ceph days

Scale Multiple Ceph-Clusters Horizontally

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HETZNER

S3 AT SCALE

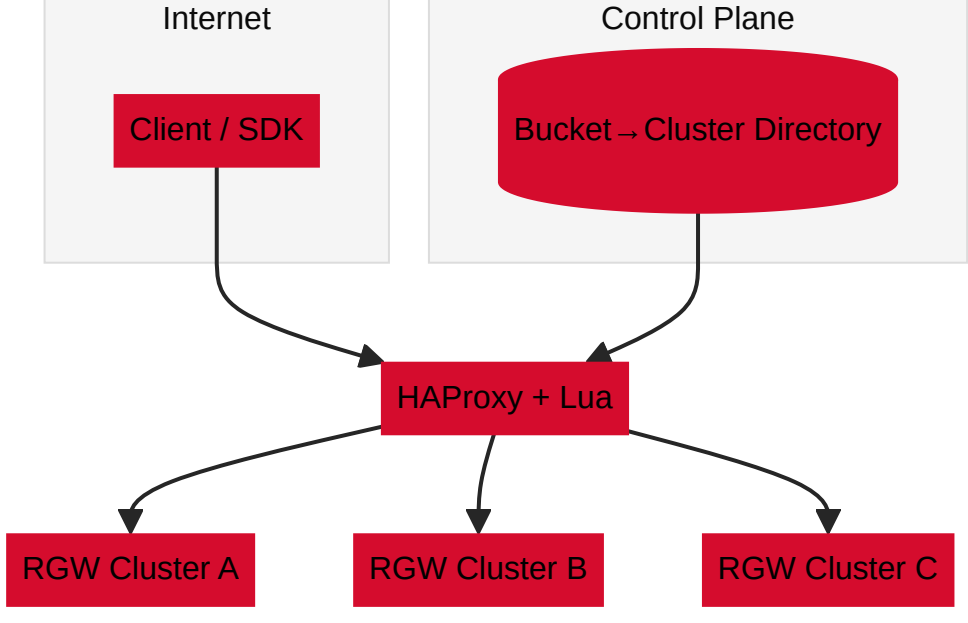
MULTIPLE CEPH-CLUSTER TRANSPARENT TO CUSTOMERS

Ansgar Jazdzewski • Hetzner-Cloud

WHY ONE CLUSTER ISN'T ENOUGH

- Physical Space
- Blast radius
- Rebalancing cost, recovery storms
- Dedicated failure domains
- Isolated maintenance windows

ARCHITECTURE



Overview

CHALLENGES TO OVERCOME

- Selct location
- Data Placement
- Move Data (Buckets)

HAPROXY + LUA (BUCKET-AWARE)

- read the bucketname from request
- create a LUA extention to lookup the cluster
- route to the correct cluster (backend)

PATH- AND DOMAIN- STYLE

Domainstyle

```
"https://[bucket].s3.example.com/[object]"
```

Pathstyle

```
"https://s3.example.com/[bucket]/[object]"
```

DECIDE IN HAPROXY

```
acl is_bucket_dns hdr_reg(host) -i ^[^.]*\.s3\.example\.com$
http-request set-var(txn.bucket) hdr(host),word(1,.) \
  if is_bucket_dns
http-request set-var(txn.bucket) path,word(2,/) \
  if ! is_bucket_dns
http-request set-var(txn.backend) lua.bucket2cluster \
  unless no_lua
http-response set-header X-Bucket %[var(txn.bucket)]
```

LUA STRUCTURE

How the Communication with Haproxy and Ceph work

LUA 1 (REQUIREMENTS)

```
local socket = require("socket")
local unix = require("socket.unix")
local socket_path = "/run/haproxy/bucket2cluster.sock"
```

LUA 2 (QUERY)

```lua
local function query_bucket(bucket)
  local client = unix()
  client:connect(socket_path)
  client:send("GET " .. bucket .. "\n")
  local response = client:receive("*l")
  client:close()
  return response
end
```

