



# Embracing Database DevOps through CI/CD

**Carlos Robles**  
Solution Architect  
DBA Mastery



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# Carlos Robles

Solutions Architect

DBA Mastery

/croblesdba

@dbamastery

dbamaster

Multi-platform  
+ 10 years experience  
Cloud, Data & DevOps

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PASS Group Leader  
Author, blogger  
International speaker

[dbamastery.com](http://dbamastery.com)

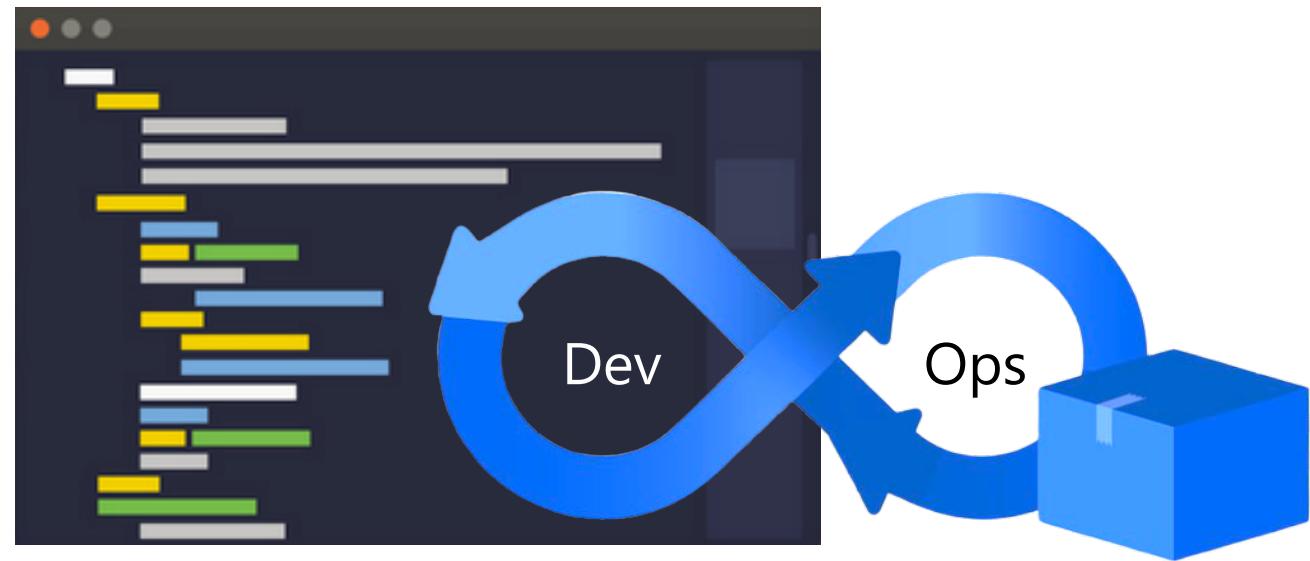
# Agenda

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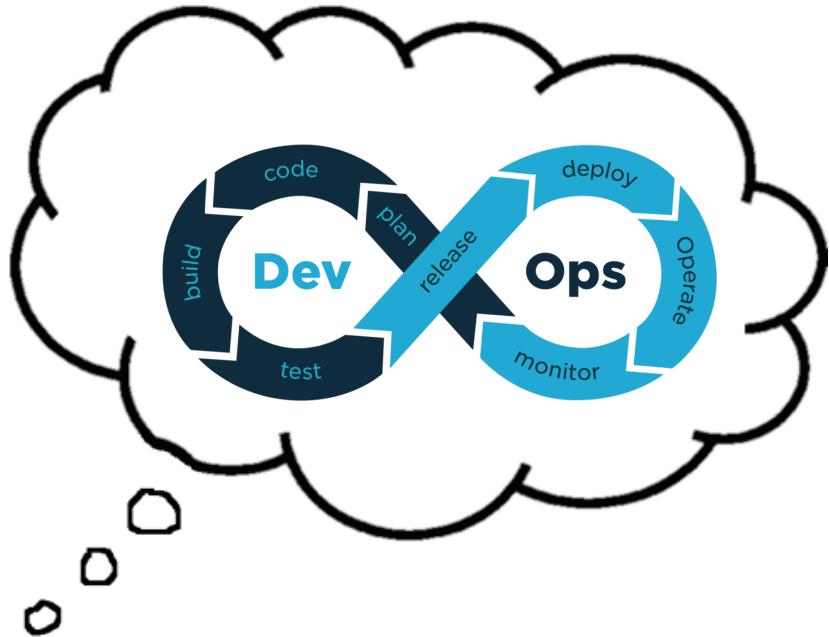
- DevOps
  - DevOps for the database
  - Flyway
  - Integrated pipeline
-



