SOLUTION BRIEF

MySQL Database as a Service (DBaaS) with Astra

Simplified day 2 operations
Introduction
Kubernetes has become the standard IT infrastructure for businesses of all sizes. Production applications are being deployed on or migrated to Kubernetes. Running a stateful application like MySQL requires lots of planning, understanding the challenges, and identifying the right solutions.

The journey of implementing DBaaS for MySQL requires the following actions on day 1, whether it’s a managed Kubernetes service or vanilla Kubernetes:
1. Identify or build your own registry.
2. Identify the right storage and the Container Storage Interface (CSI) provisioner.
3. Find the performance requirements and define appropriate storage classes.
4. Create your own manifest or identify a helm chart that meets your requirements.
5. Deploy the MySQL application.

Key benefits
- Facilitate application-consistent snapshots and backup
- Recover the entire MySQL application and Kubernetes resources in a disaster scenario
- Migrate applications to another Kubernetes cluster

Figure 1) Build your own DBaaS.
Kubernetes offers solutions for all of the day 1 requirements. When it comes to day 2 operations, you need a strategy and solution for:
1. Data corruption and security
2. Backup and recovery
3. Disaster recovery
4. Application portability

Kubernetes natively doesn’t have any solutions to address the day 2 challenges.

Astra simplifies and automates the day 1 operations by simply registering the Kubernetes cluster. The day 1 operations are simplified to
1. Identify or build your own registry.
2. Create your own manifest or identify a helm chart that meets your requirements.
3. Register the Kubernetes cluster with Astra.
4. Deploy the MySQL application

Project Astra managing your application addresses all day 2 challenges.

Astra overview
Astra is a fully managed service that makes it easier for our customers to manage, protect, and move their data-rich containerized workloads running on Kubernetes within and across public clouds and on-premises. Astra provides persistent container storage that leverages NetApp’s proven and expansive storage portfolio in the public cloud and on-premises. It also offers a rich set of advanced application-aware data management functionality (like snapshot -revert, backup and -restore, activity log, and active cloning) for your data protection, disaster recovery, data audit, and migration use-cases for your modern apps.

Managing MySQL with Project Astra
Simply register your Google Kubernetes Engine (GKE) clusters with Astra. Upon registration, Astra:
• Installs NetApp® Trident, NetApp’s open-source Kubernetes storage orchestrator.
• Creates a bucket on the cloud object store for saving application backups.
• Creates a service account on your cluster for itself.

The following example shows two clusters, one located in the us-east4 GCP region (N. Virginia) and one located in the us-central1 (Iowa) region.
Install MySQL on cluster longboat-cluster-1 using the current Bitnami Helm chart or a custom manifest. Trident automatically provisions the Kubernetes Persistent Volume Claims from NetApp Cloud Volumes Services for MySQL. Astra discovers the applications on your registered clusters, and you can easily manage either just the application or all the resources in the entire namespace as one unit.

After managing the application, Astra can take snapshots, backups, and clones of that application, its Kubernetes resources, and its associated Persistent Volumes.
Figure 5) Managed application overview.

Figure 6) Kubernetes resources for the application.
All the data generated by MySQL database clients can be automatically protected by using snapshots and backups. Astra snapshots and backups preserve the application state, its Kubernetes resources, and its volumes in one easily manageable unit. Project Astra understands the MySQL application and is quiesced before a snapshot or backup so that an application-consistent snapshot or backup can be taken. Quiesce operations take no longer than 60 seconds. All application backups are stored in an object store.

Both on-demand and scheduled snapshots and backups are supported. When taking on-demand backup, there is an option to choose any existing snapshot. Otherwise, the backup will be from the current state of the application.
Set up a snapshot and backup schedule for the volume and all the Kubernetes objects that are associated with it.
After reviewing the information, set the protection policy. Astra automatically takes snapshots and backups based on the schedule and follows the retention policy defined.

**Migrating MySQL to another cluster**

After a successful backup, the MySQL application is protected against disaster like losing the Kubernetes cluster or a human error like deleting the namespace. You can use the Clone option to redeploy MySQL to a new namespace within the cluster or to new cluster. When choosing the option, you can also select an existing snapshot or backup to go back to a point-in-time copy of the MySQL application.

For example, suppose that you have a new team in a different location that is going to take over the responsibility of managing the MySQL database. You want to migrate the MySQL applications closer to the new team. MySQL is currently running on the longboat-cluster-1 cluster in the us-cental1 (Iowa) region.
Clone MySQL to a new cluster, longboat-cluster-2, in a different Google Cloud Platform region using its current state. You could also clone from an existing backup or snapshot. When cloning from the current state, Astra first creates a backup and then uses that backup for migrating to the destination cluster. This brings up a new instance of MySQL, running at the same state as in the source cluster.
A new MySQL clone is provisioned in the destination cluster and the application is automatically managed by Astra.
Figure 12) Provisioning a new MySQL instance in the destination cluster.

After the migration, the MySQL application has the same Kubernetes resources and data as in the source cluster.

Figure 13a) MySQL application after migration.
Where can I learn more?

To learn more, visit the Astra website and the documentation on Project Astra.

About NetApp

In a world full of generalists, NetApp is a specialist. We’re focused on one thing, helping your business get the most out of your data. NetApp brings the enterprise-grade data services you rely on into the cloud, and the simple flexibility of cloud into the data center. Our industry-leading solutions work across diverse customer environments and the world’s biggest public clouds.

As a cloud-led, data-centric software company, only NetApp can help build your unique data fabric, simplify and connect your cloud, and securely deliver the right data, services and applications to the right people—anytime, anywhere. www.netapp.com

Figure 13b) MySQL application after migration.