

# APEX CI/CD

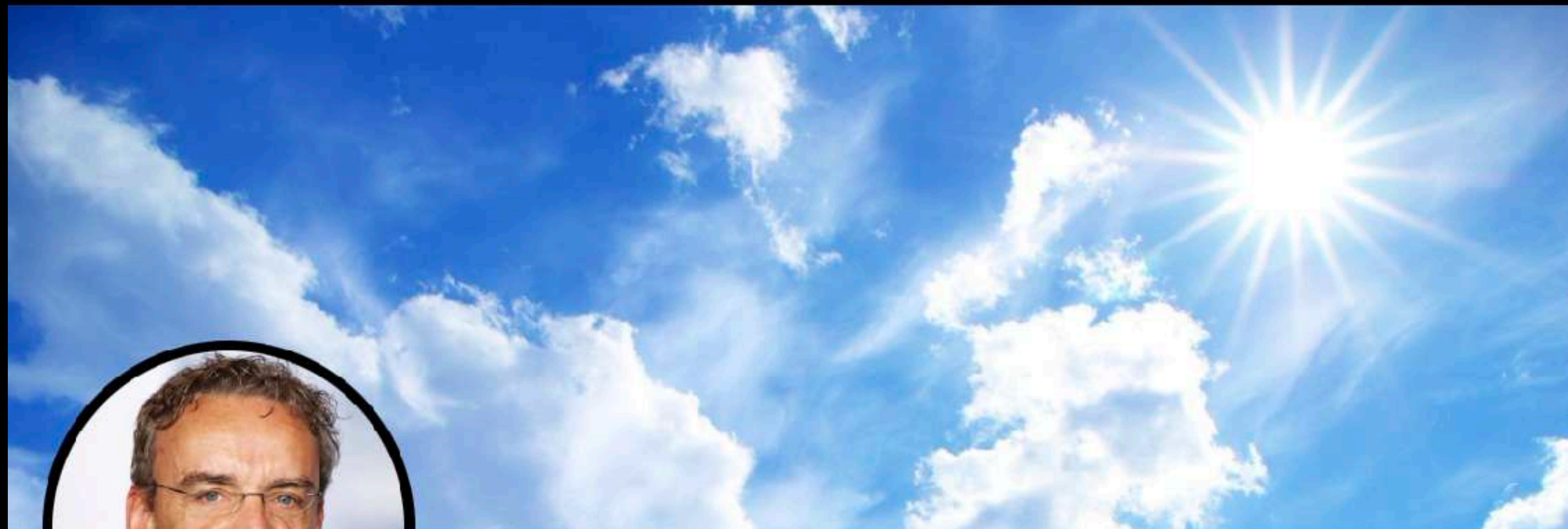
from the trenches





**Roel Hartman** 😎

9,386 Tweets



[Edit profile](#)

**Roel Hartman** 😎

@RoelH

Director at APEX Consulting.

Oracle ACE Director.

Director at ODTUG.

[Translate bio](#)

📍 The Netherlands [roelhartman.blogspot.com](http://roelhartman.blogspot.com) 🗓️ Born June 10, 1965

📅 Joined March 2007

**318** Following **3,915** Followers



42.195 KM

NN MARATHON

ER

50 EDITION

Chicago Marathon

Marikenlo

M

EDITION

APRIL 21.095meter


MARATHON EINDHOVEN 2011

MARATHON

BMW BERLIN MARATHON

SIGWIERLMANN

NOHISS

The image shows a panoramic view of the Nashville skyline at dusk. The sky is a mix of blue and orange, with some clouds. The city lights are beginning to glow, and the lights from the bridges and buildings are reflected in the water of the river. The text 'ODTUG Kscope24' is overlaid in the center. 'ODTUG' is in blue and orange, 'Kscope' is in green, and '24' is in a multi-colored geometric font.

ODTUG  
Kscope24

nashville, tn

july 14 - 18

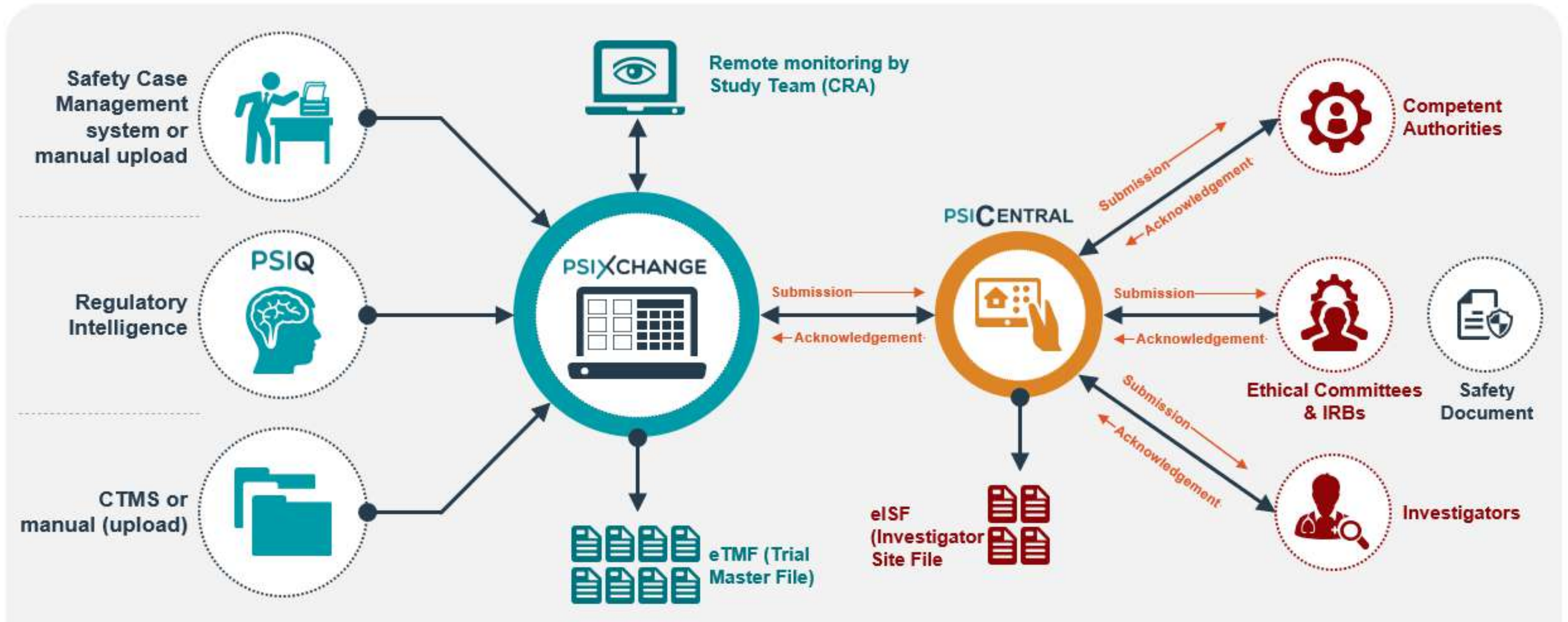
[kscope24.odtug.com](https://kscope24.odtug.com)

# Optimising pharmacovigilance for life science companies

We provide innovative software and specialist services that optimise business-critical pharmacovigilance processes for global pharmaceutical and life sciences companies – streamlining your regulatory and operational responsibilities to reduce costs, boost efficiency and increase compliance.