# DevOps



# What is DevOps?



“

DevOps is the union of **people**,  
**process**, and **products** to  
enable continuous delivery of  
value to your end users. ”

–Donovan Brown

## Benefits

- Speed
- Rapid delivery
- Reliability
- Scale
- Innovate mindset
- Greater customer experience

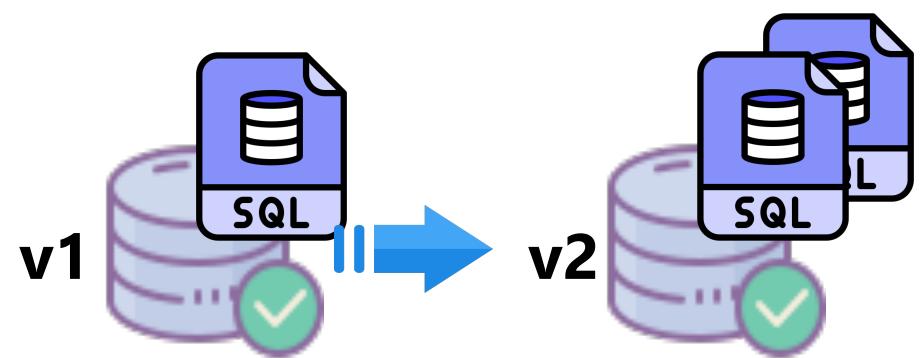
## Practices

- Infrastructure as code
- Continuous integration
- Continuous delivery
- Microservices
- Monitoring and logging
- Collaboration



