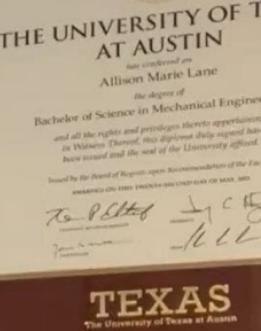


Oracle Cloud Infrastructure

# CI/CD for APEX and Oracle Database Developers

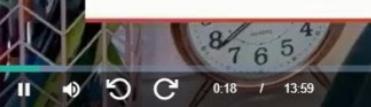
---



HOOK 'EM

Alli Lane

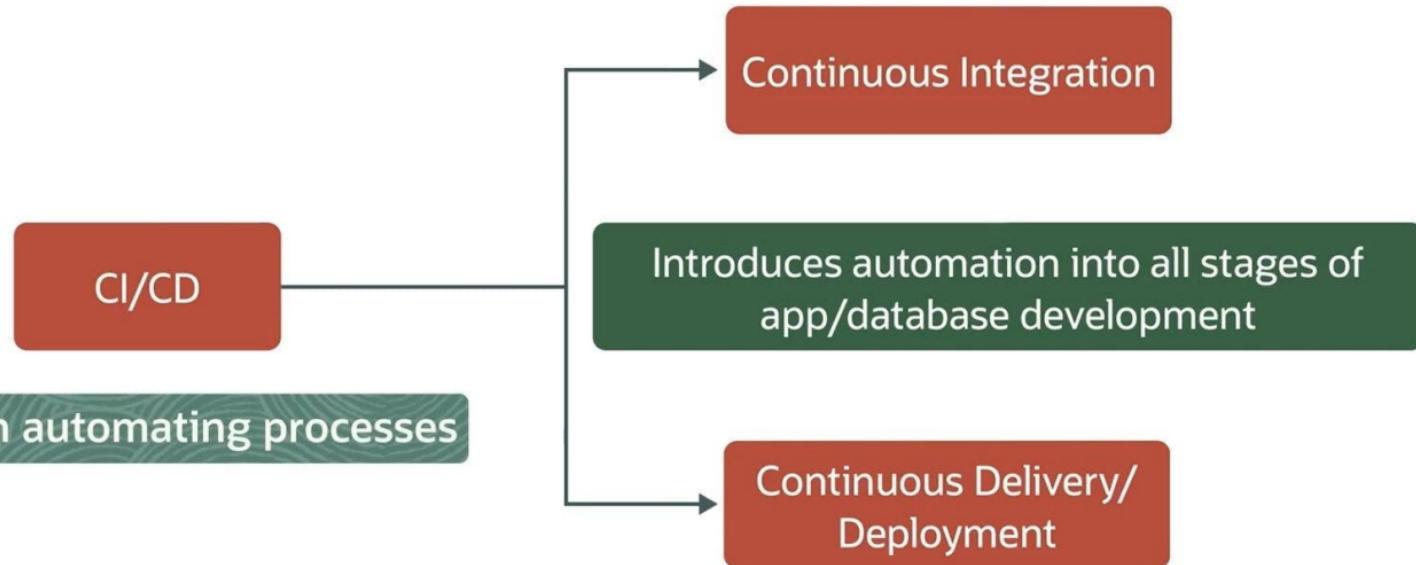
ORACLE CLOUD SOLUTION ENGINEER  
ORACLE





# What is CI/CD?

# What is CI/CD and why do we need it?



# What is CI/CD and why do we need it?



Consolidates code

Helps developers across



# What is CI/CD and why do we need it?



CI automates

Merging the Codes

Unit Testing and Functional  
Testing



Repository



# What is CI/CD and why do we need it?



Repository

Consistency  
Everyone's on  
same page



# What is CI/CD and why do we need it?



Merging the Codes



Repository



Are they following coding/  
security standards ?



# What is CI/CD and why do we need it?



Repository

Find quality Issues a lot faster



# What is CI/CD and why do we need it?



CD automates

Testing on pre-prod env followed by testing on prod env



Repository



Completely automated way



# What is CI/CD and why do we need it?



Repository

Frequent releases

Better quality

Standard

Secure

Consistent

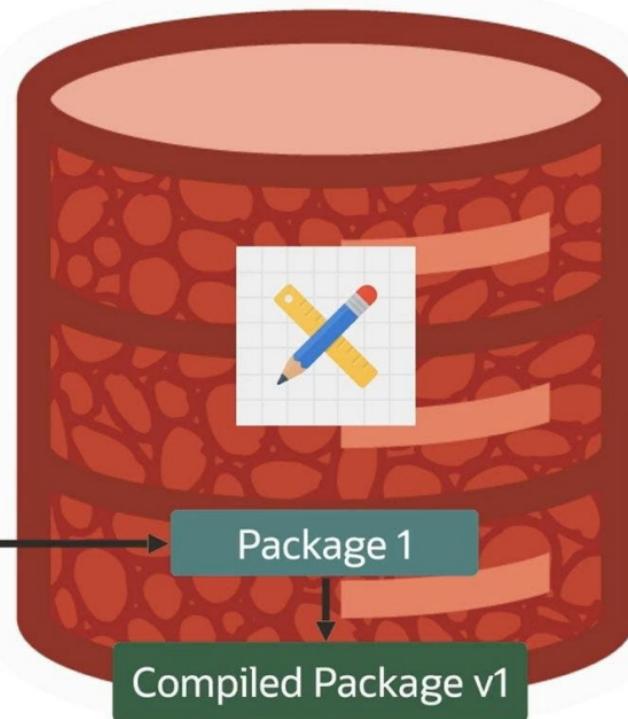
# CI/CD with the database and APEX?

