APEX CI/CD

from the trenches

A Oracle ACE
Director

Edit profile

Roel Hartman 😎

@RoelH

Director at APEX Consulting.
Oracle ACE Director.
Director at ODTUG.

💼 Software developer/Programmer/Software engineer   📍 The Netherlands
🔗 roelhartman.blogspot.com   🎂 Born June 10, 1965   📅 Joined March 2007

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![PHARMASOL enabling excellence. A PHARMALEX Company]

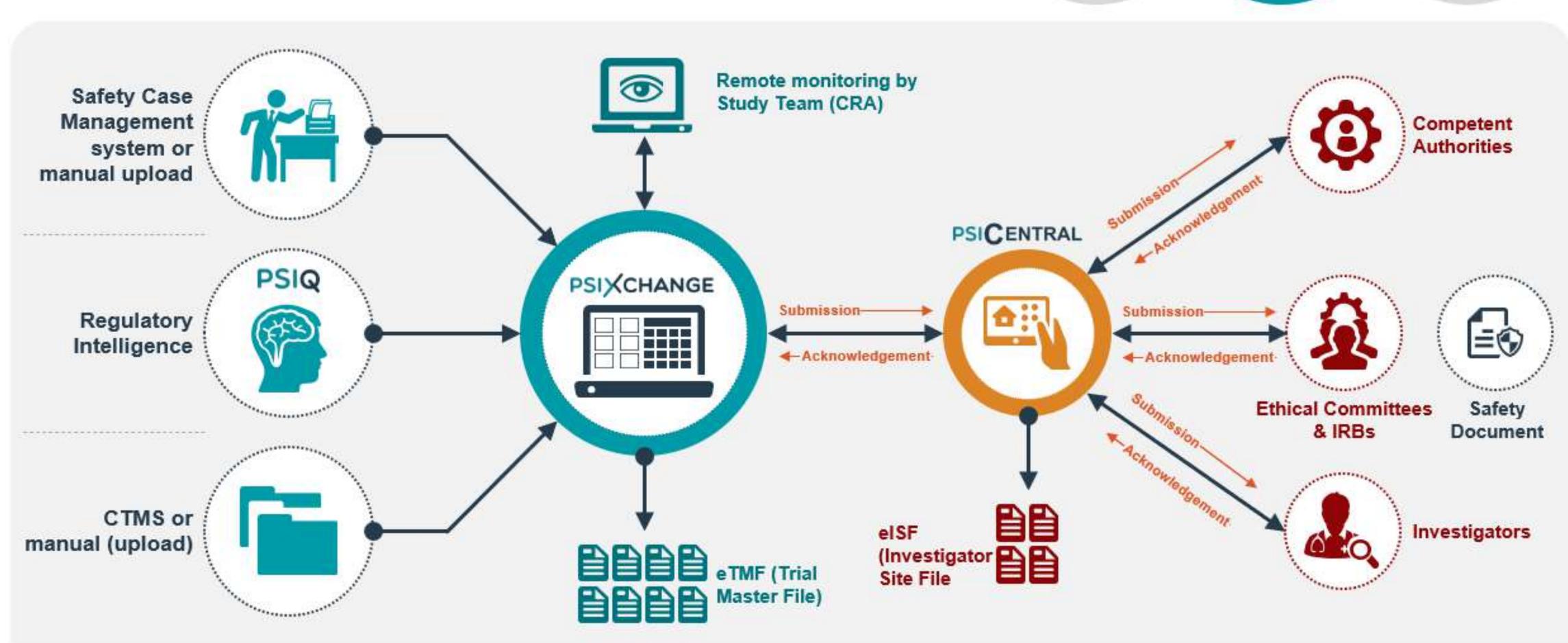# Optimising pharmacovigilance for life science companies