From automated Safety Document Distribution and data management to GxP-compliant hosting, pharmasol is focused on delivering service and solution excellence, built on over two decades of unparalleled knowledge of the sector and a rich understanding of your complex business needs.





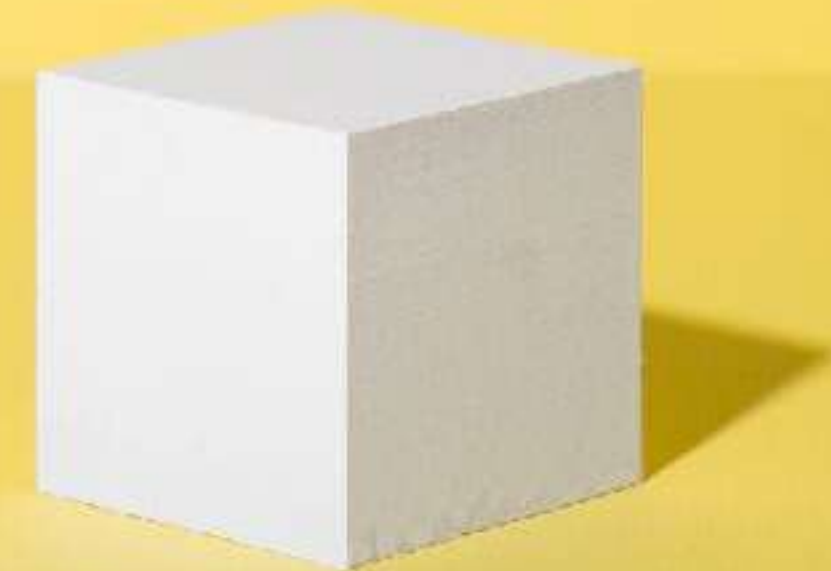
# What is CI/CD?

## Let's ask ChatGPT

*CI/CD stands for Continuous Integration and Continuous Deployment (or Continuous Delivery). It's a software development approach that emphasizes frequent integration of code changes into a shared repository (Continuous Integration), followed by automated testing and deployment processes to ensure that changes can be reliably and swiftly delivered to production environments (Continuous Deployment/Delivery). This approach helps to streamline development, improve code quality, and accelerate the delivery of software updates, ultimately leading to more efficient and reliable software development cycles.*

# Why do we need CI/CD?

- fast resolving of defects
- deliver small blocks
- small changes = less risk

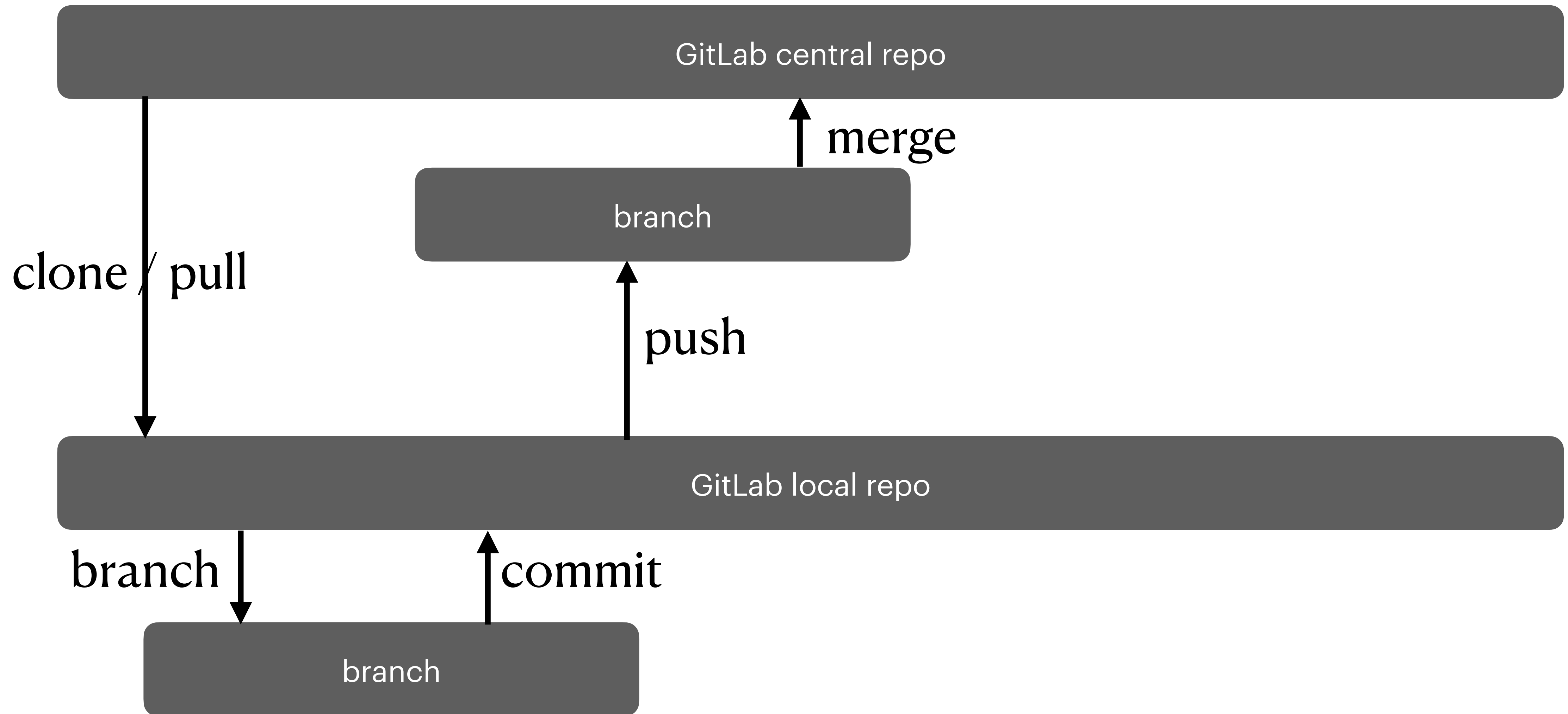




# What do we need?

- Git
- Visual Studio Code
- SQL Developer (PL/SQL Developer / TOAD)
- SQLcl (including Liquibase)





# STORMTROOPER

A large group of Stormtroopers in white armor, standing in formation. The word "STORMTROOPER" is overlaid in large, dark, semi-transparent letters across the center of the image. The background shows a blurred outdoor setting with blue railings and a bright sky.