Multiple Users sharing single instance



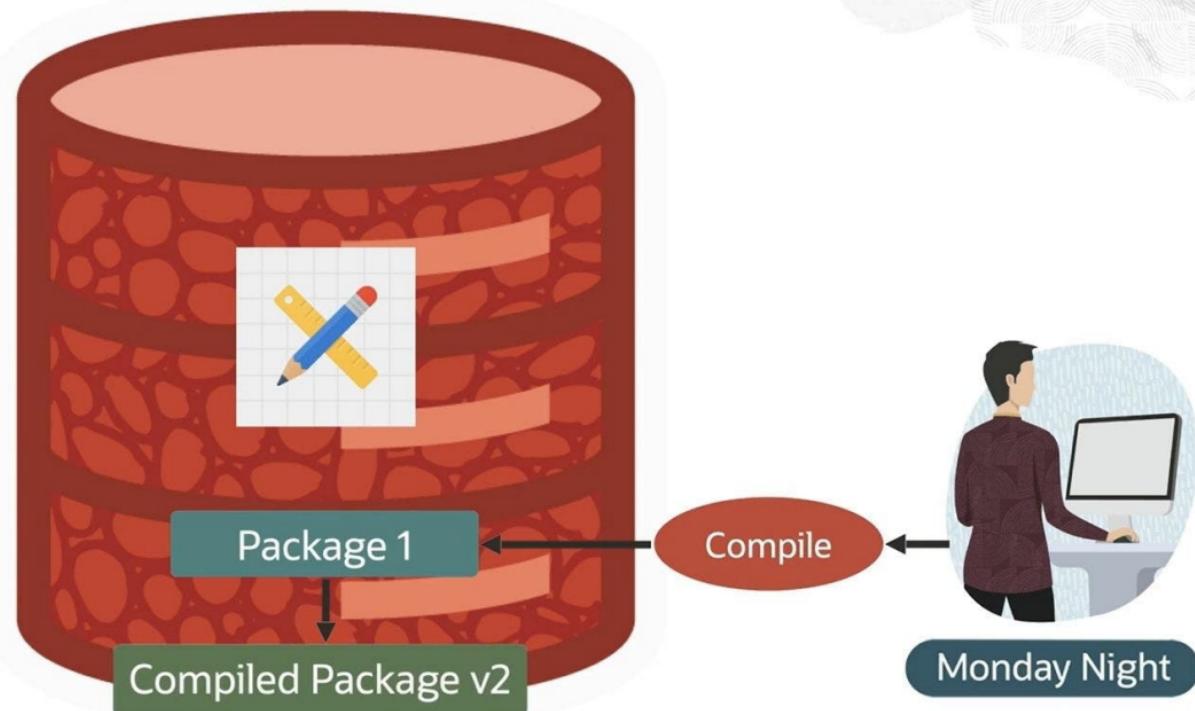
Monday Morning

Compile



# CI/CD with the database and APEX?

Multiple Users sharing single instance



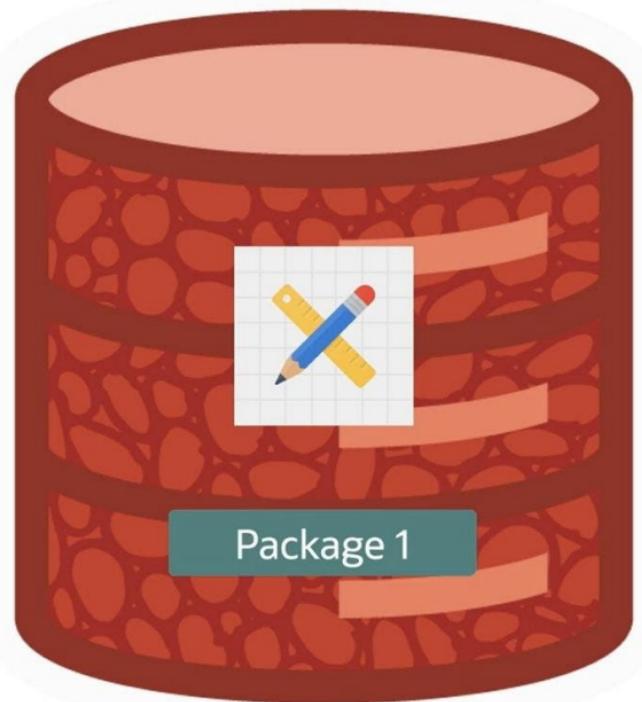
# CI/CD with the database and APEX?

