
FlywayDB

— Database Schema Migration Tool —

Java Frameworks

Database Migration?

- a.k.a Schema Migration, Database Change Management

https://en.wikipedia.org/wiki/Schema_migration

Keeping all the env in sync is difficult ???



Database Migration?

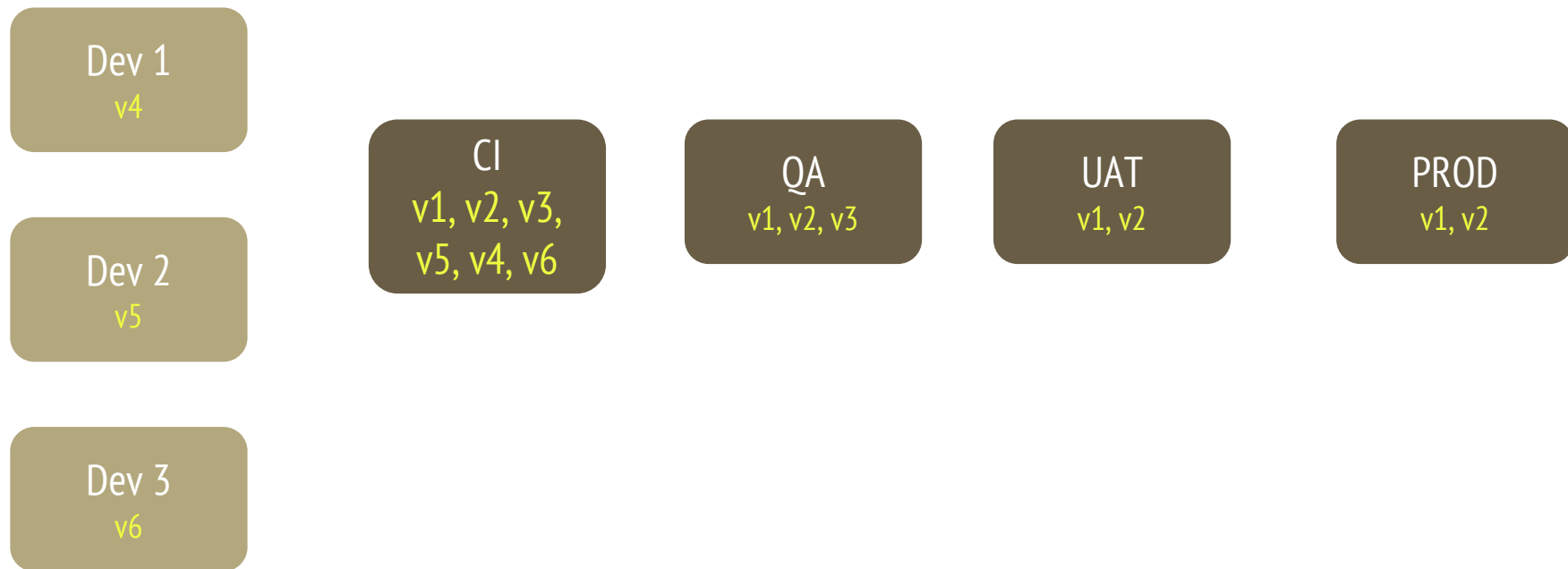
- Evolutionary database design vs Upfront design
- How to keep all environment from local dev to prod in sync

https://en.wikipedia.org/wiki/Schema_migration

Features

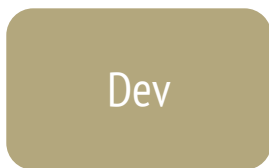
- Features of any database migration tool
 - Incremental
 - Idempotent / Repeatable
 - Integration with build tools like Maven, Ant, ...
- Tools [Flyway](#), [Liquibase](#)

What is needed?



