

Hybrid Cloud for Streaming & Real-Time Analytics



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Continuous intelligence (CI) produces insights from streaming data to take actions in milliseconds to minutes. It frequently makes use of artificial intelligence (AI) and machine learning (ML) models to perform the real-time analysis and make connections between different events as they are happening.

Such rapid analysis of streaming data requires significant and highly variable amounts of compute and data storage capacity. And in many cases, the various stages of the process (e.g., model training and tuning, data ingestion, and analysis) have distinctly different compute requirements, which can vary over time.

Traditional compute infrastructures for high-performance computing and big data analysis will not do the job. What's needed is a highly scalable infrastructure that supports very dynamic development environments, deployment scenarios, and integration of new technologies.

Hybrid Cloud Advantages for CI

Hybrid cloud is ideally suited to meet the computing requirements for real-time analytics of streaming data. It offers advantages that make deployment easier and less costly.

A hybrid cloud is a blend of a private cloud combined with the use of public cloud services. The goal is to combine services and data to create a unified, automated, and well-managed computing environment.

A hybrid cloud delivers the scalability and reliability of public cloud with the security and customization of private cloud. A hybrid approach helps businesses quickly pivot their IT resources to match shifts in business strategy. It also sets an ideal foundation to harness AI and data analytics.

In a hybrid model, data and workloads can easily shift between public and private clouds based on business needs. As such, businesses have the flexibility to explore new opportunities without the time delay or costs to deploy additional on-premises resources.

The hybrid model also allows organizations to quickly spin up environments on either the public or private cloud. Scalability is now essential in business, and it will continue to be crucial in the future as CI adoption grows. A hybrid model taps unlimited public cloud resources that can be scaled up or down as workflows change. It's an approach that fully supports a business's commitment to innovation and speed.

Hybrid also ensures business continuity and improved security. Customer-facing applications can live on a public cloud, while back-end systems that handle sensitive information and projects can be facilitated on a private cloud and onsite infrastructure.

Additionally, with a hybrid cloud approach, data and workloads can easily shift between public and private clouds based on business needs. A good example of how this helps with CI applications is when there is a large amount of streaming data on an edge device that needs rapid analysis for real-time decisions.

Take video analysis to detect pedestrians by an autonomous car. Training the AI algorithms could be done on-premises or using massive amounts of HPC (high-performance computing) cloud instances. Once the algorithms are trained, they could be run anywhere. The best choice is to run them on the car itself because it takes too much time to send the video streaming data to a central location for analysis.

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Such flexibility to run workloads in different places and to easily move them based on business priorities is enabled using technologies like containers, Kubernetes, and microservices.

Microservices provide loosely coupled application architectures, which enable deployment in highly distributed patterns. Cloud-native platforms with containers and serverless deployments provide the application platform and tools to deliver the promise of the microservices architecture.

When hybrid cloud CI applications make use of these technologies, the applications become portable and easier to deploy. For this reason, hybrid cloud solutions are reactive and responsive. They offer resiliency, agility, and scalability.

How Hybrid Cloud Used for CI Helps Unlock Business Potential

To survive and thrive in the age of digital transformation, businesses must drive data and analytics into the core of their operations and deploy those applications to every employee, customer, supplier, and partner.

CI is an essential technology to enable such a transformation. The reason: CI's use of AI is constantly gathering information from many data streams and turns that information into real-time, actionable insights.

Additionally, beyond data and analytics' traditional role in supporting decision making, CI's use of streaming data and its analysis is increasingly being infused in new places, including:

- ▶ Shaping and molding customer experiences, based on predicted preferences for how each individual or group wants to interact with the organization.
- ▶ Driving business processes, not only by recommending the next best action but also by triggering those actions automatically.

Unfortunately, there are obstacles that prevent or slow businesses from using CI to enhance business processes. Legacy IT infrastructure might not be able to offer the computational resources needed to collect, sort, clean, and analyze high volumes of streaming data on a continuous basis.

One of the essential elements of a hybrid cloud CI solution is the ability to process continuous event streams to derive real-time insights and intelligence. Streaming applications process event flows and allow data and analytical functions to be applied to information in the stream. Streaming applications are written as multistep flows across the following capabilities:

- ▶ Ingest many sources of events.
- ▶ Prepare data by transforming, filtering, correlating, aggregating on some metrics, and leveraging other data sources for data enrichment.
- ▶ Detect and predict event patterns using scoring and classification.
- ▶ Decide by applying business rules and business logic.
- ▶ Act by directly executing an action, or in event-driven systems, publishing an event notification or command.



Hybrid cloud supports the key elements (as defined by Gartner³) needed for modern cloud analytics, including:



Data sources: These are the original sources of data, which could include ERPs, CRMs, social media data, or website usage data. An example of a cloud-based data source would be Twitter sentiment data.



Data models: Cloud-based data models make sense of and standardize how data points are related to each other. These are typically created with structured data types.



Processing applications: These applications process large volumes of big data, as it's ingested into a data warehouse.



Computing power: Companies need raw computing power at scale to ingest, structure, clean, analyze, and serve business data.



Analytic models: These mathematical models are closed functions used to predict outcomes and require strong computing power to create.



Data sharing and storage: Data warehouses as a service enable organizations to implement a modern analytics architecture quickly and scale easily.