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?
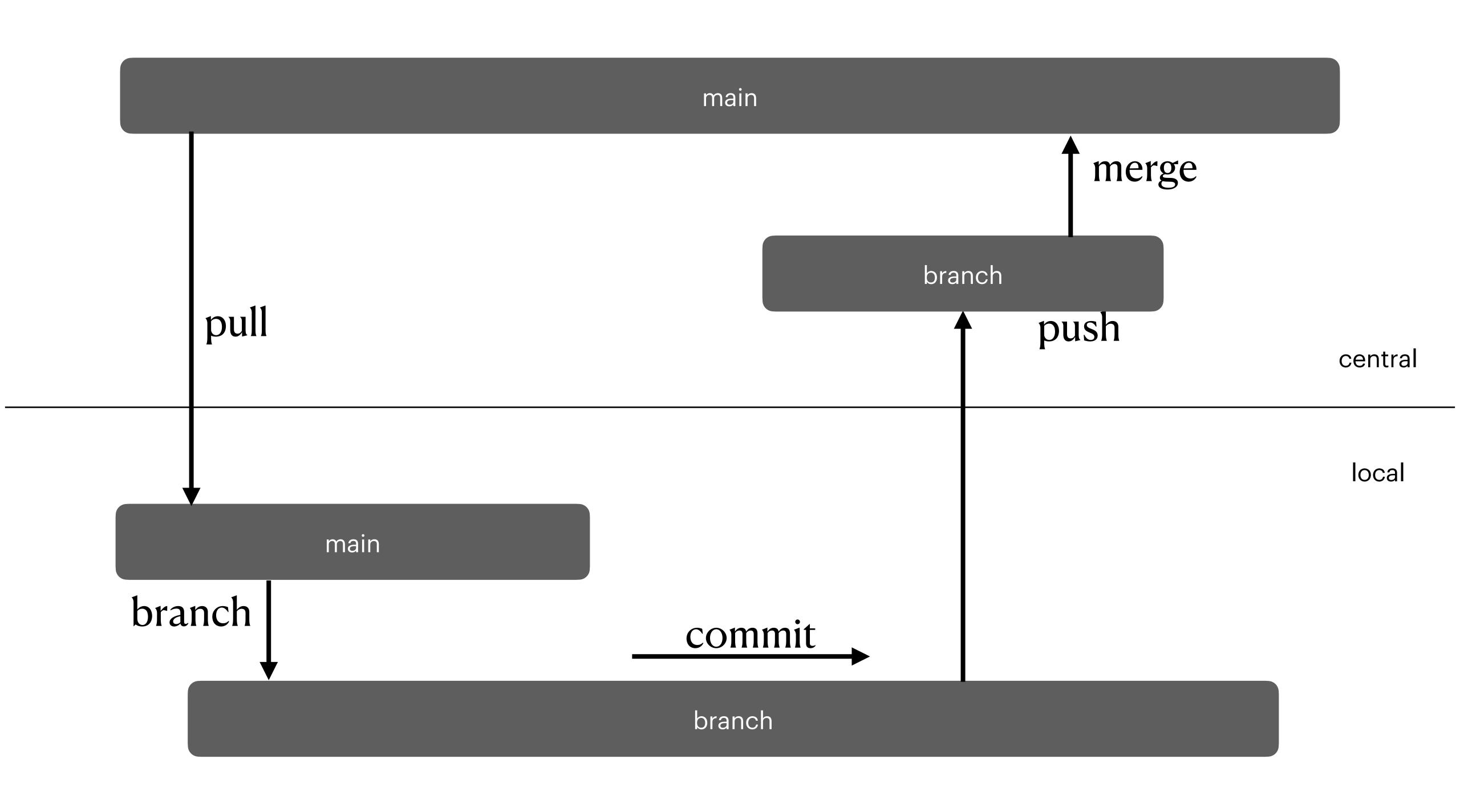
- fast resolving of defects