How it works? DEV

Initial state....



script

scripts as .sql files



script	execution_datetime

SCHEMA_VERSION table

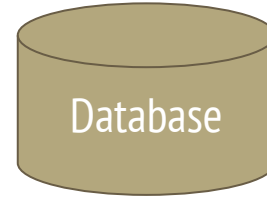
How it works? DEV

Developer codes first script... v1



script
v1

scripts as .sql files



script	execution_datetime

SCHEMA_VERSION table

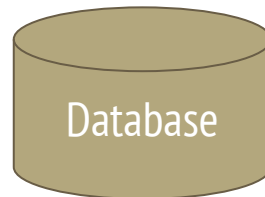
How it works? DEV

Run Migration.... first run



script
v1

scripts as .sql files



script	execution_datetime

SCHEMA_VERSION table

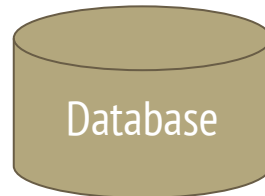
How it works? DEV

Script v1 Executed
+ SCHEMA_VERSION Updated



script
v1

scripts as .sql files



script	execution_datetime
v1	2016-02-12T18:25:43.511Z

SCHEMA_VERSION table

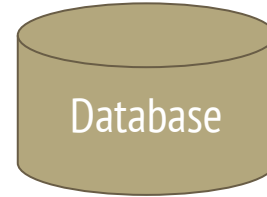
How it works? DEV

Developer codes second script... v2



script
v1
v2

scripts as .sql files

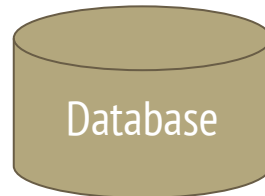


script	execution_datetime
v1	2016-02-12T18:25:43.511Z

SCHEMA_VERSION table

How it works? DEV

Script v2 Executed (Script v1 Skipped)
+ SCHEMA_VERSION Updated



script
v1
v2

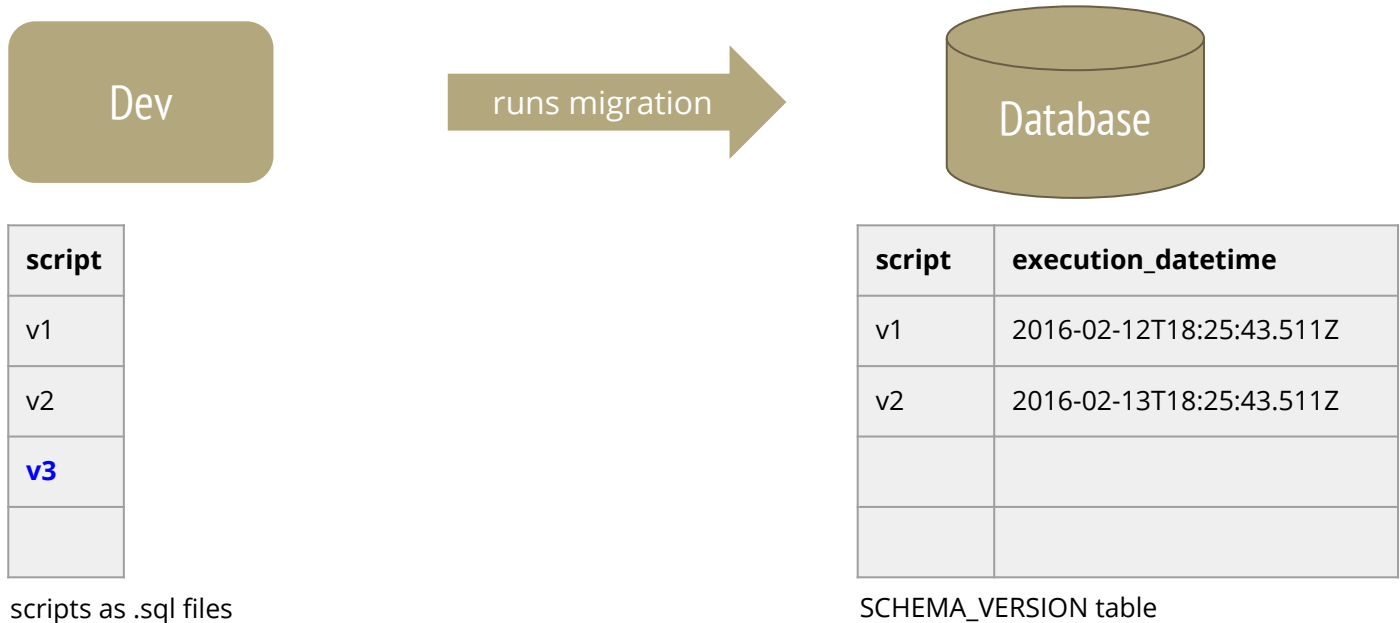
scripts as .sql files

script	execution_datetime
v1	2016-02-12T18:25:43.511Z
v2	2016-02-13T18:25:43.511Z

