# Cross-cell Volume Sync with CellCC

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## The Problem

- AFS environment, multiple regions
  - Continents
  - Buildings

- 13 sites

- Regions not isolated

- Cross-region releases/access is slow

## Rename Volumes

- app.gcc gets copies: app.gcc.na, app.gcc.eu

- /app $\rightarrow$ /afs/cell/na, /afs/cell/eu

- Need to modify mountpoints

- dbservers unchanged

## Split-horizon VLDB

- Client 1: volume is on servers A, B, C
- Client 2: volume is on servers X, Y, Z


- Requires significant new code, possibly confusing


- How do you define regions?


- dbservers unchanged

## Multiple Cells

- Release volume in master cell, then to other cells

- Unlimited sites

- Regions isolated

- Fits existing tools/models

## CellCC

- Perl, MySQL, remctl

- Idempotent retriable discrete steps
  - dump, xfer, restore, release, etc

- Distributed: pieces on source and destination

- Deployed in production

- **Not** lifecycle management

## CellCC Pieces

- `cellcc start-sync src.example.com vol.name`

- `cellcc dump-server {src,dst1,dst2}.example.com`
    - src $\rightarrow$ dst1, src $\rightarrow$ dst2

- `cellcc restore-server dst1.example.com`

- `cellcc check-server`

## Controlling Volumes

- Queues
    - Parallelism
    - vos flags

- volume-filter hook

## Progress Reporting

```
$ cellcc jobs
jobid 31203:
    Volume: app.gcc
    Source cell: master.example.com
    Destination cell: eu.example.com
    DV: 24
    Queue: app
    State: XFER_WORK
    Errors: 1
    ctime: 2017-07-16T09:10:28
    mtime: 2017-07-16T09:16:03
    deadline: 2017-07-16T09:18:03
    timeout: 120
    Dump size: 20.49kB
    Last host: "fs3.eu.example.com"
    Last known status: "Contacting [...] to get volume blob"
$
```

## Error Reporting

```
CellCC has detected the following 2 problem(s), which may require
attention:

- ALERT_RETRY for volume 'app.gcc' (a.example.com -> b.example.com)
  An error caused this job to fail to sync its volume. CellCC
  will retry the sync at the point of failure.

  Details:
  Job ID: 1943
  Started on: 2019-06-20T15:57:10
  Last heard from: 2019-06-20T16:08:01
  Current time: 2019-06-20T16:08:21
  Status: ERROR/DUMP_WORK (Checking remote volume metadata) (host fs4.
a.example.com)
[...]
```

## Extending `vos release`

- `AFSVolForward` to other cells?

- localauth keys

- Cross-cell admin would be new

- `vos release` is complex

## Code

**CellCC**
https://github.com/openafs-contrib/cellcc

**Slides**
http://dson.org/talks

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