- deliver small blocks

- small changes = less risk

What do we need?
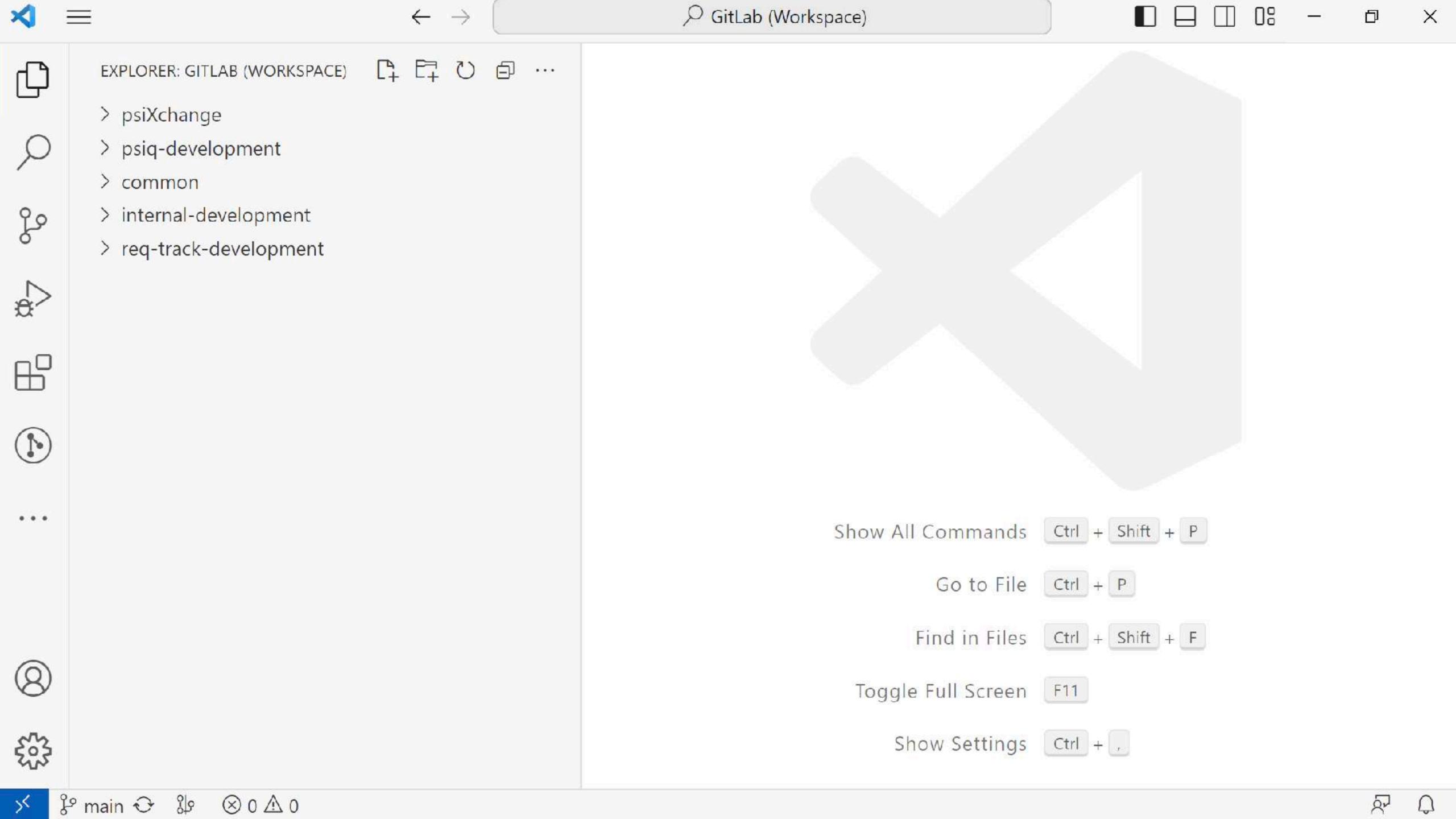
- Git

- Visual Studio Code (+ SQL Developer Extension)

- SQLcl (including Liquibase)

- SQL Developer (PL/SQL Developer / TOAD)

