Overview

HPE Apollo 4200 Gen9 with Qumulo File Fabric (QF2)

File-based data at large scale is central to all data-intensive industries where innovation is the name of the game.The growth of file-based data has accelerated to the point that companies wonder how they will be able to manage the ever-increasing scale of digital assets. In addition, the elastic resources and global reach of the public cloud are creating new demand for the mobility of file-based data. In the world of big data, scale is no longer limited to capacity and performance. New criteria for scale have emerged. They include number of files stored, the ability to control enormous data footprints in real time, global distribution of data, and the flexibility to leverage elastic compute in the public cloud in a way that spans the data center as well. Users of file storage also need to maintain and safely manage large-scale, complex workflows that rely on collaborations between many distinct computer programs and humans. Moreover, the traditional buying criteria of price, performance, ease-of-use and reliability remain as important as ever, no matter how much the landscape has changed. Users of legacy scale-up and scale-out file systems are finding that their systems are inadequate to meet all these requirements. Spending time and money rewriting existing applications to use object stores and losing the benefits of a file system for organizing data, is not an optimal option either. These new file storage requirements define universal-scale file storage.

Apollo 4200 Gen9 servers running the Qumulo File Fabric (QF2) software is a modern, highly scalable file storage solution that runs in the data center. More economical than legacy storage with leading performance, the Apollo 4200 with QF2 file storage solution provides real-time analytics to let administrators easily manage data no matter how large the footprint or where it's located globally. Apollo 4200 Gen9 with QF2 on-premise clusters are fully inter-operable with QF2 clusters also deployed in the public cloud.

Continuous replication between on-premise QF2 clusters and cloud-based QF2 clusters allow data to move where it's needed, when it's needed.

What's new:

- New custom-built Apollo 4200 Gen9 180TB and 90TB Qumulo Nodes
- New Qumulo File Fabric (QF2) 1TB Subscription and Support E-LTUs – 12 month, 36 month and 60 month terms
- New Qumulo Installation and Advanced Training Service delivered directly from Qumulo
- New Qumulo System Health Check Service delivered directly from Qumulo
- New Qumulo Qnit skus for deploying Qumulo File Fabric clusters in the public cloud. Now you can install QF2 clusters on-premise or in the cloud or in a hybrid configuration with both on-premise and cloud-based QF2 clusters while using continuous replication to move data where and when it's needed between clusters.

HPE Apollo 4200 Gen9 Qumulo nodes

HPE Apollo 4200 180TB Qumulo Node	Q2S16A
HPE Apollo 4200 90TB Qumulo Node	Q2S17A

Qumulo File Fabric 1TB Tier H1 Subscription and Support Electronic License to Use (E-LTU)

Qumulo File Fabric 1TB Tier H1 12-month Subscription and Support E-LTU	R0G81AAE
Qumulo File Fabric 1TB Tier H1 36-month Subscription and Support E-LTU	R0G83AAE
Qumulo File Fabric 1TB Tier H1 60-month Subscription and Support E-LTU	R0G85AAE

Qumulo Professional Services

Qumulo Installation and Advanced Training Service per Day	R0G89AAE
Qumulo Systems Health Check Service	R0G90AAE

Overview

Qumulo Qnits for QF2 cluster deployment in the public cloud

Qumulo File Fabric 10000 Qnits Tier 1 Public Cloud Purchased in Advance E-LTU	R0H87AAE
Qumulo File Fabric 10000 Qnits Tier 2 Public Cloud Purchased in Advance E-LTU	R0H88AAE
Qumulo File Fabric 10000 Qnits Tier 3 Public Cloud Purchased in Advance E-LTU	R0H89AAE

NOTE: A Qnit is a credit that is used to redeem hours of Qumulo usage in the cloud.

Features and Benefits

With high availability HPE Apollo 4200 Gen servers running Qumulo File Fabric, customer get a density-optimized 2U rack mount file storage solution offering either 90 or 180TB raw capacity per node.

