DataStax Enterprise on DC/OS
Yes, It’s Possible; Customer Case Studies

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Agenda

• Production Quality Stateless Services
• Evolution of the Framework
• Current State of the Project
• Customer Deployments
• Demos
What is DataStax?

(10 second overview)
DataStax Overview

- Peer-to-Peer
- NoSQL Database
- Based on Cassandra
  - + Search
  - + Analytics
  - + Graph
  - + Security
Production Quality Stateful Services
Terminology

- Node: a single instance
- Data Center: a logical grouping of racks or nodes
- Cluster: a logical grouping of datacenters
Gossip Protocol

- Gossip makes it all work
- Nodes interact every second
- Share information about themselves and others
- Slow or down nodes are marked as such
- Requests are routed based on this peer knowledge
### Write Path

**Diagram:**

- **IN MEMORY ON DISK**
- **COMMIT LOG**
- **SSTABLES**
- **MEMTABLE**

**MEMTABLE**

<table>
<thead>
<tr>
<th>ID</th>
<th>NAME</th>
<th>DOB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SSTABLES**

<table>
<thead>
<tr>
<th>ID</th>
<th>NAME</th>
<th>DOB</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB1</td>
<td>Jonny Smith</td>
<td>10/11/1972</td>
</tr>
<tr>
<td>AB2</td>
<td>Bob Jones</td>
<td>3/1/1964</td>
</tr>
<tr>
<td>AB3</td>
<td>Mary Smith</td>
<td>1/1/1982</td>
</tr>
<tr>
<td>AB4</td>
<td>Jane Hess</td>
<td>3/1/1992</td>
</tr>
<tr>
<td>ZZ3</td>
<td>Mike West</td>
<td>4/22/1968</td>
</tr>
</tbody>
</table>
Configuration Management

- 30+ configuration files
  - cassandra.yaml = ~1k settings
  - dse.yaml
- Production Changes Likely
- Workload Dependent
Stateful Services are Hard

Deployment
Maintenance
Operations
Resources
Backup + Restore
Configuration
Resilience
Configuration Management

Update

Current

A

B

Target

cpu
- 2.0
mem
- 4 GiB
persistent volume
- 5 GiB disk
- container path
- persistence ID

UNRESERVE

cpu: 1.0

RESERVE

mem: 4.0

LAUNCH
cpu: 1.0
mem: 8192
disk: 5120
- container path
- persistence ID

Launched

cpu
- 1.0
mem
- 8 GiB
persistent volume
- 5 GiB disk
- container path
- persistence ID
DCOS-Commons

- Open Source library to achieve these goals
- Robust deployment
  - install
  - configuration
  - software updates
- Maintenance of Services
- Accomplishes these tasks through a declarative or “goal oriented” approach
- https://github.com/mesosphere/dcos-commons
Evolution of the Framework
Version One

• Design Principles
  – Easy to Develop and Maintain
  – Easy to Extend and Customize
  – Single Universe Package

• Outcome
  – Customers wanted to fly a plane, not build one
Version Two – Give them a plane

• Major Changes
  – Dedicated DataStax engineering team
  – Hand-in-Hand collaboration with Mesosphere
  – Beta the heck out of it
  – Joint Support Agreements

• Better Together
  – Configuration Management – Rollback Changes
  – Automated vertical (resources) and horizontal (node count) scaling
  – Uniform deployment of Enterprise Applications
Current State
Version Two – Current State

• Full Platform Support
• Node Placement – Node / Task Failure Recovery
• Strict Mode Support
• Multi-Tenancy
• Pod Replace with local storage
• Networking Management / CNI
• Monitoring
Customer Deployments
Customer Use Cases

- Distributing Real-Time Microservices to a large travel company
  - Repeatable, Consistent deployments of an application stack
  - DSE + Kafka + API Management

- Platform as a Service by Financial Institution
  - DSE, Kafka, Others as a Service
Demos
Install DSE

( the database )
Install DSE (the database)
Install OpsCenter
( Management GUI )
DC/OS 1.10 CLI
### Services > datastax-dse Running (1)

**Instances** | **Configuration** | **Debug**
---|---|---

Showing 7 of 9 tasks  
[CLEAR]

<table>
<thead>
<tr>
<th>ID</th>
<th>NAME</th>
<th>HOST</th>
<th>STATUS</th>
<th>HEALTH</th>
<th>CPU</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>dse-2-node_00c837f1-f161-41ec-982e-20b232983a6d</td>
<td>10.0.3.173</td>
<td>Running</td>
<td>⬤</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>dse-2-agent_210942d0-5940-4a25-ba67-1890595f6959</td>
<td>10.0.3.173</td>
<td>Running</td>
<td>⬤</td>
<td>0.5</td>
</tr>
<tr>
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<td>dse-1-node_51ea31cd-a2e1-4af2-b286-84da155aeacb8</td>
<td>10.0.3.51</td>
<td>Running</td>
<td>⬤</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>dse-1-agent_c5f2c82b-8b69-4ec3-88e0-85594cdd6128</td>
<td>10.0.3.51</td>
<td>Running</td>
<td>⬤</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>dse-0-node_cd370287-9150-4a4a-8453-196d5ddac9b2</td>
<td>10.0.3.22</td>
<td>Running</td>
<td>⬤</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>dse-0-agent_1f24a760-b6d1-440f-bc87-a1500ba3aba5</td>
<td>10.0.3.22</td>
<td>Running</td>
<td>⬤</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>datastax-dse.da751c80-972d-11e7-abea-f2ea4739ecaa</td>
<td>10.0.2.128</td>
<td>Running</td>
<td>⬤</td>
<td>1</td>
</tr>
</tbody>
</table>
Add a Node
<table>
<thead>
<tr>
<th>NAME</th>
<th>STATUS</th>
<th>CPU</th>
<th>MEM</th>
<th>DISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>datastax-dse</td>
<td>Running (1)</td>
<td>8.5</td>
<td>25.9 GiB</td>
<td>0 B</td>
</tr>
<tr>
<td>datastax-ops</td>
<td>Running (1)</td>
<td>3</td>
<td>4.9 GiB</td>
<td>10 GiB</td>
</tr>
</tbody>
</table>
Take it for a spin

https://github.com/012345/MesosCon