CLONE

> 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 + ,

PULL
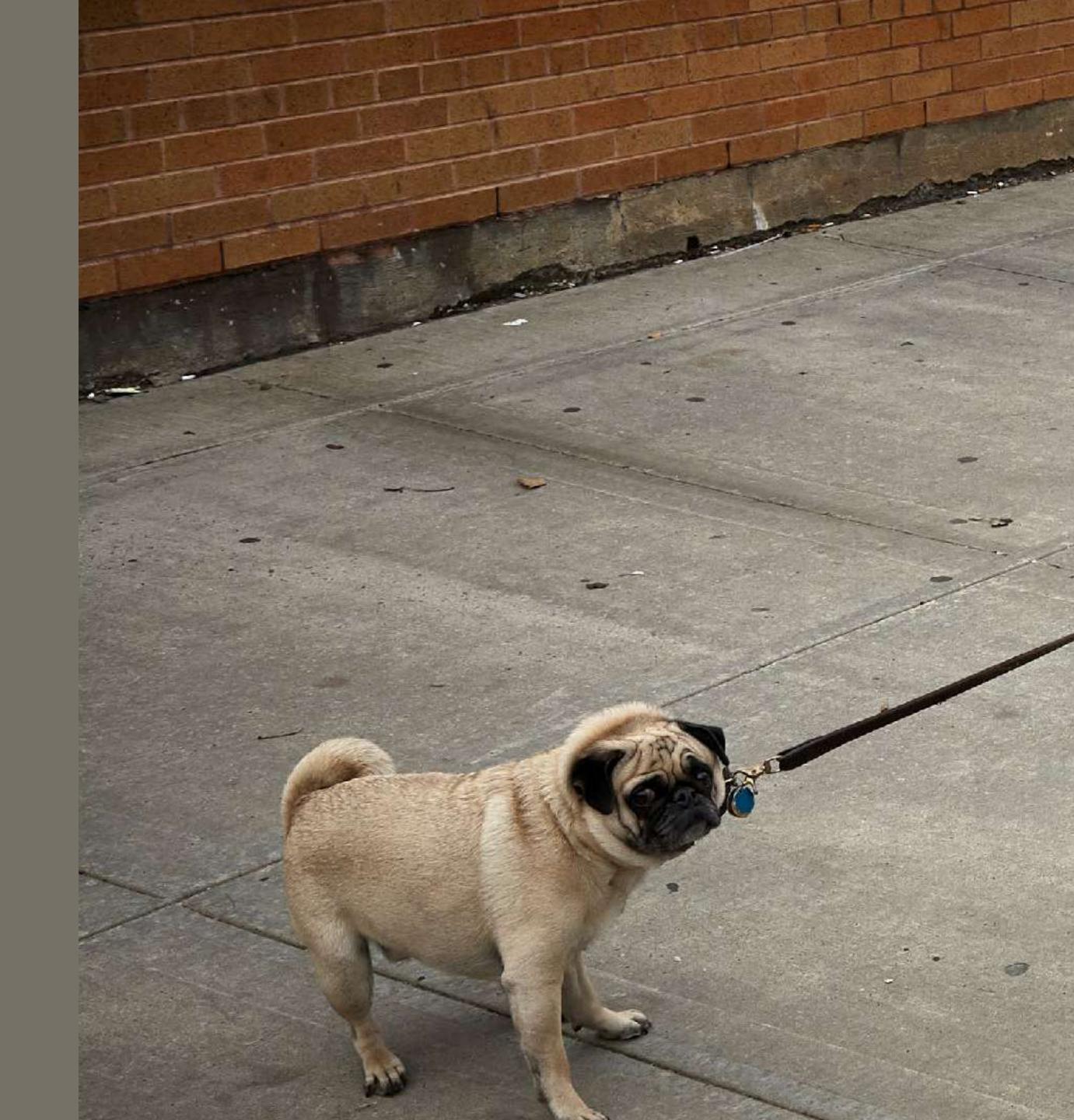
PULL to refresh

- Sync your local repo with central

Liquibase

Learn   Connect   Contribute   Join   Blog

