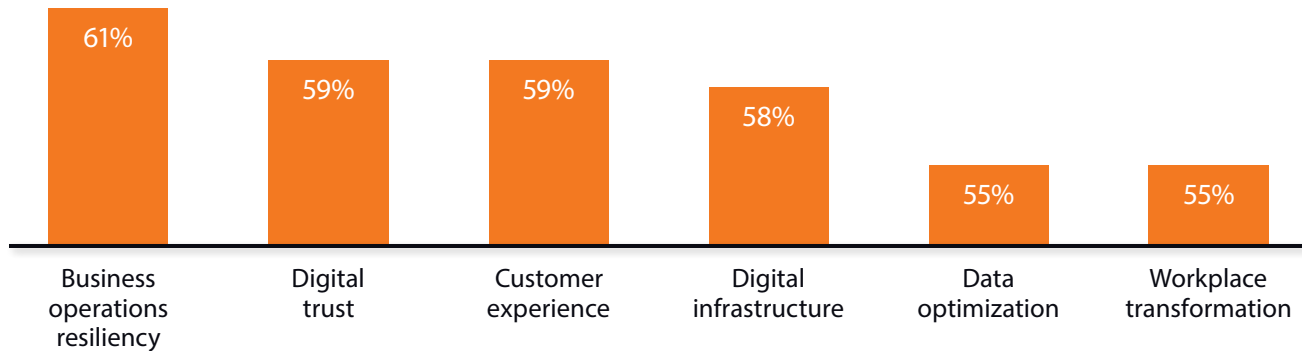
Many of these initiatives will need to work together to integrate data, analytics, automation, and security activities to ensure consistent end-to-end business performance and workflow integrations. The ability to ensure consistent, reliable application and analytics performance anywhere in the world will also be vital, as will the ability to rapidly shift resources across geographies and connect with new partners as required by unexpected business changes.

FIGURE 1

## Top Priority Technology Investments for Long-Term Business Resilience

Q. For each program below, what are your organization's technology priorities over the next two years to ensure the long-term resilience and success of the business?

(% of top technology priorities)



n = 738 (worldwide tech decision makers)

Notes: Data provided is for respondents reporting priority or top priority. Data is weighted by country GDP (500+ employee size).

Source: IDC's Future Enterprise Resiliency and Spending Survey, February 2021

IDC expects that by the end of 2021, 80% of enterprises will be working to shift to cloud-centric infrastructure and applications twice as fast as before the pandemic. IDC expects that as part of this shift, the nature of work and business will be increasingly enabled by AI/ML, automation, open source, and cloud-native infrastructure.

### Specifically, IDC predicts that by 2024:

- ▶ 60% of enterprises will mandate the use of automated digital infrastructure for greater business resiliency and security.
- ▶ 55% of enterprises will rely on embedded AI functions in their business-critical workloads to make real-time business decisions and to directly drive business process outcomes.
- ▶ A mandate for uncompromising data integrity, security, governance, and trust will lead to 80% of enterprises creating a single companywide data management strategy to break down all data silos.

