CumuLogic DBaaS Platform, MongoDB Edition User Guide

June 2014

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CumuLogic DBaaS Platform, MongoDB Edition

Welcome to the world's most comprehensive Database-as-a-Service platform!

The CumuLogic DBaaS Platform, MongoDB Edition is a software solution that provides a quick and easy way to access fully managed MongoDB instances on premises, on any Infrastructure-as-a-Service (IaaS) cloud or VM pool. Users can quickly launch a dedicated MongoDB service and optimize it for their particular workload if needed. The CumuLogic platform manages the MongoDB instances from provisioning and monitoring, to replication and sharding *automatically*, and backup/restore. Each instance of MongoDB is optimized for a given size of the database node, so users get the highest price/performance value. MongoDB instances can be scaled on-demand by adding new replica nodes without having to shutdown the database.

This guides provides you with step-by-step instructions for using the CumuLogic DBaaS Platform, MongoDB Edition to easily deploy MongoDB environments. Please review the installation and administration guide for instructions on how to setup the CumuLogic controller as a prerequisite to this guide.

Terminology

- **CumuLogic Controller** – The CumuLogic DBaaS Platform's orchestration engine, self service portal and automation platform.
- **CumuLogic Agent** – A software component embedded in any deployed service instance, used for control and monitoring telemetry into the deployed instances.
- **Target Cloud** – This refers to one or more Infrastructure-as-a-Service clouds such as Amazon EC2, Rackspace Cloud Servers, HP Cloud or any other OpenStack- or CloudStack-powered clouds.
- **Services** – Application infrastructure services such as databases. The CumuLogic DBaaS Platform, MongoDB Edition is limited to MongoDB services only.
- **Service Instance** – An instance of a service that has been deployed for a user. Service instances are any configuration of a service, from single node deployments through multi-node shard configurations.
- **Parameter Groups** – A set of configuration values, which can be modified by users for a given service instance to optimize that service instance for a specific type of application workload.
- **Access Groups** – Security or firewall configurations to control access to the service instance.
- **Automated Backups** – Backups of database instantiated by the platform, usually once in 24 hours for each running database instance.
- **Failover** – functionality of the platform to recover cloud service instances from any failures. This usually includes restarting a failed service or re-provisioning failed instances.

Supported Infrastructure Targets

CumuLogic's DBaaS Platform is capable of deploying service instances on a number of infrastructure types. Infrastructure targets are referred to as "Target Clouds" within the CumuLogic controller. The controller can be configured to provision infrastructure on-demand using the APIs exposed by several popular Infrastructure-as-a-Service software systems, as well as a number of public cloud providers. The controller is also able to work with pools of pre-installed operating systems, which can be either installed on bare metal servers or be pre-created as virtual machines.

Currently supported IaaS software systems include:

1. Apache CloudStack
2. Citrix CloudPlatform
3. Eucalyptus
4. Nebula
5. OpenStack
6. VMware vCloud Director

The target clouds offered to users of the CumuLogic DBaaS platform are configured by the administrator of the controller, but are selectable by users when provisioning any new service instance.

Register and Log into CumuLogic Console

Whether you are using a hosted or private version of CumuLogic's DBaaS platform, you need to register and activate your account. Register by clicking the "Register Now!" link on the login page.

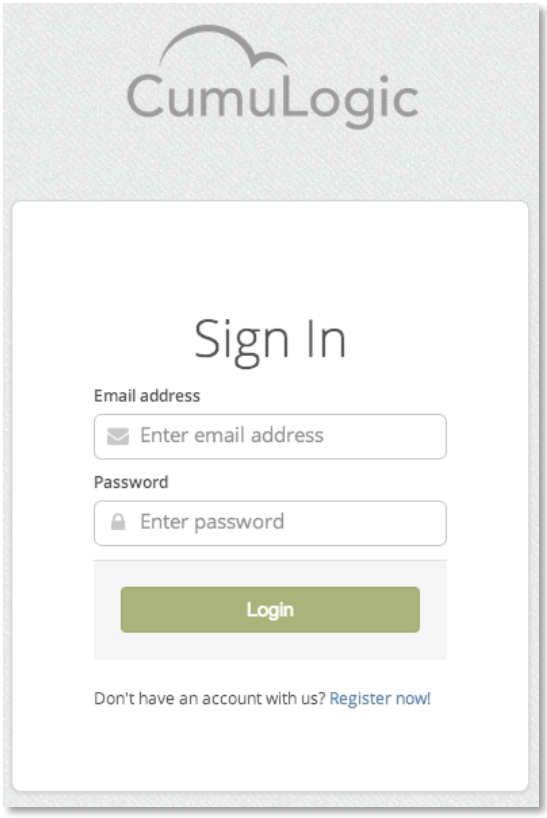

Figure 1: CumuLogic Console Login Window

After registering, you will receive an email with a link to use to confirm your email and activate your account.

Dashboard

Your landing page is the CumuLogic Dashboard. The dashboard provides information about your deployed service instances, in progress service provisioning activities, and quick access to pre-configured subscription bundles for services.

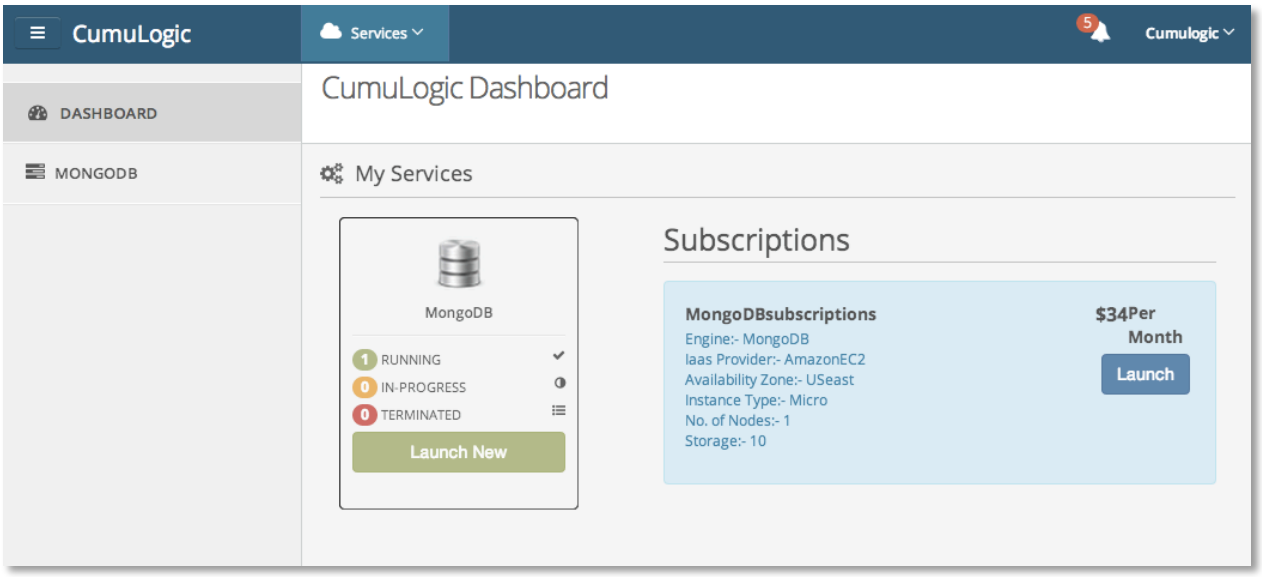

Figure 2: CumuLogic Dashboard

From the dashboard, you are able to are able to immediately launch a new service instance, based on any pre-configured subscription options that your administrator has published. You are also able to launch a new custom configuration of a service.

NOTE: You may be required to configure your API keys for target IaaS clouds prior to provisioning a service to that target cloud. Your administrator may have pre-configured these API keys on your behalf. Please see the Target Clouds section of this document for instructions for completing that task.

User Settings and Tools: Notification Center

In the upper right hand corner of the CumuLogic DBaaS Platform's web interface, you are able to view the latest notifications for your account. These include service provisioning activities, account logins, and automatic events initiated by the controller on your behalf.

