JioCloud

Cloud Management Platforms for the multi-cloud era

The growing significance, tackling challenges, and unlocking new possibilities.

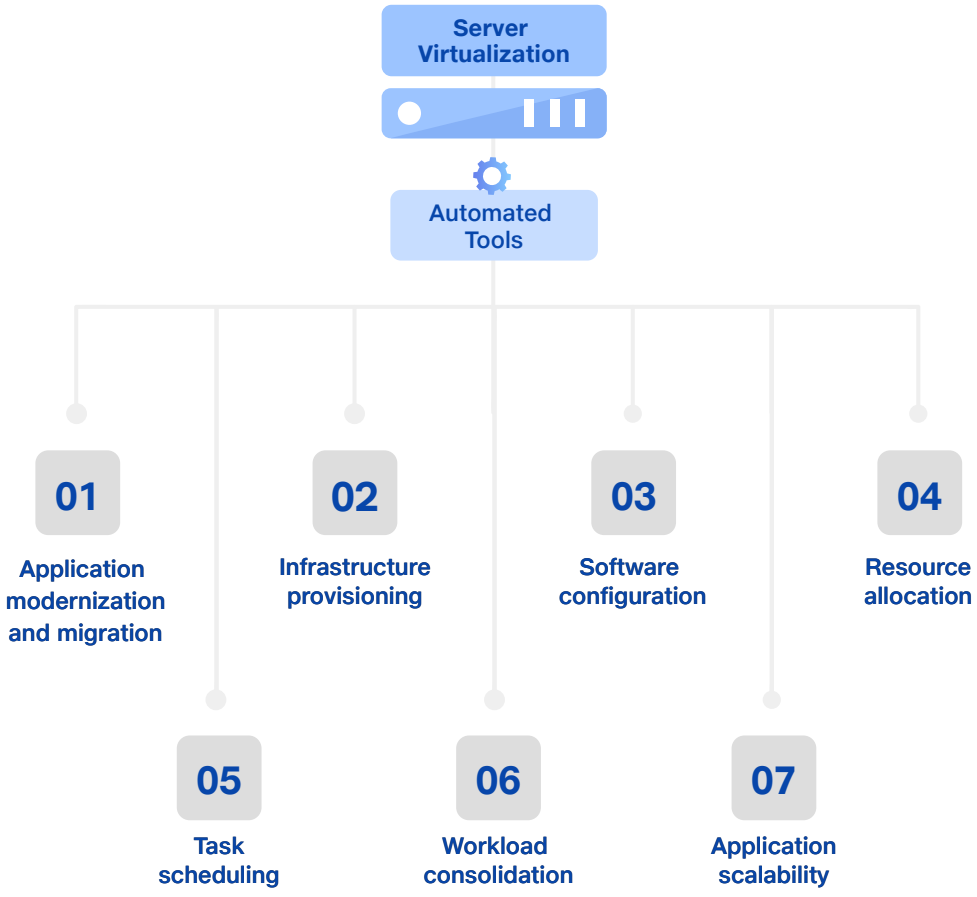
CloudXP Whitepaper

The growing significance of multi-cloud management platforms

With the advent of new technologies, cloud-adoption complexity is consistently on the rise. Enterprises across the globe have started using multiple clouds to avail benefits like IT agility and affordability, high availability, scalability, and reliability of business workloads. As per Gartner, by 2025, most of the mission-critical workloads will reside in the cloud. To accelerate the cloud transformation journey for established businesses and startups, competent cloud management platforms (CMPs) must mitigate complexities.

Explaining the multi-cloud paradigm

With the proliferation of public, private, and edge cloud environments, cloud adoption has become rapid. Enterprises are increasingly investing in the cloud infrastructure. The cloud journey began with server virtualization and was followed by the introduction of automated tools to accelerate tasks, such as application modernization and migration, infrastructure provisioning, software configuration, resource allocation and task scheduling, workload consolidation, and application scalability. Gradually, several cloud modules completely adopted virtualization.



Cloud-native computing

Post-virtualization, came the intriguing concept of containerization, a technology that enables efficient and optimized runtime environments for microservices. With the growing popularity of Microservices Architecture (MSA) and Event-driven Architecture (EDA):

- Monolithic and massive applications are being disassembled into a set of microservices
- Software products, solutions, and services are getting introduced as containerized microservices applications
- Containerization-enablement platforms are helping to create container images for software packages, database management systems, and middleware solutions
- Containerized services and applications are being deployed across multiple cloud environments, with Kubernetes emerging as the leading container orchestration platform

Characteristics of microservices and its adoption

Microservices can be independently developed, deployed, and managed. They are also horizontally scalable, configurable, composable, self-contained, publicly discoverable, network-accessible, front-ended with APIs, testable, and observable. In addition, they are resilient and produce reliable composite services, which are business-aware and process-centric. While microservices are modular, highly cohesive, and loosely coupled, event-driven microservices are asynchronous and decoupled. Complex business automation requirements approach through the path-breaking MSA style, and on the other hand, different and distributed microservices are skillfully composed to produce enterprise-scale software solutions.