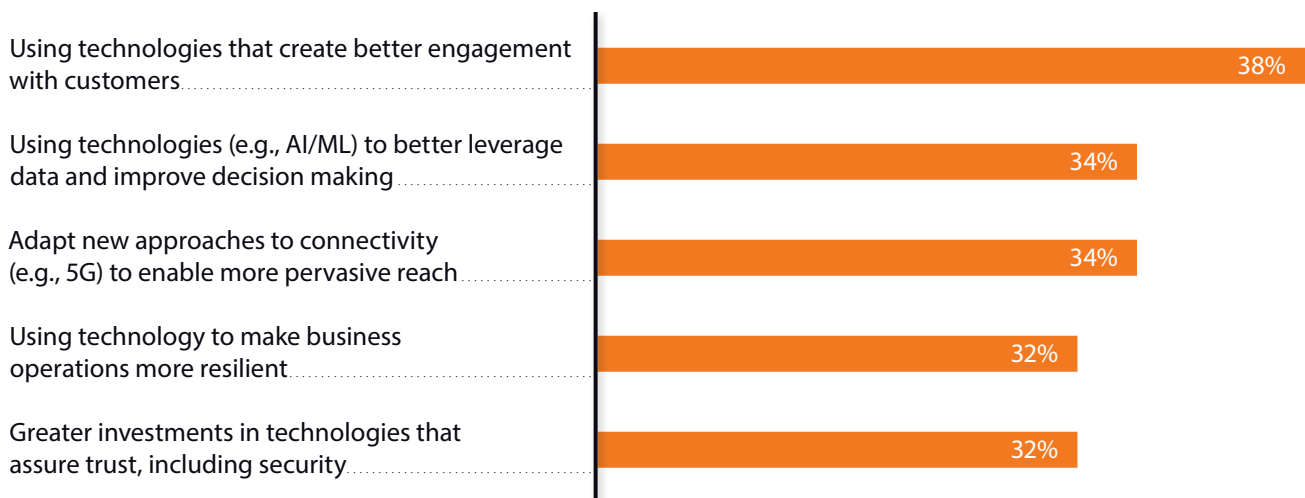
To achieve these types of business resiliency improvements and truly digitize the business, organizations of all sizes will need to identify ways to simplify data integrations, accelerate use of AI and automation more broadly, standardize and enhance security, increase connectivity to edge and remote work locations, and ensure consistency of application performance across distributed, hybrid on-prem, and public cloud computing and storage assets.

# The Case for Consistent Cloud-Native Infrastructure and Application Portability

Digital innovation is enabled by developers who are agile and able to fully leverage a fire hose of new technologies, including many originated by the open source community. As shown in **Figure 2**, IDC's research shows that the abilities of the organization to fully leverage technology, data, development, and infrastructure are top of mind with many senior business leaders.

FIGURE 2

## Most Important Strategic Areas of Interest for Board of Directors to Ensure Organization Is Competitive/Exploits Changing Market Conditions in Next Three Years



n = 351

Notes: Data shown is for respondents who indicated IT executives present long-term (3+ years) investment strategy at board of director (BOD) meetings. Data is weighted by country GDP (500+ employee size).

Source: IDC's Future Enterprise Resiliency and Spending Survey, February 2021

These business-critical capabilities will be enabled by robust, flexible distributed digital infrastructure based on containers and automated cloud-native platforms and services. Edge computing is increasing as a source of data and interaction, while public cloud services provide on-demand access to many types of computing, storage, and network resources. On-premises, dedicated infrastructure managed using traditional processes, as well as modern private cloud automation, continues to support mission-critical data and applications.

For developers, it is becoming increasingly difficult to keep up with all of the relevant technologies, programming languages, security and compliance mandates, and infrastructure choices. For cloud SREs and IT infrastructure operations teams, it is equally challenging to move, manage, and secure workloads optimized for one environment to run in another. Scaling complex applications can be time-consuming, and industry- and country-specific regulations may require unique configuration, audit, and change control procedures.

Recognizing that business digitization will continue to intensify, decision makers are investing in better ways to standardize infrastructure and access critical enabling technologies. Rather than rely on traditional tightly coupled stacks of infrastructure, middleware, and application code, many organizations are modernizing infrastructure and refactoring applications to abstract away complex integration, automation, and analytics infrastructure configuration details, while empowering developers to focus on business priorities. As this abstraction occurs, many capabilities traditionally implemented by standalone middleware or automation technologies are being bundled and integrated with core compute and container platform technologies. DevOps- and DevSecOps-driven CI/CD toolchains provide additional levels of automation for development test, integration, and release. GitOps strategies help extend consistent infrastructure-as-code (IaC) automation for infrastructure and CloudOps teams. Collectively, these more robust and modern platforms mimic public clouds in terms of providing on-demand automated access and ease of use.