Multiple Users sharing single instance



Tuesday Morning

Search  
for v1



# CI/CD with the database and APEX?

Its not always easy to  
create multiple Oracle Databases

# CI/CD with the database and APEX?

Licensing issues

Dev instances can be expensive

Hardware is Available?

Ability to clone?

Sufficient space is available in Array?

# CI/CD with the database and APEX?

Database in the apex flow is a lot different

Stateful versus Stateless

# CI/CD with the database and APEX?

Bring up doc containers

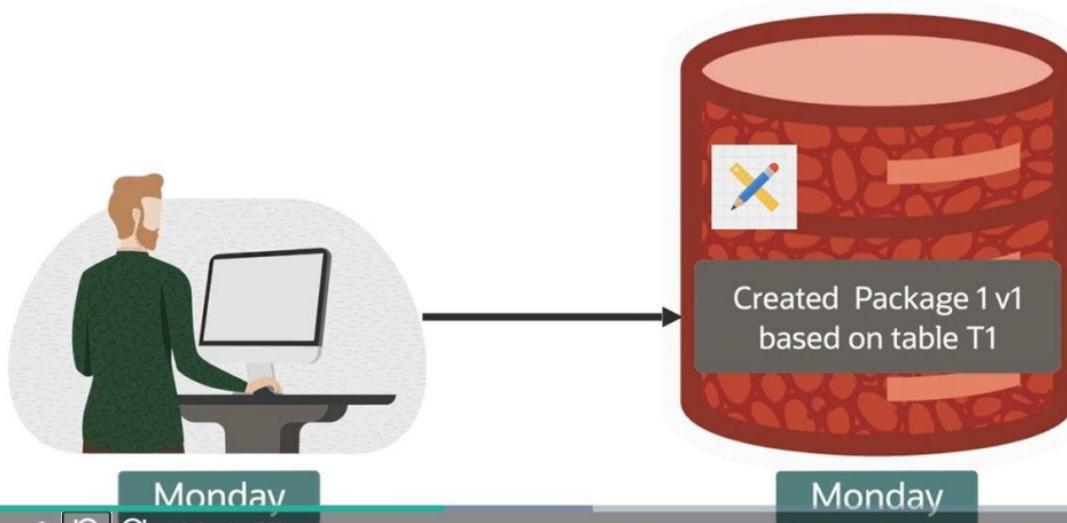
Pilot it

Push it

Done

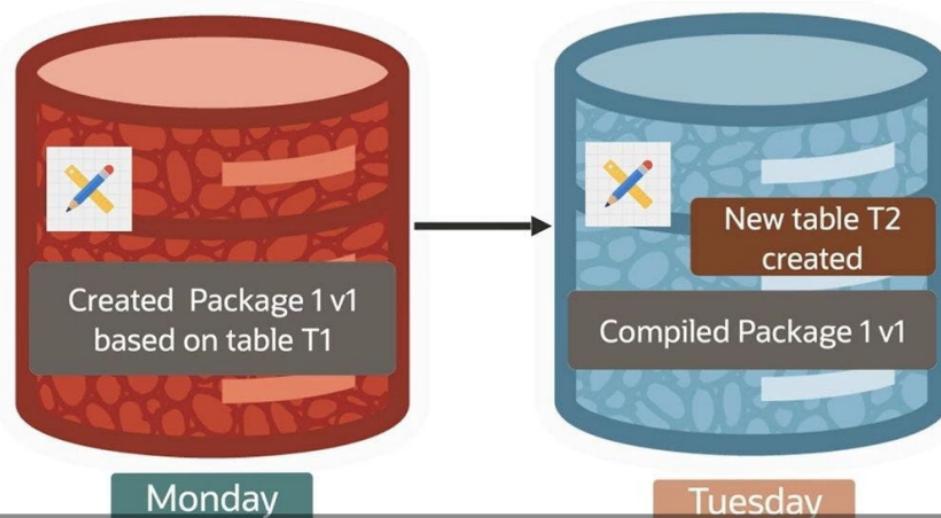
# CI/CD with the database and APEX?

