



**OPENWORKS**

**BE UNSTOPPABLE**



**OPENWORKS**

**MOVE TO THE CLOUD  
WITH ZERO DOWNTIME**

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# ONCE UPON A TIME...

Let me tell you the story of  
a seamless cloud migration



**UNSTOPPABLE  
PERFORMANCE**

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MARIADB

 MariaDB

**OPENWORKS**  
MAY 9-10, 2023

The banner features a circular portrait of Sebastien Giraud, a man with short dark hair wearing a dark suit jacket over a light blue shirt. The background is a dynamic, teal-colored image of a wave crashing, with white foam and a bright light source breaking through the water's surface.

# ONCE UPON A TIME...

BECAUSE EVERY GREAT SOLUTION  
STARTS IN A BASEMENT!

Let's imagine...

You've been busy this weekend  
building a brand new  
Amazon Retail website!



# ONCE UPON A TIME...

Your business  
is growing, growing  
and still growing!



# ONCE UPON A TIME...

BUT...

How are you going to fit all the servers in your basement?

(Without your partner finding out!!)



# ONCE UPON A TIME...

The Cloud might be the answer

- Easy scaling
- Higher performance
- Closer to end users
- Lower latency
- Fast development

(And almost invisible to your partner!)



# ONCE UPON A TIME...

The cloud offers great added values

- Deploy faster
  - Now just minutes
- An agile infrastructure
  - Add and remove instances and services
- Jump into CI/CD
  - Fully automated solution
- Devops made easy
  - API allow automations
- Straightforward DR / Backup deployment
  - Create and deploy DR solutions fast





# ONCE UPON A TIME...

But... moving to the cloud is always

- A great event with
- plenty of questions,
- lots of unknowns,
- huge expectations,
- a sprinkle of hope which will
- involve the whole company,
- and our applications,
- databases and
- infrastructure.



## ONCE UPON A TIME...

So... how can we make this bold move with ZERO interruption to our operation?



# ONCE UPON A TIME...

What about scaling to the cloud?

**Lift-and-Shift to MariaDB SkySQL**

<https://mariadb.com/docs/skysql/migration/lift-and-shift/>



# ONCE UPON A TIME...

Basis of lift and shift

- no application rewrite
- no data changes

“Existing MariaDB customers can submit a support case to request assistance with a migration”

<https://mariadb.com/docs/skysql/migration/lift-and-shift/>



AND THEY ALL LIVED...

HAPPILY EVER AFTER

# MIGRATION STEPS

# STEPS 1 : CREATE A SKYSQL DEPLOYMENT

## Transparent and seamless migration

- Create an instance on SkySQL
- Choose the architecture
- Choose the topology

The screenshot displays the 'Type, topology' configuration page in the SkySQL console. At the top, there is a dropdown menu labeled 'Type, topology' with a help icon. Below it, a section titled 'I need a database for' contains two tabs: 'Transactions' (selected) and 'Analytics'. Underneath, the text 'with the following topology' is followed by three deployment options:

- Enterprise Server Single Node**: For small projects and development with moderate concurrency. Features include SQL for relational & JSON, MySQL/Oracle compatibility, self-healing, and fast, easy, and affordable deployment.
- Enterprise Server With Replica(s)**: Read scaling with high availability. Features include all single node functionality, data proxy for load balancing and automatic zero-interruption failover, read scale (all replicas serve read requests), and MongoDB compatible NoSQL API.
- Xpand Distributed SQL** (marked as 'TECH-PREVIEW'): Read/write scaling with high concurrency and availability. Features include surviving multiple zone and node failures, millions of queries per second, elastic horizontal scaling (out/in), tables sliced and distributed across nodes, and MariaDB/MySQL compatibility.

# STEPS 1 : CREATE A SKYSQL DEPLOYMENT

- Choose
  - Instances size
  - Number of replicas
  - Auto-scaling mode
  - Auto-scaling capabilities
  - Storage size auto-scaling

Instance, storage, replicas ?