## Benefits of Kubernetes and Open Cloud-Native Platforms

Many public cloud services bundle and abstract infrastructure, access control, configuration, and automation technology as part of compute, container, and storage service offerings, including serverless solutions. Typically, each cloud service provider makes a management API available and provides a dedicated cloud management console to provide access to its cloud control plane.

This level of operational abstraction streamlines the developer experience but can also create data and workload silos that do not migrate or integrate well with data



and workloads residing in other clouds or on-prem infrastructure. This in turn slows business agility and requires both developers and ITOps teams to devote significant resources to building and maintaining brittle, single-use integrations based on manual, error-prone workflows.

Cloud-native container platforms, orchestrated using open source Kubernetes, provide an option for organizations that want to adopt a “build once, deploy anywhere” strategy. Cloud-native container platforms provide a robust application programming interface (API) for developers and standard, open source infrastructure deployment and orchestration technologies. To the extent an organization can commit to consistent developer and infrastructure architectures based on these open standard platforms, the organization can be confident that applications will run as expected, whether deployed in the public cloud, edge, or dedicated datacenter facilities. It is important, however, that developers have clear guidelines about reliance on third-party APIs and specialized services, which could potentially limit full portability in some cases. Using consistent abstractions and associated APIs in Kubernetes facilitates moving from DevSecOps to full GitOps, further increasing the degree of automation across the entire application life cycle.

Enterprise architects and digital business leaders need to determine how much in-house control is appropriate for their applications and business priorities. Some organizations may opt to rely heavily on public cloud platforms, while others may determine that regulatory matters, latency, legacy applications, or opportunities for unique business differentiation are better served with the organization maintaining direct fine-grain control. Integration across clouds continues to improve, as does the diversity of public cloud services, further complicating the analysis.

For many organizations, the ultimate answer may focus on a mixed environment that blends some functionality provided by public cloud services with some strategic in-house development and infrastructure assets. Ensuring that these environments can be consistently integrated, automated, and secured will be critical to maximizing the value of the organization’s data, customer relationships, business IP, and geographic footprint. Alignment around open source standards and open API-based architectures are important to ensuring the desired level of business agility and connectivity.

## Frameworks Simplify Application, Data, and Cloud Infrastructure Life Cycles








Effective digital business execution depends on developers’ being able to easily integrate, correlate, and normalize many types of data. Natural language, search logic, video and audio data, GIS, visualization, and more are all part of modern applications. Developers frequently prefer different languages for different use cases and need

to take advantage of sophisticated AI techniques and flexible digital infrastructure. Similarly, for SRE and ITOps teams to be able to standardize and optimize the cost, performance, and security of the underlying infrastructure, they need to maintain alignment with policies and constantly map workload requirements to the most appropriate infrastructure based on cost, regulation, and performance KPIs.

Modular, pluggable cloud-native infrastructure frameworks, available as continuously updated, pay-as-you-go subscriptions and enabled by containers and Kubernetes, are emerging to simplify back-end infrastructure and data management activities while allowing developers to focus on faster and more innovative application development. Evaluation and selection of enterprise container and cloud platforms need to factor in the value and benefits of these types of frameworks and consider how they can benefit the organization in terms of both technology and business outcomes, as shown in **Figure 3**.

FIGURE 3

### Business and IT Outcomes Driving Use of Cloud-Native Infrastructure Frameworks

	Ability to better match infrastructure choices to the needs of the business and workload — geography, latency, access control, confidentiality of data, and so forth.
	Allow migration to public cloud and container-based architectures where it makes sense while ensuring stable, secure integration with legacy systems of record.
	Align infrastructure and developer tools spending with business requirements.
	Simplify and standardize data models, APIs, and automation integrations across applications and services to ensure better integration and end-to-end performance.
	Simplify developer access to advanced analytics and automation with a “learn once, apply anywhere” approach.
	Simplify access to curated, validated industry-specific modules and platform services.
	Allow distributed development teams to more easily integrate microservices and workflows during development, test, and production.