# CLONE to local

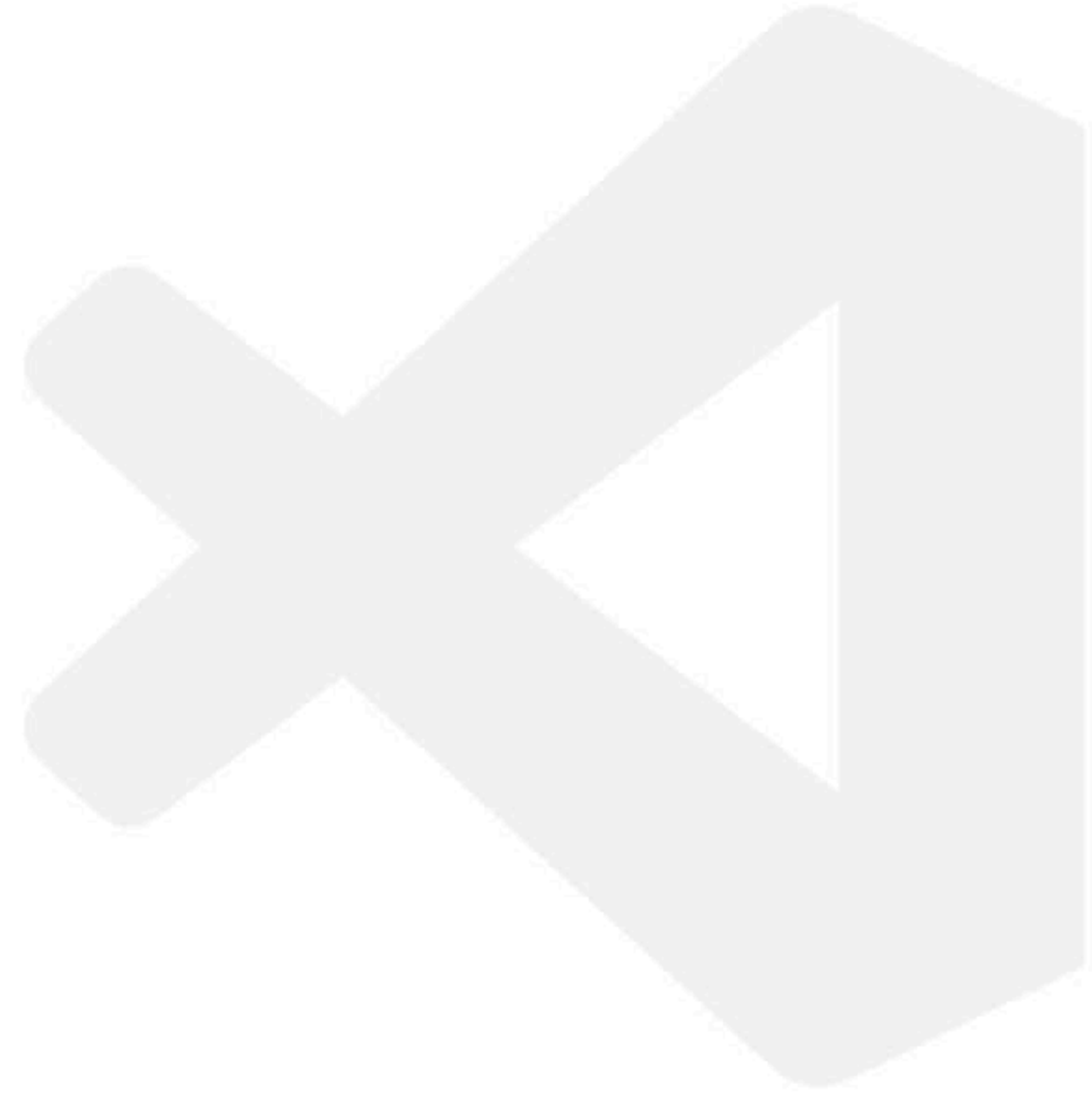
- One or more Git repositories
- One common
- Folder structure (standardize!)





EXPLORER: GITLAB (WORKSPACE)

- > psiXchange
- > psiq-development
- > common
- > internal-development
- > req-track-development



- Show All Commands **Ctrl + Shift + P**
- Go to File **Ctrl + P**
- Find in Files **Ctrl + Shift + F**
- Toggle Full Screen **F11**
- Show Settings **Ctrl + ,**



PUG

# PULL to refresh

- Sync your local repo with central





Download

See a Demo

# Welcome to the Liquibase Community

Fast database change. Fluid delivery.

Download

Try Liquibase Pro

Why Liquibase has been downloaded over **100 million** times.



