



TECHNICAL WHITE PAPER

Rubrik Guide to Public Cloud

Technology Overview and How It Works

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THE UNSTOPPABLE RISE OF PUBLIC CLOUD

According to IDC, enterprises will spend more than \$500 billion on cloud and cloud services by 2023¹. Moreover, Gartner estimates that over 95% of new digital workloads will be deployed on cloud-native platforms by 2025, up from 30% in 2021². The top 4 Clouds (“Megaplatforms”) are and will continue to become a destination of choice for workloads, with lock-in being avoided through multi-cloud and cloud-native approaches to achieve portability. Companies born in the ‘cloud era’, such as Airbnb, Slack, and Snapchat, have utilized public cloud since inception. Companies like Boeing are using Azure as their de facto platform for analytics, and companies like Capital One are using AWS to reduce their data center footprints.

The digitization of business requires enterprises to move faster and be more agile to survive. Applying new technologies to existing business activities (e.g., leveraging AI to increase customer satisfaction) will continue to fuel the cloud paradigm. For many enterprises, public cloud represents the ability to rapidly access resources for innovation while operating in a data-rich environment.

CLOUD PARADIGM INTRODUCES DIFFERENT PRINCIPLES

Enterprise IT looking to increase cloud usage will find that marrying non-cloud systems with cloud-native applications and infrastructure offers up new principles.

- **Shift from asset to service consumption.** Traditional IT is largely based on providing finite assets that service relatively stable workloads and predictable business growth. In a cloud model, IT rapidly provisions services according to business demand.
- **Automate service delivery.** With cloud, fast time to market can be delivered through automation frameworks. Infrastructure becomes programmable through code by being structured into templates that can be easily versioned and replicated for future deployments.
- **Develop applications based on microservices.** Rapid shifts in business demand require applications to deliver newer capabilities faster, to be resilient to failures, and to scale-out on-demand. Applications built in this new manner can be decomposed into independent components called “microservices”, each delivering a single function.

With public cloud playing a greater role in overall enterprise IT strategy, the need for a cloud-scale data management platform becomes paramount to protect and manage data born in the cloud and elsewhere.

WHAT IS RUBRIK CDM?

As enterprises migrate applications to the cloud, IT will need to deliver core data protection (backup, disaster recovery, archival) in the event of service outages, data loss, and natural disaster.

The Rubrik CDM platform provides a cloud-native approach to managing the lifecycle of data, from creation to expiration, to drive better performance and operational continuity at lower costs. Rubrik bridges the gap between owned, on-premises infrastructure and the cloud by decoupling data from the data center through a software-defined fabric and offering a single management plane for all data, whether on-prem or in the cloud. Comprehensive data management is delivered through instant access, automated orchestration, and enterprise-class data protection and resiliency.

- **Instant Access:** Rubrik empowers users to find the right data quickly, with predictive global search across applications. That search functionality also enables rapid recovery, with file-level granularity.
- **Automated Orchestration:** Rubrik dramatically reduces daily operational management, providing a stepfunction change in simplicity by enabling a single policy engine to orchestrate service level agreements (SLAs) across the entire data lifecycle. The Rubrik programmatic interface automates how data services are created, consumed, and retired across clouds.

1 <https://www.fiercetelecom.com/telecom/spending-public-cloud-will-more-than-double-by-2023-report#:~:text=A%20report%20by%20International%20Data,companies%20and%20%20hyperscale%20cloud%20%20providers>

2 <https://www.gartner.com/en/newsroom/press-releases/2021-11-10-gartner-says-cloud-will-be-the-centerpiece-of-new-digital-experiences>

- **Security and Compliance:** Rubrik secures data whether in-flight or at-rest throughout its lifecycle. The Rubrik platform delivers granular role-based access control across all cloud data management workflows while providing automated compliance reporting to successfully complete various industry and internal audits.