User worked on Package 1 on Monday morning and compiled it to create v1

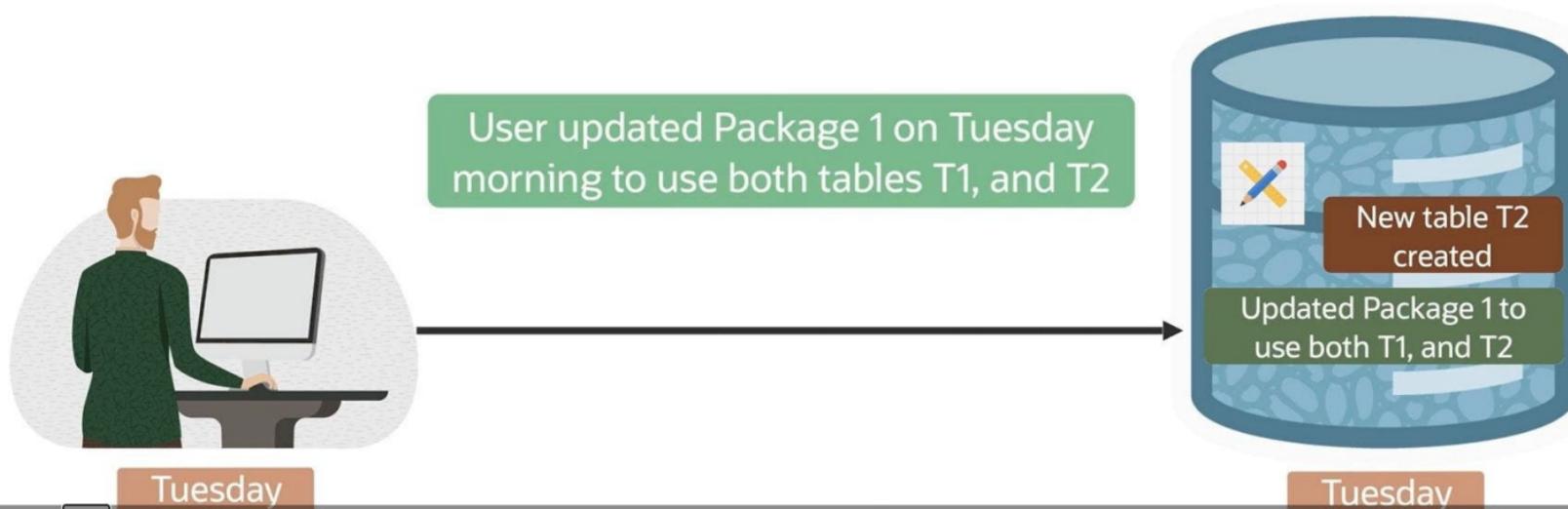


# CI/CD with the database and APEX?

Other transactions happen on Database over Monday



# CI/CD with the database and APEX?

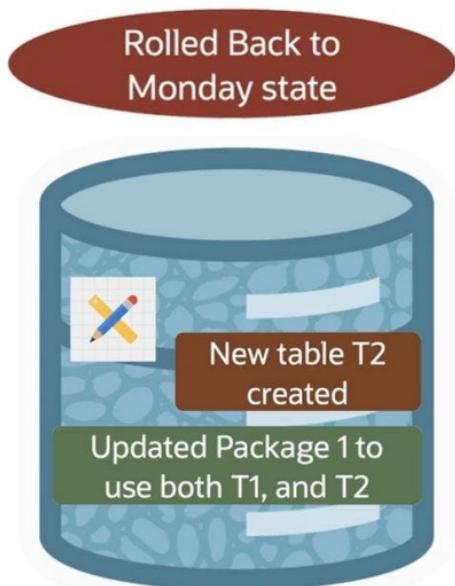


# CI/CD with the database and APEX?



Tuesday

Database Issue On Tuesday night



Tuesday

# CI/CD with the database and APEX?

User can't Use Package 1 as  
table T2 is lost



Wednesday



Wednesday

# CI/CD with the database and APEX?

What to do if there are any issues?