# DevOps for the database

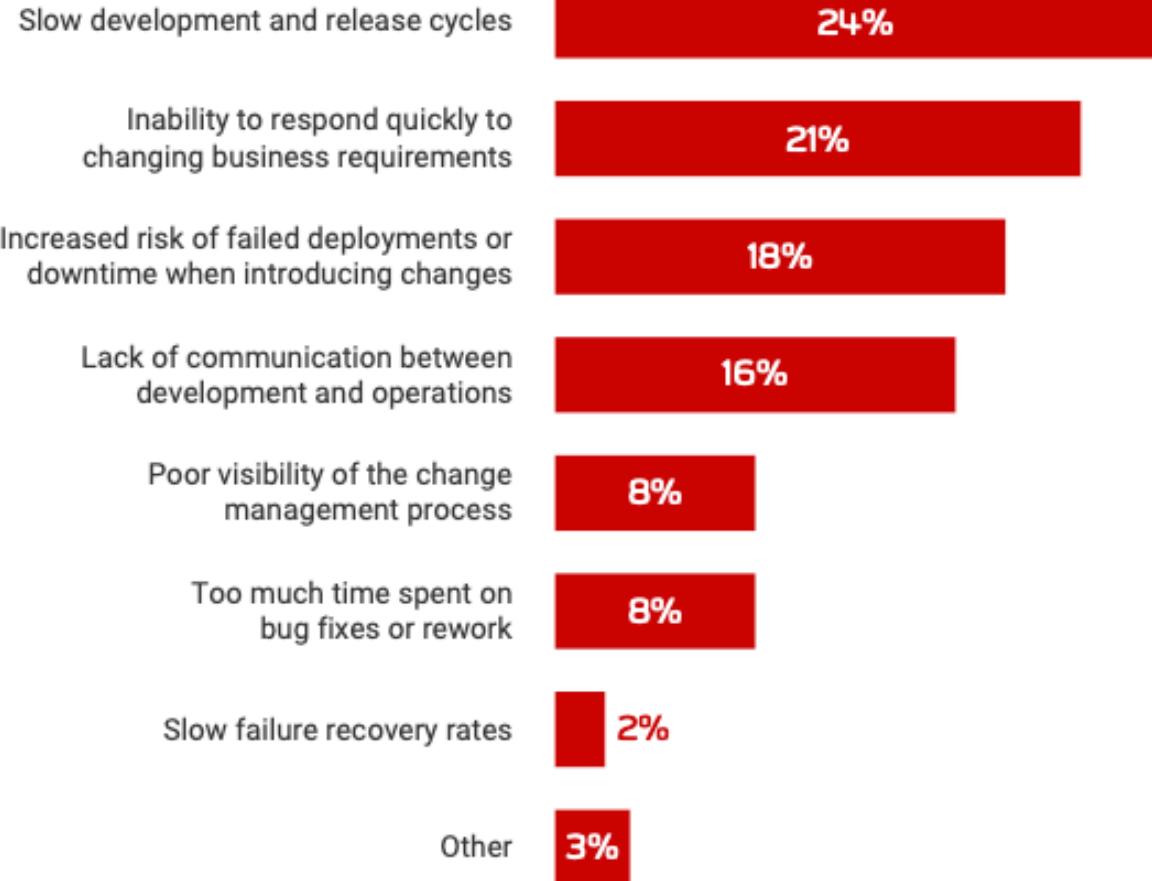
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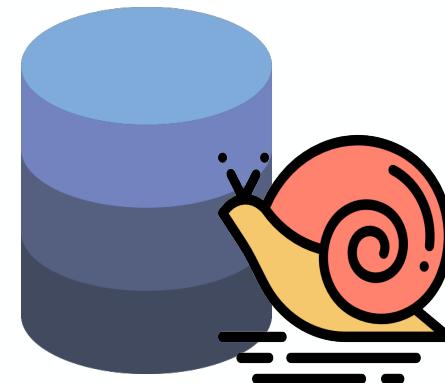
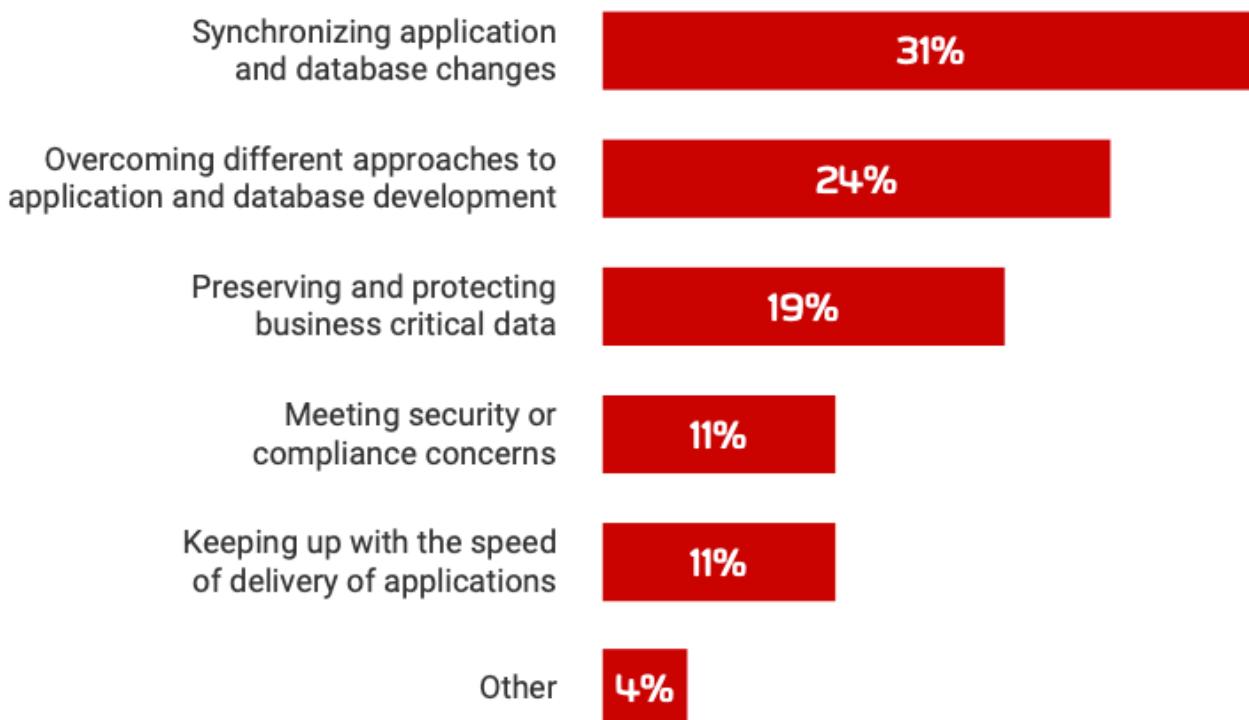


# 2020 State of Database DevOps

What do you consider the greatest drawback in traditional, siloed database development?



