Cloud Q Quick Start

Supported CloudFormation Stack Updates

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Stack Update Options

Note: Make sure **Roll back all stack resources** is enabled within CloudFormation when performing stack updates. This is required when a resource must be replaced.

Supported Stack Update Parameters for Existing VPC with Standard parameters template

If you deployed the **Deploy Cloud-Q in an existing VPC with Standard parameters** template a limited set of stack updates are supported. If you want access to all potential stack updates you will need to perform a stack update to convert to the advanced template. See the document **Updating to the Advanced Template**. The table below lists the stack update options for the standard template.

	Add	Del	Change
Total Number of Qumulo EC2 Instances			increase
Qumulo Sidecar Software Version			✅
Termination Protection	✅	✅	✅

Supported Stack Update Parameters for New VPC and Existing VPC with Advanced parameters templates

Both the New VPC and existing VPC with Advanced parameters templates support the list of stack update options below.

	Add	Del	Change
Total Number of Qumulo EC2 Instances			increase
Floating IPs for IP Failover			✅
Provision Qumulo Sidecar Lambdas	✅		
Qumulo Sidecar Software Version			✅
Qumulo Security Group CIDRs #2, #3, #4	✅	✅	
Enable Termination Protection	✅	✅	✅
OPTIONAL: SNS Topics for automated EC2 and EBS recovery	✅	✅	✅
OPTIONAL: Provision Public IP for Qumulo Management	✅	✅	✅
OPTIONAL: Enable Replication Port for Qumulo Public IP	✅	✅	✅
OPTIONAL: FQDN for R53 Private Hosted Zone	✅	✅	✅
OPTIONAL: R53 Record Name for Qumulo RR DNS	✅	✅	✅
OPTIONAL: Send Qumulo Audit Log messages to CloudWatch Logs?	✅	✅	✅
OPTIONAL: AWS Permissions Boundary Policy Name	✅	✅	✅

Adding Node(s) to the Cluster

A Qumulo cluster may be grown in both capacity and performance by adding additional nodes (EC2 instances) to the cluster. This stack supports adding as many as 16 nodes in one stack update for a maximum of 20 nodes total in the cluster. Each node added increases compute, networking, and storage capacity. To add nodes to a cluster follow the procedure below. Note, total instance count may only be increased, not decreased. If total instance count is decreased the stack update will fail and rollback.

IF you have upgraded the software on the cluster after initial deployment, leave the software version for the cluster in the template as it was originally provisioned. The stack is unaware of this update and the software version field for the cluster can not be used for upgrades after initial deployment.

1. Go to the **CloudFormation** view in the AWS Console
2. Select the top-level stack name, **QCluster1** in this example
3. Select **Update** in the upper right corner
4. Keep the default **Use Current Template**
5. Select **Next**
6. The template as last populated will be displayed
7. Scroll down to the **Total Number of Qumulo EC2 Instances**
8. Increase the number of instances to the chosen value, **8** in this example
9. Select **Next**
10. Select **Next** again
11. **Check both boxes** acknowledging that CloudFormation may create IAM roles and that it may leverage CAPABILITY_AUTO_EXPAND.
12. Select **Update stack**

The stack will commence updating. In this case four nodes will be added to the cluster. This is not service impacting as the existing nodes are left untouched. There is a brief quorum bounce to add the four new nodes to the cluster. Validate that additional nodes are spinning up in the **EC2 Console.**

Notice that the Provisioning instance is also being restarted. This is by design. The Provisioner will query the latest version of software running on the cluster and upgrade all new nodes to this version of software before joining them to the cluster. Further, it tags all the new EBS volumes and updates the floating IPs.

If the original stack provisioned Public Management and Route 53 then those nested stacks will also be updated. With the addition of new nodes, IP addresses need to be added to the load balancer for public management and the Route 53 Private Hosted Zone. The stack will automate these updates as well. You may review any nested stack to see what resources were modified or added in the stack **CloudFormation Events** tab. At the completion of node addition you may review any and all of the AWS infrastructure referencing the former section. As a final check make sure the Provisioning node shutdown, which indicates success of all secondary provisioning, and then login to the Qumulo UI and verify the additional nodes are in quorum.

Changing the number of Floating IPs

A stack update may be used to change the number of floating IPs per EC2 instance. Follow the same steps as a Node Addition, but change the **Floating IP for IP Failover** field to the desired number of floating IPs per instance, 1-4, instead of changing the number of EC2 instances (steps 7 & 8 above). Note, if DNS for the floating IPs is being managed outside of the stack, the

UNC path for clients mounting the cluster will be impacted until DNS is manually updated. To avoid this use the R53 Private Hosted Zone feature of this template.