Flexible database change



Version control for your database



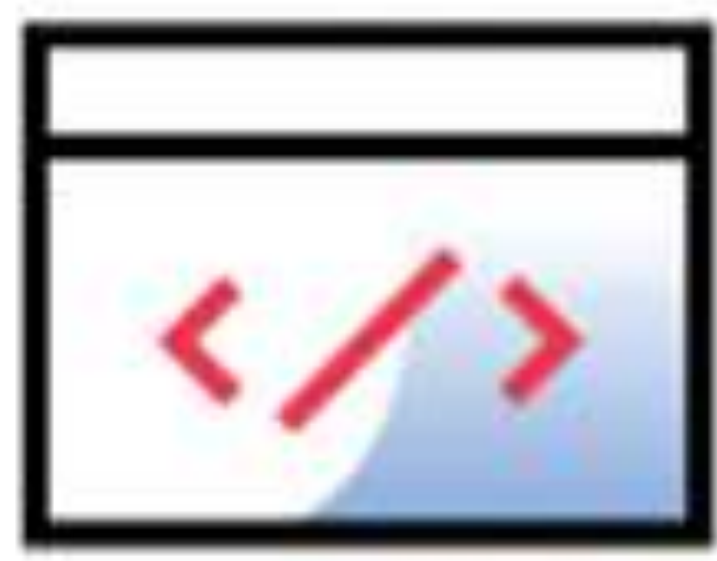
Built for developers



Developer



changelog



# Liquibase

- changelog
- changeset
  - every DB object
  - APEX applications
  - ORDS modules
- repeatable

```
SQL> lb ges
--Starting Liquibase at 13:25:15 (version 4.17.0 #0 built at 2022-11-02 21:48+0000)

Export Flags Used:

Export Grants          false
Export Synonyms        false

[Method loadCaptureTable]:
  [Type - TYPE_SPEC]:      859 ms
  [Type - TYPE_BODY]:      189 ms
  [Type - SEQUENCE]:        94 ms
  [Type - DIRECTORY]:      64 ms
  [Type - CLUSTER]:       2092 ms
  [Type - TABLE]:       37576 ms
  [Type - MATERIALIZED_VIEW_LOG]: 62 ms
  [Type - MATERIALIZED_VIEW]: 49 ms
  [Type - VIEW]:          2475 ms
  [Type - DIMENSION]:      63 ms
  [Type - FUNCTION]:       109 ms
  [Type - PROCEDURE]:      96 ms
  [Type - PACKAGE_SPEC]:   671 ms
  [Type - DB_LINK]:        79 ms
  [Type - SYNONYM]:        207 ms
  [Type - INDEX]:         2480 ms
  [Type - TRIGGER]:        202 ms
  [Type - PACKAGE_BODY]:   1978 ms
  [Type - JOB]:            190 ms

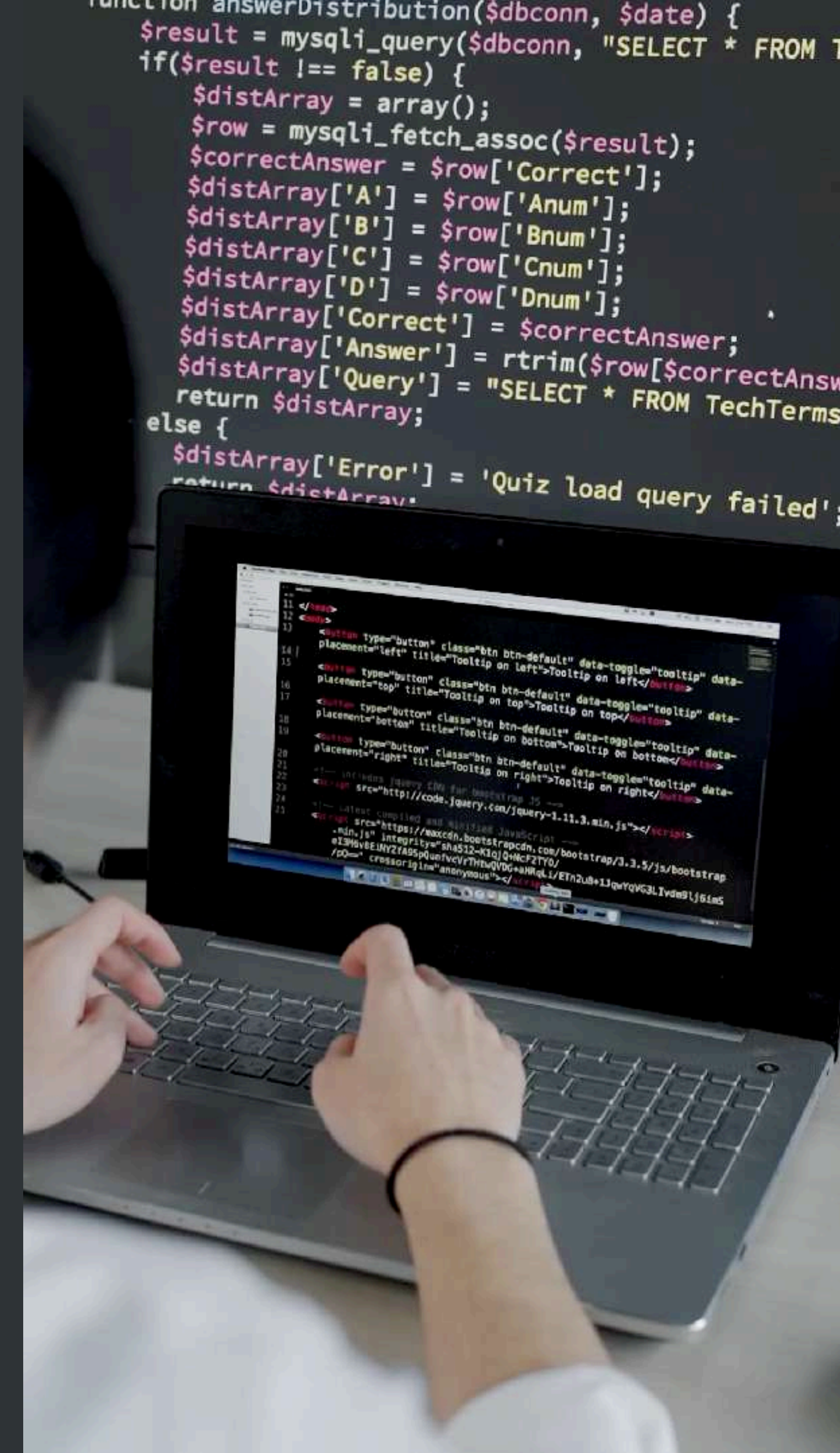
[Method loadCaptureTable]:      49535 ms
[Method processCaptureTable]:   200435 ms
[Method cleanupCaptureTable]:   47 ms
[Method sortCaptureTable]:     1484 ms
```

**BRANCH**



# Code

- APEX



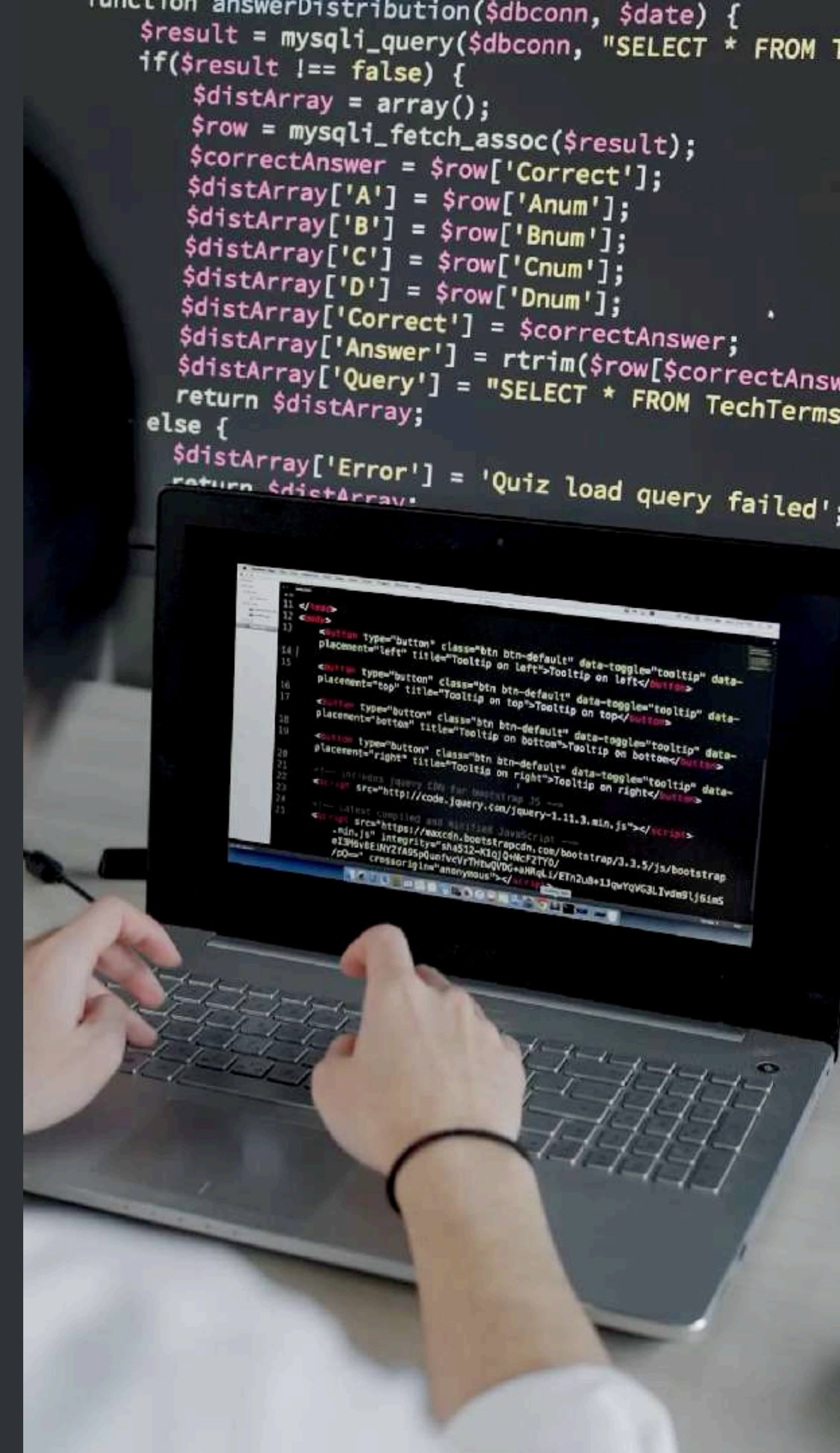
```
function answerDistribution($dbconn, $date) {  
    $result = mysqli_query($dbconn, "SELECT * FROM T  
    if($result !== false) {  
        $distArray = array();  
        $row = mysqli_fetch_assoc($result);  
        $correctAnswer = $row['Correct'];  
        $distArray['A'] = $row['Anum'];  
        $distArray['B'] = $row['Bnum'];  
        $distArray['C'] = $row['Cnum'];  
        $distArray['D'] = $row['Dnum'];  
        $distArray['Correct'] = $correctAnswer;  
        $distArray['Answer'] = rtrim($row[$correctAnsw  
        $distArray['Query'] = "SELECT * FROM TechTerms  
        return $distArray;  
    } else {  
        $distArray['Error'] = 'Quiz load query failed';  
        return $distArray;  
    }  
}
```

```
11 </head>  
12 <body>  
13 <button type="button" class="btn btn-default" data-toggle="tooltip" data-  
    placement="left" title="Tooltip on left">Tooltip on left</button>  
14 <button type="button" class="btn btn-default" data-toggle="tooltip" data-  
    placement="top" title="Tooltip on top">Tooltip on top</button>  
15 <button type="button" class="btn btn-default" data-toggle="tooltip" data-  
    placement="bottom" title="Tooltip on bottom">Tooltip on bottom</button>  
16 <button type="button" class="btn btn-default" data-toggle="tooltip" data-  
    placement="right" title="Tooltip on right">Tooltip on right</button>  
17 </body>  
18 </html>  
19 <script src="http://code.jquery.com/jquery-1.11.3.min.js"></script>  
20 <script src="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.5/js/bootstrap  
    .min.js" integrity="sha512-K1qOQI+N1G1b7m9pHTchY2L2Xh3yz3LPj9Z8W1GDZvR0Ql  
    e13HvBEIHz2w8XBn1qLWj4ZE9lWj3Q5L5e521" crossorigin="anonymous"></script>
```