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.
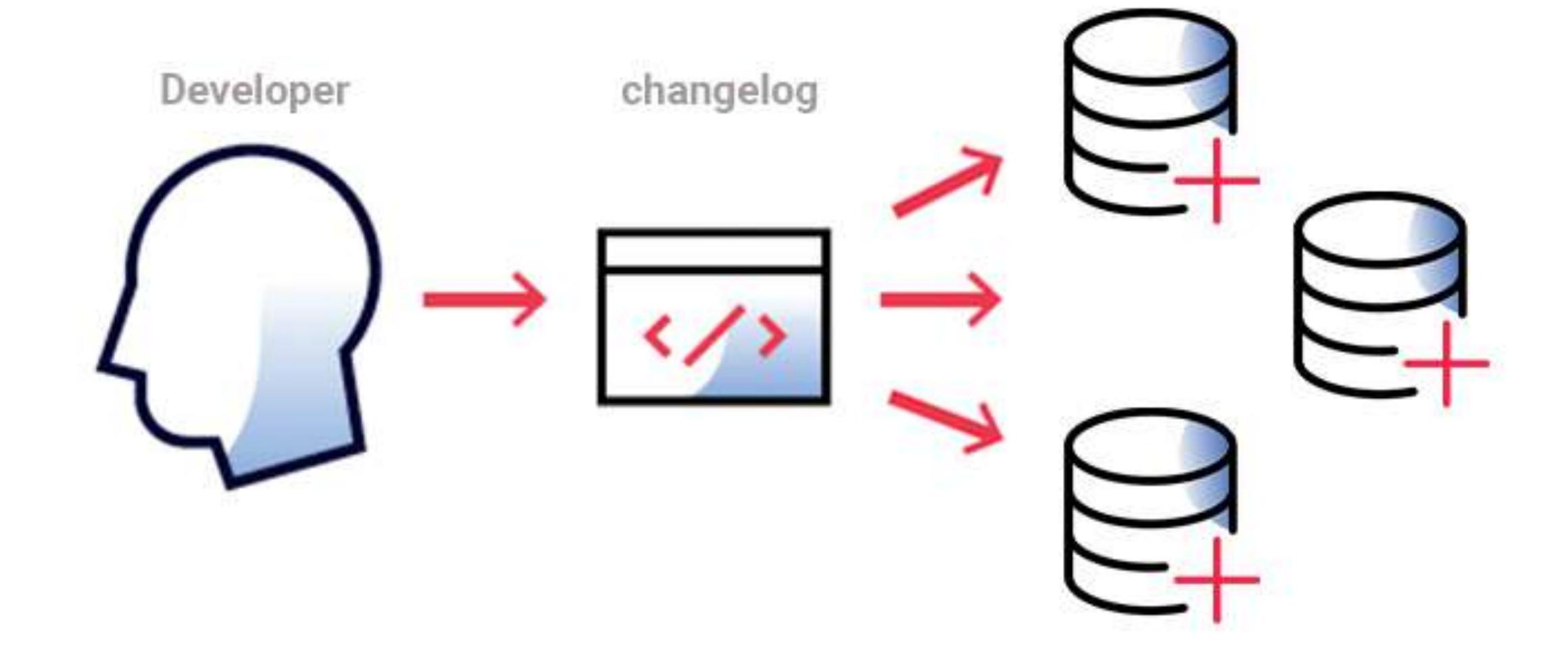
Flexible database change

Version control for your database

Built for developers

Developer → changelog → (databases)

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