Select your instance size

Instance Size	CPU	Memory	Cost Per Node	
<input checked="" type="checkbox"/> Sky-2x8	2 vCPU	8 GB	\$0.17024 / hr	\$124.28 / Mo
Sky-4x16	4 vCPU	16 GB	\$0.34047 / hr	\$248.54 / Mo
Sky-4x32	4 vCPU	32 GB	\$0.49415 / hr	\$360.73 / Mo
Sky-8x32	8 vCPU	32 GB	\$0.68095 / hr	\$497.09 / Mo
Sky-8x64	8 vCPU	64 GB	\$0.98830 / hr	\$721.46 / Mo

Need more? **Up To 64 vCPU** **Up To 512 GB** [Contact Us](#) for Power Tier  
Ideal for demanding production workloads, up to 9TB storage and VPC Peering for secure connectivity

Enable auto-scale nodes ? Up/Down sky-4x16

Transactional storage size: 100 GB SSD per replica Uses Google Cloud SSD persistent disk

Enable auto-scale storage ? 200

× 1  How many replica of this primary set up will you need?



# STEPS 1 : CREATE A SKYSQL DEPLOYMENT

- Choose the Version
- Pick a name
- Launch the service

Service Attributes ?

Version:

Enterprise Server 10.6.11-6 *recommended* [Release Notes](#)

Enterprise Server 10.5.18-13

Enterprise Server 10.4.27-18

Service Name Up to 24 characters long. Must start with a letter, and only include lowercase letters, numbers, and hyphens.

Services launched in the Foundation tier are subject to scheduled maintenance windows.

Maintenance window for **europe-west9**:



## STEPS 2 : BACKUP THE EXISTING DATABASE

### Backup the existing database

- Perform a full backup
- Include also the binlog
- Save the binlog position

You can use mariadb-dump (logical backup)

```
$ mariadb-dump --all-databases --dump-slave=1
```

*Using mydumper is also feasible*



## STEPS 2 : BACKUP THE EXISTING DATABASE

### Restore the database on SkySQL

- Use the full backup

You can use mariadb client (restore the logical backup)

```
$ mariadb --host mysqsqlinstance.skysql.com \ --port  
3306 \  
--user SecretUser --password --ssl-verify-server-cert \  
\   
--ssl-ca CA.pem MigratedProductionDatabase \  
migration-full-dump.sql
```



## STEPS 4 : CREATE INBOUND REPLICATION TO RESTORE THE BACKUP TO SKYSQL

### Grab the on prem server position

You can use mariadb client (*On premise server*)

```
SHOW GLOBAL VARIABLES
  LIKE 'gtid_current_pos';
+-----+-----+
| Variable_name | Value |
+-----+-----+
| gtid_current_pos | 0-100-1 |
+-----+-----+
```



## STEPS 4 : CREATE INBOUND REPLICATION TO RESTORE THE BACKUP TO SKYSQL

### Grab the on prem server Binary Log File and Position



You can use mariadb client (*On premise server*)

```
SHOW MASTER STATUS;
```

```
+-----+-----+-----+-----+-----+
| File           | Position | Binlog_Do_DB | Binlog_Ignore_DB | Executed_Gtid_Set |
+-----+-----+-----+-----+-----+
| mysql-bin.000001 |      154 |               |                   |                   |
+-----+-----+-----+-----+-----+
```

## STEPS 4 : CREATE INBOUND REPLICATION TO RESTORE THE BACKUP TO SKYSQL

**Grant SkySQL to replicate from the on prem server**



You can use mariadb client (*On premise server*)

```
GRANT REPLICATION SLAVE ON *.* TO 'skysql_replication'@'%' IDENTIFIED BY '<password_hash>';
```

## STEPS 4 : CREATE INBOUND REPLICATION TO RESTORE THE BACKUP TO SKYSQL

Use SkySQL magic tools to start replication



You can use mariadb client (*On skysql*)

```
CALL sky.change_external_primary('mysql1.example.com', 3306, 'mysql-bin.000001', 154, false);
```

```
CALL sky.start_replication();
```

```
+-----+
| Message                                |
+-----+
| External replication running normally. |
+-----+
```