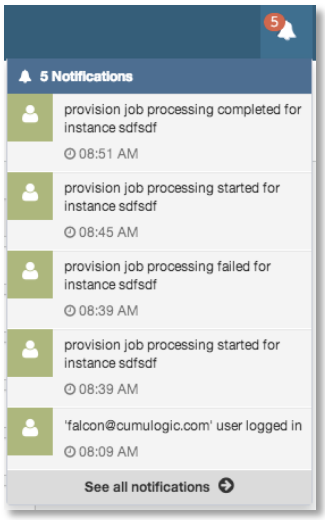

Figure 3: Notification Center

Click on the "See all notifications" link to review a full listing of notifications for your account.

User Settings and Tools: My Profile

The My Profile menu option provides access to screens that allow you to change your user information and to reset your password.

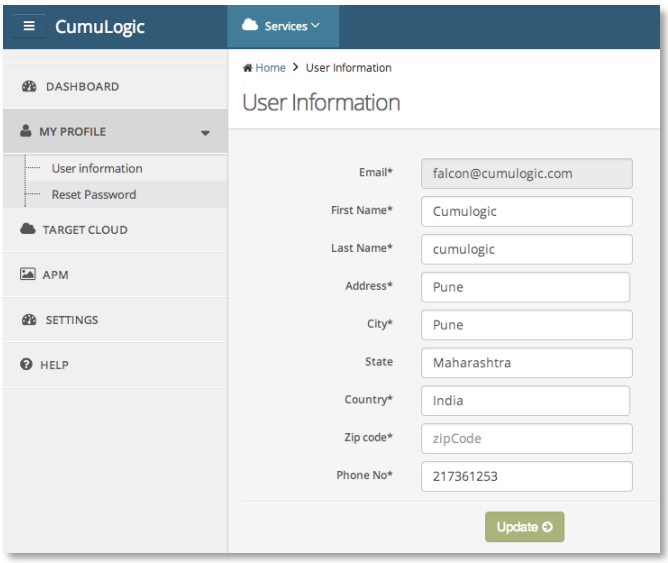

Figure 4: My Profile – User Information

The user information screen allows you to change your first and last name, address and phone number details. Your email address may not be changed, since it is the user ID you use to log into the CumuLogic controller.

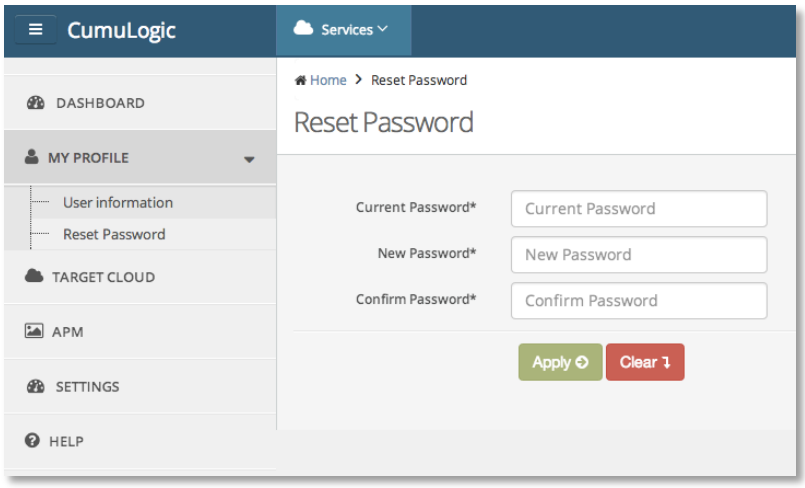

Figure 5: My Profile – Reset Password

The reset password screen allows you to change your profile's password. It requires your current password, and entry of your new password two times.

User Settings and Tools: Target Clouds

CumuLogic's platform allows you to deploy applications on multiple target Infrastructure-as-a-Service (IaaS) clouds to provision the applications. Target clouds can be one of the supported public clouds, including HP Cloud, Rackspace Cloud, Amazon EC2, Datapipe or any other clouds based on Apache CloudStack, Citrix CloudPlatform and OpenStack clouds. CumuLogic's platform also supports VMware vCloud and vSphere environments.

This page allows you to review the currently available target clouds; as well as adding, editing and deleting targets.

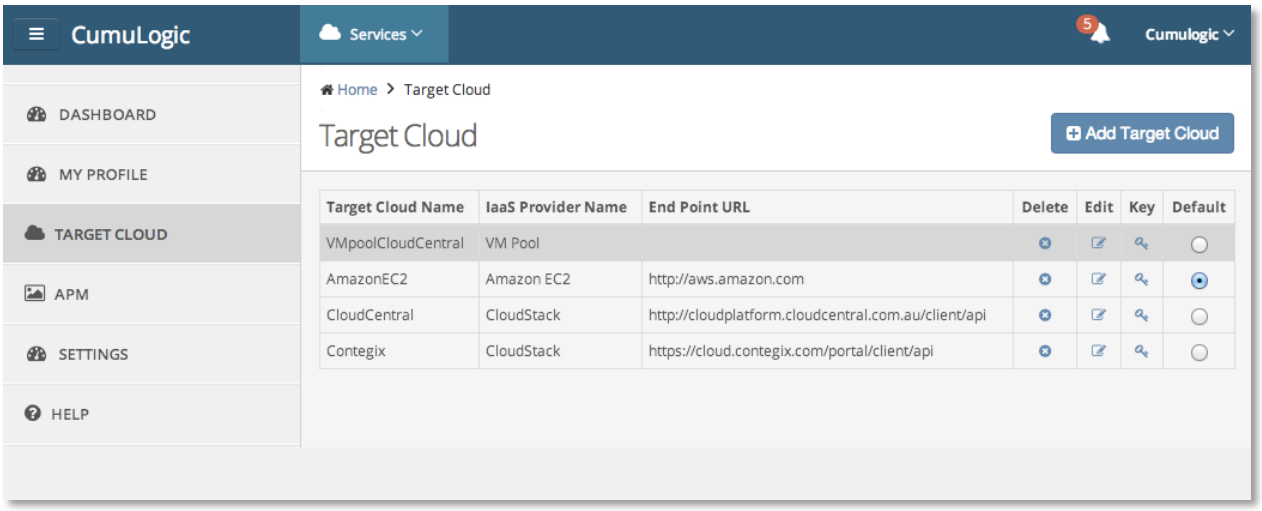

Figure 6: Target Clouds

To add a new target cloud, click the "Add Target Cloud" button. To edit or delete an existing target cloud, click the appropriate icon in the list.

You are able to select the target cloud that you want to be the default selection for new service instances on this screen as well.

Clicking on the "key" for any specific target cloud will give you access to a private key that you can use to SSH into any deployed service instance node (VM or bare metal server). SSH access requires that you have network connectivity and appropriate network ACL's applied from your local system into the environment.

Adding a new target cloud is a two step process:

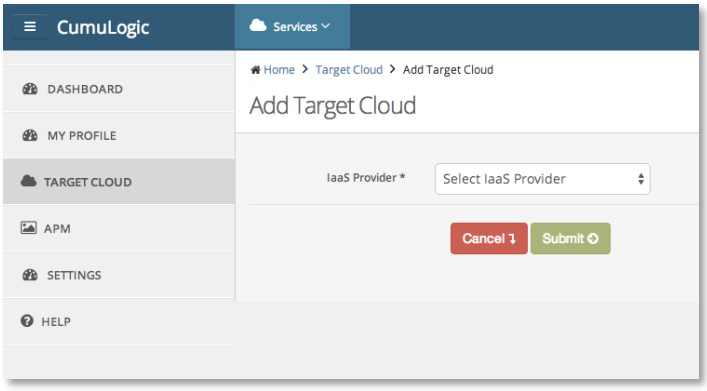

Figure 7: Add Target Cloud – Step 1

The first step is to select the IaaS provider. IaaS providers are made available to your user account by the administrator of the CumuLogic controller.