## What do you consider the greatest challenge in integrating database changes into a DevOps process?



Shiny Soft

Version: 5.2.4

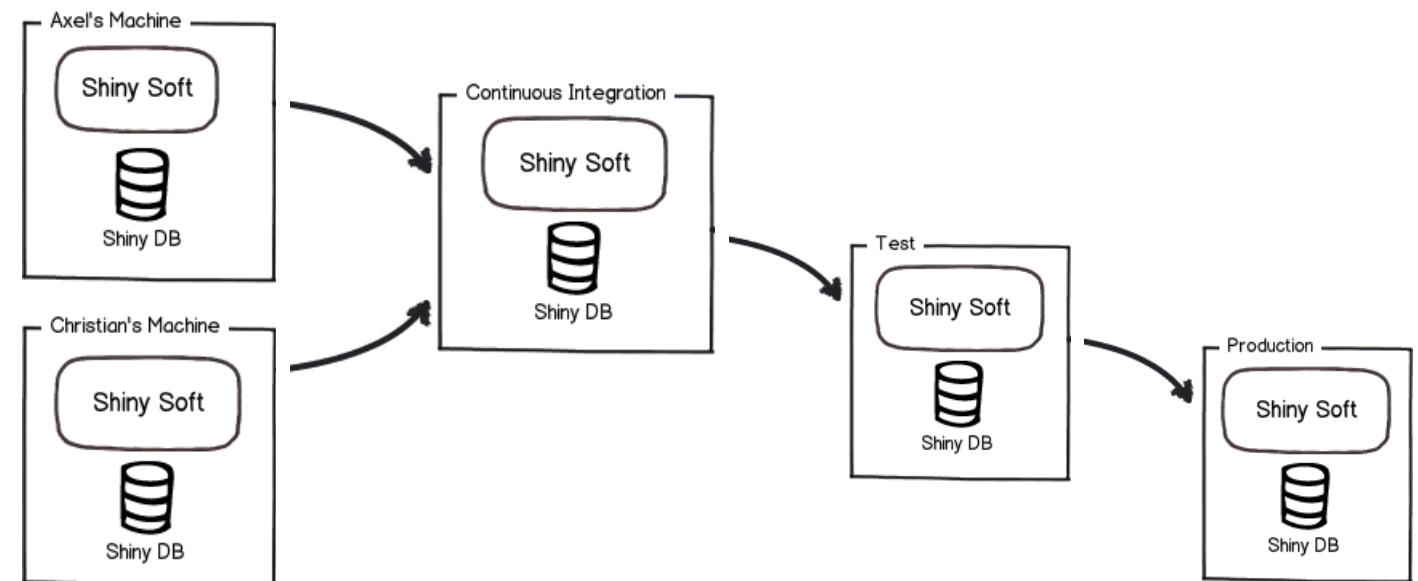
-> Well defined and  
reproducible

Version: ?

-> No exact idea about  
state

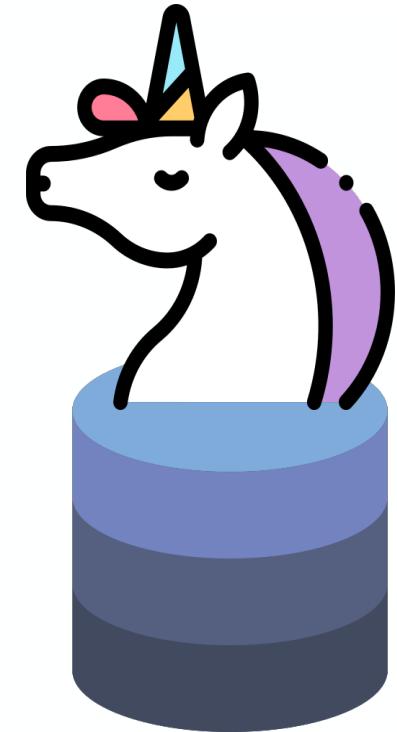


Shiny DB



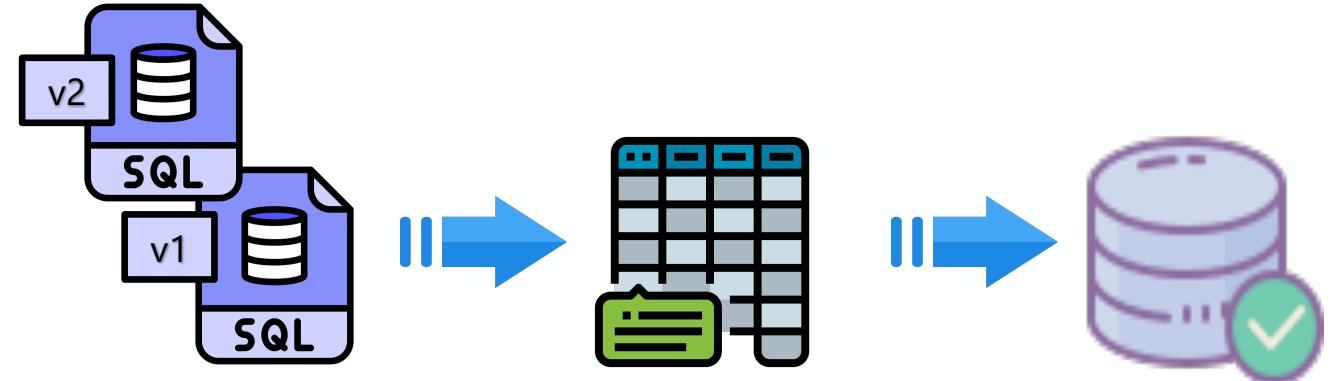
# Evolutionary database design

- DBA + Developer = Collaboration
- Version control
- Change = Migration
- Own database instance / database
- Continuous integration