Updating the Sidecar Software Version

A stack update may be used to update the Sidecar software version. Follow the same steps as a Node Addition, but change the **Sidecar Software Version** field to the desired version instead of changing the number of EC2 instances (steps 7 & 8 above). This is typically done after updating the cluster software via the Qumulo UI.

Adding or Removing Qumulo Security Group CIDRs #2, #3, #4

A stack update may be used to provision additional CIDRs for the Qumulo security group. If a CIDR change is desired remove the CIDR by leaving the field blank and executing the stack update. Then run the stack update again for the new CIDR. For every CIDR added, all ports in the security group are provisioned with ingress rules. Services allowed are SSH, HTTPS, HTTP, SMB, NFS, FTP, REST, and Qumulo Replication.

Adding or Removing Public Management

A stack update may be used to add or remove public management. Since this update is completely separate from the cluster there's no changes required to the cluster infrastructure or infrastructure touched by the Provisioning instance. Hence, it will not restart. Follow the same steps as a Node Addition, but change the **OPTIONAL: Provision Public IP for Qumulo Management** parameter to 'YES/NO' instead of changing the number of EC2 instances (steps 7 & 8 above). Note, the MGMTNLBSTACK will be deleted when removing public management. This is expected. The stack will show as DELETE_FAILED for a period of time while CloudFormation retries the delete of the Elastic IP. Ultimately it will succeed.

Adding or Removing Route53 DNS Private Hosted Zone

It is possible to change the R53 FQDN, but AWS requires the deletion of the current Private Hosted Zone and a new one rebuilt if the FQDN is modified in a stack update. To remove the private hosted zone, clear the FQDN parameter. In the stack update pages you can review the changes the update will make. Follow the same steps as a Node Addition, but change the **OPTIONAL: FQDN for R53 Private Hosted Zone** parameter to the desired value instead of changing the number of EC2 instances (steps 7 & 8 above).

Enabling or Disabling Audit Logging

A stack update may be used to enable or disable Qumulo audit logging. These logs are stored in a CloudWatch Logs log group. If a stack update is used to disable audit logging the log group will be deleted. Likewise, if audit logging is enabled in a stack update a log group will be created with the name **/qumulo/[Stack Name]**. Follow the same steps as a Node Addition, but change the **OPTIONAL: Send Qumulo Audit Log messages to CloudWatch Logs?** parameter to 'YES/NO' instead of changing the number of EC2 instances (steps 7 & 8 above).

Adding the Qumulo Sidecar Lambdas

If the Sidecar was not deployed with the Cluster originally, it may be added subsequently to the stack. Follow the same steps as a Node Addition, but change the **Provision Qumulo Sidecar Lambdas** parameter to 'Yes' instead of changing the number of EC2 instances (steps 7 & 8 above). Removing the Sidecar lambdas is not supported.

Enabling or Disabling Termination Protection

A stack update may be used to enable or disable Termination Protection for the EC2 instances and the CloudFormation stack. Termination protection should be enabled in all production environments. Only disable it with a stack update prior to deleting the stack.

Adding or Removing SNS Topics for recovery alarms

A stack update may be used to add SNS topic ARNs for the EC2 Instance Recovery alarm and the EBS Volume Recovery alarm. These notification ARNs can be added, removed, or changed with a stack update.

Other Stack Updates and the QSTACK Policy

The only restrictions placed on stack updates are for the Qumulo cluster. Specifically, this is the QSTACK and its nested stacks. The stack policy is applied by the Provisioning instance, and it forbids any modifications, deletions, or replacements of QSTACK EC2 and EBS infrastructure. This is to protect production environments from erroneous stack updates. In the event a stack update is attempted for an unsupported change the update will simply fail and rollback without harm. Many stack updates are possible and not all permutations have been tested. The common examples are documented above that are most productive and well tested.

Changing EC2 Instance Types and EBS Volume Types

Qumulo does not support changing the cluster instance types with a stack update. This is prevented with the aforementioned stack policy. While it would be possible if allowed, it would stop all the instances, change the instance type, and restart them. This would be service impacting in a production environment. Instead Qumulo recommends shutting down an instance at a time so the cluster can leverage floating IPs and maintain the production workload.

Due to the permutations of EBS volume configurations the likelihood of user error is high attempting to change EBS volume types with a stack update. Rather than risk data loss this is blocked by the QSTACK policy.

For both EC2 instance type changes and EBS volume type changes Qumulo offers simple scripts that are production friendly.