

Qumulo for Oracle RMAN Backups

Fast, Scalable, Observable

With Oracle Database workloads, database administrators frequently run Oracle Recovery Manager (RMAN) backups and recoveries. This produces large volumes of unstructured file data.

These RMAN jobs occasionally experience hangs or freezes. Command-line scripts for troubleshooting only provide limited visibility -- not an end-to-end view of the entire stack.

To resolve these Oracle backup and recovery challenges, Qumulo is actively being deployed to assist customers with RMAN troubleshooting and performance tuning via our real-time analytics.

Qumulo's real-time analytics provides point-click visibility into these jobs offering immediate and greater insight into hangs and freezes. Moreover, Qumulo's unique Application Programming Interface (API) -- shortcomings of Dell/Isilon and NetApp -- provide database administrators with the ability to automate database clones in seconds.

RPO and RTO

Minimizing downtime, especially in a mission critical application is of paramount importance. Whether you're using internal metrics or working with SLAs, Recovery Point Objective (RPO) and Recovery Time Objective (RTO) are key concepts in providing necessary business continuity.

RPO is the maximum amount of data that can be lost before causing detrimental harm to the organization and indicates the data loss tolerance over a period of time a business process or an organization in general.

RTO is the duration of time and a service level a business process must be restored after a disaster, in order to avoid consequences associated with a break in continuity. Qumulo's data protection features, such as erasure coding, snapshots, snapshot and continuous replication, helps meet company requirements for disaster recovery, backup, and user management. Qumulo's real-time analytics and performance awareness visualize throughput, IOPs and latency of different applications and users, to deliver expected performance.

Why Traditional Solutions Can't Keep Up

Traditionally, once an initial backup is complete, incremental backups rely on time and performance intensive 'tree walks' to discover file changes across the file system and can dominate the backup window, consuming massive amounts of compute and network resources and leaving little time to backup files.

The result can be a constantly struggling system, leaving critical data at risk of not being backed within backup windows—which leaves IT departments out of compliance with their stated backup SLAs.

Eliminate slow 'tree-walks' to identify file changes with Qumulo's intelligent cache that automatically places data at your fingertips for fast and dependable data access.



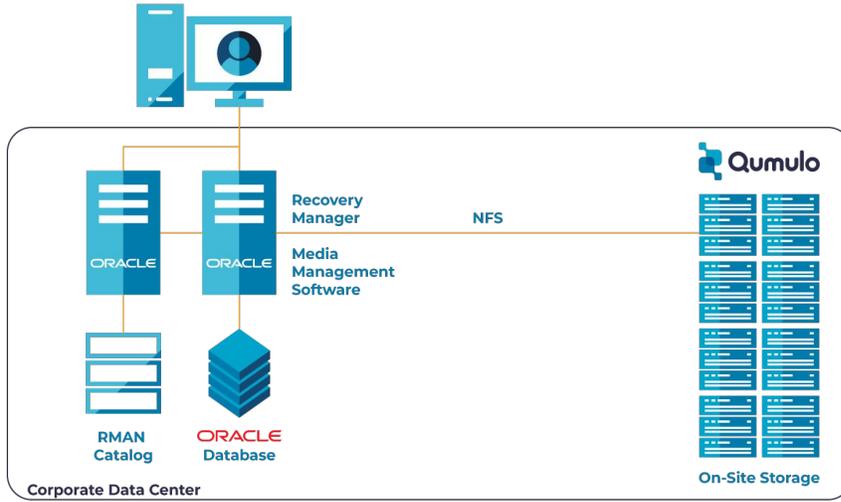
Features & Benefits

- Oracle - extend the usable life of Oracle Database via Qumulo's Integrated Analytics
- Qumulo compliments HPE block storage with carrier-grade uptime, risk reduction
- Keep API Focus with Qumulo's programmable storage

How It Works

- Qumulo running on HPE servers is a highly scalable, high-performance file data platform, providing enterprise clients with file data services across multiple protocols
- Qumulo offers robust REST API frameworks to access all its features, making it simple for to integrate tightly with Qumulo, gaining incredible performance and data awareness benefits without relying on legacy protocols like NDMP
- Data awareness makes incremental backups quick to start and finish reliably. Management of entire data platform is simple, with integrated analytics on a single pane of glass





The Power of NVMe All Flash for Oracle RMAN backups.

Qumulo provides a petabyte-scale file system, built from the ground up, to provide high parallelism in a scale-out architecture across a single large global namespace.

Qumulo software is combined with HPE NVMe compute nodes to drive low latency and high throughput performance to optimize backup job performance and, more importantly, accelerate data recovery resulting in a lower Recovery Time Objective (RTO).

- Flash-first design enables uniformity and fast ingestion
- Single cluster performs at over 1 million IOPS, 333GB/s reads and 200GB/s writes
- Designed for scale-out/scale-across
- Enterprise-proven file system and server hardware
- Real-time analytics
- Ability to use 100% of your available storage

About Qumulo

Qumulo hybrid cloud file storage delivers real-time visibility, scale, and control of data across on-prem and cloud. Qumulo customers understand storage at a granular level; programmatically configure and manage usage, capacity, and performance; and are continuously delighted with new capabilities, 100 percent usable capacity, and direct access to experts. More: www.qumulo.com

About Hewlett Packard Enterprise

Hewlett Packard Enterprise is the global edge-to-cloud platform as-a-service company that helps organizations accelerate outcomes by unlocking value from all of their data, everywhere. Built on decades of reimagining the future and innovating to advance the way people live and work, HPE delivers unique, open and intelligent technology solutions, with a consistent experience across all clouds and edges, to help customers develop new business models, engage in new ways, and increase operational performance. www.hpe.com

HPE Appliances Powered by Qumulo

Persistent Performance

| HPE Proliant DL325 Gen10 PLUS | All-NVMe (two starter configurations) | | |
|-------------------------------|---------------------------------------|-----------------------------------|-----------------------------------|
| | HPE 34T | HPE 145T | HPE 291T |
| Platform | HPE 34T | HPE 145T | HPE 291T |
| Form Factor | 1U | 1U | 1U |
| Raw Storage Capacity | 34TB | 145TB | 291TB |
| SSD/NVMe | 9 x 3.84TB NVMe | 19 x 7.68TB NVMe | 19 x 15.63TB NVMe |
| Networking | 4 x 100Gb | 4 x 100Gb | 4 x 100Gb |
| CPU | AMD Epyc 7402 24 cores 2.8 Ghz | AMD Epyc 7402 24 cores 2.8 Ghz | AMD Epyc 7402 24 cores 2.8 Ghz |
| Memory | 128 GB | 128 GB | 128 GB |

| Mellanox SN2100M | Switching Bundle |
|------------------|-----------------------------------|
| Platform | HPE SN2100M 100GbE 16QSFP28 |
| Form Factor | 2U |
| Number of Ports | 24 |
| Networking | 100Gb |