The second step is to provide details for your account's access to that target environment. These are the same fields available when updating / editing a target cloud:

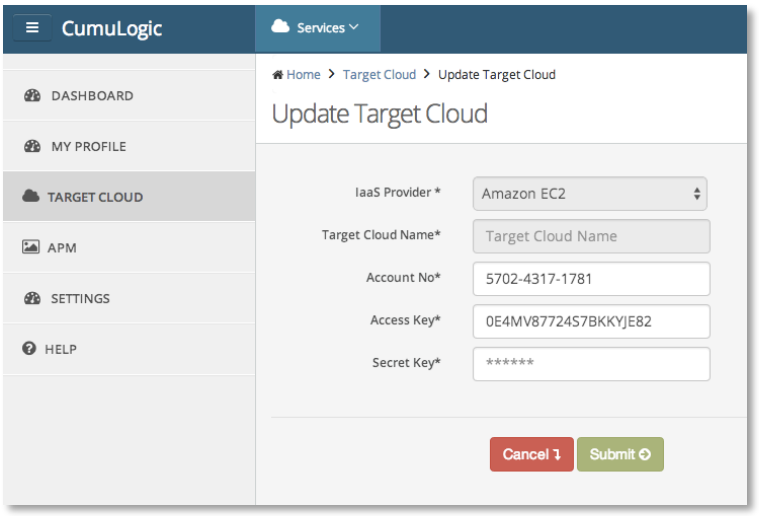

Figure 8: Add Target Cloud – Step 2

Target clouds require different information, depending on the specific type of environment. Generally, fields include:

1. Target Cloud Name – the name that you want to use when referring to this target cloud
2. Account No – the account number used for clouds like AWS
3. Access Key – the API access key for the target cloud
4. Secret Key – the API secret key for the target cloud

User Settings and Tools: APM

In addition to the build-in monitoring features, the CumuLogic DBaaS Platform allows you to automatically deploy and configure New Relic and AppDynamics monitoring services for each service instance you create.

The APM page allows you to configure your account specifics for these services:

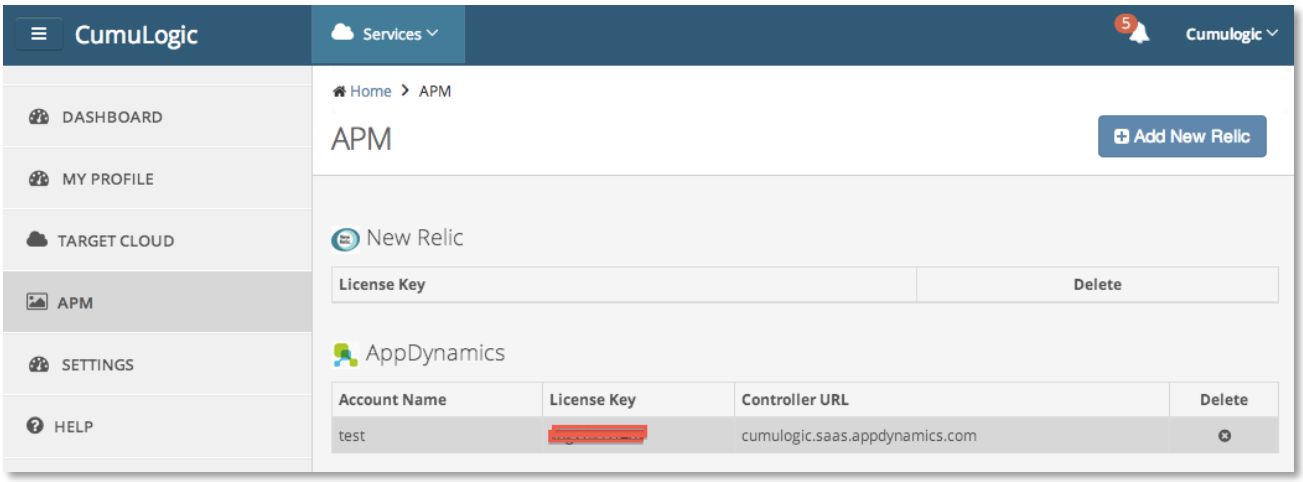

Figure 9: APM

User Settings and Tools: Settings – MongoDB Defaults

The MongoDB Defaults page allows you to configure certain service properties that you want to be defaulted each time you perform a custom service instance provisioning process. For more details on the meanings of these fields, please review the Creating a new MongoDB Cluster section of this document.

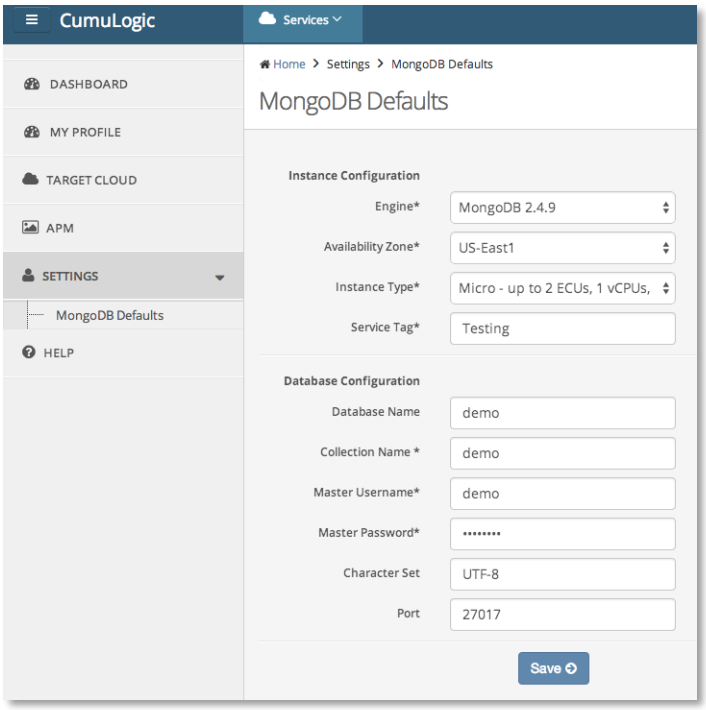

Figure 10: MongoDB Defaults

MongoDB Clusters: Cluster Overview Page

The MongoDB clusters page gives you a listing of any deployed, in progress or terminated MongoDB service instances for your account.

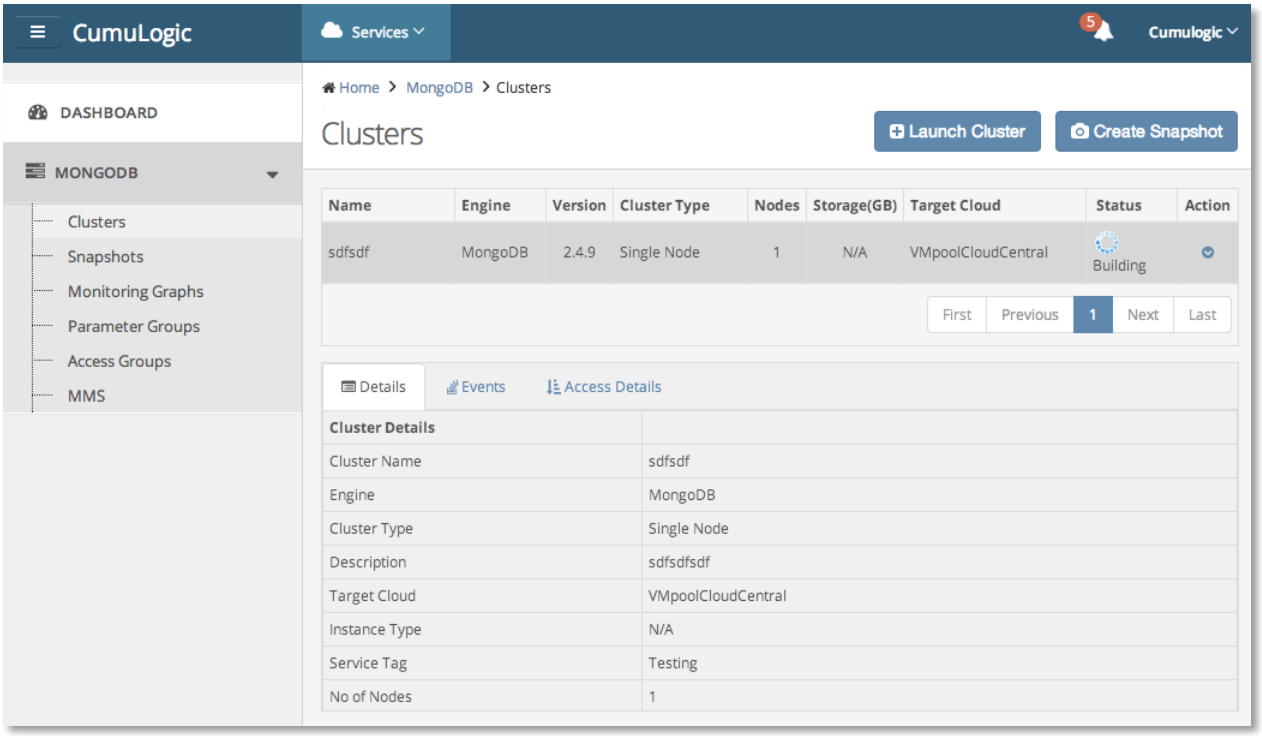

Figure 11: MongoDB Clusters

From this page, users can launch a new cluster, create a snapshot of a cluster, and manage their clusters. Several service management functions can be performed, based on the status of the cluster, by clicking on the "Action" icon for that cluster.

