Compute Cells for Grizzly

Chris Behrens
chris.behrens@rackspace.com

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Overview
Overview

• Scalable/distributed nova
• Separate DB and AMQP broker per cell
• New nova-cells service
  – Message routing (broadcast and direct-to-cell)
  – Scheduling
    • Separate from host scheduling
    • Periodic broadcasts from children with capacity and capabilities
• Inter-cell communication via RPC
• Cells connected in a hierarchical tree
  – API cell(s) at the top
  – No nova-api in child cells
What data is where?

- Each cell has its own DB
- Child cells only have data for its own cell
  - Same data as a normal nova deploy
    - Instances, services, compute_nodes, etc
  - Quotas should be disabled (NoopQuota class)
- API cells have subset of all child cell data
  - All instances
  - Quotas
  - Migrations (due to how Quota code works)
- API cells know nothing about hosts, hypervisors, etc
## Minimal services

<table>
<thead>
<tr>
<th>API cell</th>
<th>Child compute cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMQP broker (for RPC)</td>
<td>AMQP broker (for RPC)</td>
</tr>
<tr>
<td>DB</td>
<td>DB</td>
</tr>
<tr>
<td>nova-cells</td>
<td>nova-cells</td>
</tr>
<tr>
<td>nova-api</td>
<td>nova-scheduler</td>
</tr>
<tr>
<td></td>
<td>nova-network</td>
</tr>
<tr>
<td></td>
<td>nova-compute</td>
</tr>
</tbody>
</table>
Routing

API Cell
- nova-api
- DB
- nova.Cells
- AMQP Broker

Child Cells
- nova.Cells
- nova-network
- nova-scheduler
- nova-compute
- DB
- AMQP Broker

Grandchild Cells
- nova.Cells
- nova-network
- nova-scheduler
- nova-compute
- DB
- AMQP Broker
Status

• Been running in a large-scale production environment
  – Since 8/1/2012 within Rackspace® Cloud Servers

• Code is available publicly
  – http://github.com/comstud/nova/tree/cells_service

• Didn’t make Folsom 😞

• Needs to merge into trunk ASAP!
What works?

• Building instances
• Actions on instances
• Quotas
• API extensions with cells support
  – Hosts
  – Hypervisors
  – Instance_usage_audit_log
What’s not implemented?

• Security groups  
• Host aggregates  
• Volumes  
• Availability zones
Issues

• New ComputeCellsAPI class
  – Overriding of current compute API class not ideal

• Quotas
  – Needs migrations in API cell
  – Commits quotas early in API cell

• Cells manager class
  – Code is confusing
  – Should be broken up into more classes?

• Message ordering between cells
  – Race conditions
  – Amount of messages?
Discussion
Discussion
When can this go to trunk?

• Within next 2 weeks? (I hope)
• Code is proven, as it’s running in a production environment
• Getting it into trunk allows us to iterate on it more easily
Discussion
Miscellaneous

• Security group support
• Host aggregates
• …
THANK YOU

Chris Behrens
chris.behrens@rackspace.com