# STEPS 4 : CREATE INBOUND REPLICATION TO RESTORE THE BACKUP TO SKYSQL

## Use SkySQL magic tools to check replication status



You can use mariadb client (*On skysql*)

```
CALL sky.replication_status()\G
***** 1. row *****
      Slave_IO_State: Waiting for master to send event
      Master_Host: mariadb1.example.com
      Master_User: skysql_replication
      Master_Port: 3306
      Connect_Retry: 60
      Master_Log_File: mysql-bin.000001
      Read_Master_Log_Pos: 462
      Relay_Log_File: mariadb-relay-bin.000002
      Relay_Log_Pos: 665
      Relay_Master_Log_File: mysql-bin.000001
      Slave_IO_Running: Yes
      Slave_SQL_Running: Yes
      ...
```



## WHERE WE ARE?

You now have your production replicated to SkySQL!

- SkySQL is synchronized with your running production
- Production update and insert also present in SkySQL since now
- Switch application server to use SkySQL is now feasible



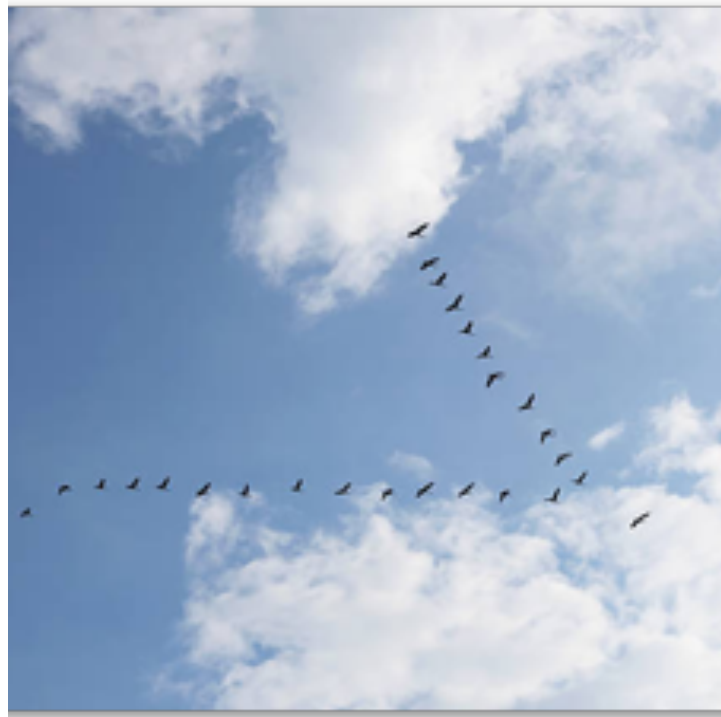
You Did it!

# TRANSPARENT MIGRATION IN A NUTSHELL

What we learned in this session?

## Transparent and seamless migration

- Create an instance on SkySQL
- Backup the running production
- Restore the backup on SkySQL
- Perform application unit testing
- Enable replication from the production to SkySQL
- Double check the application behavior on SkySQL
- Switch some user to the new application
- OR switch the database address to SkySQL from the application



# ACHIEVE SUCCESSFUL MIGRATION

# MIGRATION IS A JOURNEY

Migration is mostly moving from a robust and stable system to a new deployment !

- Moving from existing comfort zone to increase the comfort zone size

But migrating mean also improvement

- Cost reduction
- Performance increase
- Reliability increase
- Extra capabilities benefits
- MariaDB expertise on 24/7 basis



# SUCCESSFUL MIGRATION

Key points to achieve a successful migration

- No interruption during switch over
- No end user data loss
  - Include no end user data inconsistency
  - No data corruption
  - Avoid manual data remediation
- Keep rollback solution
  - Enable circular replication (both way replication)
- Switch over and back if needed



# KEY SUCCESS FACTOR FOR CLOUD MIGRATION

# Key factor to successful migration

## Key points for a successful migration

- Build a migration plan including timeline and timing
  - Plan application test including application users
  - Plan and execute deployment test
    - Schema migration
    - Data migration
    - Application validation
    - Quality assurance



# KEY FACTOR TO SUCCESSFUL MIGRATION

Key points for a successful migration

- Build pre production to test and validate the whole migration process
- Validate applications behaviour
- Perform unit tests
- Ensure latency allow good performance
  - If needed adjust the configuration to reduce the latency
    - Find closer location
    - Enable VPC peering