Benefits of Hybrid Cloud Analytics

Hybrid cloud helps unlock the potential of a business's greatest digital asset: data. Insight from data will create new business opportunities and ways to gauge the true pulse of the market, competition, and customer base. But current IT infrastructure might not be able to handle the computational resources needed to collect, sort, clean, and analyze high volumes of data on a continuous basis. Many AI-supported technologies are constantly gathering information from many data points and turning that information into real-time, actionable insights.

With a hybrid cloud strategy, businesses can run data analytics programs through public clouds and tap private clouds to store sensitive data. Data management will be a top priority as organizations rely more on data analytics, and a hybrid approach will remove the stress and complications an organization would otherwise face by solely relying on its own infrastructure.

Hybrid cloud for CI lets businesses integrate applications and data across multiple cloud domains to connect traditional on-premises enterprise applications with private cloud environments and new lightweight public cloud services. Since new services and connections are typically not governed solely by a central IT team, the result may be a confusing network of point integrations. Hybrid cloud is a way to standardize integration and data movement across multiple groups to maintain control without slowing down innovation.

An agile, hybrid cloud integration architecture breaks up integration runtimes into smaller, more manageable, and dedicated components so that new applications can perform at a rapid pace that scales quickly. When integration is broken down into separate pieces, businesses can opt to distribute those pieces by ownership and administration. This decentralized integration approach reduces the number of teams implementing a solution, which significantly reduces unproductive cross-team chatter and development delays.



How Hybrid Cloud Enables CI

Developing and deploying CI applications can be challenging. Businesses often need new approaches to accommodate vast volumes of streaming data from multiple sources. A hybrid cloud architecture for CI addresses these core issues by providing:

DATA CONSOLIDATION

A hybrid cloud solution makes data accessible to all who need it. At the same time, businesses can ensure data governance.

EASY ACCESS

Applications and data in hybrid clouds can be used by internal and external stakeholders while enforcing governance controls.

SHARING AND COLLABORATION

Data and applications in hybrid clouds enable more sharing and collaboration.

REDUCED OPERATING COSTS

Do-it-yourself analytics solutions take time and money to build, install, and maintain. With companies of all sizes needing CI for competitive reasons, hybrid deployments eliminate the huge upfront investment in analytics required in the past.

SCALABILITY

Businesses can start small and try many different CI initiatives. When a particular application proves its value, hybrid cloud lets a business quickly deploy and scale it to match business requirements.

Ultimately, an agile, hybrid cloud architecture enables businesses to embrace CI as part of their normal operations. CI applications built on hybrid cloud let businesses:

- ✓ Manage access to internal and external services
- ✓ Connect on-premises and cloud apps to drive business transformation
- ✓ Move huge amounts of data rapidly, securely, and predictably
- ✓ Cleanse and prepare data for a consistent view of the business

Summary

CI uses flows of data from streaming sources, such as the Internet of Things (IoT), mobile devices, sensors, clickstreams, and transactions. Such data sources have, to date, remained largely unused. CI offers businesses a way to unlock this data to optimize decision making.

CI analytics solutions are not just about ingesting streaming data and performing analytics. They are also execution platforms that enable the real-time enterprise by detecting urgent situations and acting immediately.

Essentially, CI takes real-time analytics to new levels. It makes use of AI and ML models on streaming data to get insights into events as they are happening. Unfortunately, legacy infrastructures and architectures do not offer the compute and data management capabilities to support CI.

As a result, businesses need to update their information architectures to accommodate CI's data in motion and embed AI into all business processes.

What's needed to enable such functionality and flexibility is an infrastructure that allows businesses to:

- ✓ Continuously analyze data in motion across multiple sources to deliver actionable insights
- ✓ Connect to any data stream to make predictions and discoveries as data arrives to enhance and improve analytic models and cognitive systems
- ✓ Deploy a complete set of streaming analytics—such as natural language processing, geospatial, predictive, and more—to satisfy unique, industry-specific requirements and use cases

Hybrid cloud offers the flexibility, portability, and scalability to meet these needs.

IBM Cloud Pak for Data

To enable predictive analytics and AI everywhere, IBM developed Cloud Pak™ for Data, a fully integrated data and AI platform that modernizes how businesses collect, organize, and analyze data and infuse AI throughout their organizations. Built on Red Hat® OpenShift® Container Platform, IBM Cloud Pak for Data integrates market-leading IBM Watson® AI technology with IBM Hybrid Data Management Platform, data ops, governance, and real-time streaming analytics technologies. Together, these capabilities provide the information architecture for AI that meets organizations' ever-changing enterprise needs.

Deployable in just hours and easily extendable with a growing array of IBM and third-party microservices, IBM Cloud Pak for Data runs across any cloud, enabling organizations to more easily integrate their analytics and applications to speed innovation. IBM Cloud Pak for Data lowers the total cost of ownership, accelerates innovation based on open source technologies, and fully supports multi-cloud environments such as Amazon Web Services (AWS), Azure, Google Cloud, IBM Cloud™ and private clouds.

For more information, visit ibm.biz/CloudPak4Data



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ⁱ <https://www.gartner.com/smarterwithgartner/modernize-it-infrastructure-in-a-hybrid-world/55739>