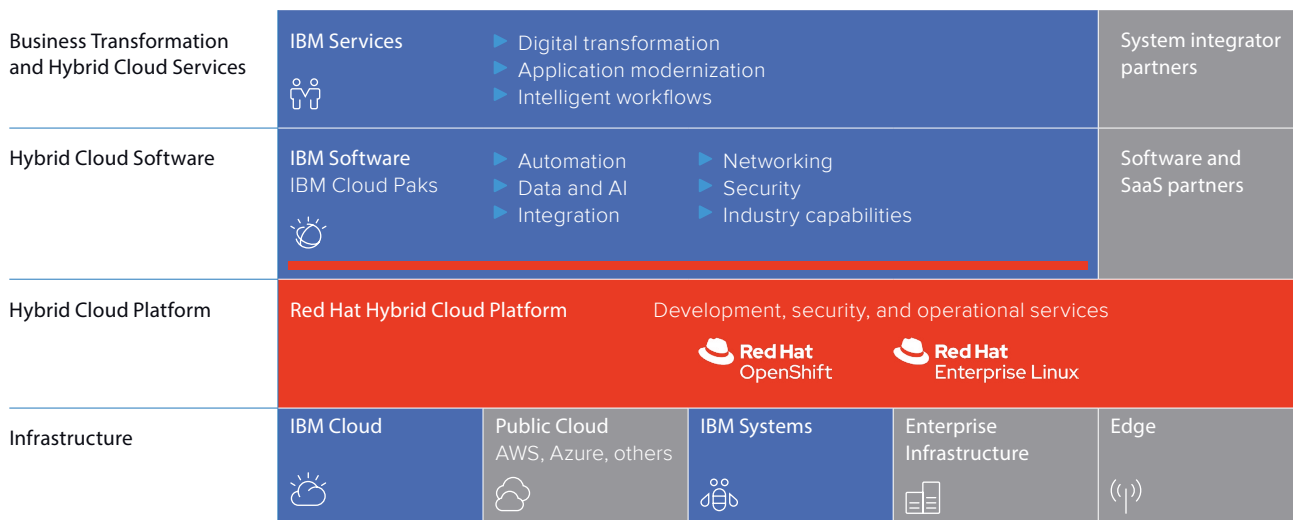
Source: IDC, 2021

# Considering IBM Cloud Pak Framework Designed for Open Hybrid Cloud Integration and Portability

IBM Cloud Paks are AI-powered containerized software that can help organizations build, modernize, and manage applications securely across hybrid, multicloud environments.

IBM Cloud Paks provide customers with a common operations and integration framework enabled with pre-certified software, running on the open source-based Red Hat OpenShift Kubernetes container infrastructure platform. This cloud-native platform supports a consistent framework for infrastructure management control plane that includes automation, security, and AI for operational analytics. Red Hat OpenShift is certified on most major public cloud infrastructure services as well as most major datacenter computing platforms. IBM Cloud Paks designed for the needs of specific use cases provide higher levels of standard, reusable integration and data management and analytics to streamline many developer activities **Figure 4**.

**FIGURE 4**  
**IBM Hybrid Cloud and AI Solutions**



Source: IBM, 2021

### The value of the IBM Cloud Pak framework is based on several factors, including:

- ▶ OpenShift-enabled portability across on-prem, edge, and multiple public clouds
- ▶ Standardized security, governance, APIs, and data handling to simplify operations, since admins and developers need to learn only one set of tools and controls
- ▶ Curated, validated integrations across a broad ecosystem of IBM, open source, and third-party technologies

The alignment around a common infrastructure platform and shared security, governance, and automation framework can radically simplify the developer and operator experiences. Developers no longer need to become experts in a myriad of workload-specific infrastructure and middleware tools, and organizations no longer need to evaluate, purchase, deploy, support, and integrate numerous standalone products and services.