# USEFUL FEATURES

# USEFUL FEATURES

SkySQL is provided with associated tools and required features

- Live migration rely on active replication
- Live replication should be fast enough
- Active replication rely on Binlogs
- Replication disruption could be fixed easily with Binlogs availability
- Production server may not have sufficient capacity to store needed binlogs
- MaxScale could be used as a Binlog router
  - Physical storage of binlogs
  - Provide multiple replication endpoints without performance impact on production
  - Provide the more flexible way to deal with replication architecture

# SEVERAL MIGRATION WAYS WE CAN HELP WITH

## Assisted Migrations

- Receive assistance from MariaDB Corporation when migrating a database to SkySQL

## AWS DMS

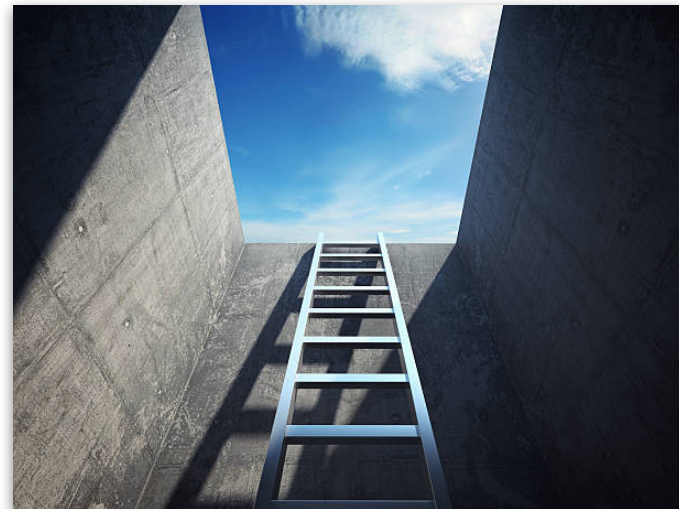
- Migrate from AWS to MariaDB SkySQL using the AWS Database Migration Service (DMS)