Launching a MongoDB Cluster

You can launch a MongoDB service instance (cluster) from the service dashboard or from the clusters page by clicking on the "Launch Cluster" button.

The process of launching a cluster includes two pages of input from the user. The first page of the wizard asks the user to provide a number of configuration options related to the instance sizing, availability configuration and network configuration. That page also provides fields for initial database naming and collection details. The second page of the wizard provides options for selecting a parameter group, as well as establishing backup and maintenance policy.

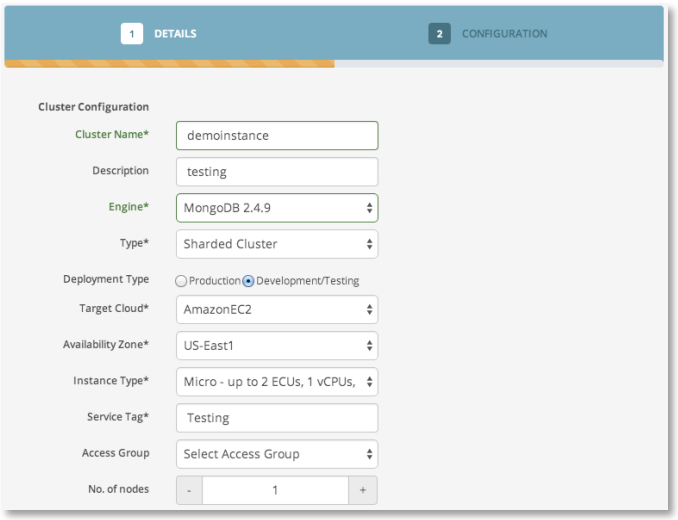

Figure 12: Launch MongoDB Cluster – Page 1, top

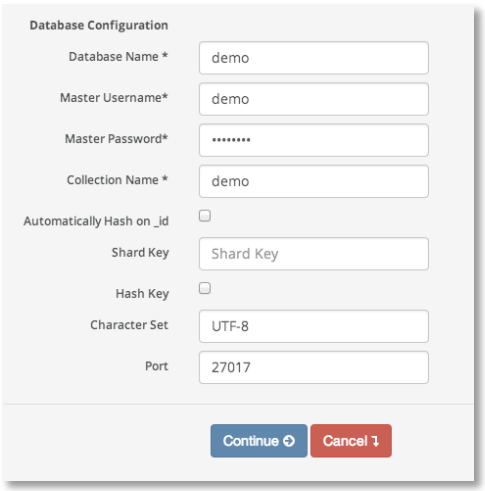

Figure 13: Launch MongoDB Cluster – Page 1, bottom

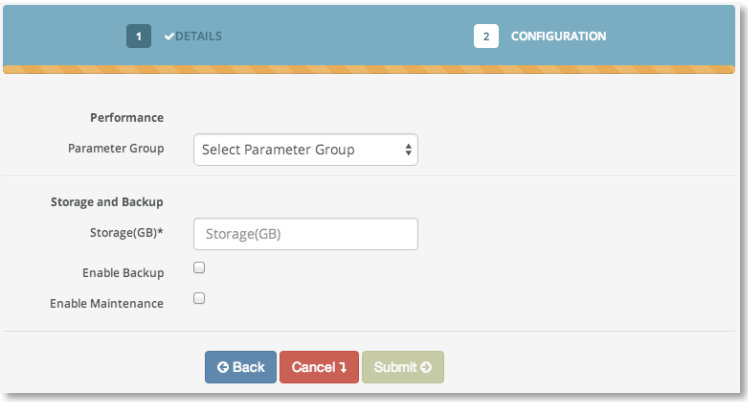

Figure 14: Launch MongoDB Cluster – Page 2

Below is a description of each field in the wizard and the default values:

Data Field	Description	Default
Cluster Name	Name of your database instance	default_instance
Description	Describe your database instance	default_instance
DB Engine	The CumuLogic DBaaS Platform, MongoDB Edition only supports MongoDB. The full version of the CumuLogic DBaaS platform includes additional database engines.	MongoDB 2.4.9
Type	The architectural type of the new cluster. Options include: Standalone, Replica Set, Sharded Cluster	-
Deployment Type	Only visible for Sharded Clusters There are two available types: Production and Development/Testing. Production Sharded Clusters include 3 mongos nodes, 3 config server nodes, and 3 node replica sets for each shard. Development/Testing clusters include 1 mongos, 1 config server and each shard contains a standalone MongoDB node.	Development/Testing
Target Cloud	Target IaaS cloud to provision the database on	Default cloud from user's My Account Profile
Availability Zone	Availability zone of target IaaS cloud	Default Availability Zone from user's target cloud
Instance Type	Size of database instance	Small. Usually 2GB RAM
Service Tag	Tag the lifecycle of database instance	-
Access Group	The appropriate network access group for the new service instance	(defaults to the system-wide default access group)
No of nodes	Only available for Replica Set types of clusters. Number of nodes to provision within the replica set.	3 for a Replica Set type
Database Name	The name of the initial database that will be seeded into the MongoDB environment	-
Master Username	The username to provision within the MongoDB environment	-
Master Password	Password for the user	-
Collection Name	Initial collection to create within the database, which will be the target for Sharded Cluster shard logic	-
Autmomatically Hash on _id	Only for Sharded Clusters. Configures the shard logic to automatically shard based on a hash of	-

	the _id attribute of documents in the specified collection.	
Shard Key	Only for Sharded Clusters. Not visible if configured to automatically hash on _id. The key (attribute) to shard on within the specified collection.	-
Hash Key	Only for Sharded Clusters. Not visible if configured to automatically hash on _id. Hashes the Shard Key as part of the shard logic.	-
Character Set	Character set for the database engine to be configured to support.	UTF-8
Port	The network port that MongoDB will listen on.	27017
Parameter group	Optimized Parameter Group for your workload.	Default Parameter Group
Storage	Storage size allocated to the database instance	None. Must be specified by the user
Enable Backup	Enables CumuLogic's Backup services for the database	No
Backup Retention period	How long to retain automated backups	One day
Backup Start Time	Start time every day to initiate automated backups	Midnight in user's local time zone
Enable Maintenance	Allows a user to enable a maintenance window policy (useful for when to push changes to a parameter group)	No
Maintenance Day	Day of the week when automated updates and minor patches can be applied to running instance	Monday
Start Time	Start time of two-hour window when automated updates and minor patches can be applied	Midnight in user's local time zone

Once the MongoDB instance has been provisioned, you will be returned to the cluster listing page. To view progress of the provisioning process, click on the cluster name and then select the "Events" tab.

Viewing MongoDB Cluster Details

Deployed MongoDB clusters have eight tabs worth of data for review. Each tab provides different information about the cluster.

Details Tab

The details tab for a cluster provides a listing of the configuration parameters used to design the cluster's size, type, target cloud, and other values.