All IBM Cloud Paks take advantage of IBM Watson for analytics and automation capabilities, which are provided as part of the IBM Cloud Pak foundational services, while additional, targeted functionality is made available as appropriate in IBM Cloud Paks for specific use cases.

### Core foundational services shared across all IBM Cloud Paks include:

- ▶ Watson AI analytics and automation engines
- ▶ Unified API catalog
- ▶ Infrastructure-as-code automation
- ▶ Identity and RBAC controls
- ▶ Credential management
- ▶ Licensing and metering
- ▶ UI frameworks and standards
- ▶ Event streaming and caching engines

The fact that all IBM Cloud Paks run on the Red Hat OpenShift Kubernetes platform ensures that workloads will perform as expected regardless of where they are deployed if the OpenShift platform is used consistently across all deployments, including public clouds. OpenShift is certified to run in many environments, including on-premises datacenters, public cloud infrastructure from IBM and other public cloud providers,

and hosted, colocation, outsourced, and edge locations.

IBM Cloud Paks are sold via modular, plug-and-play, pay-as-you-go consumption-driven subscriptions. IBM retains full responsibility for the continuous update and refresh of the OpenShift platform and the IBM Cloud Paks software — whether deployed on premises or as a public IBM Cloud service. These continuous updates are managed by IBM in the same way SaaS providers continuously update their online software services. Traditional software releases are also provided to support dedicated air gap installations.

Each IBM Cloud Pak encompasses modularized functionality that previously would have been provided by dozens of standalone products and services and multiple vendors. IBM Cloud Paks unify many related individual functions that are typically used by the same community of developers or operators. Functionality can be purchased incrementally over time; however, the IBM Cloud Pak foundational services are included for no additional fee, regardless of whether a customer implements just a few modules within a single IBM Cloud Pak or opts to broadly deploy the entire portfolio.

Customers can opt to start with a few base modules within a single IBM Cloud Pak and expand over time as appropriate for their requirements. Different modules can be deployed on premises or in the public cloud if desired, but the foundational services will be consistent regardless.

#### Major IBM Cloud Paks currently available include:

- ▶ **IBM Cloud Pak for Data**, which provides support for more than 45 data collection, organization, and analysis applications, including many powered by IBM Watson technology and leading open source software. Within the IBM Cloud Pak for Data services catalog, developers can opt to activate a range of Watson AI capabilities ranging from data discovery, translation, speech to text, chatbots, and many other services as well as integrations with other IBM data warehouse and business intelligence (BI) products such as Db2 and Cognos and third-party data governance, source control, and storage management tools.
- ▶ **IBM Cloud Pak for Business Automation**, which includes a broad set of AI-powered automation capabilities for content, capture, decisions, workflows, and RPA. It incorporates low-code tooling support to streamline automation and visualization of many business processes across areas such as customer service, human resources, and accounting.
- ▶ **IBM Cloud Pak for Watson AIOps**, which provides an integrated application and infrastructure observability, diagnostic analytics, and security management toolkit as well as automation for operations teams supporting legacy and cloud-based

resources. It enables code-driven automation of many IT configuration, service management, and problem remediation activities and is designed for hybrid and multicloud operations, governance, and security.

- ▶ **IBM Cloud Pak for Integration**, which delivers API management, application and data integration, messaging and events, high-speed transfer, and end-to-end security including certified integrations with many third-party SaaS solutions.
- ▶ **IBM Cloud Pak for Network Automation**, which enables the automation of network operations so communications service providers (SPs) can transform their networks, evolve to zero-touch operations, reduce OPEX, and deliver services faster. Communications SPs gain a range of enhanced capabilities, such as normalized life-cycle modeling, intent-driven orchestration, service design and testing, dynamic service assurance, and closed-loop operations.
- ▶ **IBM Cloud Pak for Security**, which provides a broad set of threat detection, data security, automated, intelligent incident response, and risk management capabilities across hybrid and multicloud environments. It is designed to collect security data from IBM and third-party sources, including open source standards, and support many IBM and third-party tools, to search for threat indicators and behaviors.