DATA MANAGEMENT DESIGNED FOR CLOUD

Delivering data protection and management for cloud requires a modern approach to accommodate the shift to service consumption, automation of service delivery, and development of modular, scale-out applications. Rubrik CDM is designed with the following principles:

- **Master-less, self-healing architecture:** Rubrik distributes data, metadata, and task management across the cluster to deliver predictive scalability and eliminate performance bottlenecks. The system has its own distributed file system (Atlas) built from the ground up to store and manage versioned data at scale. Tasks are divvied up across cluster nodes based on data location and resource availability. Data is also stored efficiently while delivering resiliency (erasure coding).
- **Distributed metadata and namespace:** Rubrik's Distributed Metadata System operates alongside its cloud-scale file system (Atlas), providing a global index and catalogue that can be accessed at high speeds. It delivers continuous availability, linear scalability, and operational simplicity with no single point of failure in the cluster. The system is built to handle large amounts of data, distribute replicas of data across nodes (access to metadata is maintained even in the case of node failure), and provide low latency access to facilitate search.
- **Data Operations Platform as a single system of record:** Rubrik aggregates and organizes metadata into a universal ledger that surfaces semantic relationships across your on-prem and cloud data silos. Rubrik provides a unified control plane for all data and all workloads under management, regardless of whether they are on-premises or in the cloud. This enables the use of SLA policies across all enterprise locations.
- **Elastic compute for light-weight data operations:** Rubrik employs innovative exocompute technology that establishes a bi-directional communication path between your data in your private cloud and Rubrik to exchange metadata. Through the use of cloud-native compute best practices, Rubrik spins up resources as necessary to manage and process data. This circumvents the impracticality of data movement and costs associated with managing multiple replicas of petabytes of data. And by avoiding the tight coupling of data and operations, the data never leaves your environment, reducing compromise to data sovereignty and governance.
- **Policy-driven data management:** Rubrik offers a global SLA policy engine in which users can automate protection of cloud applications, databases, and file sets to business requirements. Rubrik pioneers a declarative policy approach to eliminate the minutiae of scheduling data protection jobs—users simply select the desired snapshot frequency, retention duration, etc.
- **Secure access in self-service environment:** Granular control over user access is defined at a platform level, regardless of location. Rubrik allows self-service access (role-based access control) to empower users to perform their own backup, recovery, and archival services.
- **Consumption and compliance analytics:** Rubrik delivers real-time platform insights on data management, compliance reporting, and capacity planning across your cloud environment. Rubrik Zero Trust Data Protection provides full-featured SaaS-based monitoring across all Rubrik clusters in all infrastructures.
- **Easy integration with automation frameworks:** Rubrik's API-first architecture enables automation of all types of data management workflows. Automate all aspects of data lifecycle management with a full-featured RESTful API. Move local data to the cloud and intelligently manage cloud data to reflect business needs.

HOW CLOUD DATA MANAGEMENT WORKS AND USE CASES

Deploy Rubrik CDM on your choice of infrastructure: plug-and-play appliances, certified third-party hardware platforms, or directly in the cloud.

MANAGING CLOUD-NATIVE APPLICATIONS AND DATA

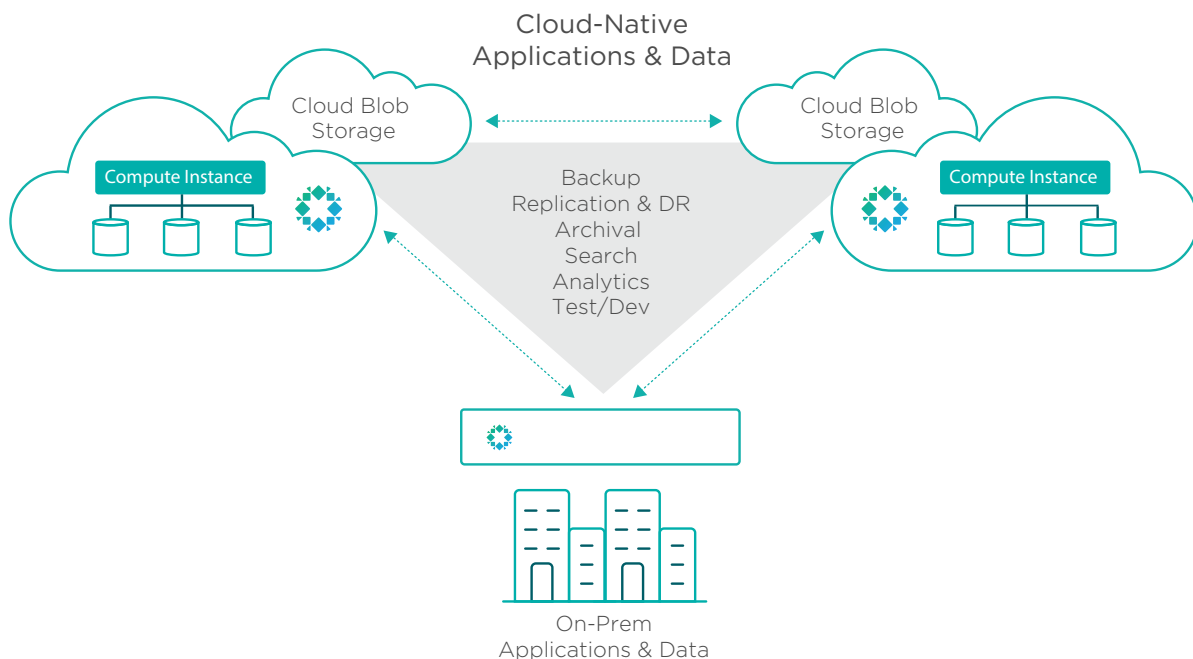
Rubrik is a SaaS platform that organizes metadata from across your Rubrik deployments and enables global management through a single control plane. Cloud-native backup for Amazon EC2, Azure VMs and Office 365 are delivered through Rubrik. Using cloud-native APIs, Rubrik automatically spins up a single lightweight Rubrik node in the cloud to index snapshots and relevant metadata in the cloud. Once complete, the Rubrik node is automatically powered down, saving on both bandwidth and egress costs.