# Code

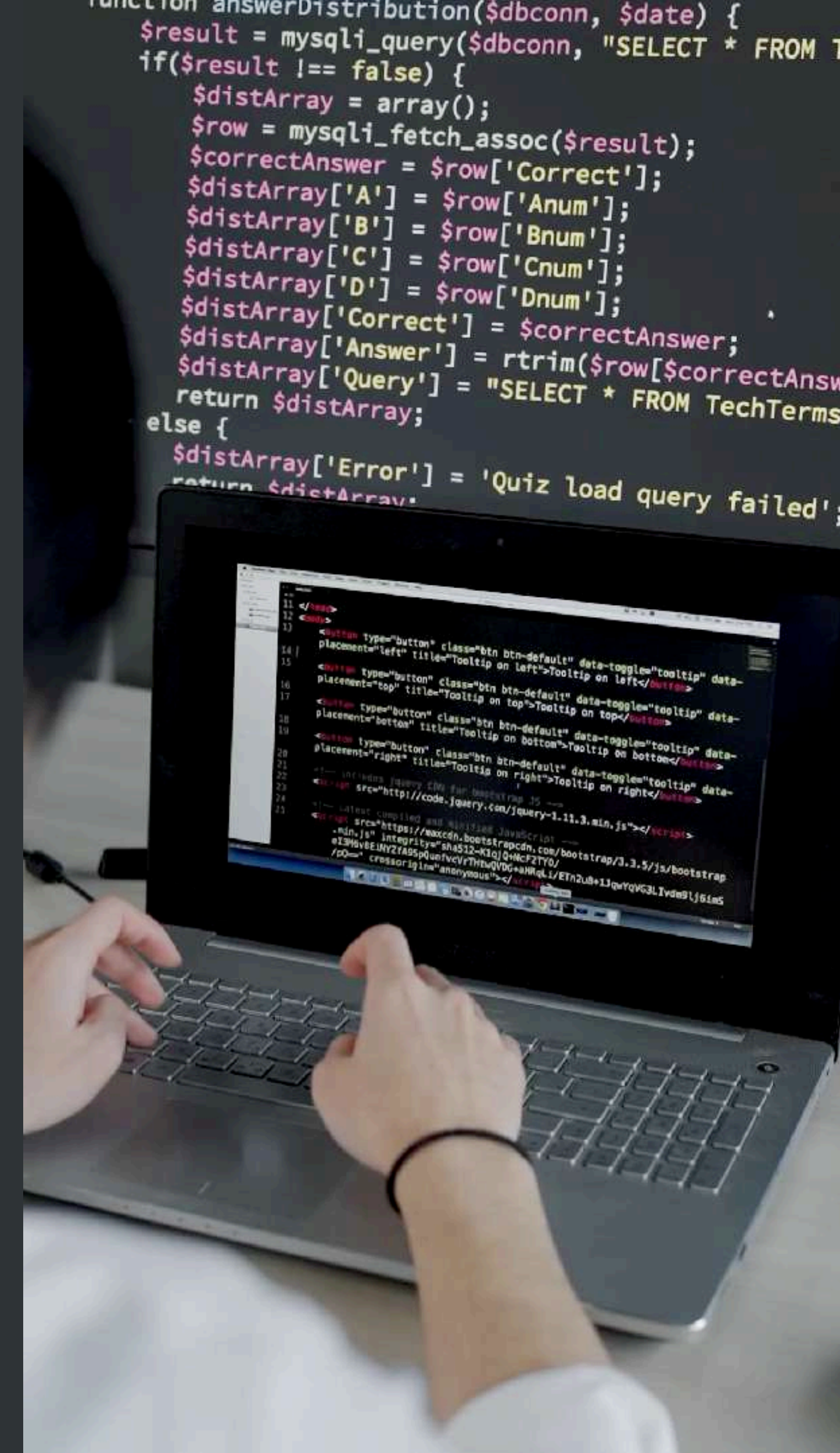
- APEX
  - script to export APEX (split, YAML, Liquibase)

```
lb generate-apex-object -applicationid &app_id  
-exporiginalids false -exppubreports  
-split -dir .\  
-exptype READABLE_YAML,APPLICATION_SOURCE
```



