Intro to OpenStack Trove & Database as a Service (DBaaS)

OpenStack Austin Meetup

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Transformation of Cloud Data Management

**Traditional IT**
- Provisioning by admins
- Database management by specialists
- Waterfall development
- Few large machines / bare metal
- Oracle Enterprise licenses
- Captive audience

**Cloud**
- Self Service Provisioning
- Developers manage their own databases
- Agile development
- Many small machines / virtualization
- Many data management technologies
- Competition with AWS
The Solution: Database as a Service

• The delivery of database software & related storage “as-a-service”

• Available on-demand, without any hardware or software installation or configuration

• A fully managed service maintained & administered by the service provider
Amazon is demonstrating the importance of DBaaS

- DynamoDB was the fastest growing service in AWS history in 2012
  - Werner Vogels, Amazon CTO, [AWS Blog June 2012](#)
- Redshift is now the fastest growing AWS service ever
  - Werner Vogels, Amazon CTO, [The Register, April 2015](#)
- 45% of Amazon customers have implemented and are expanding use of RDS
  - Jeffrey Hammond, [Forrester Blog, September 2013](#)
- AWS database business currently on a $1 billion revenue run rate
  - Andy Jassy, the SVP of AWS - [TechCrunch, October 2015](#)
- Amazon’s #1 hiring focus - 84 open positions in DBaaS in November 2015
  - Deutsche Bank Markets Research - [NetworkWorld, November 2015](#)
Trove in a Nutshell

- Database as a Service for OpenStack
- API’s for both development and operations
- Self service database provisioning
- Full database lifecycle management
- Multi-database support
- Both Relational and NoSQL
What is Trove? RDS for OpenStack...and DynamoDB...and RedShift

Amazon AWS

Developer API

DynamoDB
RDS
RedShift

EC2
S3
EBS

OpenStack

Developer API

NoSQL
Trove
NoSQL

RDBMS
DW

Operations API

Nova
Swift
Cinder

...and API’s for DevOps
Complete Database Lifecycle Management

**Provision**
- On demand
- Wide DB selection
- Clusters & single instances

**Manage**
- Manage schemas
- Create replicas for scale & availability
- Backup/restore

**Secure**
- Automated patch management
- Users/permissions
- Restricted root access

**Tune**
- Manage log files
- API’s to tune fleets of servers, not just single instances
- Sane defaults
A word about our sponsors

- Tesora, the Trove company
- Leading contributor to Trove
- Makers of Tesora “DBaaS Platform”
  - Enterprise product based on Trove
  - Additional capabilities
  - Additional datastores
  - Support and Services
- Located in Boston and Toronto
  - We’re hiring
Multi-database - support for 13 different databases

**SQL**

- IBM DB2
- MySQL
- PostgreSQL
- Oracle
- MariaDB
- Vertica

**NoSQL**

- Couchbase
- Cassandra
- DataStax
- Redis
- MongoDB
- CouchDB
Different Use Cases Require Different Databases

Not all users or applications are the same...

- Different needs for
  - Stability & Scalability
- Development vs. QA vs. Production
- SQL vs. NoSQL vs. Data Warehouse vs. Big Data
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Deployment options to support varied use cases

- Tesora DBaaS:
  - Lets users choose the right provisioning option for each use case
  - Bare metal for high end transactional throughput
  - Massively scalable clusters for web applications or high volume testing
  - Simple VM provisioning for development
  - Multi-tenant for resource optimization & efficient management
Trove Multi-Datastore Architecture

Datastore-agnostic code in Trove Controller and Dashboard

Datastore specific code isolated to guest agents

Trove Dashboard (Horizon)

API
Task Manager
Conductor

Guest
MariaDB
Guest
DataStax
Guest
Oracle
Guest
Cassandra
Guest
MySQL
Guest
Couchbase
Guest
mongoDB
Guest
Percona
Guest
Vertica
What’s new in Mitaka

• Cassandra clustering, backup & restore, configuration groups, user functions
• CouchDB backup and restore, user functions
• DB2 backup and restore
• Improvements to Mongo Cluster grow/shrink support
• Extend MySQL replication to include MariaDB GTID replication
• Percona XtraDB Cluster grow/shrink support, root enable
• Vertica configuration groups, cluster grow/shrink
• Improved Ceilometer notifications
• Bug fixes
What’s on deck for Newton

• Here are some projects currently under consideration
  – Improvements to usability, guest image creation
  – Improvements to upgrade
  – Extend persistent storage to include more than Cinder/Ephemeral
  – Hbase support (code is already available for review)
  – Python 3 support
  – Trove “Superconductor”
  – Management client for Trove, use the OpenStack client
  – Trove capabilities API
  – Improvements in modularity between guest agent and image
  – Trove v2 API
Learn More about Trove

- Trove Wiki - https://wiki.openstack.org/wiki/Trove
- Trove Source - https://git.openstack.org/cgit/openstack/trove
- On IRC - #openstack-trove
- Trove Day
  - tesora.com/troveday
  - slideshare.net/tesoracorp
- LinkedIn - OpenStack Trove Group

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OpenStack East - August 23-24 - New York City

- Official OpenStack event
- Community-driven
- Focus on enterprise users
  - Retail
  - Financial services
  - Telecom

More at OpenStackEast.com
Thank You!