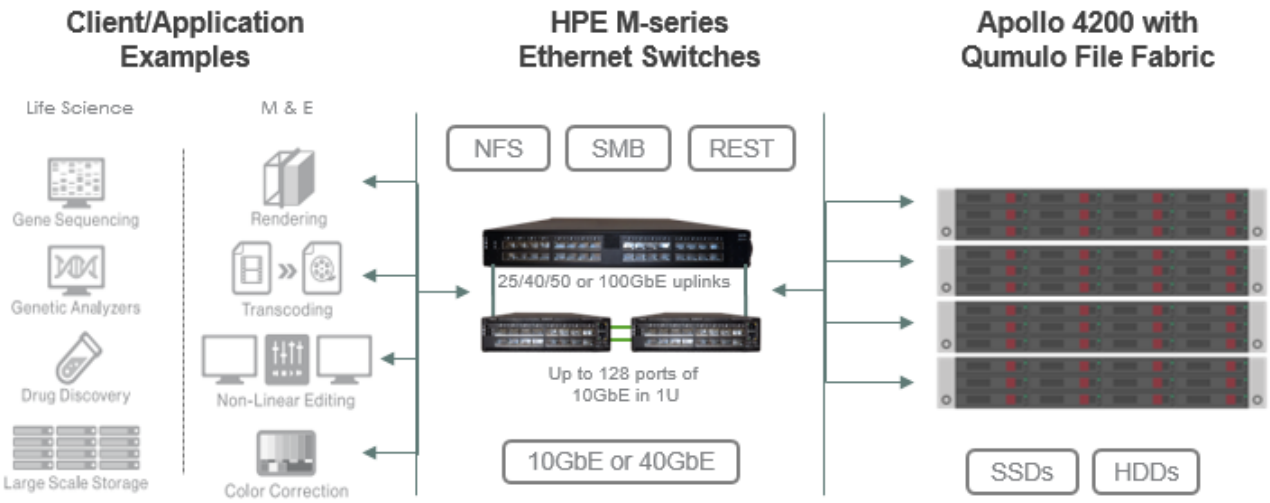

Figure 1. HPE Apollo 4200 running Qumulo File Fabric

Key benefits of HPE Apollo 4200 with QF2 :

1. **Ability to seamlessly scale to billions of files with flash-first design**
   With the density-optimized HPE Apollo 4200 servers, there is no practical limit to scale. A flash-first hybrid software and hardware architecture optimizes cost and performance. Users can simultaneously get the speed benefits of SSD and the economic advantages of HDD. User files can occupy 100% of provisioned capacity, not just 70% or 80%. QF2 on HPE Apollo 4200 Servers are more economical than legacy storage appliances from a usable capacity basis.

2. **Control at scale with up to the minute analytics**
   QF2's up-to-the-minute analytics allow administrators to pinpoint problems and effectively control how storage is used. Storage administrators can instantly see usage, activity and throughput at any level of the unified directory structure, no matter how many files in the file system. And all information is available from a central web GUI.

3. **Scalable performance on premise or public cloud**
   Store user data anywhere and get multiple GB/s of performance for your workloads both on and off premises. You get scalable performance regardless of number of files or file sizes.

4. **New experience defined by customer success rather than support**
   The customer success program offered by Qumulo provides responsive, personal customer care, with one of the highest Net Promoter Scores (NPS) in the industry. Included as part of the QF2 subscription, it offers direct path to true subject matter experts (Customer Success Manager/CSM), dedicated Slack channel for instant access to CSMs, and cloud monitoring across entire fleet (on-premises and cloud).Simple subscription pricing covers everything – all features, updates and software support.

