Lab Course: Cloud Databases

Project ECS Shutdown

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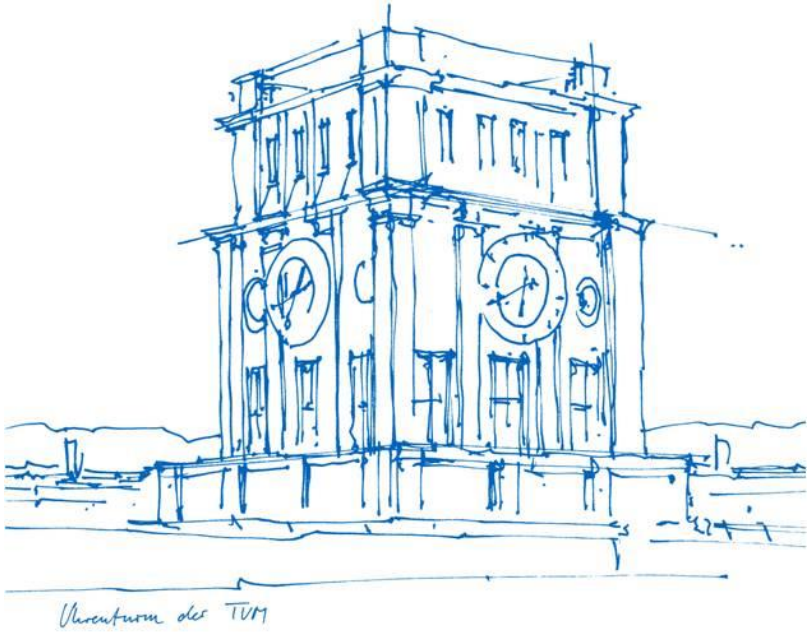


Agenda

- Problem Statement
- Solution
- Approach
- Demonstration
- Evaluation

Problem Statement

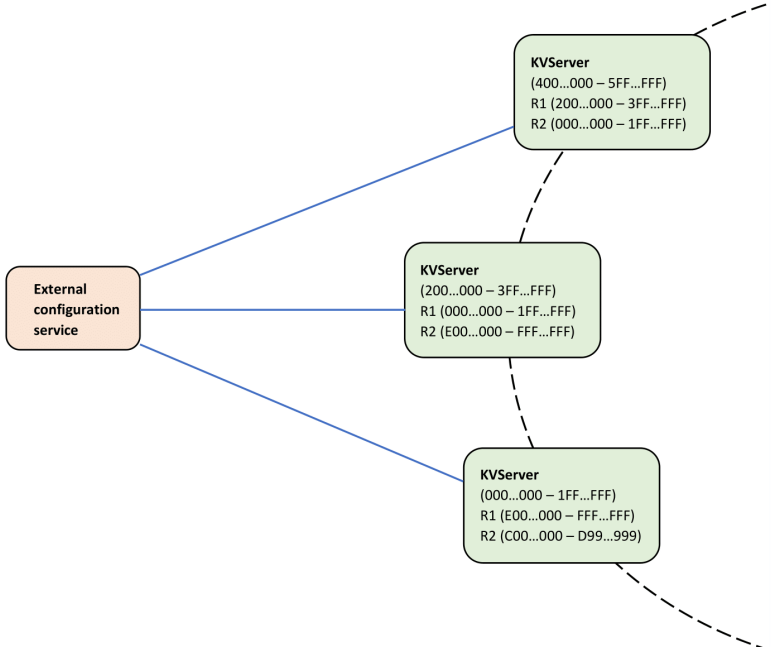
- Storage system managed by an External Configuration Sever
- The failure of a KV Server is managed by the ECS
- What happened and how should the failure of the head of the system which is the ECS be handled?