The cloud-native era represents a wide adoption of the MSA pattern as the agile software design and development mechanism, the close affinity between microservices and containers, the continuous strengthening of Kubernetes for speedy and declarative software deployment and management, and the increased usage of DevOps and value stream management (VSM) concepts and tools (infrastructure as code (IaC) and data (IaD), etc.) for agile software engineering.

The evolution of the multi-cloud paradigm

As the latest business trends support the multi-cloud phenomenon, government and private enterprises are aggressively transitioning their local IT environments to the cloud. In the recent past, the concept of edge clouds has flourished. There is a faster proliferation of the Internet of Things (IoT), edge devices such as cameras, IoT, middleware/gateways/brokers/hubs, robots, smartphones, drones, medical instruments, defense equipment, information appliances, gadgets and gizmos, machinery, etc. In addition, edge devices are used to collect and crunch data from homes, hotels, hospitals, retail stores, airports, and manufacturing floors to produce real-time insights.

In this race of cloud transitioning, various organizational departments collaborate with different CSPs without permission from the enterprise IT organization. Many of the shadow deployments that occur on public clouds inadvertently create a multi-cloud. Therefore, enterprises across the globe formulate well-intended multi-cloud strategies to leverage the distinctions of different and distributed cloud environments.

Why the multi-cloud phenomenon?

Multi-cloud is similar to the hybrid cloud but with a crucial difference. In a multi-cloud, there are two or more public and/or private cloud services. They could be completely different or run disparate workloads. In a hybrid cloud, there can be multiple clouds, but they are well-integrated to facilitate data transfer and workload interactions. There are several business and technical reasons for enterprises to embrace the flourishing hybrid-cloud idea.

Avoid vendor lock-in

When a business organization integrates with several clouds, it helps move workloads to the cloud provider that offers the best business value.

Affordability

Companies can choose the most affordable CSP to host, run, and deliver their software products, solutions, and services.

Leverage Cloud capabilities

Most hyper-scale clouds are well-known for hosting AI applications and some for providing high-performance computing, quantum computing, etc.

Location affinity

Enterprises can choose the nearest cloud environment to guarantee high performance.

Business continuity

Adopting multiple clouds helps accomplish disaster recovery needs and guarantees business continuity.

Core features of multi-cloud management platforms

Each public cloud environment supports different features and tools to manage cloud service offerings. Cloud services are front-ended with proprietary APIs and each offering guarantees different SLAs. In addition, the distributed clouds need to be connected and secured. The enterprise IT team can hence comfortably manage one public cloud but not all. In crux, monitoring and managing multiple clouds collectively and concurrently is tough and time-consuming.

In this context, there are six features for any service orchestration and automation platform (SOAP).

- **Application workflow orchestration** to create and manage workflows for multiple applications across clouds
- **Event-driven automation** to automate manual IT processes
- **Scheduling, monitoring, visibility, and alerting** to enable real-time capabilities to significantly improve SLAs
- **Self-service automation** to empower business users, developers, and end-users to perform their own tasks
- **Resource provisioning** of cloud resources (compute, storage, and network)
- **Managing data pipelines** for automating data ingesting and processing

How are multi-cloud management platforms overcoming industry challenges?

There are various challenges in setting up and sustaining multiple cloud environments. We'll understand these in the following section and how CMPs are overcoming them.

Multi-Cloud security

Cloud providers have different security policies, products, and settings to safeguard their data and applications. Thus, business consistent and effective security, appropriate security configuration, and user access control (IAM) solutions are needed to ensure unbreakable and impenetrable security.

Continuous demand for microservices

Cloud applications require microservice compositions, expected to be individually upgraded and verified before getting deployed. Business behemoths demand faster and more frequent deployment to meet evolving business sentiments and market situations.

Cloud orchestration

Automating cloud operations and putting them in motion require an advanced orchestration engine that orchestrates infrastructure resources. Also, workflows and multi-cloud services use an orchestration tool to run.

Cloud brokerage and advisory

A multi-cloud platform must collect past performance data, analyse multiple parameters, and factually weigh critical factors to identify the best cloud service(s). Therefore, the capability to make relevant recommendations for cost reduction is essential.

Multiple deployed consoles

Multi clouds have multiple deployed consoles. A unified console with a selection of Machine Learning (ML) algorithms is needed to centrally monitor and manage all consoles, automatically discover and co-relate events, understand the origin of issues, and recommend corrective solutions.