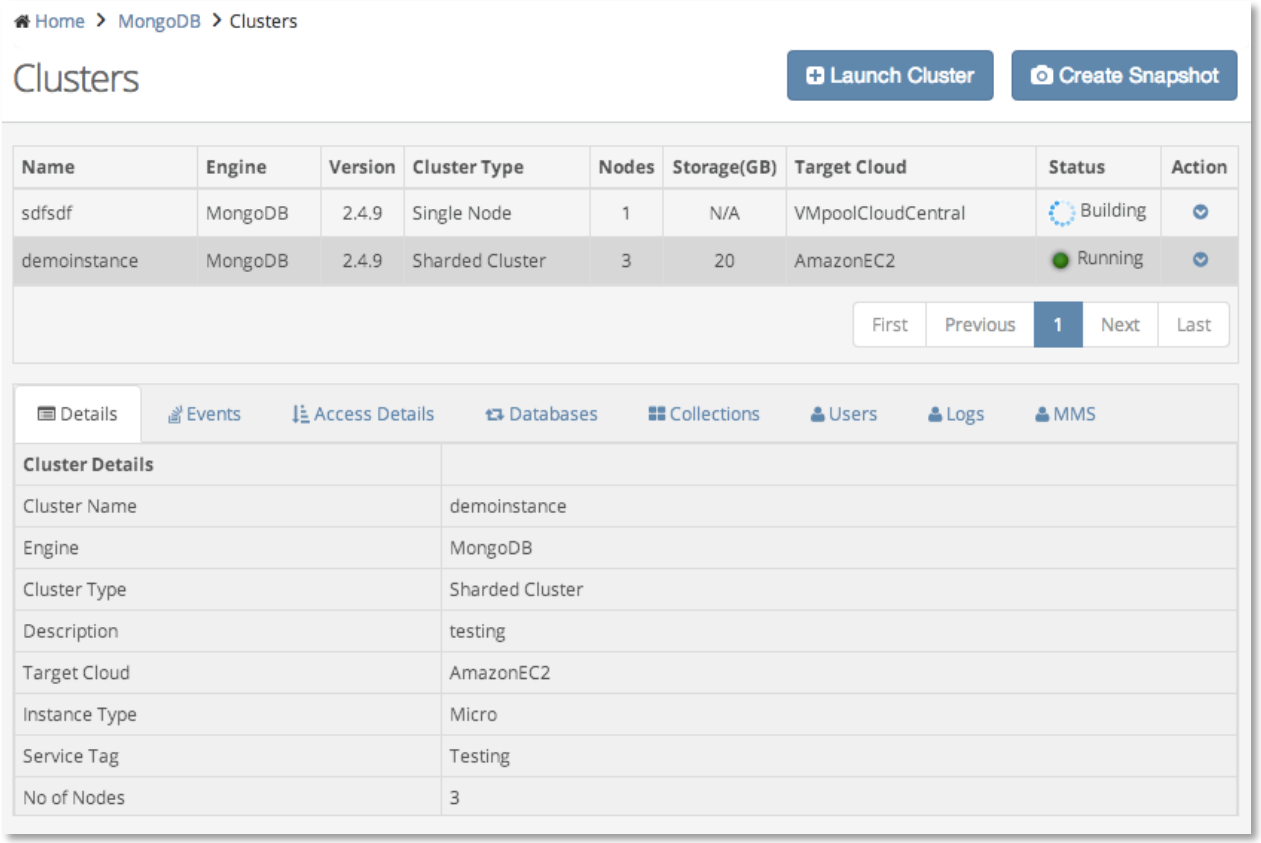

Figure 15: Details tab

Events Tab

The events tab provides a listing of all automation events performed for that cluster, including the initial provisioning process, changes, and automatic tasks performed by the CumuLogic controller against the cluster (such as performing a daily backup routine). The

refresh button can be used to refresh the view, as a way to get the latest events (e.g.: during a multi-step process).

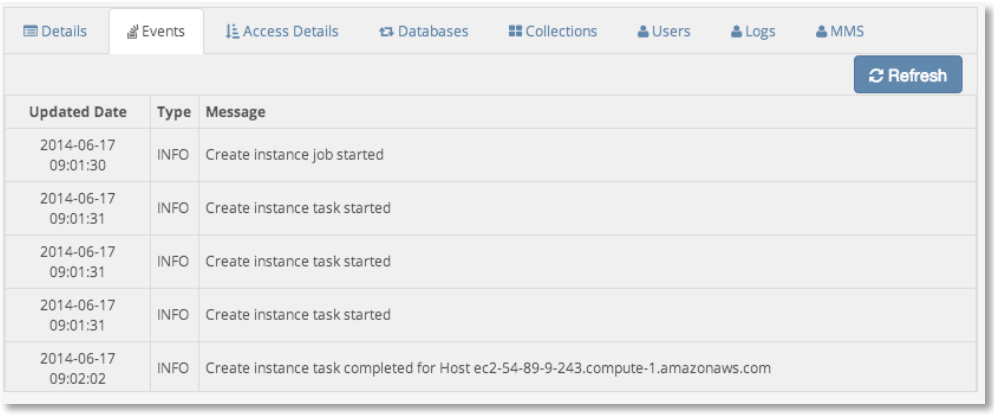

Figure 16: Events tab

Access Details Tab

The access details tab provides a listing of each component of the deployment. For a standalone or replica set type of cluster, all nodes in the cluster are listed. For a sharded cluster, all mongos, config servers and shards are listed.

Clicking on the Host Name / IP field will display additional details about the IP addresses (internal and external) and hostnames provided by the target cloud.

For a production sharded cluster, the clicking on that same field will display a listing of all nodes in that shard's replica set.

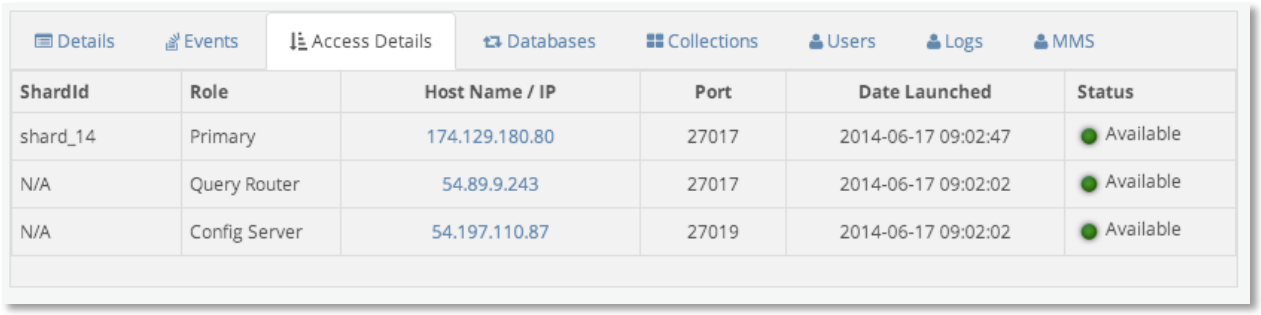

Figure 17: Access Details tab

Databases Tab

The databases tab shows all databases configured in the cluster, including an Object Count, as well as Data Size and Storage Size.

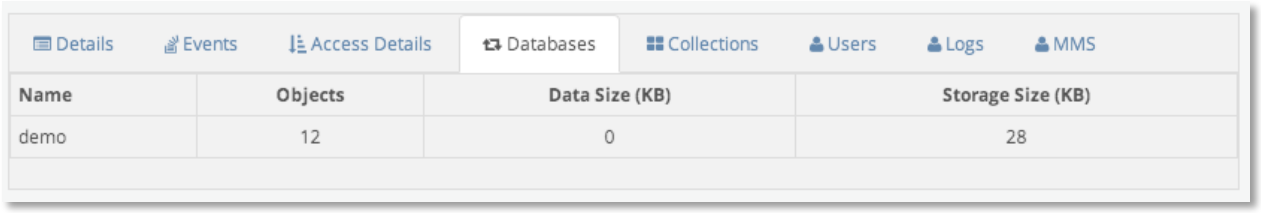

Figure 18: Databases tab

Collections Tab

The collections tab shows all collections in all databases configured in the cluster, including an Object Count, as well as Data Size and Storage Size.