Configuration Information

The Apollo 4200 Gen9 with Qumulo File Fabric solution is configured as follows:

Step 1: Select HPE Apollo 4200 Qumulo nodes (required)

HPE Apollo 4200 180TB Qumulo Node	Q2S16A
HPE Apollo 4200 90TB Qumulo Node	Q2S17A

NOTE: Customized 180TB and 90TB HPE Apollo 4200 Qumulo nodes. A minimum of 4 HPE Apollo Qumulo nodes are required to build a QF2 cluster. Node sizes cannot not be mixed within a cluster, a cluster must be all 180TB or 90 TB nodes.

Step 2: Select HPE Data Encryption (recommended option but not required)

HPE Smart Array SR Secure Encryption (Data at Rest Encryption/per Server Entitlement) E-LTU	Q2F26AAE

NOTE: Enable data at rest encryption via the Smart Array P440 controller included in the Apollo 4200 180TB or 90TB Qumulo node. HPE Smart Array SR Secure Encryption is a FIPS 140-2 Level 1 validated enterprise-class encryption solution that complies with regulations for sensitive data, such as HIPPA and Sarbanes-Oxley. One HPE Smart Array SR Secure Encryption E-LTU is required for every Apollo 4200 node in a QF2 cluster when encryption is enabled. For more information on HPE Smart Array Encryption see the QuickSpecs: **https://h20195.www2.hpe.com/v2/GetDocument.aspx?docname=c04318075**

HPE Special Reminder: Before enabling encryption on the Smart Array controller module on the Apollo 4200 Qumulo node, you must ensure that your intended use of the encryption complies with relevant local laws, regulations and policies, and approvals or licenses must be obtained if applicable.
For any compliance issues arising from your operation/usage of encryption within the Smart Array controller module which violates the above mentioned requirement, you shall bear all the liabilities wholly and solely. HPE will not be responsible for any related liabilities.

Step 3: Select HPE Apollo 4200 Installation Service (recommended option but not required)

HPE Installation ProLiant DL1000/DL2000 Service	UM857E

NOTE: Hardware Installation of the HPE Apollo 4200 node is an optional service but is highly recommended.

Step 4: Select Qumulo File Fabric Subscription and Support E-LTU (required)

Qumulo File Fabric 1TB Tier H1 12-month Subscription and Support E-LTU	R0G81AAE
Qumulo File Fabric 1TB Tier H1 36-month Subscription and Support E-LTU	R0G83AAE
Qumulo File Fabric 1TB Tier H1 60-month Subscription and Support E-LTU	R0G85AAE

NOTE: Number of 1TB E-LTUs ordered must match raw capacity of each Qumulo Node that the E-LTU is installed on. As an example one Apollo 4200 180TB Qumulo node (Q2S16A) requires 180 x R0G81AAE or R0G83AAE or R0G85AAE.

NOTE: E-LTUs R0G81AAE or R0G83AAE or R0G85AAE can only be installed on the Apollo 4200 Qumulo nodes listed above (Q2S16A or Q2S17A). The E-LTUs cannot be used on generic server hardware.

Configuration Information

Step 5: Select Qumulo Installation and Advanced Training Service (required)

Qumulo Installation and Advanced Training Service per Day	R0G89AAE

NOTE: Qumulo will help you get your QF2 cluster up and running. Qumulo will evaluate your site to make sure that it's ready, install QF2, and hold an orientation session to get everyone on board. Also, Qumulo trainers will teach your team all about administering a QF2 cluster. Qumulo teachers are experienced storage professionals with a practical, real-world approach. They'll make sure that everyone leaves the class with the skills they need for long-term success with your QF2 cluster.
NOTE: R0G89AAE is required for each separate QF2 cluster to be installed. This service is purchased on a per Day basis.