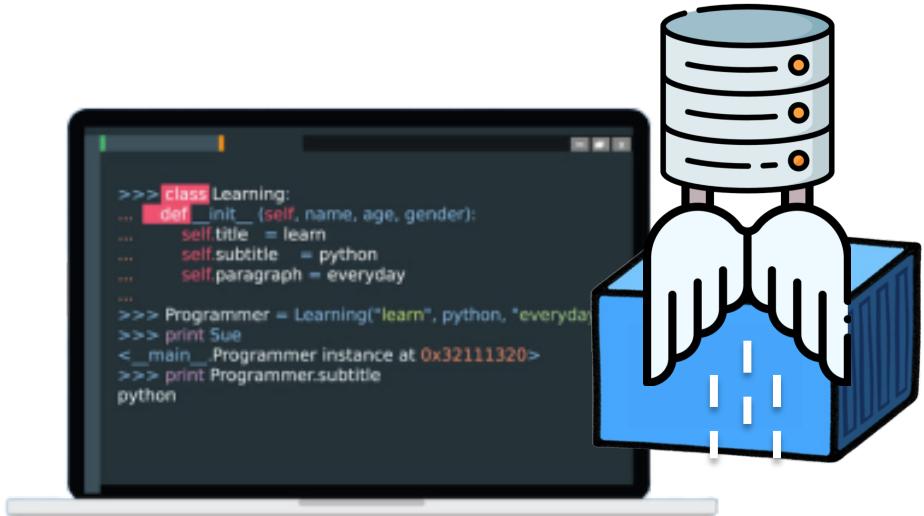


# Database migrations

- Unique identifier
- Migration history
- Sequence
- Consistent



# Flyway



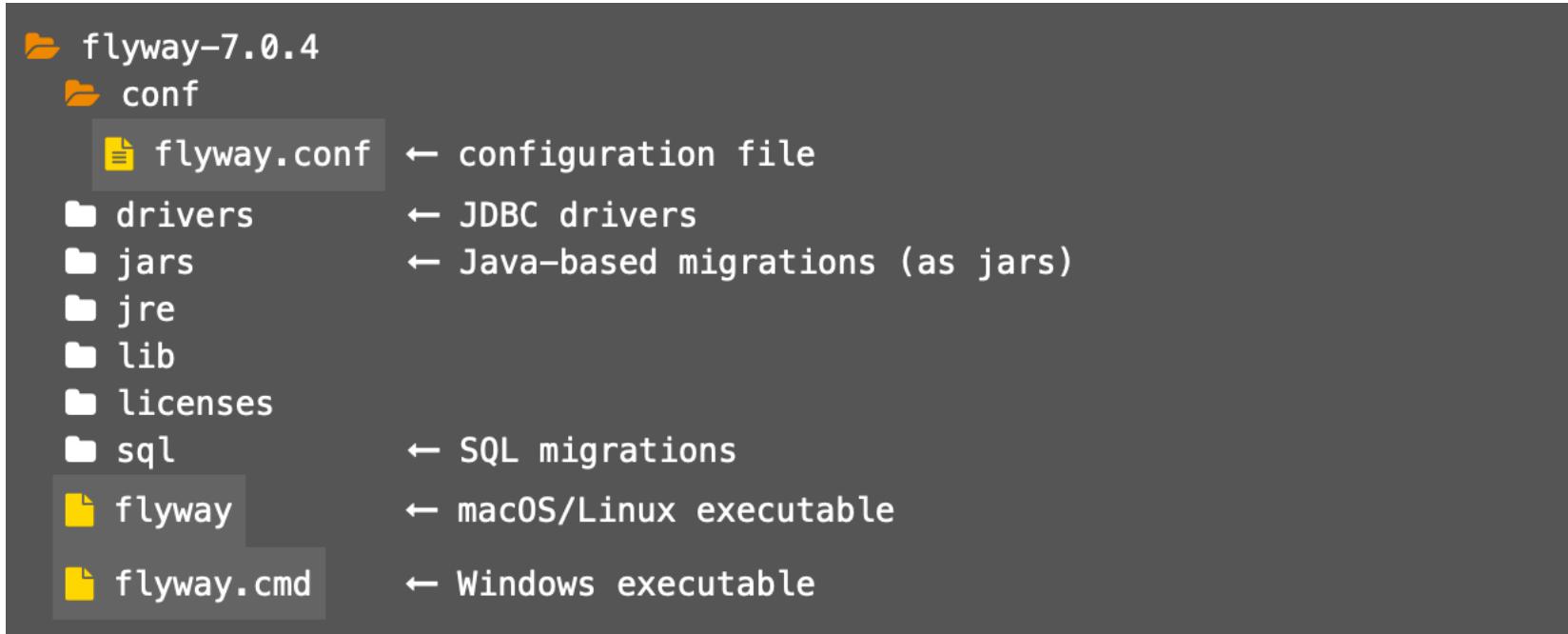
```
>>> class Learning:  
...     def __init__(self, name, age, gender):  
...         self.name = name  
...         self.age = age  
...         self.gender = gender  
...     def print_info(self):  
...         print(f"Name: {self.name}, Age: {self.age}, Gender: {self.gender}")  
>>> Programmer = Learning("Sue", 25, "Female")  
>>> Programmer.print_info()  
<__main__.Programmer instance at 0x10101010>  
>>> Programmer.subtitle = "python"  
>>> Programmer.print_info()  
Name: Sue, Age: 25, Gender: Female  
Subtitle: python
```