LUA 3 (RESULT)

```
function bucket2cluster(txn)
  local bucket = txn:get_var("txn.bucket")
  local response = query_bucket(bucket)
  if response:find("^200 ") then
    backend = string.sub(response, 5)
  else
    backend = "unknown"
  end
  txn:set_var("txn.backend", backend)
end
```

LUA 4 (REGISTER)

```
core.register_fetches("bucket2cluster",
  bucket2cluster_lookup)
```

HAPROXY PERFORMANCE OPTIMIZATIONS

Lua Load Per Thread

```
global
  lua-load-per-thread /etc/haproxy/bucket2cluster.lua
```

Load Lua script per thread to avoid lock contention

HAPROXY + CREATE/DELETE BUCKET

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- Create ACL

HAPROXY + CREATE/DELETE BUCKET

- Create ACL
- Send to Service

HTTP METHODS

```
acl is_put method PUT
acl is_del method DELETE
```

TEST ROOT

```
acl path_is_root_host \
  path,normalize(),url_dec,lower \
  -m reg ^/$
acl path_is_root_path \
  path,normalize(),url_dec,lower \
  -m reg ^/[^/]+/?$
```

path "/" or "/bucket/"

SET ROOT

```
acl is_bucket_dns hdr_reg(host) -i ^[^.]*\.s3\.example\.com$
acl is_bucket_path hdr(host) -i "s3.example.com"
acl is_bucket_root \
  ( is_bucket_dns path_is_root_host ) \
  or ( is_bucket_path path_is_root_path )
```

CREATE OR DELETE

```
acl has_authorization hdr_cnt(authorization) gt 0
acl is_bucket_create \
  is_put has_authorization is_bucket_root
acl is_bucket_delete \
  is_del has_authorization is_bucket_root
```

USE BACKEND

```
use_backend be_bucket_create if is_bucket_create
use_backend be_bucket_delete if is_bucket_delete
```

SERVICE CREATE/DELETE BUCKET

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Unified view Buckes can be managed with the UI (Hetzner Console) and S3-API

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- Storage capacity

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- Storage capacity
- Noisy neighbors

CEPH RAOSGW MULTISIDE

We use multiside to have all metada in sync Users and Bucketnames

CHANGE THE DEFAULT

```
radosgw-admin sync group create \
  --group-id=default \
  --status=allowed
```

CREATE A PIPE

```
radosgw-admin sync group pipe create \
  --group-id=default \
  --pipe-id=pipe-main \
  --source-zones='*' \
  --source-bucket='*' \
  --dest-zones='*' \
  --dest-bucket='*'
```

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- Delte data on Source-Side

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- Traffic read/write
- Used features (not hit Bugs)

CONFIGURATION (GROUP)

```
radosgw-admin sync group create \
  --bucket="${BUCKET}" \
  --group-id="group-${BUCKET}" \
  --status="enabled"
```

CONFIGURATION (PIPE)

```
radosgw-admin sync group pipe create \
  --bucket="${BUCKET}" \
  --group-id="group-${BUCKET}" \
  --pipe-id="pipe-${BUCKET}" \
  --source-bucket="${BUCKET}" \
  --source-zones="${SOURCE_ZONE}","${DEST_ZONE}" \
  --dest-bucket="${BUCKET}" \
  --dest-zones="${SOURCE_ZONE}","${DEST_ZONE}"
```

COPY DATA

```
radosgw-admin bucket sync run \
  --source-zone=fsn1-prod1-ceph3 \
  --bucket="${BUCKET}" \
  --debug_rgw=1
```

DELETE SYNC

```
radosgw-admin sync group remove \
 --bucket="${BUCKET}" \
 --group-id="group-${BUCKET}"
```

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- Keymanagemet (RO-Keys)
- STS-Lite + IAM

ADVANCED FEATURES

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- Automated bucket rebalancing

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- Automated bucket rebalancing
- Predictive capacity planning

Q&A

What’s your biggest scale blocker today?