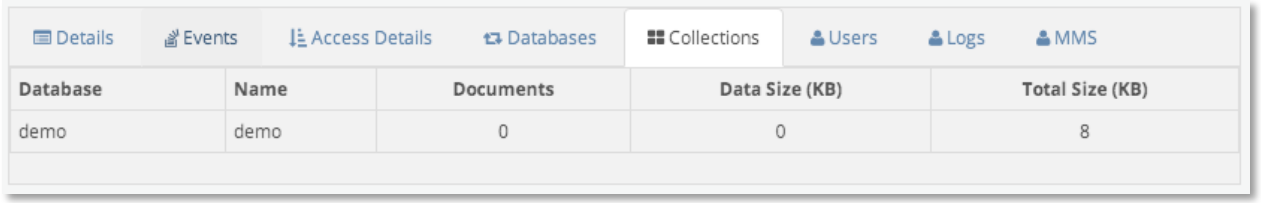

Figure 19: Collections tab

Users Tab

The users tab shows all users in each database of the cluster. You are able to delete users via this interface by clicking on the “x” icon in the actions column.

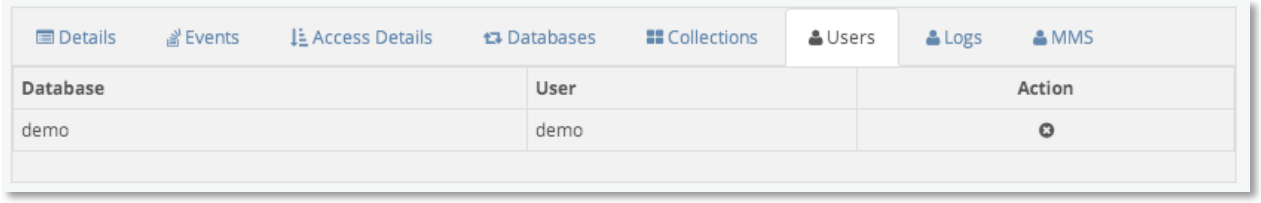

Figure 20: Users tab

Logs Tab

The logs tab gives you access to the latest logs from each node in the cluster. This is useful for debugging the configuration, or understanding how the environment is being used.

Figure 21: Logs tab

MMS Tab

If you have configured an MMS agent for the target cloud and zone, the MMS tab provides information about the cluster's status within the MMS system. If the cluster was deployed prior to an MMS agent being created, or if you did not select to add the cluster to MMS during the provisioning process, the tab allows you to add the cluster's hosts to MMS. If the cluster is provisioned within MMS, there is a link available to navigate into the MMS console.

Actions to Modify Clusters

For any deployed cluster, there is a set of actions available to you for management of that cluster. Clicking on the "Action" icon in the cluster list will display this menu:

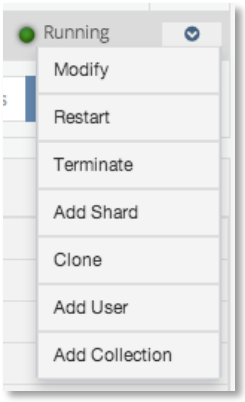

Figure 22: Cluster actions

The actions available are:

1. **Modify** – This action will allow you to change aspects of the cluster's configuration, like its parameter group and backup rules.
2. **Restart** – This action will initiate a restart of the services in the cluster.
3. **Terminate** – This action will destroy all underlying nodes of the cluster, but leave the definition of the cluster intact for future re-provisioning.
4. **Add Shard** – This action is only available in a sharded cluster, and adds a shard to the environment. For a production type of sharded cluster, this will result in a three node replica set being deployed. For a development/testing type of sharded cluster, this will add a single standalone node as a shard.
5. **Add Node** – This action is only available for a standalone or replica set cluster. It will add a single node to the replica set, unless the cluster is a standalone cluster. In that case, two additional nodes will be created to make a three node replica set.
6. **Clone** – This action will create a new version (clone) of the cluster, by creating a snapshot of the cluster prior to provisioning.
7. **Add User** – This action allows you to create a new database and user within the cluster.
8. **Add Collection** – This action will create a new collection within the selected database on the cluster. For sharded clusters, it will also allow you to specify the sharding rules for that collection.

Working with Snapshots

If you are planning to make any major schema or data changes to your running cluster, you may consider storing the latest snapshot. Snapshots are also performed automatically by the controller, if you selected backup serviced for the cluster in question.

All snapshots stored by the system are available on the Snapshots page:

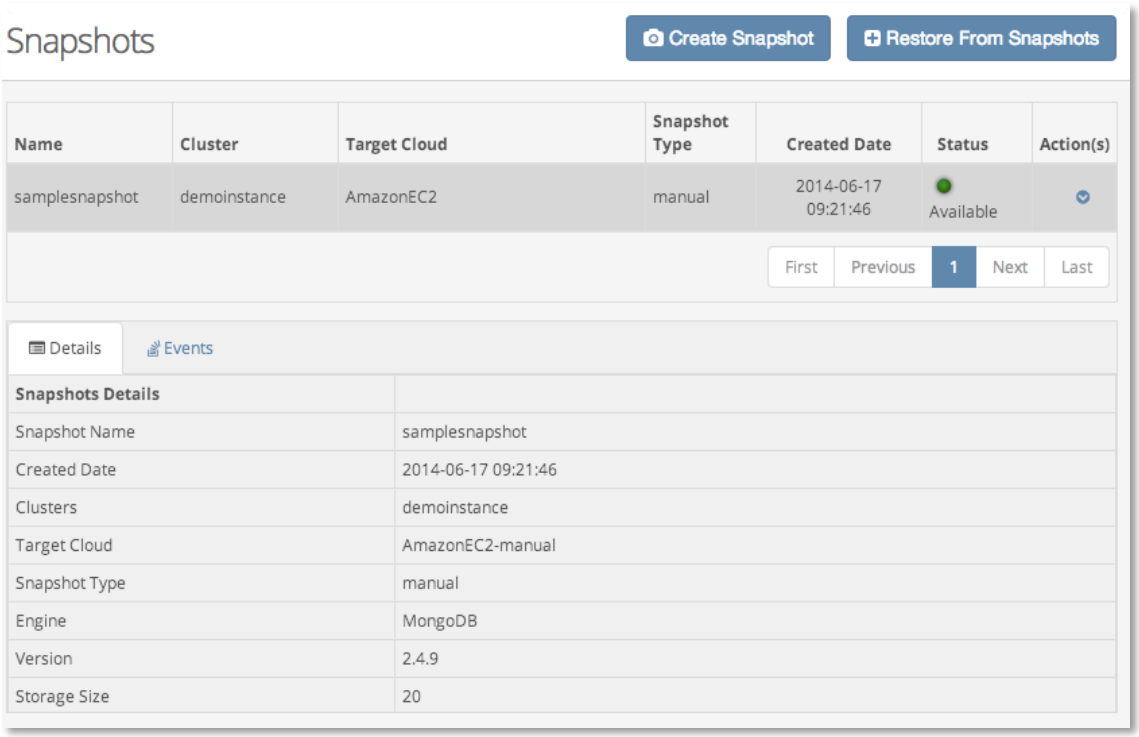

Figure 23: Snapshots

Actions available for any existing snapshot include “Restore Snapshot” and “Delete”.

Creating a Snapshot

From either the Clusters or Snapshots page, click the “Create Snapshot” button to manually create a new snapshot.

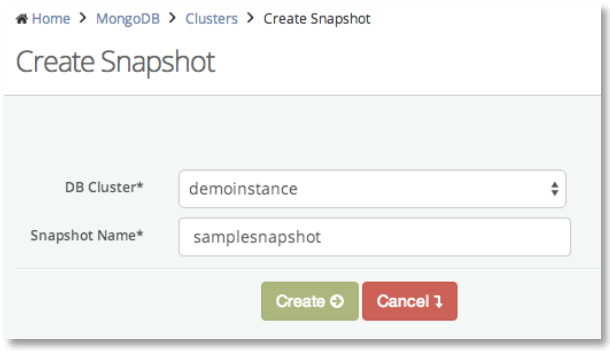

Figure 24: Create Snapshot dialog

After selecting the target cluster and providing a name for the snapshot, the system will perform a file-system based snapshot of the relevant nodes in the cluster (e.g.: one mongos node, one config server node, and one node from each shard). Each of these filesystem-based snapshots will be compressed and stored by the controller in the configured backup storage location (as setup by the administrator when the controller was installed). Application access to the database will not be affected by this process, however the CumuLogic controller will deny any management modifications to the cluster during both the snapshot and archival phases of the operation.

Restoring from Snapshot

Snapshots can be restored from either the top of the Snapshots page (by clicking on the "Restore From Snapshot" button) or from the actions menu of a snapshot.