Step 6: Select HPE Support for the HPE Apollo Qumulo nodes (recommended option but not required)

3 year Service options

HPE 3 year Foundation Care 24x7 Apollo 4200 Service	U8MH3E
HPE 3 year Foundation Care 24x7 wDMR Apollo 4200 Service	U8MH4E
HPE 3 year Foundation Care 24x7 wCDMR Apollo 4200 Service	U8MH5E
HPE 3 year Foundation Care Call to Repair Apollo 4200 Service	U8MJ2E
HPE 3 year Foundation Care Call to Repair wDMR Apollo 4200 Service	U8MJ3E
HPE 3 year Foundation Care Call to Repair wCDMR Apollo 4200 Service	U8MJ4E

NOTE: (Call to Repair Service is highly recommended for mission critical applications).

5 year Service options

HPE 5 year Foundation Care 24x7 Apollo 4200 Service	U8MN7E
HPE 5 year Foundation Care 24x7 wDMR Apollo 4200 Service	U8MN8E
HPE 5 year Foundation Care 24x7 wCDMR Apollo 4200 Service	U8MN9E
HPE 5 year Foundation Care Call to Repair Apollo 4200 Service	U8MP6E
HPE 5 year Foundation Care Call to Repair wDMR Apollo 4200 Service	U8MP7E
HPE 5 year Foundation Care Call to Repair wCDMR Apollo 4200 Service	U8MP8E

NOTE: (Call to Repair Service is highly recommended for mission critical applications).

Step 7: Select Top of Rack HPE M-series switches (optional)

HPE StoreFabric SN2100M 100GbE 16QSFP28 Half Width Switch	Q2F23A
HPE StoreFabric SN2100M 100GbE 8QSFP28 Half Width Switch	Q2F24A
HPE StoreFabric SN2410bM 10GbE 48SFP+ 8QSFP28 Switch	Q6M28A
HPE StoreFabric SN2410bM 10GbE 24SFP+ 4QSFP28 Switch	Q6M29A
HPE StoreFabric SN2410M 25GbE 48SFP28 8QSFP28 Switch	Q2F22A
HPE StoreFabric SN2410M 25GbE 24SFP28 4QSFP28 Switch	Q6M27A
HPE StoreFabric SN2700M 100GbE 32QSFP28 Switch	Q2F21A
HPE StoreFabric SN2700M 100GbE 16QSFP28 Switch	Q6M26A

NOTE: If a StoreFabric M-series switch is ordered information on cables and optics needed can be found in the StoreFabric M-series QuickSpecs:
StoreFabric SN2100M QuickSpecs

Configuration Information

StoreFabric SN2410M QuickSpecs
StoreFabric SN2700M QuickSpecs

Step 8: Select HPE M-series installation service (recommended option if M-series switch is ordered)

HPE StoreFabric M-series Eth Startup SVC	HA114A1#5SE
HPE StoreFabric M-series Ethnet Installation and Startup Service	H6SV4E

Options for existing HPE Apollo 4200 and QF2 clusters

Qumulo File Fabric Subscription and Support Renewal E-LTU

Qumulo File Fabric 1TB Tier H1 12-month Subscription and Support Renewal E-LTU	R0G82AAE
Qumulo File Fabric 1TB Tier H1 36-month Subscription and Support Renewal E-LTU	R0G84AAE
Qumulo File Fabric 1TB Tier H1 60-month Subscription and Support Renewal E-LTU	R0G86AAE

NOTE: The skus above are used to renew the QF2 subscription and support license on installed Apollo 4200 QF2 nodes. Number of 1TB E-LTUs ordered must match raw capacity of each Qumulo node that the E-LTU is installed on. As an example one Apollo 4200 180TB Qumulo Node (Q2S16A) requires 180 x R0G82AAE or R0G84AAE or R0G86AAE depending on renewal term desired.

Qumulo File Fabric 1-month Co-term E-LTU

Qumulo File Fabric 1TB Tier H1 1-month Subscription and Support E-LTU	R0G87AAE

NOTE: The QF2 Co-term sku is used to re-balance QF2 license terms on existing nodes when a new node(s) is added to cluster.