# CI/CD with the database and APEX?

Manual Solution

# CI/CD with the database and APEX?





SQLcl/Liquibase

Jenkins

VS Code/SQL Developer

PLSQL

Terraform

OCI account

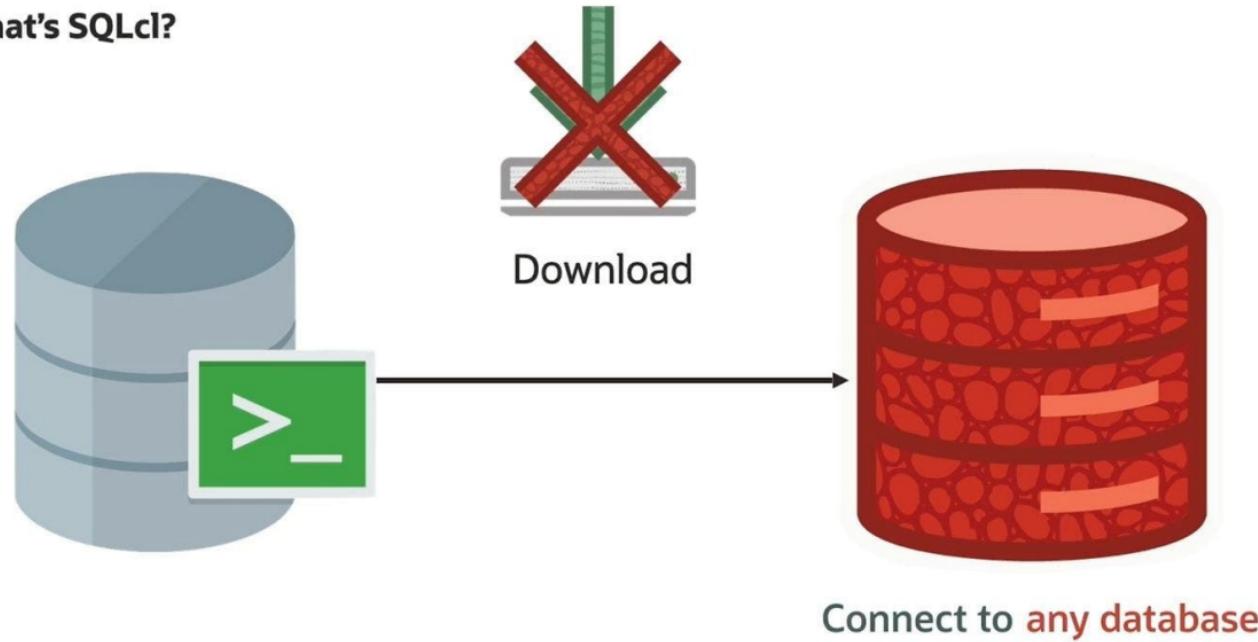
# SQLcl and Liquibase

## What's SQLcl?

## Command line SQL Plus tool

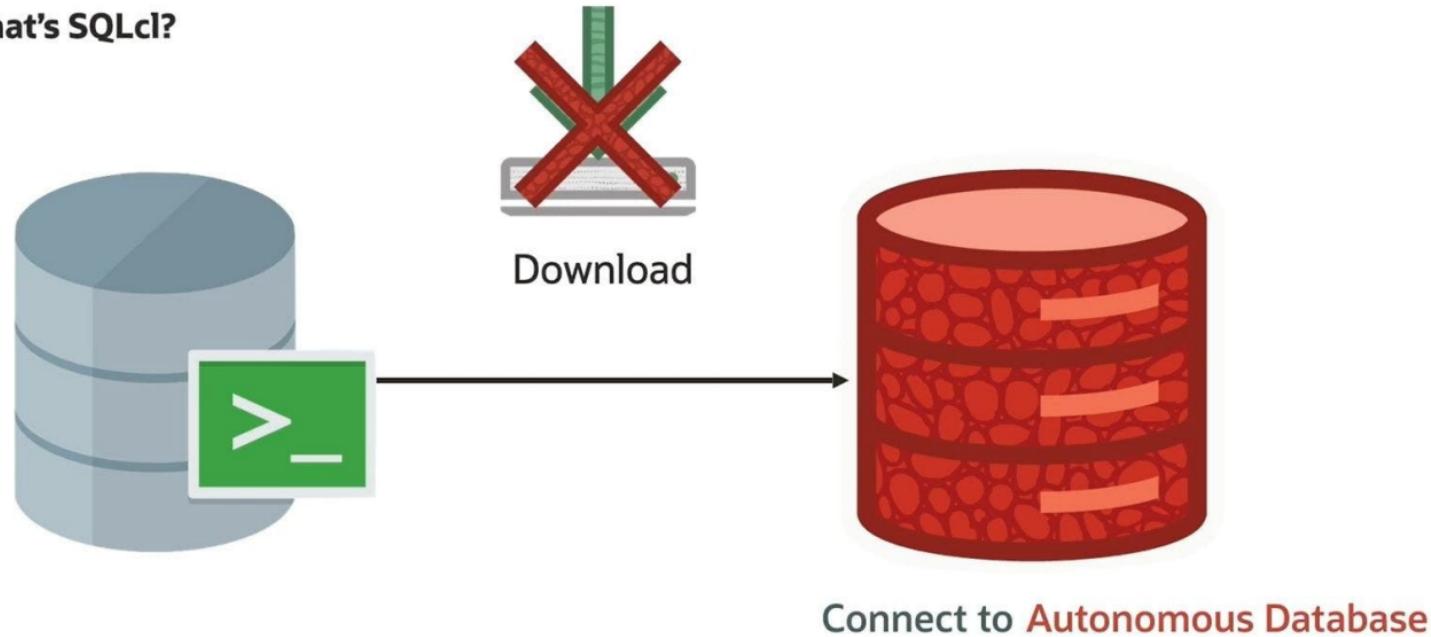
# SQLcl and Liquibase

What's SQLcl?