Serverless computing

DevOps facilitates infrastructure setup and maintenance for continuous integration, delivery, deployment, feedback, and improvement. Also, serverless platforms are required for automation. Event-driven services need to be serverless and enabled for guaranteed deeper automation.

Cloud governance

Enforcing custom policies is essential to automatically govern multiple clouds. There is also a need to view configuration items (CI) and their dependencies, track CI changes, set up and manage policies, and quickly remediate disruptive events

Heightened cost expenditure

Reducing cloud expenditure requires on-demand provisioning of infrastructure resources, correct configuration of software packages, and enhancing cloud resource utilization. In addition, a detailed multi-cloud spend report with filtering, tagging, and parsing capabilities is a must.

Cloud workload prediction (CWP)

Cloud operational costs can increase with a bit of oversight from cloud users. An advanced Machine Learning model is needed to precisely predict the required quantity of optimal resources. Administrators can then focus on the optimal provisioning of cloud assets and their resources.

Transformation to containerized workloads

Compartmentalization technologies are making business workloads cloud-enabled. Some application services are hosted/run in Kubernetes-like container orchestration tools. This platform is feature-rich, facilitates application portability, and supports virtualized workloads.

Interactions with customers

Cloud management platform solutions must feature NLP-enabled conversational Chatbots for automated customer interactions. Also, semantic searching and querying require a substantial boost in the form of added domain-specific knowledge graphs.

Back up, archiving, and disaster recovery

Effective multi-cloud management tools enable cloud reliability, thereby, guaranteeing business continuity. Businesses must leverage various cloud facilities and make backup and archiving of applications easy, cheap, and secure for data and disaster recovery.

Real-time data insights/ analytics

Continuous monitoring of resources is essential in generating real-time, data-driven insights. These insights enable timely discovery/ dissemination of knowledge, insight-driven decision-making, and cloud operation automation, accelerating end-to-end multi-cloud management tasks.

Operational complexity

Cloud integration and orchestration complexities increase with the multiplicity of clouds. Thus, multi-cloud management solutions/services are needed to simplify operational complexity, reduce cloud expert's requirements, and overcome the short supply of skilled professionals.

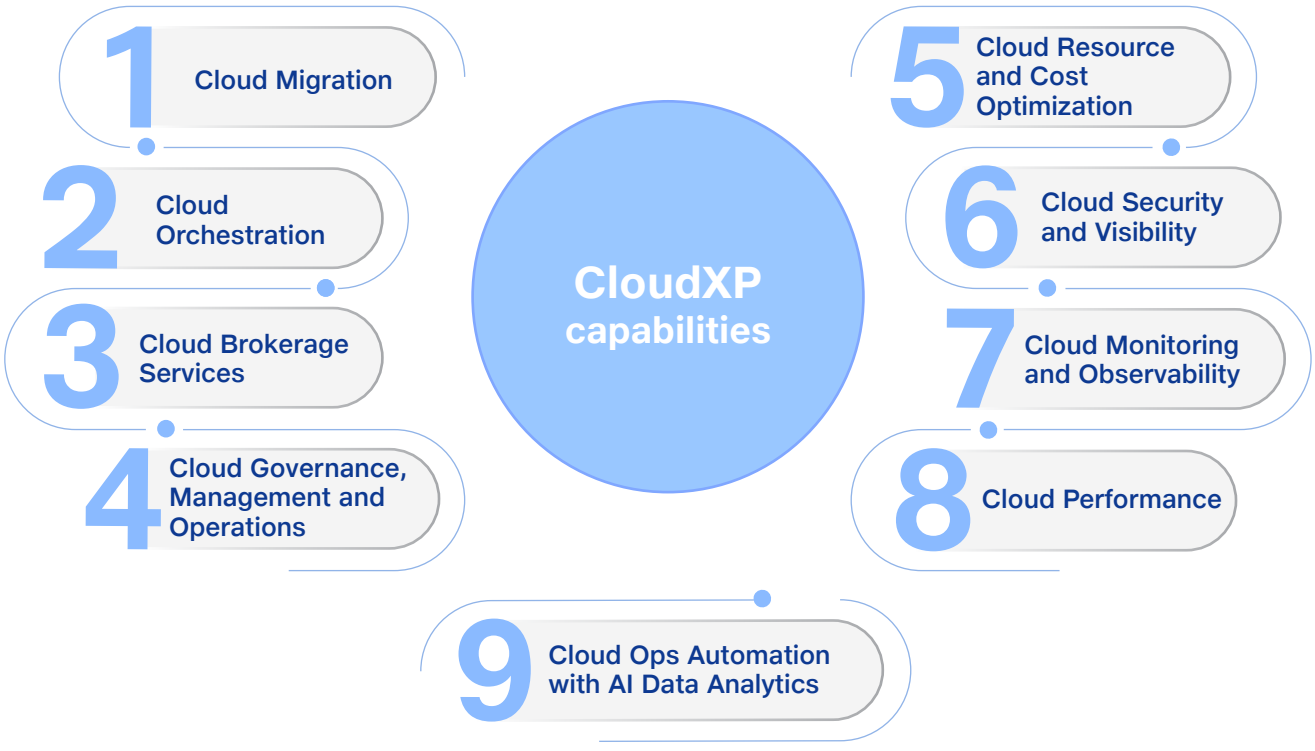
Jio CloudXP: the solution for multi-cloud challenges

CloudXP is designed to efficiently manage geographically distributed cloud environments that are beset by the challenges covered above.

