



Incident Report for database cluster malform and subsequences issues

Information Technology Department, Group of
infrastructure and system management

HYPHER GROUP NETWORK LTD.

Related Parties:

1. Name: Ivan Cheung
Role(s): Project In-charge and Chief Information and Operation Officer

2. Name: Anson Tsang
Role(s): Chief Technology Officer

3. Name: Oscar Fung
Role(s): Database Administrator

4. Name: Jia Jun
Role(s): Cloud Infrastructure Engineer

Related Information:

Incident Location: HN NFVi Cluster (OPN) compute #010

Date: 28/8/2023 – 30/8/2023

Incident Description:**- 28 Aug 2023**

We have planned maintenance on 28 Aug 2023 for the location update in both HN internal, ResonanceCraft Network, and HN Host panel databases. Using internal local “InnoDB” to “ndbcluster” increases the database IO’s resilience and performance. Besides, we will integrate the HN Host database towards the database cluster.

After several hours of system installation, we discovered the compute for the database cluster had malfunctioned as the IO delay is huge staying at around 80% - 90% which is not expected. Several minutes later, we received an alarm from our internal alarm system stating that compute #010 was failing. We tried to check the cluster status on other compute which stated the network connectivity is disconnected from the management network.

The database team had issued a request to the Cloud infrastructure team for help checking the system integrity. However, compute #010 is not accessible from either SSH or GUI. After discussion, we decided reboot is needed at compute #010.

After rebooting, the system is accessible. However, the installation fails and we cannot construct the database cluster.

- 29 Aug 2023

To resume the services as soon as possible, we migrated all services about Panel to compute #014 temporarily. Also, we requested the networking team to help add a new route from compute #014.

We resumed the services around the afternoon. However, due to the increased volume of the routing towards the NRU to compute #014, the BGP is flapped and caused the EDNS network disconnected. The networking team is restoring the system within 1 hour and adding VRRP support to the EDNS system to prevent another network failure.

The cloud infrastructure team have contacted the Vendor for the high IO delay problem and found that the issue is caused by disk failure. We have replaced the disk and compute #010 rejoined the cluster.

After all, the database team have retried the database cluster formation and the installation and underlay configuration is completed on 29 Aug 2023.

- 30 Aug 2023

We have tried to load the standalone InnoDB database into the database cluster. However, due to the wrong version of the database cluster being installed. The data failed to import due to missing data type.

We have rebuilt the cluster to a newer version and tried to import the data. It failed also due to the "key handling mechanism" being different from "ndbcluster" and "InnoDB". The database team has revoked some unused tables and loaded the keys in without an UPDATE cascade. The database was loaded successfully at 30 Aug 2023 at 20:00.

All services are migrated back into compute #010 and services are resumed at 22:00 that day.

Incident causes:

- Compute #010 hardware failure,
- Incompatibility of database cluster version (compared to standalone database),
- Behaviors differences between “ndbcluster” and “InnoDB”,
- Misconfiguration in NRU.

Follow-up recommendations:

We will remind the operator or cloud infrastructure team to perform a health check before applying any new services to the computes. Besides, we will compare the standalone database version and the desirable database cluster version. Also, we will discuss this with the finance team to see if a failover server is allowed in our current production environment which allows us to failover the system as soon as possible when we face failure.

Report by: Ivan Cheung (Chief Information and Operation Officer)

Verify by: Alex Liang

Additional verification by: Jia Jun, Oscar Fung, Anson Tsang

=== End of the report ===