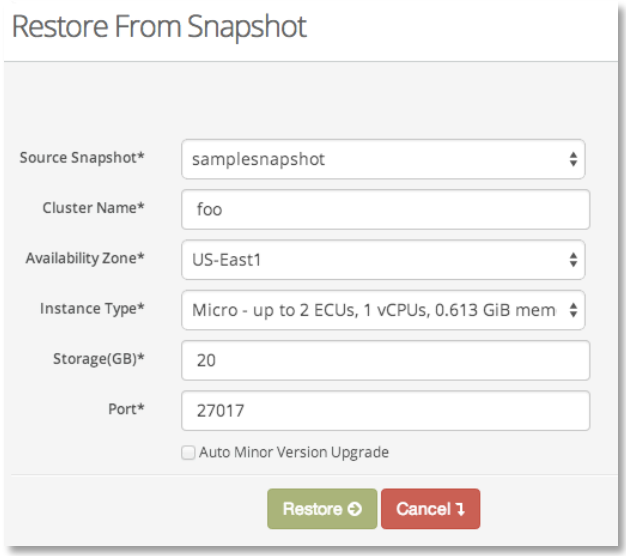

Figure 25: Restore from Snapshot dialog

Restoring from a snapshot will create a new version of the cluster, with the selected options.

Working with Parameter Groups

Parameter groups are a set of configuration and optimization parameters that CumuLogic database service exposes for users to modify to meet specific workload requirements. For instance, you may want to optimize MongoDB parameters to tune your database for read-heavy workloads or increase the query cache size. If you are familiar with optimization techniques for databases, you can create your own Parameter Groups and change the values for specific parameters and apply them to any database instance.

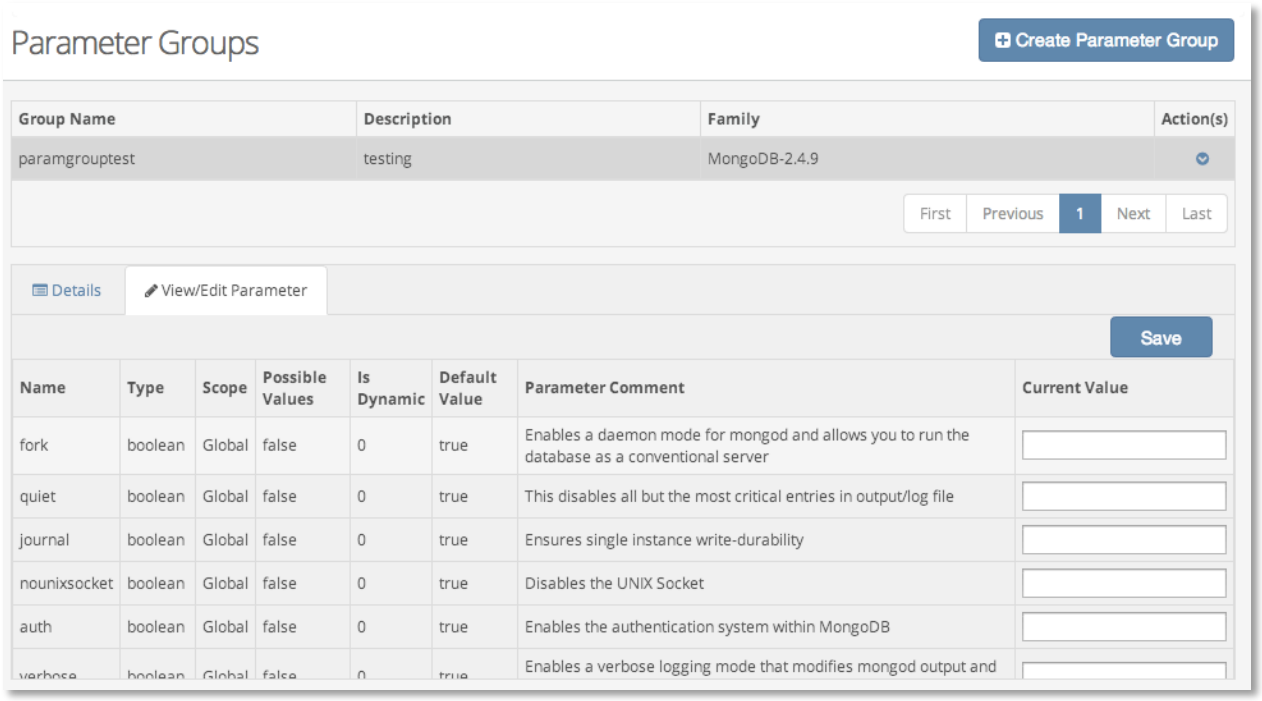

Figure 26: Parameter Groups

Working with Access Groups

Access groups such as Security Groups provide firewall-like functionality to secure database instances. By default, access to database instances via any protocol is blocked. In order to connect to the database instances, users can create and configure Access Groups to allow access from specific IP addresses or servers.

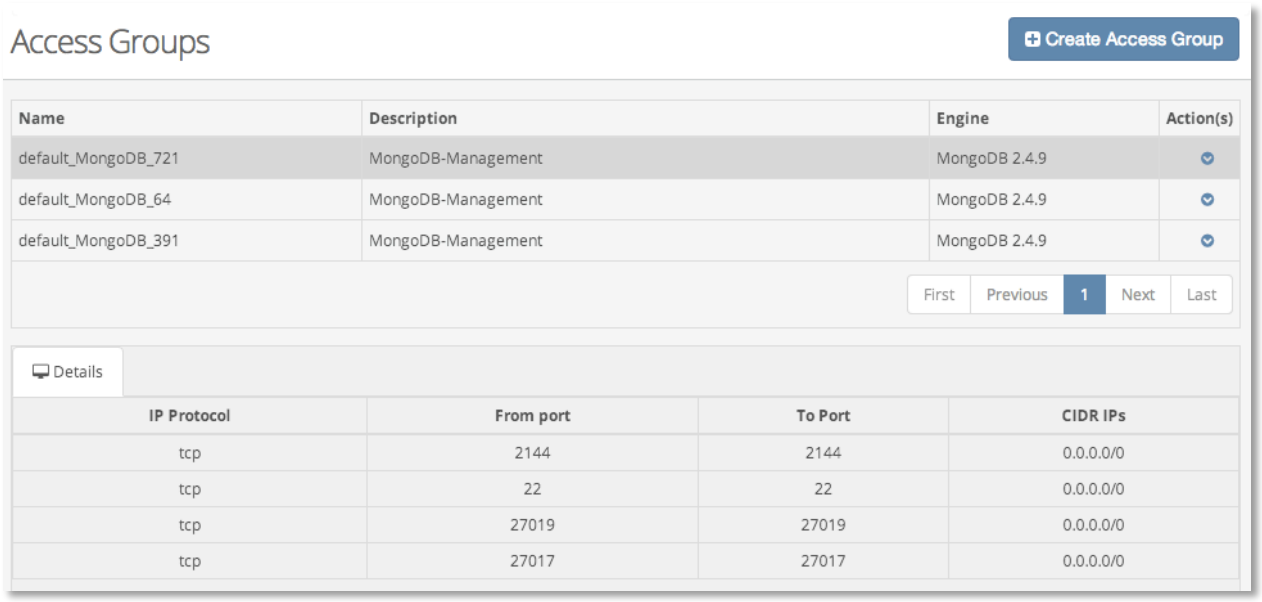

Figure 27: Access groups

In the example above, the Access Group called “default_MongoDB_721” is allowing access to the cluster from any IP address (0.0.0.0/0) on ports 2144, 22, 27019 and 27017.

Access Groups can be edited and applied to running database instances in real time without impacting database operations.

Monitoring Graphs

The Monitoring Graphs page provides performance reporting for all deployed clusters you have configured. When the page loads, you will need to select the cluster that you want to view data for.

