



Monitoring and operations of database clusters in Ping Identity's hybrid cloud environment

Customer Case Study: Ping Identity



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1. Ping Identity

Ping Identity provides cloud identity solutions to over 800 of the world's largest companies, government organizations and cloud businesses.

The company launched PingOne in March 2012. PingOne provides businesses with Tier 1 single sign on (SSO) access to all of their cloud applications, lets IT centralize control and automate identity management, and allows cloud application providers to offer Tier 1 SSO to all of their customers.

For security conscious businesses, Tier 1 requires exclusively standards based federated SSO protocols, such as SAML, OAuth, and OpenID, with zero tolerance for storing passwords or managing duplicate end user accounts in the cloud.

Ping Identity At a Glance

Industry: IT Security

Location: Colorado, USA

Data Center: Hybrid cloud environment with one public and two private data centers (Boston, Denver)

Use Case: Monitoring and management of distributed database clusters

Why Severalnines: Deploying and managing database clusters across multi-datacenters

2. Challenge

Ping's Site Reliability Engineering team manages a geographically distributed infrastructure, running on two private data centers and one public. The team combines experts in development and operations, and is tasked with deploying code into production, while constantly optimizing resource allocation and scalability.

The PingOne infrastructure is built to autonomously handle any failure in the stack, ranging from single sub-systems to an entire datacenter. One important component of this architecture is configuration data, which is read and updated by various subsystems. Since these subsystems are deployed in geographically dispersed datacenters, the data needs to be strongly consistent across all these locations. Also, security around authentication and authorization were paramount, so a relational database was a logical choice.

Galera Cluster for MySQL was chosen for its ability to synchronously replicate data across remote data centers.

Since database performance would be impacted by network latency and WAN replication, developers had to follow certain programming considerations. The team needed full insight into database bottlenecks. This specially included database locks in hot tables because of the way Galera replicated data (using Certificate Based Replication).

Finally, with the ratio of team members to servers at 1:200 at that time, with the goal of increasing it to 1:600, the team needed an efficient solution for the monitoring and management of a distributed cluster.

“High availability and fault tolerance come at a cost, but once you’ve paid it your enterprise application is a lot better off.”

- Michael Ward, Site Reliability Engineer specializing in High Availability and System Architecture.

3. The Solution

Galera was a very promising technology, and ClusterControl provided the whole toolset from deployment to monitoring and management.

“ClusterControl presents value to our operations team in several different ways, one of which is performance analysis. When first implementing Galera, we found a number of performance bottlenecks which we quickly found and resolved as a direct result of ClusterControl. One of those being 'Health Report' which provides insight into cache hit ratios, percentage of max connections, open file limits, table lock contention along with other valuable metrics.” - Michael Ward

Ping uses ClusterControl in its production environment today. ClusterControl not only monitors the database cluster and provides insight into transaction metrics and key performance indicators. It also manages the availability of the cluster, and knows how to restart or re-initialize failed nodes. Other benefits include backup scheduling, cluster configuration management, central logging and node management.

More details on Ping’s distributed database architecture can be found in this blog post:

<https://www.pingidentity.com/blogs/pingone/2013/02/Why-PingOnes-heart-doesnt-skip-a-beat-MySQL-Galera.html>

“Hurricane Sandy unfortunately battered the East Coast, but it couldn't bring us down even though PingOne lost a datacenter. As a result of our distributed architecture, the majority of PingOne customers knew Sandy only as a video clip on the nightly news.”

- Michael Ward



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