Use case—specific IBM Cloud Paks provide customers with deeper layers of product certifications, integrations, and APIs that are specific to the area of focus.

Many third-party technology partners are also certified to support IBM Cloud Pak integrations. IBM Cloud Paks typically focus on critical infrastructure and operational activities that are shared by a large number of developers, SREs, ITOps teams, and

# Challenges and Opportunities

IBM's approach to IBM Cloud Paks represents a major restructuring of the way enterprises have traditionally purchased and maintained development, ITOps, and middleware products. IBM Cloud Paks ensure consistent software functionality and support across the organization, whether workloads are deployed on premises or in public clouds. Customers can pick and choose the functionality they want to consume, and prices adjust accordingly based on usage.

The real value of the IBM Cloud Pak framework increases as the scale of IBM Cloud Pak usage rises. For organizations that are early in the journey to hybrid or multicloud architectures or have just begun to learn about containers and Kubernetes, the benefits of the simplification, integration, and standardization provided by IBM Cloud Paks may not always be apparent. Potential IBM Cloud Pak customers need to take a total-cost-of-ownership perspective that considers not just the price of software and software support but also the operational efficiencies, scale, performance, security, portability, and administrative overhead improvements.

For many organizations, this will require a new approach to the way they make decisions about infrastructure, cloud, and developer platforms. Organizations may need to start small but recognize that the real paybacks ramp up over time. Early investments should focus on groups of workloads, developers, and infrastructure operations that can take advantage of multiple capabilities within a specific IBM Cloud Pak functional area. Organizations launching AI-powered customer experience or multicloud operations might want to start with an emphasis on IBM Cloud Pak for Data or IBM Cloud Pak for Watson AIOps, respectively.

## Conclusion

Software development, scalable infrastructure, hybrid and multicloud architectures, and AI-powered innovation are all critical for the future success of almost every business. IDC expects to see rapid escalation in the volumes of data generated across many business processes as edge computing and 5G connectivity enable a new generation of powerful local and branch digitization and online, remote business continues to expand. IDC predicts that by 2024, 50% of G2000 companies will sell internally developed industry-specific software and data services as subscriptions to create new revenue streams built on their unique data and deep domain knowledge.

Enterprise infrastructure and development organizations will have to work more efficiently and take greater advantage of cloud, containers, AI, and automation to keep their organizations competitive and resilient going forward. The ability to standardize many core analytics, operations, security, and governance functions will help increase productivity and scale. Pay-as-you-go subscriptions that include continuous, intelligent vendor support will further help offload internal staff and allow them to focus on what matters most to the business. Open source–based container platforms will enhance portability, overall business resiliency, and the ability to respond to the unexpected.

# About the Analyst



## Mary Johnston Turner

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Mary Johnston Turner is Research Vice President, Future of Digital Infrastructure, part of IDC's Future Enterprise research team. She analyzes how enterprise IT and business strategies are taking advantage of ubiquitous, autonomous cloud infrastructure solutions deployed across dedicated datacenter and shared public service environments. Her practice emphasizes the voice of the enterprise customer, based on surveys and in-depth analysis of best practices related to how enterprises are changing the ways they source, secure, and optimize digital infrastructure solutions. Her research emphasizes consideration of how pay-as-you-go consumption-based subscriptions, cross-cloud control planes, and collaborative enterprise infrastructure governance models are enabling enterprises to better align infrastructure investments with critical business outcomes and innovation priorities.

[More about Mary Johnston Turner](#)



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[https://www.ibm.com/cloud/paks.](https://www.ibm.com/cloud/paks)

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