# Code

- APEX
- packages, views, triggers
  - File based development

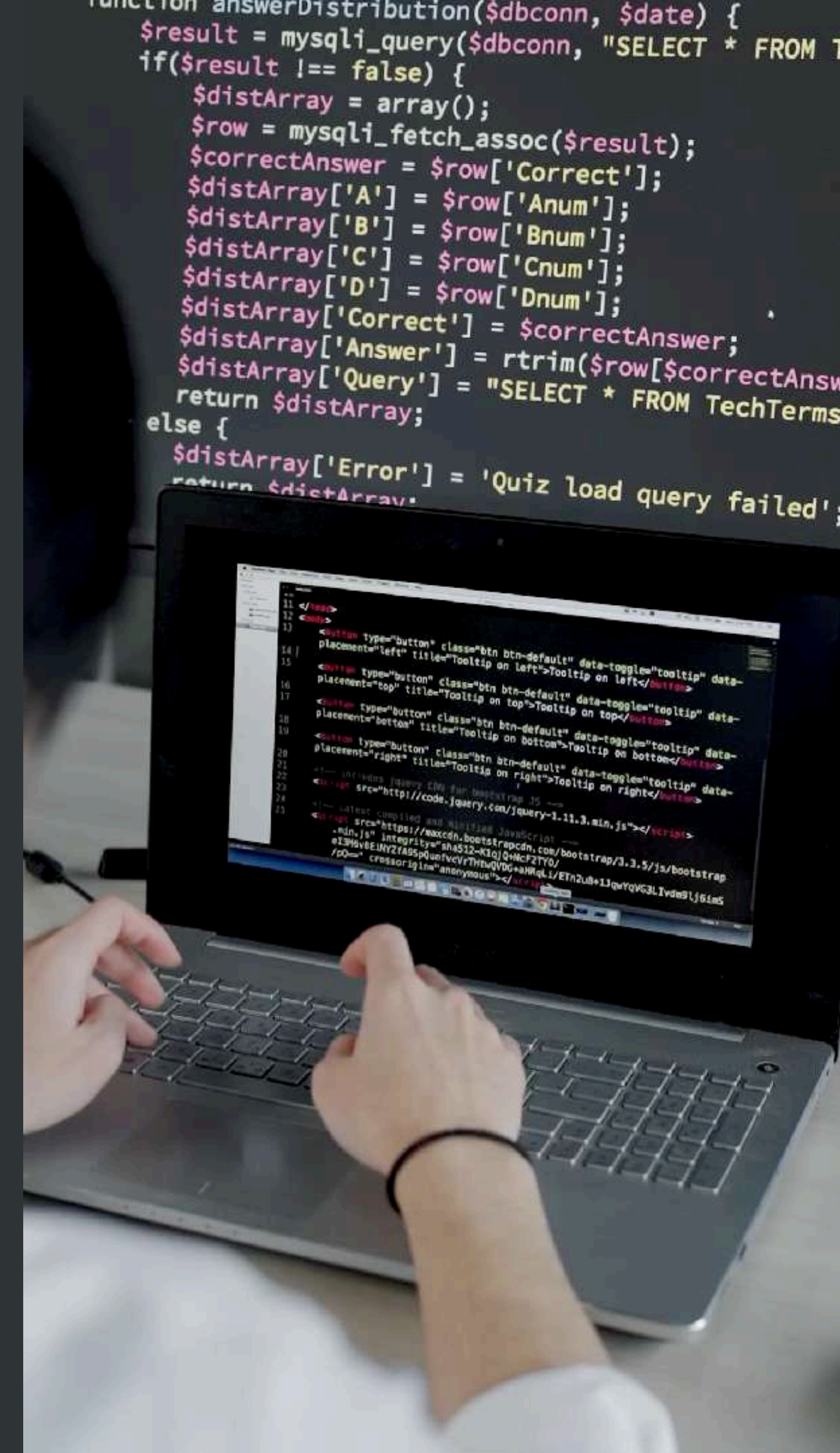


# Code

- APEX
- packages, views, triggers
- tables, indexes

```
lb generate-object -obt table -obn <tablename>
```

```
(update the controller.xml)
```



COMMIT





# COMMIT only REAL changes

- pick your APEX changes



SOURCE CONTROL

psiXcha... dummy\* [status icons]

Message (Ctrl+Enter to commit on "du...")

**Commit**

Changes 66

- apex \ f104 \ f104
  - application
    - pages
      - page\_00000.sql M Discard Changes
      - page\_00030.sql M
      - page\_00400.sql M
      - page\_00401.sql M
      - page\_00402.sql M
      - page\_00410.sql M
      - page\_00500.sql M
      - page\_00600.sql M
    - shared\_components
    - plugins \ template\_component
      - theme\_142\_avatar.sql M
      - theme\_142\_badge.sql M
      - theme\_142\_button.sql M

CONTRIBUTORS

```

psiXchange > apex > f104 > f104 > application > pages > page_00000.sql
11 ,p_default_id_offset=>-129698909472
12 ,p_default_owner=>'PSIXSC'
13 );
14 wwv_flow_imp_page.create_page(
15 | p_id=>0
16 ,p_name=>'Global Page - Desktop'
17 ,p_alias=>'GLOBAL'
18 ,p_step_title=>'Global Page - Deskt
19 ,p_autocomplete_on_off=>'OFF'
20 ,p_page_template_options=>'#DEFAULT
21 ,p_protection_level=>'D'
22 ,p_page_component_map=>'14'
23- ,p_last_updated_by=>'HARTR'
24- ,p_last_upd_yyyymmddhh24miss=>'2023
25 );
26 wwv_flow_imp_page.create_page_plug(
27 | p_id=>wwv_flow_imp.id(253937959778
28 ,p_plug_name=>'Sponsor Logo'
29 ,p_region_template_options=>'#DEFAU
30 ,p_plug_template=>wwv_flow_imp.id(3
31 ,p_plug_display_sequence=>30
32 ,p_include_in_reg_disp_sel_yn=>'Y'
33 ,p_plug_display_point=>'AFTER_LOGO'
34 ,p_function_body_language=>'PLSQL'
35 ,p_plug_source=>wwv_flow_string.joi
36 'return sponsors.showLogo(iSponsorI
37 '

```

# COMMIT only REAL changes

- pick your APEX changes
- styling is irrelevant
  - auto format - for changed objects
  - (re)apply formatted code



main 2 branches 18 tags

Go to file Code

	<b>PhilippSalvisberg</b> back to snapshot version 23.1.1-SNAPSHOT	e877947 on Apr 23	🕒 1,518 commits
📁 hook	check for empty staging area earlier		last year
📁 images	update screenshot for custom format settings		2 years ago
📁 settings	back to snapshot version 23.1.1-SNAPSHOT		4 months ago
📁 sqlcl	back to snapshot version 23.1.1-SNAPSHOT		4 months ago
📁 standalone	back to snapshot version 23.1.1-SNAPSHOT		4 months ago
📄 .gitattributes	add test file encoded in Windows-1252		last year
📄 .gitignore	add temporary file created by maven-shade-plugin to .gitignore		last year
📄 LICENSE.txt	rename LICENSE to LICENSE.txt		3 years ago
📄 README.md	updated SQLCl and SQLDev version in main README		4 months ago

☰ README.md

# PL/SQL & SQL Formatter Settings

## Introduction

This repository provides formatter settings for the [coding style rules](#) of the Trivadis PL/SQL & SQL Coding Guidelines.

Settings are primarily provided for

- [Oracle SQLCl, Version 23.1.0](#)

## About

PL/SQL & SQL formatter settings based on the Trivadis PL/SQL & SQL Coding Guidelines

- sql
- plsql
- oracle-database
- sql-developer

- 📖 Readme
- 📄 Apache-2.0 license
- 📈 Activity
- ★ 117 stars
- 👁 12 watching
- 🍴 41 forks
- Report repository

## Releases 18

📦 **SQLDev 23.1.0** Latest on Apr 23

+ 17 releases

## Packages

No packages published

## Contributors 3

**PhilippSalvisberg** Philipp Salvisberg

# COMMIT only REAL changes

- pick your APEX changes
- styling is irrelevant
  - auto format - for changed objects
  - (re)apply formatted code
- auto generate changesets
  - for changed objects only



EXPLOR...