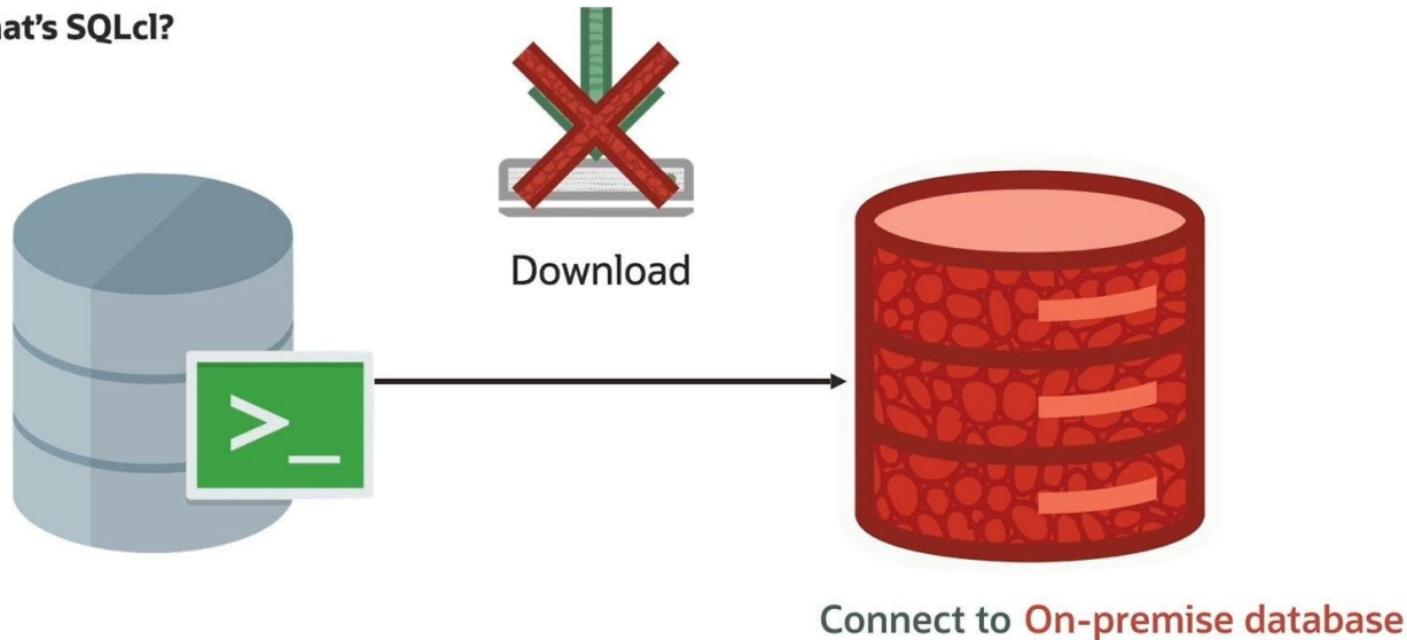
# SQLcl and Liquibase

What's SQLcl?



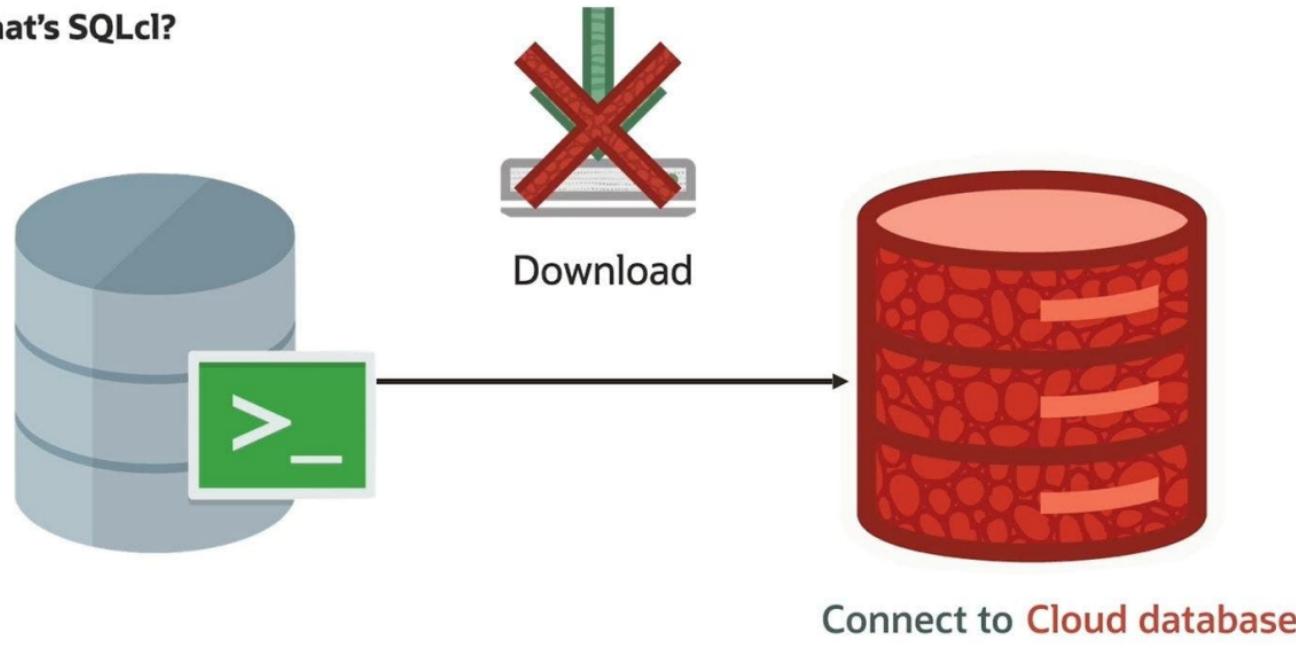
# SQLcl and Liquibase

What's SQLcl?