As an example you purchased 4 x HPE Apollo 4200 180TB Qumulo nodes with a 36 month QF2 subscription. Six months later you purchase another HPE Apollo 4200 180TB node with 36 month QF2 subscription to add to original 4 node cluster. Now the cluster has 4 nodes with 30 months of QF2 subscription and 1 node with 36 months of QF2 subscription. You would therefore need to get the the QF2 subscription back to the same terms across all 5 nodes at 36 months by purchasing 6 x QF2 1TB Tier H1 1mo subscription (R0G87AAE) for each of the original 4 nodes.

Qumulo Health Check Service

Qumulo Systems Health Check Service	R0G90AAE

NOTE: A periodic evaluation of your QF2 deployment ensures that you're getting the most out of your investment. Qumulo can perform a thorough systems health check that will let you know how well your cluster is performing now and the steps you can take to make that performance even better. Qumulo consultants will come on site, implement those improvements, and demonstrate the results.

Qumulo File Fabric (QF2) for Amazon Web Services (AWS)

You can configure a QF2 cluster in AWS to support a wide range of use cases with compute-intensive workloads such as VFX rendering, data analytics and genomic sequencing. QF2 for AWS is priced using a utility model that is based on the number of hours it's used, the capacity of the cluster, and its performance. If you want to experiment with QF2 for AWS, you can set up a standalone node with 5TB of storage and use it for free, or contact **Qumulo** to evaluate QF2 for larger workloads. You pay only for the underlying AWS infrastructure.

Configuration Information

Performance and capacity can scale linearly with QF2 for AWS. Adding another EC2 instance with the Qumulo Advanced Machine Image (AMI) installed can add both. You can also scale performance and capacity independently of each other, depending on the number and sizes of EC2 instances you choose.

Transferring data between your on-premises QF2 cluster and your QF2 cluster in the cloud is easy. The QF2 clusters work together to form a globally distributed but highly connected storage fabric tied together with continuous replication. Continuous replication moves the data where it's needed when it's needed.

Cloud architects and DevOps engineers expect fully programmable infrastructure and automated configuration management. With QF2, you can inspect and control the file system with a GUI, command-line tools, and a REST API. You can use popular automation platforms, such as Terraform, to automatically deploy QF2 for AWS.

Let QF2 for AWS help you expand what's possible for your business. Qumulo File Fabric for Amazon Web Services Cloud is the world's highest performance file storage in the public cloud. Support elastic compute nodes with enterprise-grade file storage to tackle your toughest problems.

Qnits for Qumulo File Fabric deployment in public cloud

Qumulo File Fabric 10000 Qnits Tier 1 Public Cloud Purchased in Advance E-LTU R0H87AAE

NOTE: Minimum order quantity of 10 x R0H87AAE (100,000 Qnits).

Qumulo File Fabric 10000 Qnits Tier 2 Public Cloud Purchased in Advance E-LTU R0H88AAE

NOTE: Minimum order quantity of 25 x R0H87AAE (250,000 Qnits).

Qumulo File Fabric 10000 Qnits Tier 3 Public Cloud Purchased in Advance E-LTU R0H89AAE

NOTE: Minimum order quantity of 50 x R0H87AAE (500,000 Qnits).

NOTE: For help calculating the number of Qnits required for a QF2 in AWS deployment or to try a free 5TB Tier go to: **https://qumulo.com/product/qf2-aws/**

Apollo 4200 Qumulo Node Specifications

Specification	Q2S16A 180TB Node	Q2S17A 90TB Node
Raw Storage Capacity	180TB	90TB
Storage Media	3 x 480GB SSD, 6 x 960GB SSD, 18 x 10TB 6G SATA 7.2K LFF 512e HDDs	3 x 960GB SSD, 9 x 10TB 6G SATA 7.2K LFF 512e HDD
CPU	2 x Intel Xeon E5-2620v4 (2.1GHz 8-core)	1 x Intel Xeon E5-2620v4 (2.1GHz 8-core)
Memory	128GB	64GB
Networking Ports	4 x 40GbE	2 x 40GbE
Management Port	Dedicated iLO Port (with iLO Advanced License)	
Power	2 x 800W	
Cooling	10 redundant fans	8 redundant fans
Form Factor	2U rack mount	
Dimensions (L x W x D)	3.44 x 17.63 x 32 in (8.75cm x 44.8 x 81.28 cm)	
Weight (approximate)	89.32 lb (40.6 kg) maximum	