- psiXchange
  - apex
  - apexsec
  - build
  - common
    - formatter
    - git-hooks
      - pre-commit
    - git-scripts
      - create-liquibase-files.sh**
      - login.sql
      - reset-submodules.sh
      - run\_test.sh
      - run-all.sh
      - test.sh
    - scripts
      - apex
      - database
      - various
      - format\_all.bat
      - format\_all.sql
      - sqlcl
      - PSI\_FBDA\_ADMIN
      - PSIXAOD

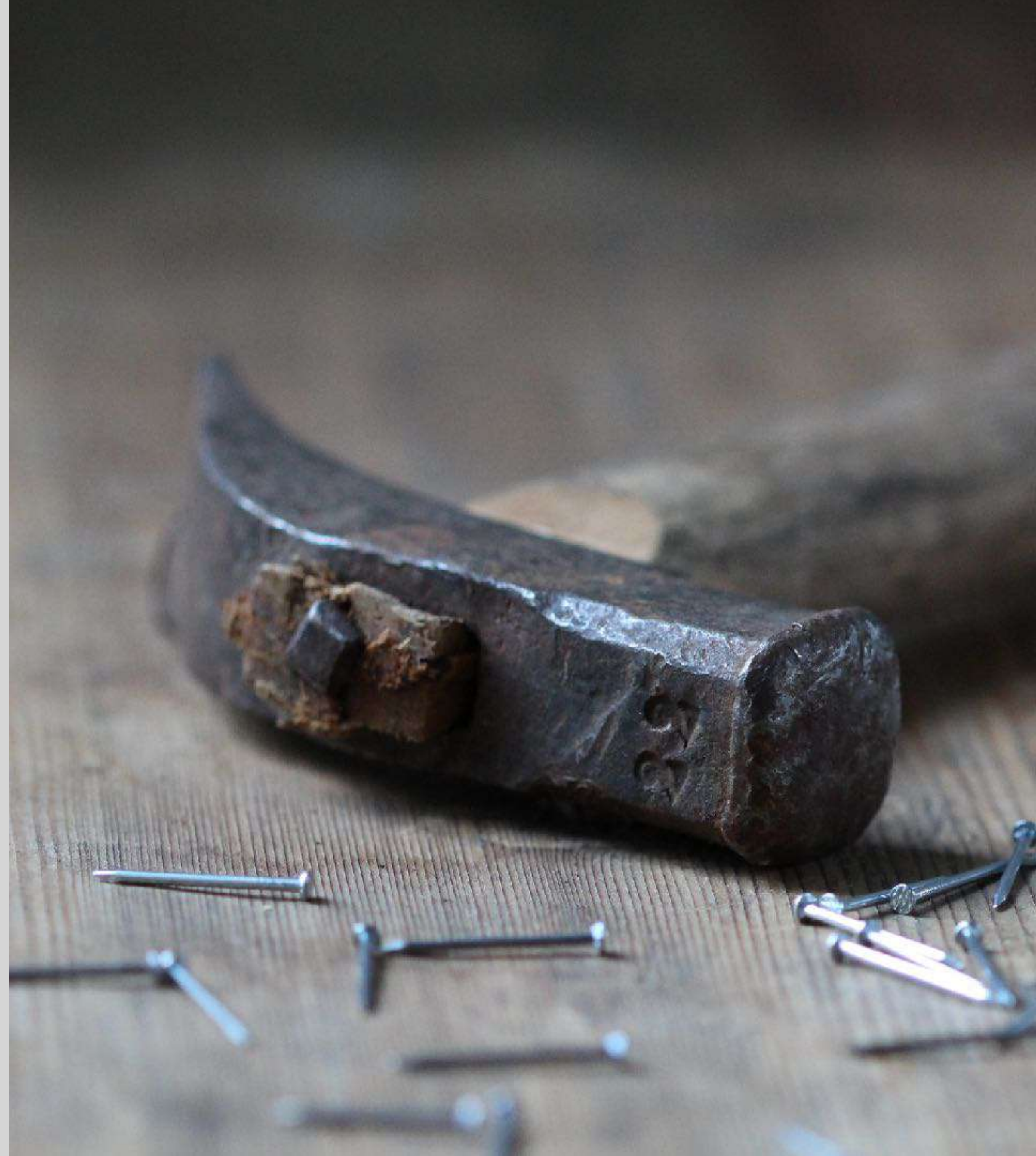
```

$ create-liquibase-files.sh
psiXchange > common > git-scripts > $ create-liquibase-files.sh
79
80     if [ "$SHOW_COMMAND" = true ]; then
81         echo "Schema = ${schema} > Type = ${type}"
82         echo "lb generate-object -object-type ${objecttype} -object-name ${objectname}"
83     fi
84     xmlfile="${objectname}_${objecttype}.xml"
85     sql $SQLCL_OPTS <<EOF
86     ${login}
87     prompt Info: Compile $f to ${login} (1/4)
88     set define off
89     @@$f
90     set define on
91
92     prompt Info: Generate Liquibase object for ${objectname} (2/4)
93     lb generate-object -object-type ${objecttype} -object-name ${objectname} ${runalway
94
95     prompt Info: Move Liquibase file to Liquibase directory (3/4)
96     !mv -f &_PWD./${xmlfile} &_PWD./${schema}/liquibase/${objecttype}
97
98     prompt Info: Done! (4/4)
99     exit
100 EOF
101     # Ensure Liquibase files are considered in this commit
102     git add ${schema}\\liquibase\\${objecttype}\\${xmlfile}
103     done
104 }

```

# COMMIT only REAL changes

- pick your APEX changes
- styling is irrelevant
  - auto format - for changed objects
  - (re)apply formatted code
- push changes



Explorer (Ctrl+Shift+E)

SOURCE CONTROL

psiXchange... D2241\*

Added restriction for current sponsor only

Commit

Changes 3

PSIXCTM \ views

- my\_contact\_staging\_vw.sql M
- my\_institution\_staging\_vw.sql M
- my\_site\_staging\_vw.sql M

psiq-develop... main

common Git main

internal-devel... main

req-track-deve... main

common Git main

common Git main

common Git main

CONTRIBUTORS

my\_contact\_staging\_vw.sql M

my\_site\_staging\_vw.sql M

my\_inst

```

psiXchange > PSIXCTM > views > my_contact_staging_vw.sql > ...
You, 1 second ago | 3 authors (You and others)
1 create or replace view my_contact_staging_vw as
2     select *
3         from contact_staging csg
4         where (uploaded_by = sys_context('APEX$SESSION', 'APP_USER') -- My up
5                or exists (
6                    select 1
7                        from my_studies_vw mst
8                        where csg.study_id = mst.study_id
9                            and mst.access_flag <> 'R'
10                ))
11     and csg.sponsor_id = to_number(sys_context('psix$session', 'current
12 /
13
Roel Hartman, 16 months ago • Feedback week14 ...

```





GETTAAB

BUNNER



code  
pushed  
to GitLab



GitLab  
trigger  
GitLab Runner



install  
dependencies,  
run tests job



WINTERBOGE

REQUIREMENTS



# MERGE REQUEST - pipeline

- run unit test
- code review
- approve



EXPLOR...

