Charmed MongoDB

Training Curriculum

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Version 1.0

Canonical

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Canonical

Objective

Ramp up your knowledge of the Canonical solutions to secure and automate the deployment, maintenance and upgrades of your MongoDB across private and public clouds. This is a 3 - day comprehensive training and onboarding package.

Target audience: Enterprises interested in using Charmed MongoDB

Content

Section	Description
Day 1	Introduction and Concepts Theory and demos
Overview of MongoDB	Brief history around MongoDB Introduction to MongoDB data model: Primary: Document Database Secondary: Geo-spatial DBMS, Time Series, Search Engine, Vector database MongoDB enterprise use cases: Use cases: web application, mobile app, internet of things, analytics, payments, content management, product catalog, AI/ML related MongoDB SSPL License
MongoDB Architecture	Overview on MongoDB architecture. We need to cover: ● Flexible schema ● BSON document ● Indices ○ Unique, Compound, wildcard indexing ○ When to use each ● Distributed architecture ○ Replication ○ Sharding ● Backup and restore ● Profiling & Tuning: ○ Cache view: mongostat command ○ Mongotop ○ Slowops and setting profiler level
Demo 1	Manually setting (without using a charm) up a 2 nodes MongoDB in Ubuntu

Section	Description
	• Installing LXD, multipass • Creating 2 VMs • Installing MongoDB on primary • Access MongoDB • Create 2 databases and some dummy data • Installing and removing MongoDB replica
Canonical's MongoDB solutions	• Canonical customers with an Ubuntu Pro subscription get up to 10 years of commitment for bug and security fixes. We support 3 types of artefacts: snap, OCI image and charm. • Canonical can also provide 24/7 operational phone or screen-sharing support to back your staff with a committed SLA on response times. • Customers opting for a managed setup, get even more peace of mind by offloading deployment, patching, hardening and monitoring to our Canonical experts. • Canonical can also provide training and advisory services to its customers.
Demo 2	Demo Charmed MongoDB snap and ROCKs

Canonical's MongoDB stack	Provide an overview on the curated list of components used by Canonical:
	• Main codebase: mongodb server
	• Javascript interface: mongodb-shell
	• Back up module: mongodb backup
	• Observability: mongodb-exporter
	• Observability stack:
	  ○ Prometheus
	  ○ Loki
	  ○ Grafana
	• Juju: our framework for software operators
	Explain the rationale behind our choices (widely used and proven, supported by Canonical).

Demo 3	Using of the snap: backup-mongodb; mongodb-exporter; COS Manually install backup-mongodb and perform backup and restore Manually install mongodb-exporter and use it to connect to the database Manually deploy COS and show some metrics (without a UI)

Section	Description
Create a web app	Creation of web app using MongoDB (using a non charmed solution)
Overview on Juju	Basic introduction to Juju, terminology such as "Charmed Operator", and "Framework for software operators" What is Juju? What problems does Juju solve? Comparison to other tools/methodologies - Ansible/Chef/Puppet - Terraform/Pulumi Generic operator pattern Operator Framework Juju's consistency across substrates - Bare-metal/MAAS/LXD - Azure/AWS/GCP/Oracle/Rackspace - VMWare - Openstack - Kubernetes Deployment patterns and examples - Applications/stacks on single substrates - Applications and services across multiple substrates Charmed - Juju Community - Docs - Discourse/Mattermost - Charmhub - Github/Launchpad Repos
Juju concepts	This section should crystallise the definitions of the various terms used when describing Juju and Charmed Operators. - Controllers - Controller function - Juju CLI interaction with controller API - Controller database and state storage - Single-substrate/multi-substrate controllers - JAAS / JIMM - Charms - Models - Applications - Units - Leadership - Charms - operators - Events - Actions

Section	Description
	- Config - Bundles
Demo 3	Install Juju Bootstrap Juju to use MicroK8s Deploy 1 MongoDB instance Scale to 3 MongoDB instances Illustrate the various introduced concepts by inspecting the various namespaces, pods, containers …
Day 2	Kubernetes set up Hands-on interactive session
Prepare EKS based lab	Install juju Bootstrap Juju to use EKS Deploy 1 MongoDB instance Connect with MongoDB Create test user
Managing units - HA	Adding 3 replica set Removing replica
Managing passwords	Set and update passwords Guide tutorial
MongoDB user management	username, password, and database for the desired user/application
TLS enablement	Enabling Disabling
Backup and restore	Configure S3 Create and list backups Restore backup Cluster migration with restore
Observability	MongoDB exporter Canonical Observability Stack (COS) Usage of Prometheus, Grafana with the usage of MongoDB information and other sources e.g. serverStatus

Section	Description
Presenting benchmark result	Presenting Charmed MongoDB benchmark result and how to use the test suite
Create web app using Charmed MongoDB	Creation a web app that uses Charmed MongoDB (with and without data-integrator / charmed app)
Day 3	IaaS set up Hands-on interactive session
Similar features as K8s set up	Install juju Bootstrap Juju to use LXD (Microcloud) Deploy 1 MongoDB instance Connect with MongoDB Create test user Managing units - HA Managing passwords MongoDB user management TLS enablement Backup and restore Observability
Sharding	Deploy Config Server Deploy 1 shard Write some data Add 1 shard Verify data is sharded Remove 1 shard Show config Mongos
Minor version upgrades	Perform an upgrade Explain the sequencing, the different steps