Configuration Information

Qumulo File Fabric Software Specifications

Specification	
Supported protocols	NFSv3, SMBv2.1, REST
Management	API REST
Total Cluster Size	4 – 1,000 Nodes
Data Protection	Erasure coding, snapshots
Storage Management	Real-time quotas

Service, Support, Warranty and Other Information

Apollo 4200 Gen9 Qumulo Node Hardware Warranty

The hardware warranty is the same as standard Apollo 4200 Gen9 warranty. Warranty details can be found in the Apollo 4200 Gen9 QuickSpecs here: **https://h20195.www2.hpe.com/v2/GetDocument.aspx?docname=c04616495**

Qumulo Customer Success Program

Service and Support for Qumulo products are provided directly by Qumulo. Details on Qumulo's Customer Success Program can be found here: **https://qumulo.com/resources/terms-hub/support-offerings/**

Qumulo licensors service delivery organization will be responsible for responding with a call, assigning a severity level to the call, and determining the service Severity Level acceptable to Hewlett Packard Enterprise customer. The support request will be processed by Qumulo in accordance with the Severity Level agreed upon.

Qumulo File Fabric Software Warranty

For a period of ninety (90) days from the Start Date, Qumulo warrants (a) that the media on which the software is delivered will be free of defects in material and workmanship, and (b) the software will operate substantially as set forth in the applicable Qumulo specifications when used in accordance with the terms of the Qumulo software license. End User's exclusive remedy and the entire liability of Qumulo and its suppliers under this limited warranty will be replacement of the software media. Except for the foregoing, the software is provided AS IS. This limited warranty extends only to the End User as the original licensee. See other Warranty Limitations and Restrictions below.

Restrictions

Qumulo warranties as set forth herein ("Warranty") are contingent on proper use of the Hewlett Packard Enterprise hardware and Qumulo branded software ("Products") and do not apply if (a) the Products have been modified without the written approval of Qumulo, (b) the Products' serial number label is removed, (c) the Product has been damaged or subjected to abnormal physical or electrical stress, abnormal environmental conditions, misuse, negligence, or accident, or (d) the Product is licensed for beta, evaluation, testing or demonstration purposes. In order to ensure proper operation of Qumulo products, it is required that all Qumulo systems utilize only Qumulo supplied optical transceiver components. Qumulo reserves the right to void warranty and service support offerings if optical transceiver components other than those supplied by Qumulo are used in the operation of Qumulo products. The terms of the Warranty are limited to the remedies as set forth in this Warranty. This warranty is provided in lieu of all other rights, conditions and warranties. Qumulo makes no other express or implied warranty with respect to the software, hardware, products, documentation or Qumulo support, including, without limitation, any warranty of merchantability, fitness for a particular purpose and non-infringement of third party rights. Qumulo does not warrant that any products will be error-free, or that any defects that may exist in its products can be corrected. In no event shall Qumulo be liable for cost of procurement of substitute goods, lost profits or any other special, indirect, consequential or incidental damages (including but not limited to lost data), however caused whether or not Qumulo has been advised of the possibility of such damages. Some jurisdictions do not allow limitation or exclusion of liability for consequential or incidental damages, so that limitation or exclusion may not apply.

For any Qumulo support and generic queries please email: **support@qumulo.com**.

Summary of Changes

Date	Version History	Action	Description of Change
04-Jun-2018	Version 1	Created	All content created.

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