As a cloud-native, artificially intelligent, and multi-faceted cloud management platform (CMP), CloudXP is offered in the Software as a Service (SaaS) mode. It is packed with advanced functionalities to simplify the process of setting up and sustaining multi-cloud environments. Event-driven and empowered through a sophisticated orchestration engine, CloudXP is continuously available, highly reliable, and easily configurable, ensuring optimal resource management. The platform also works across geographically distributed cloud environments (public, private, hybrid, and edge).

The CloudXP team continuously creates and updates architectural blueprints for various cloud-enabled and cloud-native workloads and services in a controlled repository. They use infrastructure as code (IaC) and data (IaD) tools to create reusable infrastructure-provisioning scripts. The team also uses the containerization-enablement platform and a private container image repository to containerize software solutions and microservices to securely persist their images.

The DevOps concepts and tools are used to speed up software deployment. CloudXP's Site Reliability Engineering (SRE) team uses engineering metrics to ensure IT reliability that in turn, guarantees business continuity. As a result, the engineering team maintains a fast-growing catalogue of blueprints for business-critical software solutions with a code and configuration files repository. All the noteworthy improvisations of the Kubernetes platform are meticulously leveraged to perform workload consolidation, task and resource scheduling, automated deployment and management of containerized and serverless applications, policy-based governance, and self-healing of infrastructure modules.



CloudXP Features

Automated Cloud operations

CloudXP automates repetitive tasks and security measures. Service orchestration facilitates the workflow-centric integration of automated tasks towards self-run composite jobs, job scheduling, workload optimization, resource and application monitoring, and technology-enabled self-scaling and healing.

On-demand resource provisioning

CloudXP provides a self-service portal that enables on-demand resource provisioning to address customized resource requirements.

Knowledge visualization

CloudXP provides details about provisioned and used infrastructure on a single pane of glass. It features integrated dashboards that offer deeper visibility into systems and components for improved control.

Superior Cloud management experience

Driven by zero-touch operations, CloudXP uses a NoOps model that focuses only on actions and eliminates redundant tasks. It relies on system-engineered inputs and auto-healing to fix outliers and break isolation by bringing internal teams together.

Seamless Cloud infrastructure management

CloudXP enables easy provisioning and management of assets across cloud environments to run virtualized, containerized, and serverless workloads. It gathers diagnostic information about the assets' health and offers valuable insights to implement corrective and preventive actions.

Improved application performance and uptime

CloudXP employs accurate, predictive models on cloud resource data to pinpoint anomalies and usage patterns, which helps in enhancing service/application availability across the enterprise.

Full-stack observability

CloudXP extensively and efficiently automates processes using embedded observability and auto-remediation capabilities. With the AI processing of logs, performance key indicators, security and monitoring data, and service and operational agreements (SLAs and OLAs) are adhered. CloudXP fully complies with the service orchestration and automation platform (SOAP) features mentioned in Gartner's report.

Complete system/module support

CloudXP is capable of provisioning, configuring, and deploying all kinds of infrastructure modules (virtual machines, bare metal servers, containers, storage appliances, security, and network solutions), middleware solutions, integrated platforms (development, integration, orchestration, deployment, etc.), databases and data warehouses, message brokers and queues, data analytics platforms (batch and stream processing), knowledge visualization tools, and other mission-critical software systems. Additionally, it can help mitigate the complexities of cloud adoption and sustenance.

Optimized cost and resource utilization

The platform's predictive capabilities let you study usage trends across the spectrum, which enables cost reduction. CloudXP:

- Saves up to 30% on monthly cloud costs
- Guarantees heightened resource utilization efficiency
- Automates complicated cloud management tasks
- Provides deeper visibility into shadow IT resources
- Ensures agility, adaptivity, and affordability

Enhanced security for cloud assets

CloudXP tightly secures IT assets, services and data with inbuilt techniques for access control, authentication, and authorization. It proactively detects and prevents cyberattacks with the help of network and host-based intrusion detection systems. In addition, it offers actionable insights by meticulously gathering and investigating security event data.

Contact Us

For queries and demo, write to us at JPL.CloudSales@ril.com