# What is Flyway?

- Open source, by Redgate
- Multi-platform / database
- Database migrations
- CLI, SQL Scripts
  - API, Java, plugins
- Schema history

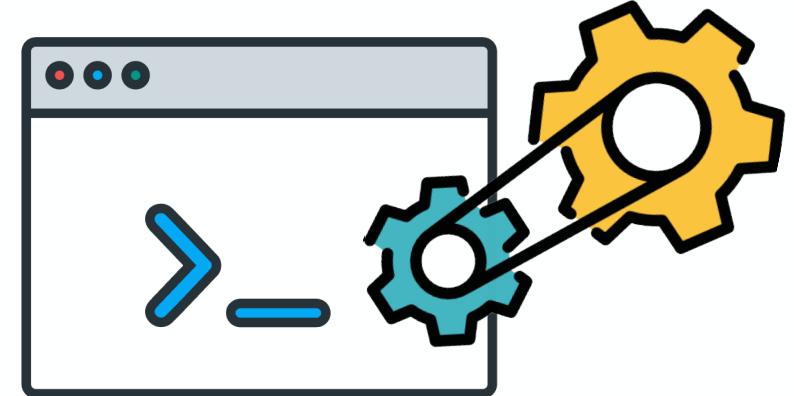


# Folder structure



# Commands

- Migrate
- Clean
- Info
- Validate
- Baseline
- Repair
- Undo (pro version)



# Configuration file

flyway.url	jdbc:<db>:<host>:<port>
flyway.user	sa / flyway / postgres
flyway.password	s3cr3Tp@s\$
flyway.env_abc	\${abc}