```
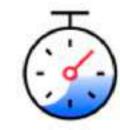
BRANCH

Code

- APEX

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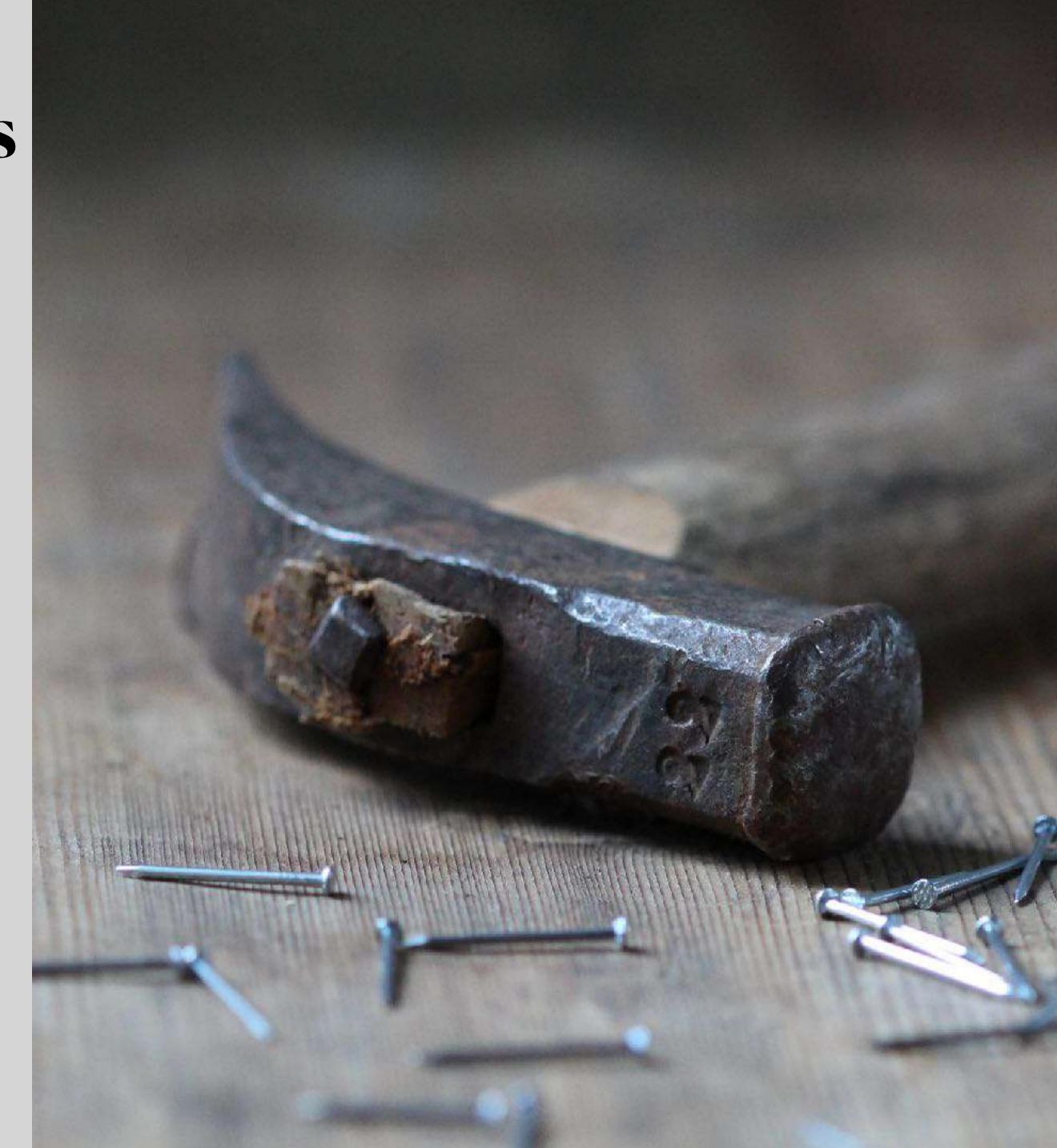
```
lb generate-object -obt table -obn <tablename>