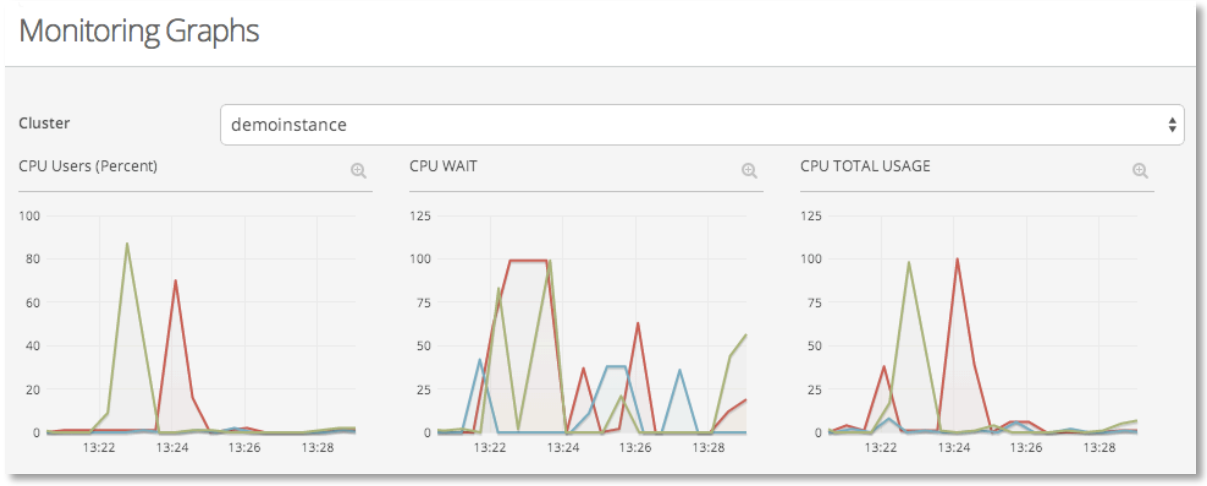

Figure 28: Monitoring graphs

Each metric can be expanded by clicking on the magnifying glass icon in the upper right corner of each small chard. Once expanded, you may select a different periods over which to chard the specific metric.

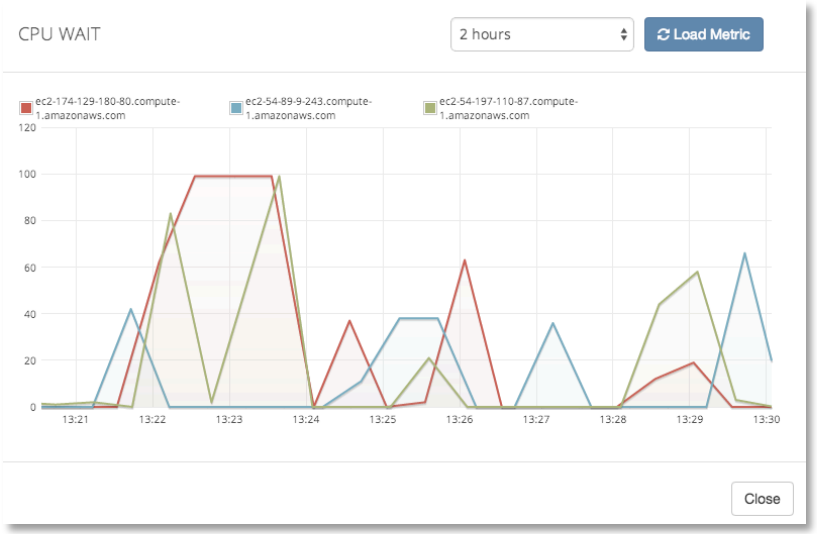

Figure 29: Monitoring graph expanded

Working with MongoDB MMS

The CumuLogic controller is able to provision MongoDB Management Service (MMS) monitoring agents into selected target clouds / zones on your behalf. For more information about MMS, please visit the MongoDB Management Service website at: https://mms.mongodb.com/

From the MMS screen, you can add, change and delete MMS agents on your behalf.

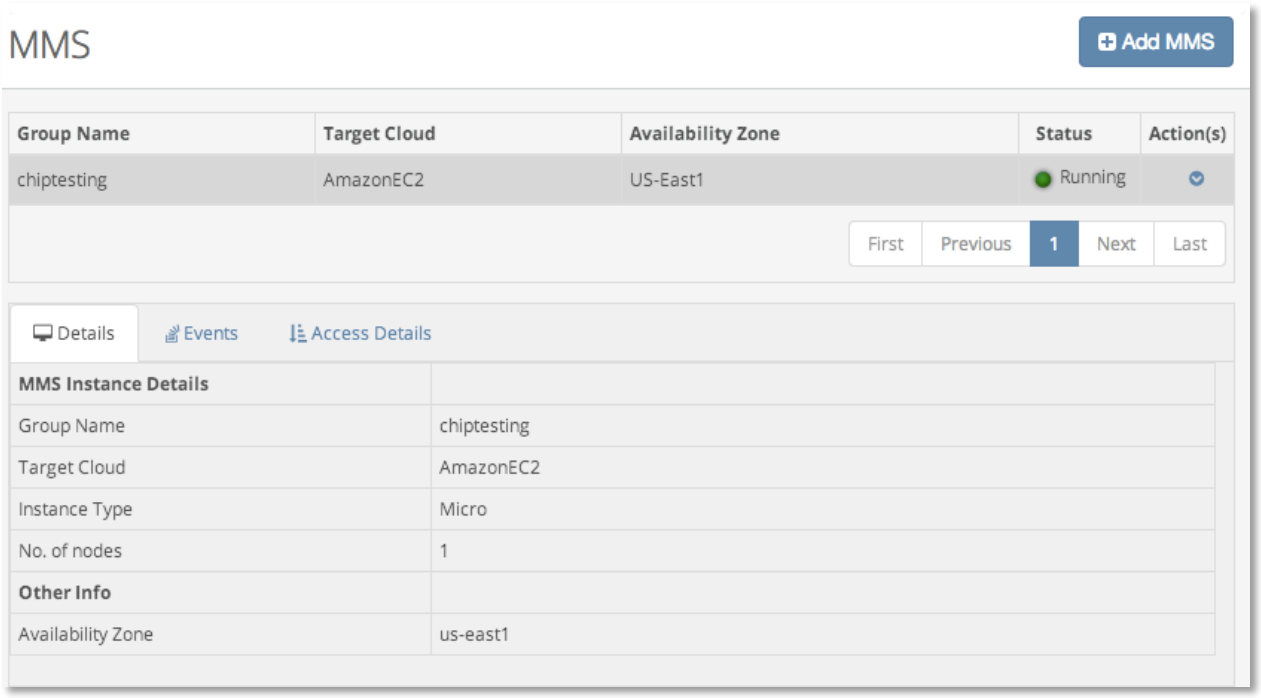

Figure 30: MMS Screen

When you first start using the CumuLogic DBaaS Platform, no MMS agents will exist. To add an MMS agent, you need to click the Add MMS button on the MMS page, and complete the required fields:

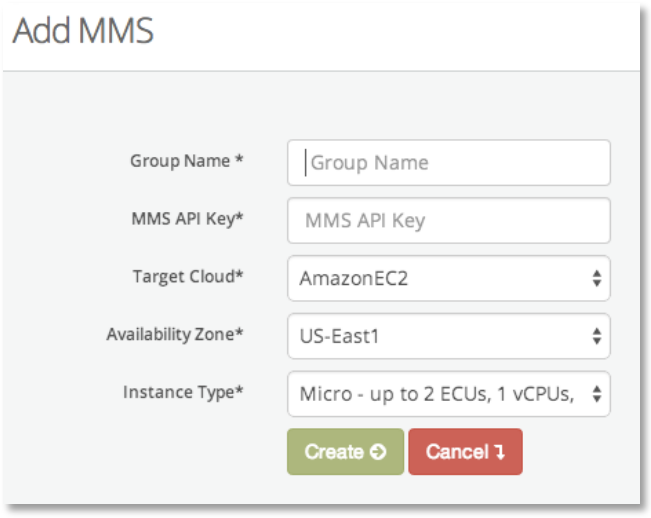

Figure 31: Adding an MMS Agent

You are required to provide the following values:

1. **Group Name** – The MMS group name that you want clusters to be provisioned into.
2. **MMS API Key** – The MMS agent API key provided by MMS for your account.
3. **Target Cloud** – The target cloud that you want to deploy into.
4. **Availability Zone** – The zone within the selected target cloud that you want to deploy into.
5. **Instance Type** – The VM instance size for the MMS agent to run within.