- psiXchange
  - > apex
  - > apexsec
  - > build
  - > common
  - > PSI\_FBDA\_ADMIN
  - > PSIXAOP
  - > PSIXCTM
  - > PSIXSC
  - > scripts
  - > SYSADMIN
  - ! .gitattributes
  - ! .gitignore
  - ! .gitkeep
  - ! .gitlab-ci-bash.yml
  - ! .gitlab-ci-powershell.yml
  - ! .gitlab-ci.yml
  - ! .gitmodules
  - psiXchange.code-workspace
  - > psiq-development
  - > common
  - > internal-development
  - > req-track-development

```

! .gitlab-ci-bash.yml x
psiXchange > ! .gitlab-ci-bash.yml
40
41 # after merging with master >> update test environment
42 Deploy to test database (bash):
43   <<: *bash_template
44   script:
45     - export DTAP_ENV="test"
46     - ${CI_PROJECT_DIR}/common/sqlcl/bin/sql /nolog @./scripts/jobs/update.sql
47   artifacts:
48     when: always
49     paths:
50     - ${CI_PROJECT_DIR}/build/*.log
51   only:
52     - master
53   except:
54     - schedules
55   You, 55 seconds ago • Uncommitted changes
56 # upon schedule >> calculate difference between TEST and DEV
57 Diff TEST and DEV (bash):
58   <<: *bash_template
59   script:
60     - export DTAP_ENV="test"
61     - sql /nolog @./scripts/jobs/diff.sql
62     - sh ./scripts/jobs/diff-check.sh
63   artifacts:
64     when: always
65     paths:
66     - ${CI_PROJECT_DIR}/build/diff.log

```

psiXchange > psiX Development > Merge requests > 1702

# D2241 and updated Liquibase controller files

Edit Code

Open Roel Hartman requested to merge D2241 into master 4 minutes ago

Overview 0 Commits 2 Pipelines 1 Changes 12

Compare master and latest version

12 files +356 -1177 Expand all files

Search (e.g. \*.vue) (Ctrl+P)

- PSIXCTM
  - liquibase
    - view
      - my\_contact\_staging\_vw\_view.xml +9 -8
      - my\_institution\_staging\_vw\_view.xml +9 -8
      - my\_site\_staging\_vw\_view.xml +9 -8
      - install\_controller.xml +5 -320
      - update\_controller.xml +5 -321
    - views
      - my\_contact\_staging\_vw.sql +8 -7

PSIXAOP/liquibase/install\_controller.xml +53 -105 Viewed

```

4  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
5
6  xsi:schemaLocation="http://www.liquibase.org/xml/ns/dbchangelog
7  http://www.liquibase.org/xml/ns/dbchangelog/dbchangelog-latest.xsd">
8  - <include
9  file="sequence\aop_pdf_form_sequence.xml"/>
10 - <include
11 file="sequence\aop_sample_cust_seq_s

```



WINTER RIDE

- psiX Development
- Project information
- Repository
- Merge requests** 1
- CI/CD
- Deployments
- Wiki
- External wiki
- Snippets
- Settings

psiXchange > psiX Development > Merge requests

Open 1 Merged 684 Closed 16 All 701

Subscribe to RSS feed Edit merge requests **New merge request**

Recent searches Search or filter results... Created date

**D2842** 8 Approved 0  
 I701 · created 1 hour ago by Roel Hartman  
 updated 35 minutes ago



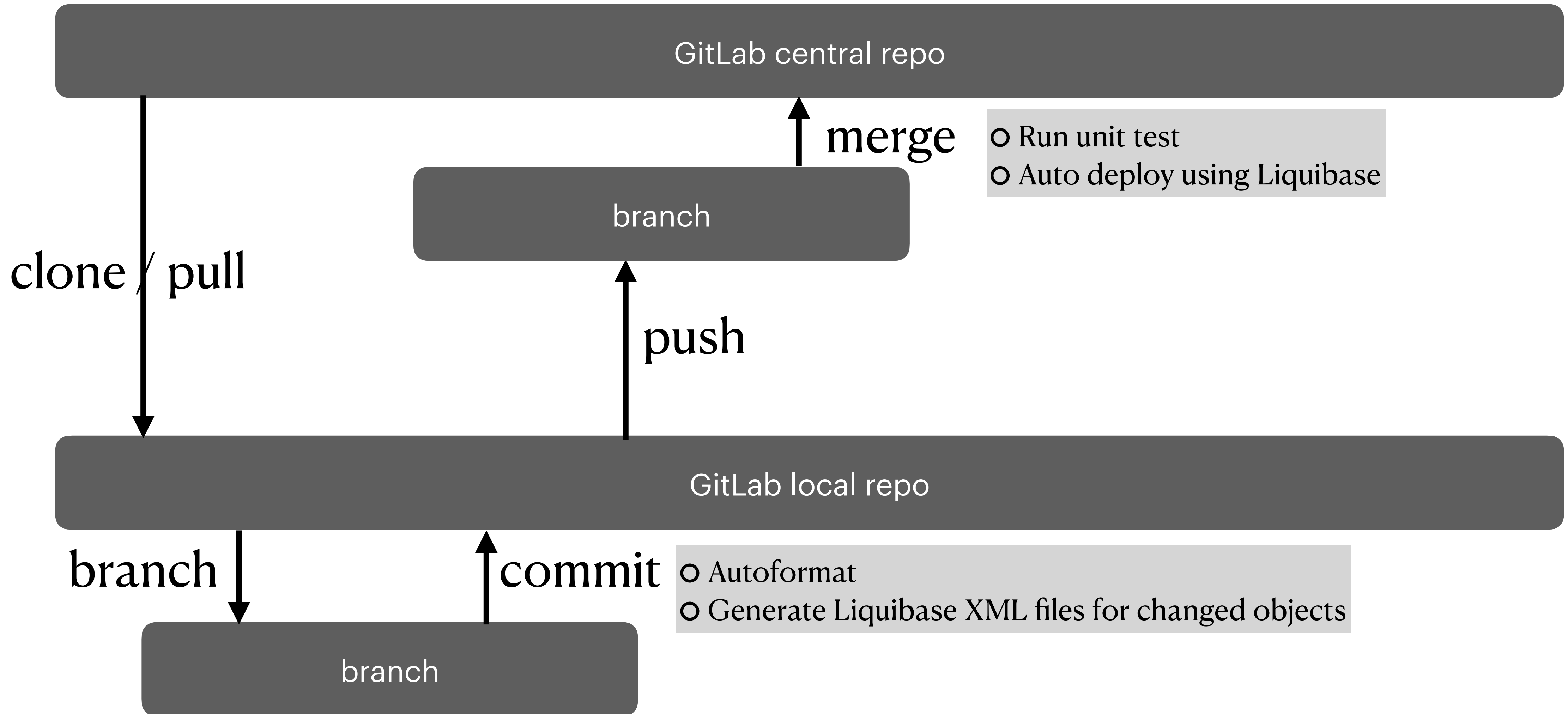
**REFRESH**



# RELEASE

- Tag a commit
- Download the repo from that point in time
- Use Liquibase for deployment





TAKE

AWAYS



# TAKE AWAYS

- Learn / use Git
- Learn / use SQLcl - Liquibase
- Automate & script
- Easy to use



Answers 1km →



@RoelH

roel@apexconsulting.nl