The KV Servers will also fail

Solution

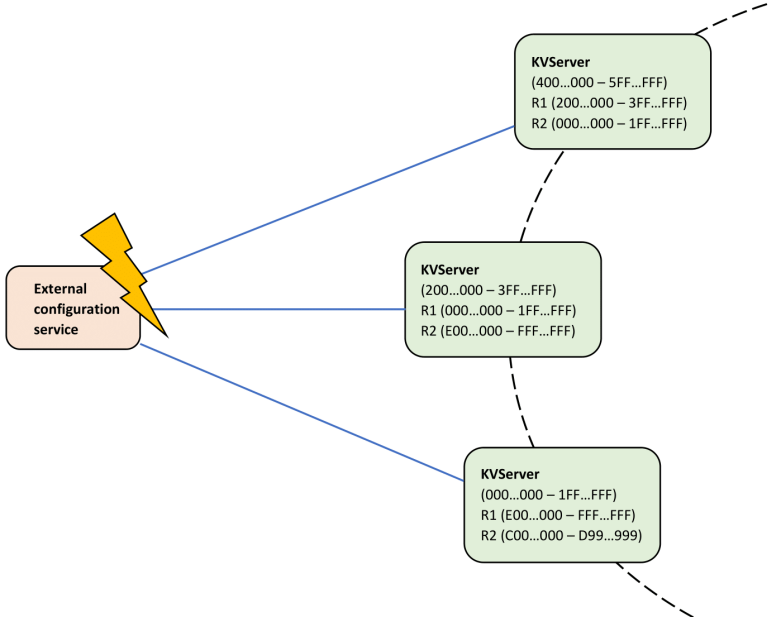
- An addition to the current system was implemented that avoids the single point of failure of a graceful or ungraceful shutdown of the ECS.
- Replace the crushed ECS with a new ECS
- BUT! Which ports or hardware resources will be used ?
- Selecting one of the already existing KV servers to use its framework and hardware to transform into the new ECS
- Once the ECS is chosen all the other KV servers connect to the new ECS, and the system is again stable and ready to proceed
- The data of the old KV server is transferred to the KV server with the responsible hash range before it is deleted on the ECS.

Approach



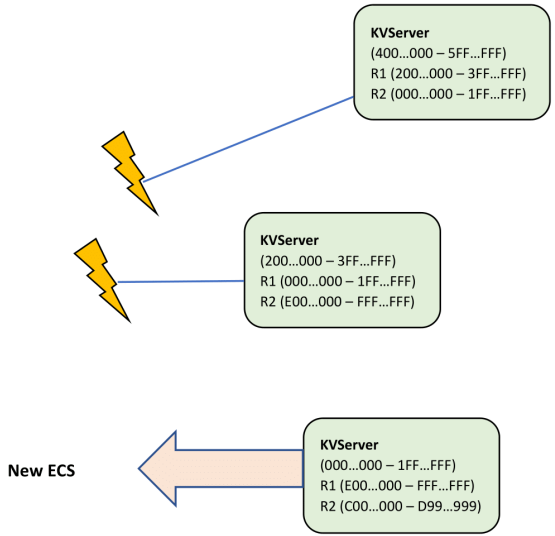
- Storage system before ECS shutdown

Approach



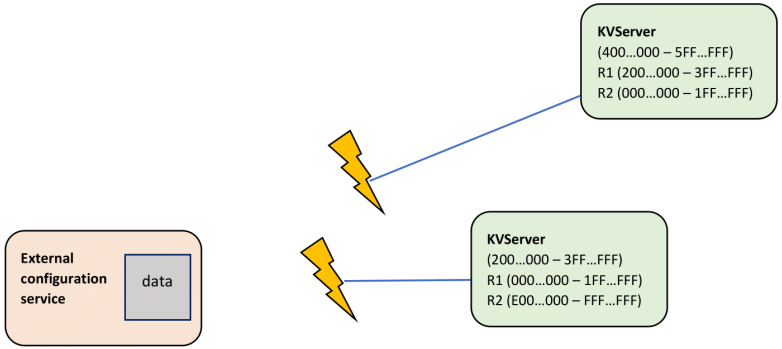
- ECS shuts down

Approach



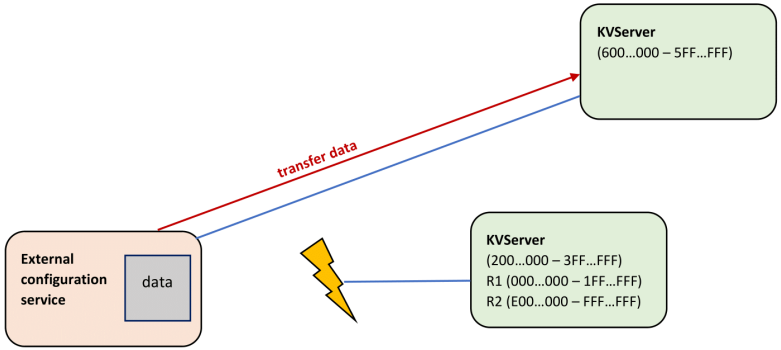
- Shut down of ECS is detected by KV servers
- New ECS is defined