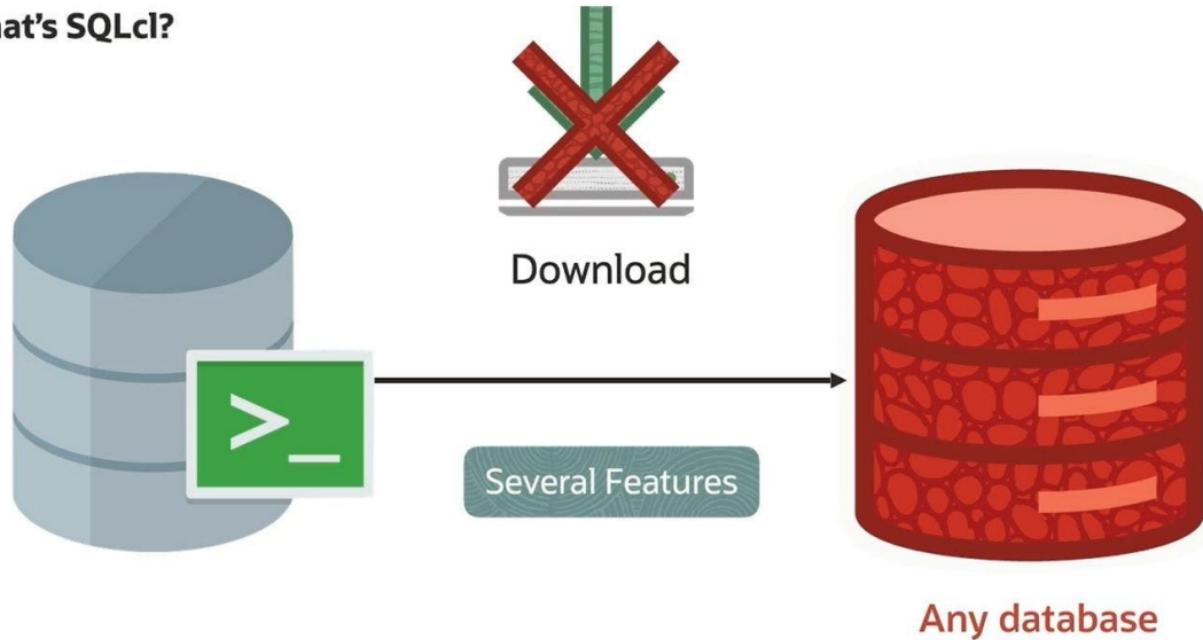
# SQLcl and Liquibase

What's SQLcl?



# SQLcl and Liquibase

What's SQLcl?



# SQLcl and Liquibase

What's SQLcl?



Free with SQLcl

# SQLcl and Liquibase

What's SQLcl?



One of the features  
of SQLcl

Environment to environment  
in a manual or automated way

Tracking database schema  
changes

Managing database schema  
changes

Applying Database Schema  
changes

Change logs

Database  
tables

# SQLcl and Liquibase

What's SQLcl?



One of the features  
of SQLcl

Gets updated frequently

Tracking database schema  
changes

Managing database schema  
changes

Applying Database Schema  
changes

Change logs

Database  
tables

# Liquibase and SQLcl

DATABASECHANGELOG\_DETAILS is a view that consolidates information from the DATABASECHANGELOG and DATABASECHANGELOG\_ACTIONS tables.

DATABASECHANGELOG_ACTIONS						
	id	sequence	sql	sxml	author	filename
1	f02ae6a5d04c968...	0	CREATE TABLE "M..."	(null)	(GARY)-Generated	may2018_table.xml
2	708012af706c7da...		CREATE TABLE "E..."	(null)	(GARY)-Generated	emps_table.xml
3	f02ae6a5d04c968...		--skipped	--skipped	(GARY)-Generated	may2018_table.xml

Emp table created with  
thousands of record on Sunday

Emp id	First_name	Last_name	Dept id	Salary
100	Alan	Bell	10	4000
101	Ben	Pollock	10	3500
102	Chris	Ryan	12	4250

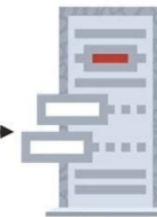
## Liquibase and SQLcl

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Emp id	First_name	Last_name	Dept id	Salary
100	Alan	Bell	10	4000
101	Ben	Pollock	10	3500
102	Chris	Ryan	12	4250

Moved to production on  
Monday



Production

# Liquibase and SQLcl

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3	f02ae6a5d04c968...	1	--skipped	--skipped	(GARY)-Generated	may2018_table.xml
4	83fffe6152b9f421...	0	ALTER TABLE "E! />?xml version="1.0... Value: ALTER TABLE "EMPS" ADD ("MGR" VARCHAR2(100) COLLATE "USING_NLS_COMP")	(GARY)-Generated	(GARY)-Generated	emps_table.xml

New column “MGR” added on  
Tuesday

Emp id	First_name	Last_name	Dept id	Salary
100	Alan	Bell	10	4000
101	Ben	Pollock	10	3500
102	Chris	Ryan	12	4250