Alternatively, Rubrik can also be deployed as a software instance in the public cloud to orchestrate all critical data management functions. Users can spin up the recommended compute instance and scale easily by growing the Rubrik cloud cluster in lock-step with production cloud data. Users spin up the recommended compute instance on supported public cloud providers and can scale-out easily by growing the Rubrik cloud cluster in lock-step with cloud data growth. All data is indexed and efficiently stored in a single, scale-out repository.

Users can quickly locate (with real-time predictive search) and deliver application-consistent recoveries for data born in the cloud, including files, folders, file sets, VMs, and database instances (e.g., Windows, Linux, SQL databases). Users receive actionable insights with Rubrik Envisions rich visual reporting, which allows creation, customization, and sharing of platform analytics on consumption, compliance, and more, across a multi-cloud environment.

Regardless of how you protect your cloud applications, you will get the exact same user interface and same control plane as for other applications. With Rubrik, you have the power to export data across regions, and you can take full advantage of lower-cost public cloud storage for archival. Cloud vendor lock-in can be avoided by migrating data from public cloud to public cloud to optimize application service quality. Keep in mind that workload portability across heterogeneous clouds can be expensive given the transfer costs posed by public cloud providers. Data transfer out from public cloud provider to the internet will incur a charge. Data transfer within a public cloud service (data center to data center or region to region) will also often incur a charge.

Figure 1: Cloud Native Applications & Data



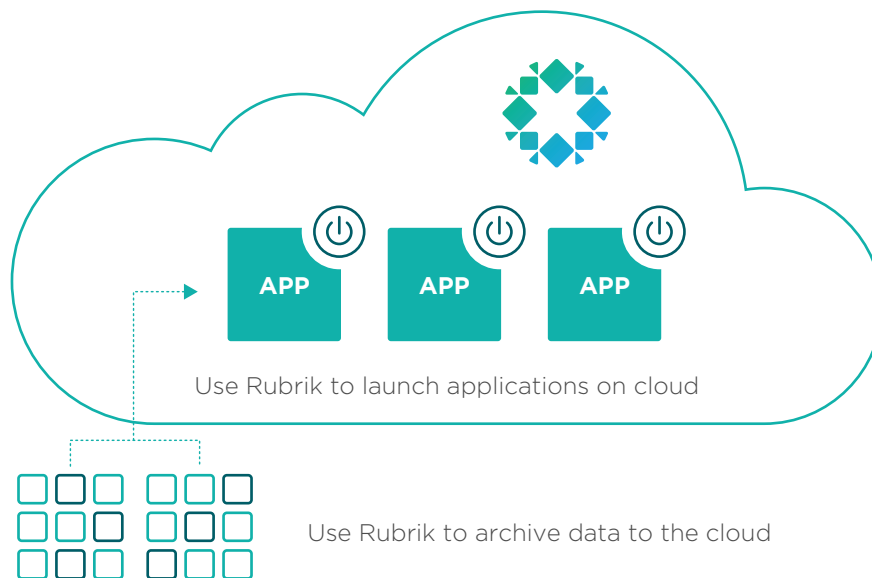
MANAGING HYBRID CLOUD APPLICATIONS AND DATA

Hybrid cloud enterprises can deploy Rubrik to manage applications on-premises while utilizing cloud services for archival, disaster recovery, and test/development.