SCHEMA_VERSION table

How it works? DEV

Another developer wrote script... v3
Take latest from version control



How it works? DEV

Script v3 Executed (Script v1, v2 Skipped)
+ SCHEMA_VERSION Updated



script
v1
v2
v3

scripts as .sql files

script	execution_datetime
v1	2016-02-12T18:25:43.511Z
v2	2016-02-13T18:25:43.511Z
v3	2016-02-14T18:25:43.511Z

SCHEMA_VERSION table

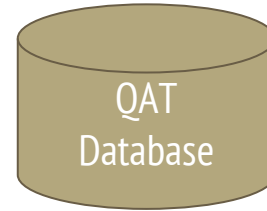
How it works? QAT

Downstream Environment.... QAT

Database Migration
Machine (DEV)

script
v1
v2
v3

scripts as .sql files



script	execution_datetime

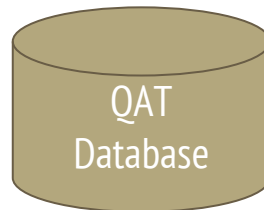
SCHEMA_VERSION table

How it works? QAT

Script v1, v2, v3 Executed
+ SCHEMA_VERSION Updated

Database Migration
Machine (DEV)

runs migration



script
v1
v2
v3

scripts as .sql files

script	execution_datetime
v1	2016-02-15T18:25:43.511Z
v2	2016-02-15T18:25:43.511Z
v3	2016-02-15T18:25:43.511Z

SCHEMA_VERSION table

How it works? DEV

Script v4 Executed (Script v1, v2,v3 Skipped)
+ SCHEMA_VERSION Updated



script
v1
v2
v3
v4

scripts as .sql files

script	execution_datetime
v1	2016-02-12T18:25:43.511Z
v2	2016-02-13T18:25:43.511Z
v3	2016-02-14T18:25:43.511Z
v4	2016-02-16T18:25:43.511Z

SCHEMA_VERSION table

How it works? QAT

Script v4 Executed (Script v1, v2,v3 Skipped)
+ SCHEMA_VERSION Updated

Database Migration
Machine (DEV)

runs migration

QAT
Database

script
v1
v2
v3
v4

scripts as .sql files

script	execution_datetime
v1	2016-02-15T18:25:43.511Z
v2	2016-02-15T18:25:43.511Z
v3	2016-02-15T18:25:43.511Z
v4	2016-02-17T18:25:43.511Z

SCHEMA_VERSION table

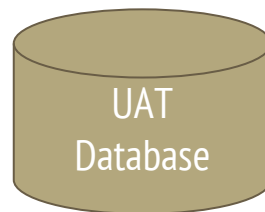
How it works? UAT

Downstream Environment.... UAT

Database Migration
Machine (DEV)

script
v1
v2
v3
v4

scripts as .sql files



script	execution_datetime

SCHEMA_VERSION table

How it works? UAT

Script v1, v2, v3, v4 Executed
+ SCHEMA_VERSION Updated

Database Migration
Machine (DEV)

runs migration

UAT
Database

script
v1
v2
v3
v4

scripts as .sql files

script	execution_datetime
v1	2016-02-18T18:25:43.511Z
v2	2016-02-18T18:25:43.511Z
v3	2016-02-18T18:25:43.511Z
v4	2016-02-18T18:25:43.511Z

SCHEMA_VERSION table

Database Migration Tools

- FlywayDB
- Liquibase

FlywayDB Commands

- migrate
- info
- baseline
- validate
- repair
- clean

<http://flywaydb.org/documentation/maven/>

FlywayDB Supports

- Most of the build tools
 - Maven, Ant, Gradle, SBT
- All of the popular databases
 - Oracle, SQL Server, SQL Azure, DB2, DB2 z/OS, MySQL (including Amazon RDS), MariaDB, Google Cloud SQL, PostgreSQL (including Amazon RDS and Heroku), Redshift, Vertica, H2, Hsql, Derby, SQLite and solidDB

FlywayDB Demo

Gotachs

- Never check-in failing scripts
- Always take latest re-run all migration to avoid conflicts
- Never change script after check, always write new migration

Future Reading

- https://en.wikipedia.org/wiki/Schema_migration
- <http://flywaydb.org/getstarted/why.html>

Thanks!

Like to reach us,

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