Approach



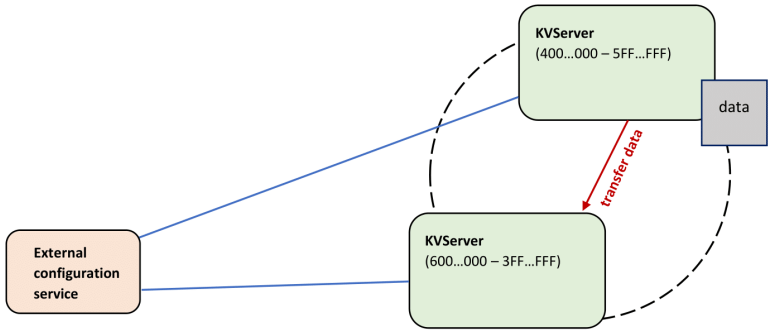
- Transformation of the specified KV server into the new ECS
- New Connection to ECS are set up by KV Servers

Approach



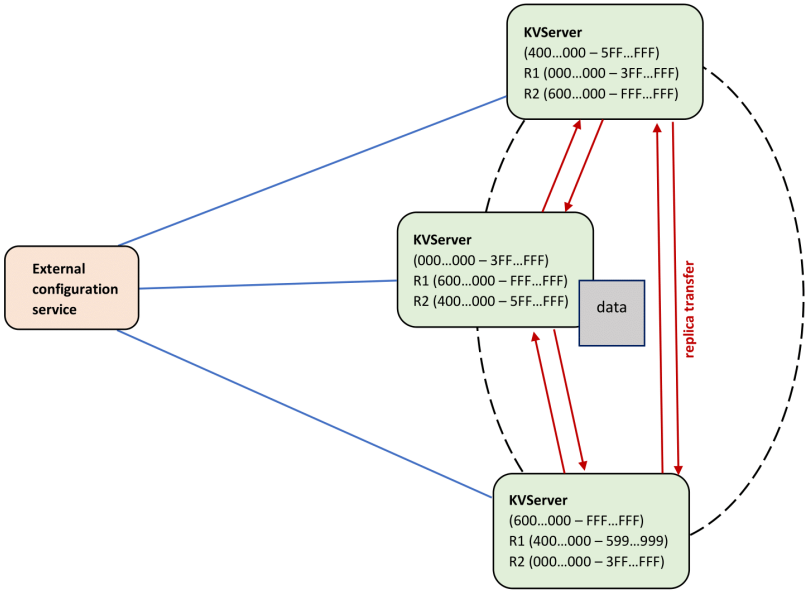
- First KV server is added to the system
- Data of new ECS is transferred

Approach



- Second KV server is added to the system
- Data of the new ECS is passed on

Approach

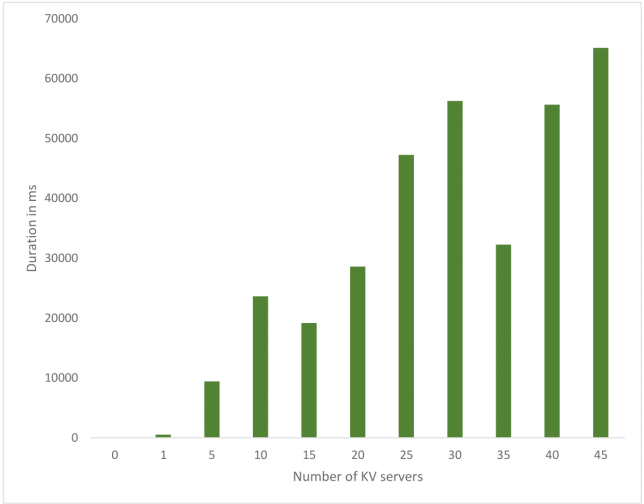


- Another KV server is added to the system
- Replication of the data is activated