Enterprises often ease into cloud services by utilizing low-cost cloud storage services for long-term retention of application data while eliminating tape management complexity. With Rubrik, users can quickly set up archival policies to be applied across their hybrid cloud environment. Rubrik globally indexes all data, no matter where it resides, allowing users to retain quick access to archived data with predictive search. Users can quickly locate a file (rather than the entire data set) and download to restore in any location, saving both bandwidth and egress costs.

Enterprises can also leverage Rubrik to launch applications on the cloud for application mobility, and app restores for recovery from downtime and test/dev. To power on applications in the cloud initially, users will configure the desired security group and virtual private cloud (VPC) details. Rubrik scans the configuration file of a VM to understand its characteristics (compute, memory, storage, etc.) and recommends a compatible cloud instance type. At this point, Rubrik begins constructing a cloud instance from data stored in the cloud storage service. A single ephemeral, lightweight Rubrik node is automatically created in the target VPC to begin conversion of the VM into a cloud instance. This prevents the need for any data to exit the cloud region, saving both bandwidth and egress costs. Once the conversion is completed, the Rubrik node powers down and is purged until needed again.

Figure 2: App Instantiation in the Cloud



DATA MANAGEMENT FOR CLOUD-NATIVE APPLICATIONS

Cloud-Native Backup and Recovery	<p>Get up and running quickly with native protection delivered as a service. With zero additional infrastructure required, Rubrik's solution is also agentless, minimizing operational overhead for AWS, Azure and Google Cloud security and management. Rubrik's single SLA policy engine scales protection across hundreds of cloud accounts and subscriptions. Apply SLAs with granularity down to the VM or tag-level. Leverage an incremental-forever approach to minimize cloud storage costs.</p> <p>Unify management with a single, consumer-grade UI to protect, manage and secure data and workloads across clouds, on-premises, and edge locations.</p>
Cloud-Native Data Archival	<p>Archive cloud-native data to a public cloud provider's blob storage service. Ensure quick accessibility of archived data with Rubrik's real-time predictive search.</p>

DATA MANAGEMENT FOR HYBRID CLOUD APPLICATIONS

App restores to the Cloud	<p>Use the cloud to recover on-demand from outages, regardless of where you run Rubrik or store data. Rubrik can automate the conversion of VMs, or cloud-based object storage, into compute instances. Whether your applications are on-prem or in the cloud, you can move on from your largely idle DR site.</p>
Migrating Test/Dev to the Cloud	<p>Migrate existing on-premises applications to the cloud for test or development tasks. Spin up test or dev instances from on-prem VM backups – then get rid of them when you're done.</p>
Replication – On-Prem to Cloud and Cross-cloud	<p>Deliver replication within a multi-cloud environment (heterogeneous cloud providers or different regions under same cloud provider). Or you can replicate data within a multicloud environment.</p>
Data Archival	<p>Send your application data to the cloud for long-term retention while retaining immediate access with predictive search.</p>

ENVIRONMENT SUPPORT CONSIDERATIONS

Amazon Web Services (AWS)	Starting with m5.xlarge instances Minimum of 4 instances (nodes), starting at 1.5 TB per node, for overall beginning usable capacity of 4 TB (erasure coding)
Microsoft Azure	Standard D3 v2 instance Minimum of 4 instances (nodes), starting at 1.5 TB per node, for overall beginning usable capacity of 4 TB (erasure coding)
Google Cloud Platform	N1-standard-4 instance Minimum of 4 instances (nodes), starting at 1.5 TB per node, for overall beginning usable capacity of 4 TB (erasure coding)



Global HQ
3495 Deer Creek Road
Palo Alto, CA 94304
United States

1-844-4RUBRIK
inquiries@rubrik.com
www.rubrik.com

Rubrik, the Zero Trust Data Security Company™, delivers data security and operational resilience for enterprises. Rubrik's big idea is to provide data security and data protection on a single platform, including: Zero Trust Data Protection, ransomware investigation, incident containment, sensitive data discovery, and orchestrated application recovery. This means data is ready at all times so you can recover the data you need, and avoid paying a ransom. Because when you secure your data, you secure your applications, and you secure your business. For more information please visit www.rubrik.com and follow @rubrikInc on Twitter and Rubrik, Inc. on LinkedIn. Rubrik is a registered trademark of Rubrik, Inc. Other marks may be trademarks of their respective owners.

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