# SQL migrations

Versioned Migrations

Undo Migrations

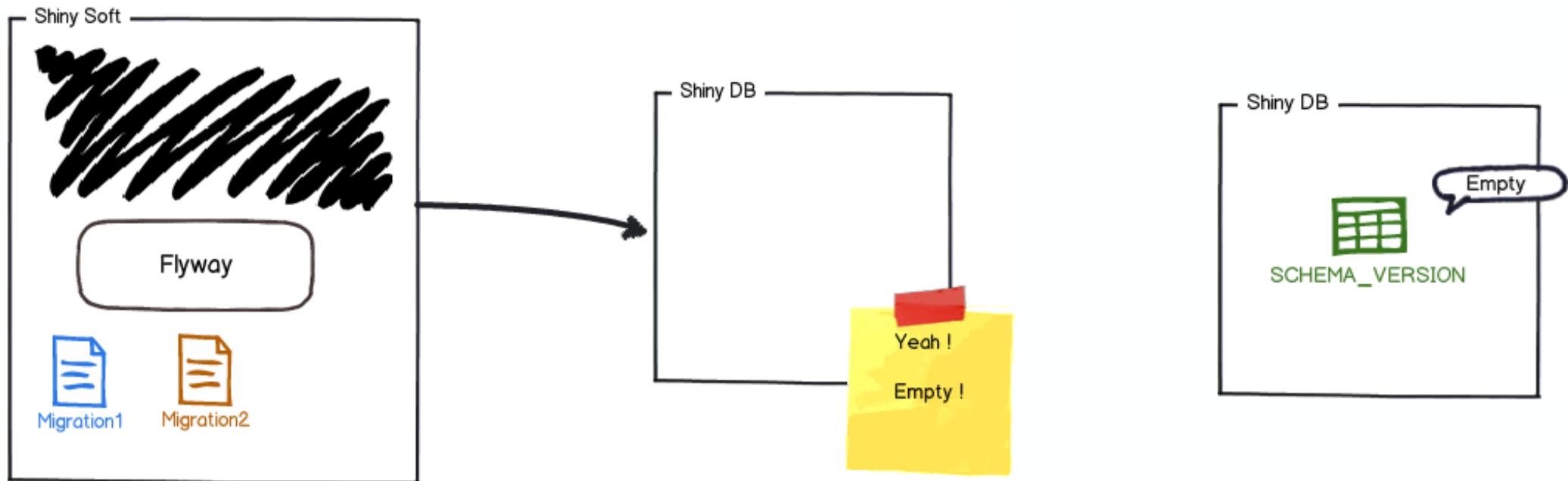
Repeatable Migrations

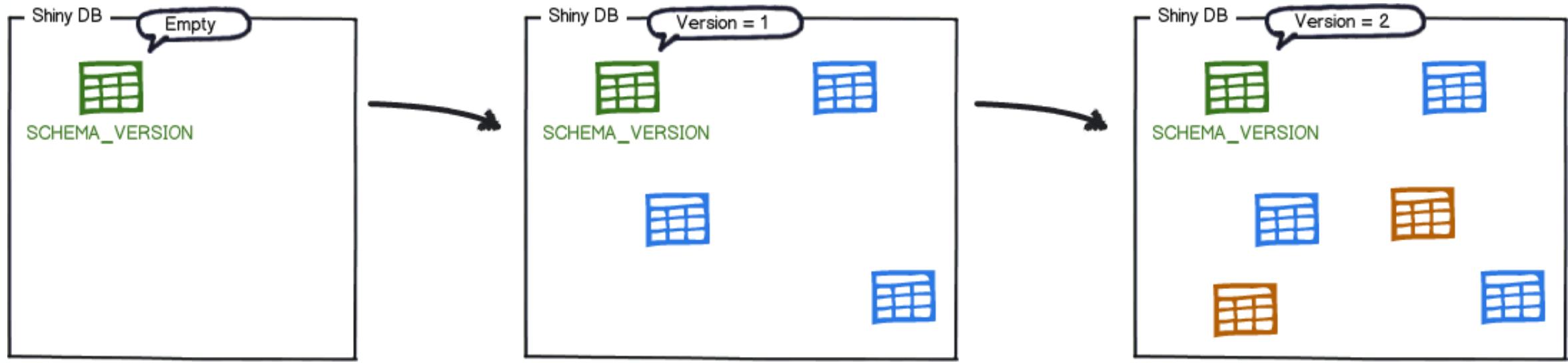
v 2 \_\_ Add\_new\_table .sql

u 2 \_\_ Add\_new\_table .sql

R \_\_ Add\_new\_table .sql

# How it works?





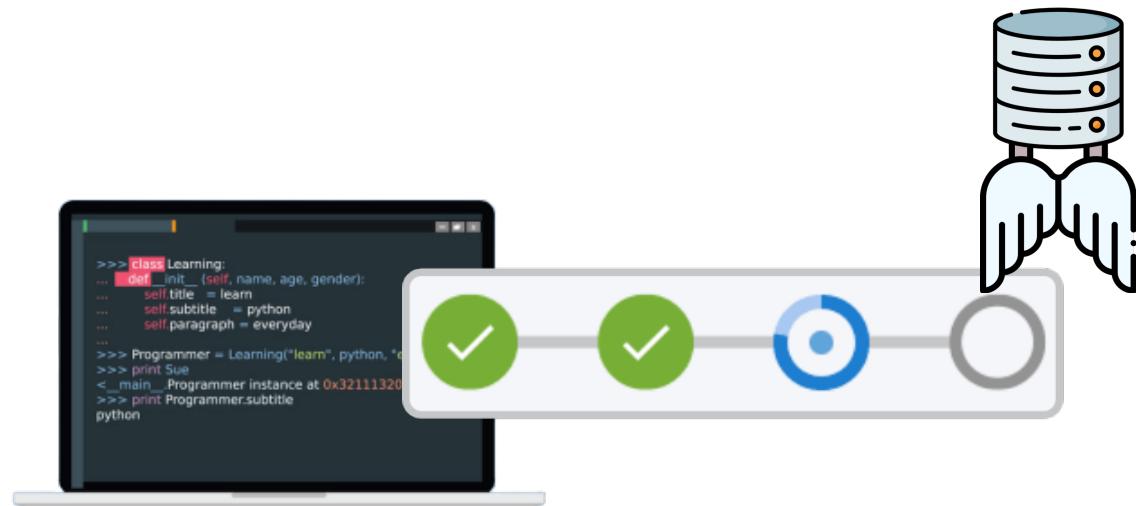
**DEMO**

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# Flyway migrations with containers



# Integrated pipeline



# Integrated pipeline



Application



Database

- Build
- Test
- Deploy

# Azure DevOps



- Any language / platform / cloud
- Free for open source
- Extensible
- Containers & Kubernetes
- YAML support