Demonstration

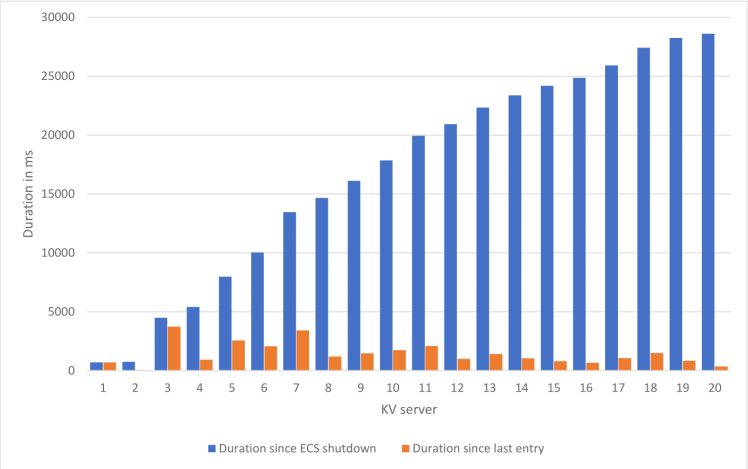
Evaluation
(1) Scalability KV Servers

- Almost linearly increasing duration
- Reconnection of each Server seperately
  -> Transfer all Data



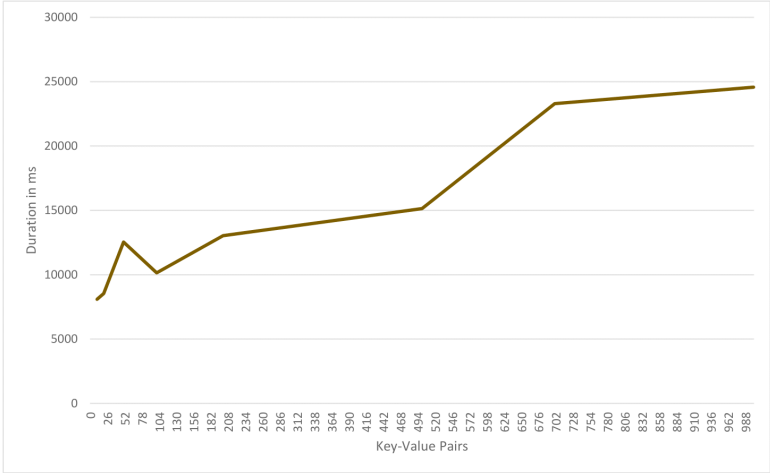
Evaluation
(2) Rejoining Storage System

- Increasing time for each server to join
- Noticable Time for addition of first KV Server
  -> Transfer of old data
- Negligible time for addition of second server
  -> No transfers
- Most of the time for addition of third server
  -> Activation of replication
- In long-term: Decrease of duration to add new KV server to storage system
  -> Decrease in hash ranges



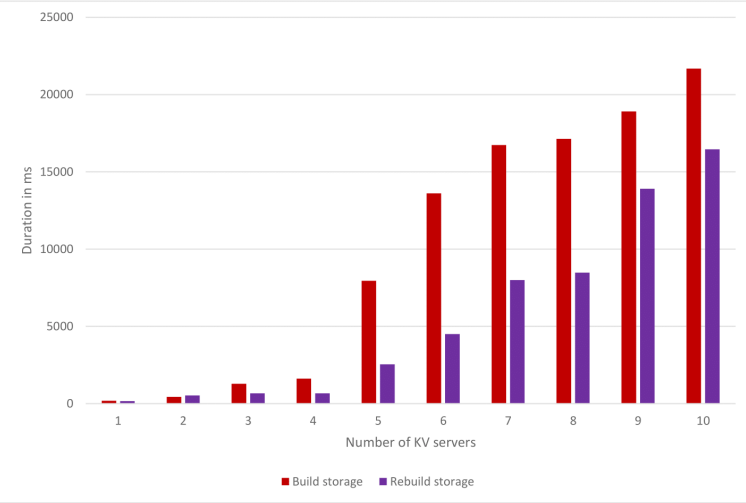
Evaluation
(3) Scalability Data Size

- Same process for different data sizes
- Positive Correlation between data size and time to rebuild storage system
  -> Longer transfer times



Evaluation
(4) Comparison Building vs Rebuilding

- Rebuilding process after ECS shutdown faster than building process
  -> Only replication transfers for rebuilding
- Duration with One and Two KV Servers almost the same
  -> No replication active in both processes



Questions?