## Lift-and-Shift

- Move to SkySQL from an existing MariaDB Server

## Proof of Concept (POC)

- Create a POC when adopting SkySQL



# WAR STORIES ISSUES AND SOLUTIONS

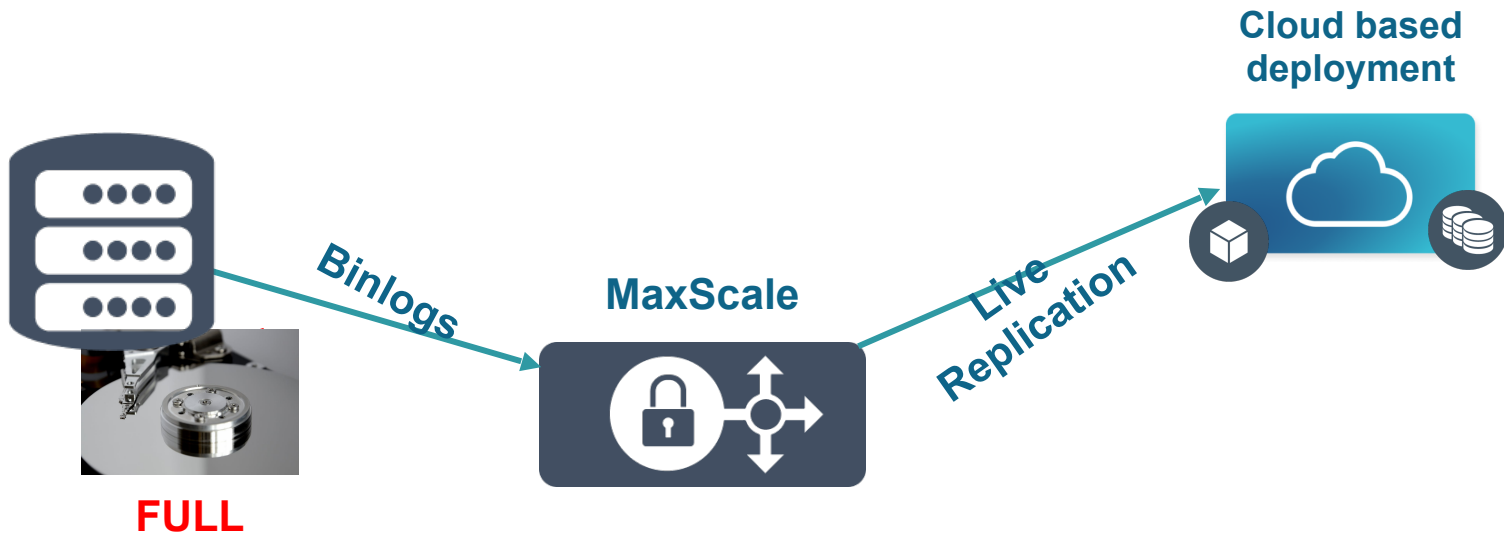
# WAR STORIES

## Dealing with huge database

- Huge traffic involve huge amount of Binlogs
- Encountered issues
  - Replication speed
  - Extra storage for Binlogs
- Lack of extra space on production server  
(only 24 hours of binlog retention was doable)
  - Binlogs should be externalized
  - MaxScale with blog router capabilities helped

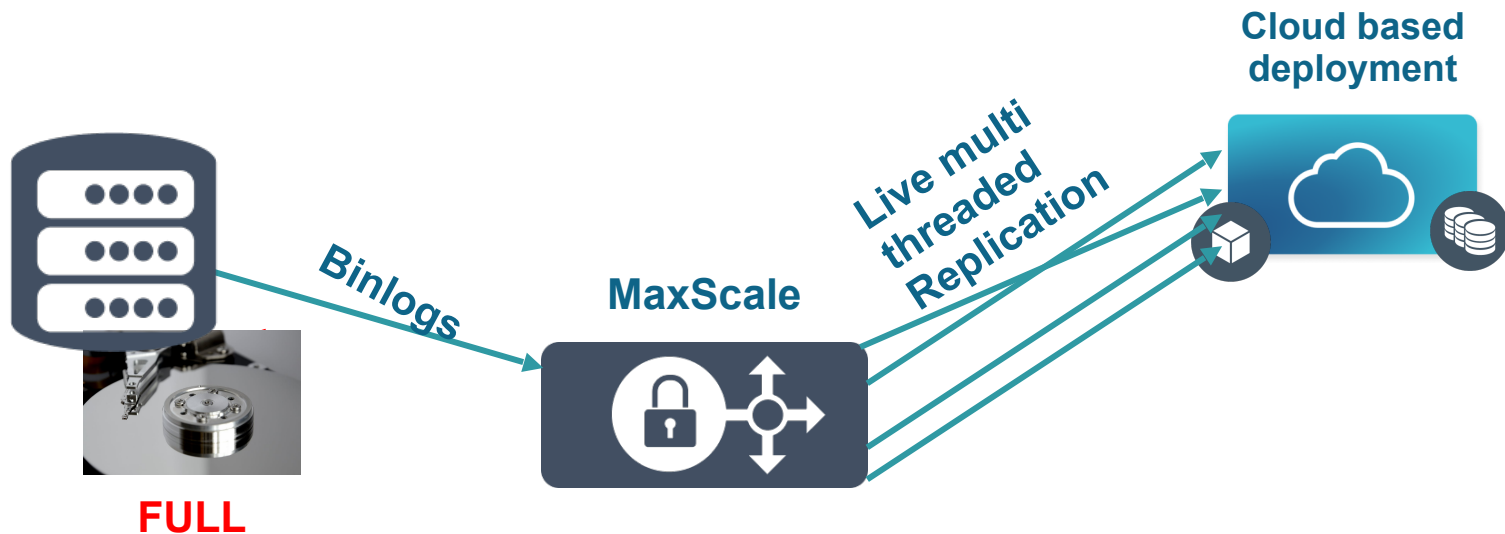
# WAR STORIES: MAXSCALE AND THE MAGICAL TRICKS

Dealing with huge database workload, thanks to MaxScale binlog router



# WAR STORIES: MAXSCALE AND THE MAGICAL TRICKS

Dealing with huge database workload, thanks to MaxScale binlog router





**THANK YOU**





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