Production

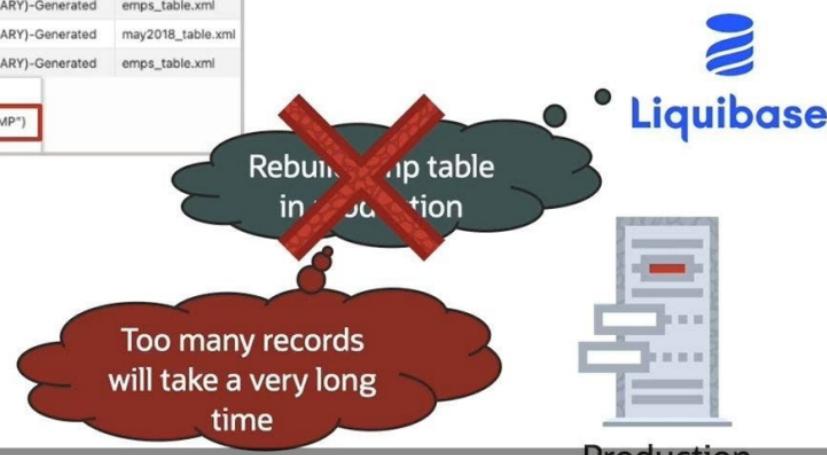
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4	83fffe6152b9f421...		ALTER TABLE "EI" <?xml version="1.0...	(GARY)-Generated		emps_table.xml

Value:  
ALTER TABLE "EMPS" ADD ("MGR" VARCHAR2(100) COLLATE "USING\_NLS\_COMP")

Emp id	First_name	Last_name	Dept id	Salary	MGR
100	Alan	Bell	10	4000	200
101	Ben	Pollock	10	3500	200
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901670	Brian	Mox	12	300	



Liquibase

# Liquibase and SQLcl

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901670	Brian	Mox	12	300	

Emp table and data  
is already in Prod,  
adding the MGR col  
to it will be quicker



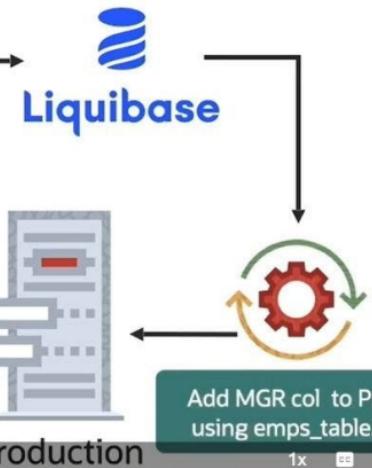
Production

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901670	Brian	Mox	12	300	



# SQLcl and Liquibase: APEX

```
SQL> lb genobject -type apex -applicationid 101
```

Creates a single f101.xml file for your application

```
SQL> lb genobject -type apex -applicationid 101 -split
```

Creates multiple folders/files per component and an install file (like with the database)

NOTE: Liquibase will only update the new/altered files when exporting so that  
your repository only reflects the changes.

Important flags for change management:

```
-skipExportDate -expOriginalIds -split
```

```
SQL> lb update -changelog f101.xml
```

To install the single file

```
SQL> lb update -changelog controller.xml
```

To install multiple files

Export will have new ids and dates

Shows up as changes in git repo

# SQLcl and Liquibase: APEX

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Without these changes management  
becomes difficult

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Individual pieces

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To install multiple files

Liquibase can identify:

- What changed and what didn't change
- Push to git repository only those that changed

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```
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```

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```

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## Track:

- Accountability
- Following security standards
- Following coding standards

# SQLcl and Liquibase: APEX

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## Pipeline:

- Get and setup environment
- Apply new database objects
- Instal APEX app into the environment

# SQLcl and Liquibase: Table Data

What about data???

You can pull data using [Liquibase](#)

Not meant for huge amount of data

**ORDS** used to move data

Use **data pump** for huge amount of data



# SQLcl and Liquibase: Table Data

Liquibase export is great for Metadata tables

Table has only few hundred rows

```
SQL> lb data -object TABLE_NAME, TABLE_NAME...
```

Exports the data from the indicated table(s)

```
SQL> lb update -changelog data.xml
```

Imports the data into the table(s)

Best for Metadata tables  
or smaller tables



# Terraform and OCI

# Terraform and OCI

**Terraform can be used to:**

- Build OCI infrastructure
- Modify OCI infrastructure
- Version OCI infrastructure

# Terraform and OCI

```
resource "oci_database_autonomous_database" "new_autonomous_database" {
    #Required
    compartment_id = var.compartment_ocid
    cpu_core_count = "1"
    data_storage_size_in_tbs = "1"
    db_name = "TESTDB${random_string.db_name.result}"
    admin_password = random_string.password.result
    db_workload = "OLTP"
    display_name = "TESTDB${random_string.db_name.result}"
}
```

# Terraform and OCI

OCI CLI and Terraform can be used to  
create VMs and other OCI resources

# Terraform and OCI

## Autonomous Database:

- Pay for it by the second you use
- Very helpful for testing purpose