# Kubernetes

- Open source
- Container orchestrator
- Declarative model
- Loosely coupled

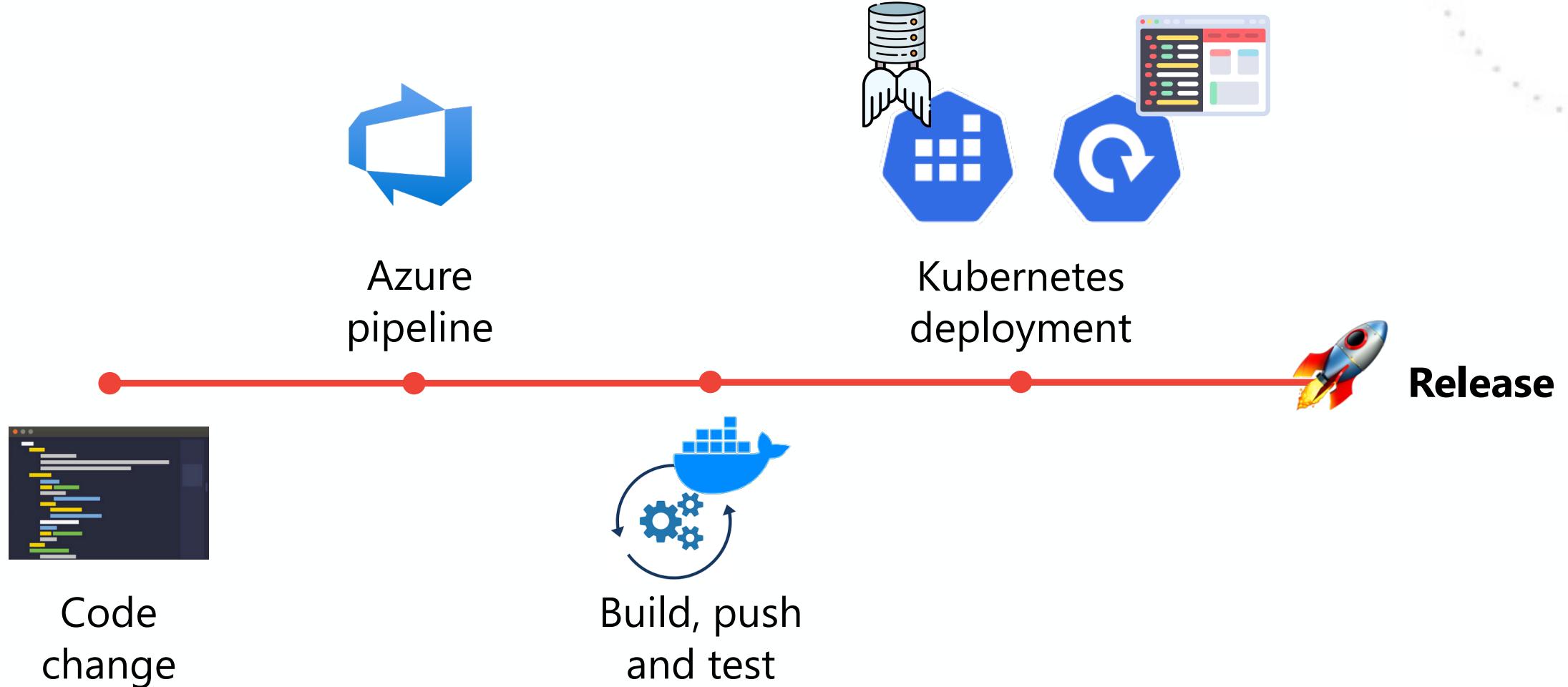


**DEMO**

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# Integrated pipeline





# Review

- DevOps + databases
- Database migrations
- Flyway
- Integrated pipeline (DB + App)
- Azure DevOps → Azure pipelines
- Kubernetes



# References

## Flyway

- [Documentation](#)
- [Blog](#)

## Books

- [The Phoenix & Unicorn project](#)
- [The DevOps Handbook](#)
- [Kubernetes: Up and running](#)
- [Continuous delivery](#)
- [Refactoring databases](#)

## Microsoft learn

- [Kubernetes](#)
- [Azure SQL](#)
- [Azure DevOps](#)
- [Modern apps in Azure](#)

# More about it

## Articles

- [Simple-talk](#)
- [SQL Server Central](#)

## Blog

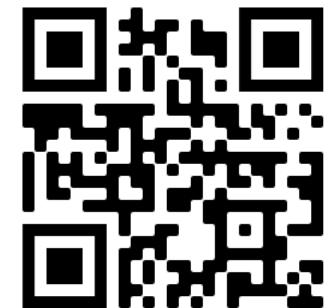
- [http://dbamastery.com](#)

## GitHub

- [https://github.com/dbamaster](#)

## Demos

- [https://git.io/JT49Y](#)



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# Thank you

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