Trove: The OpenStack DBaaS
Simplifying how databases are managed in the cloud

OpenStack Meetup, DFW
August 3, 2016
Introductions

- Who am I?
- Who are you?
- What are we doing here?
- Other philosophical questions like this ...
Introductions

• Who am I?

• Who are you?

• What are we doing here?

• Other philosophical questions like this ...

• Amrith Kumar, Trove PTL (Newton)
  CTO, Tesora (the Trove company)
  – ... say some other things here ...

• Remember to tweet along
  – Follow me @amrithkumar
  – Follow Tesora @tesoracorp
  – Tweet #openstackdfw #trove
Introductions

• Who am I?

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Introductions

• Who am I?

• Who are you?

• What are we doing here?

• The general plan was ...
  ◦ ... talk about Trove
  ◦ Database as a Service

• Other philosophical questions like this ...
Mandatory disclaimer

• This isn’t a sales pitch

\[1\] Manufactured on equipment that also processes sales pitches, and other sales pitch related products. Traces of sales pitch may be present.
Trove trivia

• Initially created by Rackspace and HP
• Incubated in Havana, Integrated in Icehouse (Atlanta)
• 17% of OpenStack deployments have installed Trove\(^1\)
  – 3% of them in production
  – This is the #1 installed project outside of the core OpenStack services
• The new mascot for the Trove project is the stingray

\(^1\) https://www.openstack.org/assets/survey/April-2016-User-Survey-Report.pdf
... Let’s switch gears ...
Today’s Database Challenges

“I need a NoSQL DB for my app to scale”

“I need my environment NOW”

“I only need it for a couple of weeks”

“I just don’t understand these developers…”

“I have to release it next month or else”

“I’ll just use AWS”

Developer

Operations
These Ops people just don’t get it…”

“My budget and team aren’t getting any bigger”

“Why can’t they just use Oracle?”

“We have no idea what they are putting on the public cloud”

“We need time to do it right”

“I know that they are putting our customer data at risk”

Today’s Database Challenges
Solution: Database as a Service Platform

- Self-service provisioning and life cycle management
- Manage SQL and NoSQL databases
- Through single, consistent pane
- Leverages native capabilities of each database
- Deploys in private, public, and hosted private clouds
OpenStack Trove Mission Statement

To provide scalable and reliable Cloud Database as a Service provisioning functionality for both relational and non-relational database engines, and to continue to improve its fully-featured and extensible open source framework.

https://wiki.openstack.org/wiki/Trove
Complete Database Lifecycle Management

Provision
- Wide array of databases
- One click away
- Single instances to clusters

Manage
- Schemas and users
- Replica sets
- Resize and backup

Secure
- Automated patching
- Granular permissions
- Restricted root access

Tune
- Database images
- Optimized and tuned
- APIs for custom configurations
## Supports Popular Databases

<table>
<thead>
<tr>
<th>Open Source</th>
<th>Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td>MySQL</td>
<td>EDB 11g</td>
</tr>
<tr>
<td>MariaDB</td>
<td>ORACLE 12c</td>
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<td>PERCONA</td>
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<td>redis</td>
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<td>mongoDB</td>
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</tbody>
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DBaaS (Database as a Service) with Trove supports both open source and commercial databases, including SQL and NoSQL solutions.
An Introduction to DBaaS with Trove
Trove is advancing rapidly
Yet enterprises don’t deploy every OpenStack release
Want the latest features
Tesora DBaaS
  - Latest Trove functionality without updating to latest OpenStack release
Tesora: Enterprise-class Database as a Service

- Mission: Make Database as a Service a reality for Enterprises
- Leading minds in database world
- OpenStack Trove project leadership
OpenStack Trove Architecture

- **Tesora Database as Service/Trove**
  - TROVE-API
  - DB
  - MESSAGE BUS
  - TROVE-TASKMANAGER
  - TROVE-CONDUCTOR

- **OpenStack**
  - COMPUTE INSTANCE
    - GUEST AGENT
    - SQL/NOSQL
  - DATA
  - CINDER VOLUME
  - DB BACKUP
  - GUEST IMAGE

- **Integration Tools**
  - NOVA
  - CINDER
  - SWIFT
  - GLANCE
  - NEUTRON
  - KEYSTONE
Another look at the Trove Architecture

- Trove provisions Nova VM’s
- Trove instance contains database and Guest Agent
- Guest Agent provides database specific implementations of the Trove internal (Guest Agent) API

Trove Controller Node

Trove API

Trove Guest Agent API

Trove Guest Instance

OpenStack Compute Node

Database

Data API

Nova API

Nova

OpenStack Controller Node
The Tesora Remote Agent Architecture™

- Trove provisions Nova VM’s for proxy guest agents
- Proxy Guest Agent talks with a remote database
- Proxy Guest Agent implements Trove internal (Guest Agent) API

Trove API

Trove Controller Node

Nova API

Nova

OpenStack Controller Node

Proxy Agent

Trove Proxy Instance

OpenStack Compute Node

Data API

Database

Database Instance
New in Newton

- Additional database support
  - CouchDB capabilities
  - DB2 capabilities
- Scheduled backups
- Quota management improvements
- Locality management for clusters and replicas
- Volume Type support for databases
- Upgrade
- Debugging improvements (persistence of error messages, ...)
- Image building tools
Is Trove production ready?

• In a word, “Absolutely”
• It is in production in several places
  – At least 8\(^1\), and certainly many more (I know of over a dozen)
  – Including OpenStack Infra\(^2\)
• Capabilities
• Supported databases
• Support and services

\(^1\) [https://www.openstack.org/assets/survey/April-2016-User-Survey-Report.pdf](https://www.openstack.org/assets/survey/April-2016-User-Survey-Report.pdf). N=290, production = 3% 
\(^2\) uses Rackspace’s Trove based DBaaS
How does one get started with Trove?

• **I strongly recommend**
  – Get Trove installed into a devstack environment
    • git clone [http://git.openstack.org/openstack/trove-integration](http://git.openstack.org/openstack/trove-integration)
    • cd trove-integration/scripts
    • ./redstack install
    – Optionally, you can manually configure local.conf and run stack.sh
      • More error prone; hence the redstack command

• **Once you are done, you will need guest images for each database**
  – If you used redstack
    • ./redstack kick-start <database>
How does one get started with Trove?

• Help the project, and get up to speed quickly by reviewing code
  – Use the handy dandy Trove Gerrit dashboard

• There are a number of ‘low-hanging-fruit’ bugs

• We’re always looking for new contributors
How does one get started with Trove?

• Most common problems that people face with Trove
  – Getting Trove installed and running from upstream is a pain
  – How on earth do I build a guest image
  – Why don’t you just distribute guest images?
  – What is the project doing to make these things easier?

• How hard is it to add a new database to Trove?
How does one get started with Trove?

• Go to
  – http://www.tesora.com
  – Go to Products -> Downloads

  – Download a copy of our Enterprise product, evaluate for free
    • This includes guest images!

• What do I get?
  – Software, Guest images, Support, ... Additional databases
And now …

• What else can we talk about
• Do you have questions?

• Have you tweeted about this presentation?
  – Follow me @amrithkumar (amrith@tesora.com)
  – Follow Tesora @tesoracorp (info@tesora.com)
  – Follow the Trove project @openstacktrove
  – #openstackdfw #trove
Thank you!