(update the controller.xml)
```
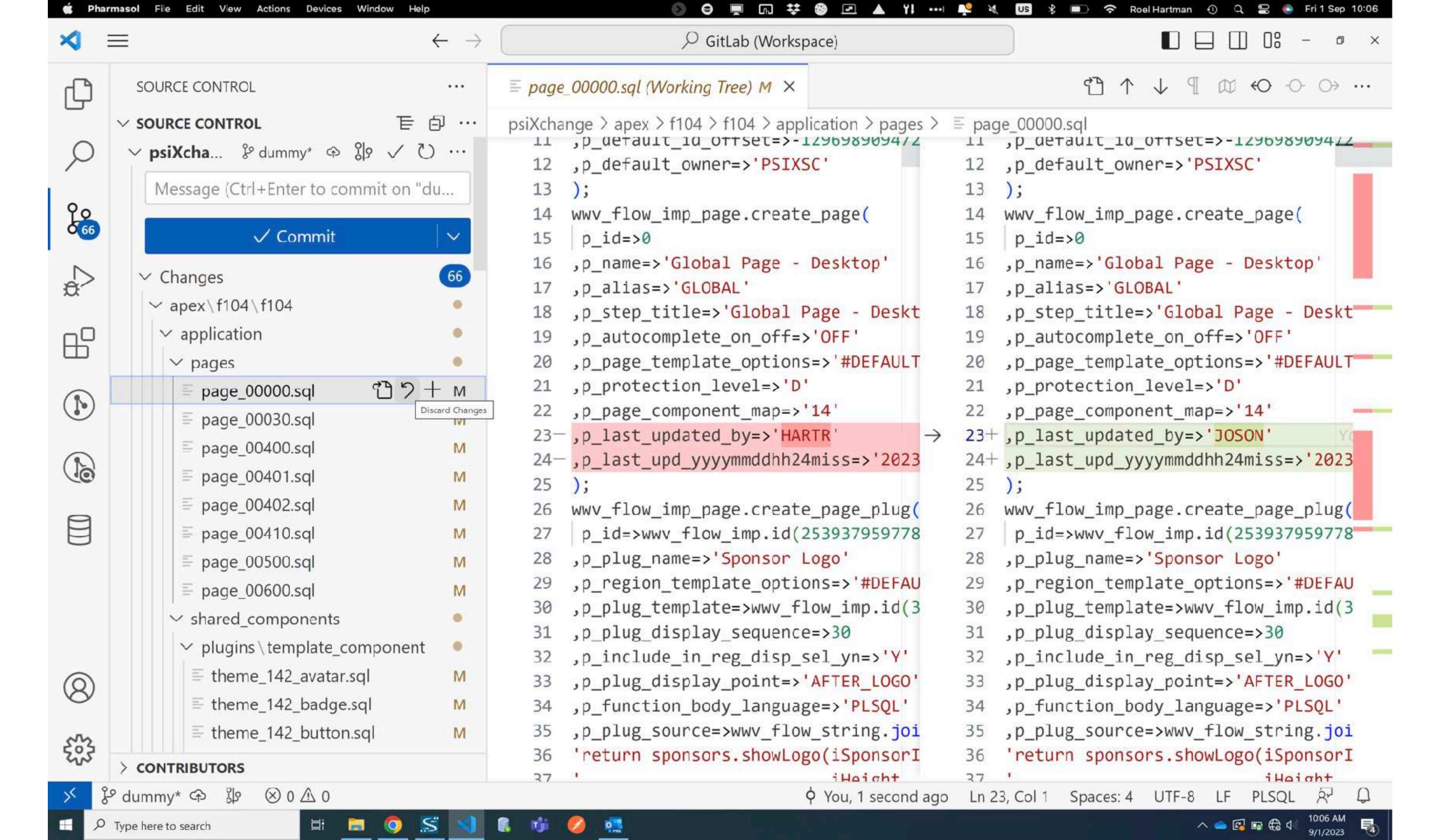
COMMIT

COMMIT only REAL changes

- pick **your** APEX changes

GitLab (Workspace)

SOURCE CONTROL   ···

page_00000.sql (Working Tree) M   ✕

⌄ SOURCE CONTROL

⌄ psiXcha...   ⌄ dummy*   ✓

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

✓ Commit

⌄ Changes   66

⌄ apex\f104\f104
  ⌄ application
    ⌄ pages
      page_00000.sql   M
      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=>-1296989094722        11  ,p_default_id_offset=>-1296989094722
12  ,p_default_owner=>'PSIXSC'                    12  ,p_default_owner=>'PSIXSC'
13  );                                            13  );
14  wwv_flow_imp_page.create_page(                14  wwv_flow_imp_page.create_page(
15   p_id=>0                                      15   p_id=>0
16  ,p_name=>'Global Page - Desktop'              16  ,p_name=>'Global Page - Desktop'
17  ,p_alias=>'GLOBAL'                            17  ,p_alias=>'GLOBAL'
18  ,p_step_title=>'Global Page - Deskt           18  ,p_step_title=>'Global Page - Deskt
19  ,p_autocomplete_on_off=>'OFF'                 19  ,p_autocomplete_on_off=>'OFF'
20  ,p_page_template_options=>'#DEFAULT           20  ,p_page_template_options=>'#DEFAULT
21  ,p_protection_level=>'D'                      21  ,p_protection_level=>'D'
22  ,p_page_component_map=>'14'                   22  ,p_page_component_map=>'14'
23- ,p_last_updated_by=>'HARTR'              →    23+ ,p_last_updated_by=>'JOSON'
24- ,p_last_upd_yyyymmddhh24miss=>'2023          24+ ,p_last_upd_yyyymmddhh24miss=>'2023
25  );                                            25  );
26  wwv_flow_imp_page.create_page_plug(           26  wwv_flow_imp_page.create_page_plug(
27   p_id=>wwv_flow_imp.id(253937959778           27   p_id=>wwv_flow_imp.id(253937959778
28  ,p_plug_name=>'Sponsor Logo'                  28  ,p_plug_name=>'Sponsor Logo'
29  ,p_region_template_options=>'#DEFAU           29  ,p_region_template_options=>'#DEFAU
30  ,p_plug_template=>wwv_flow_imp.id(3           30  ,p_plug_template=>wwv_flow_imp.id(3
31  ,p_plug_display_sequence=>30                  31  ,p_plug_display_sequence=>30
32  ,p_include_in_reg_disp_sel_yn=>'Y'            32  ,p_include_in_reg_disp_sel_yn=>'Y'
33  ,p_plug_display_point=>'AFTER_LOGO'           33  ,p_plug_display_point=>'AFTER_LOGO'
34  ,p_function_body_language=>'PLSQL'            34  ,p_function_body_language=>'PLSQL'
35  ,p_plug_source=>wwv_flow_string.joi           35  ,p_plug_source=>wwv_flow_string.joi
36  'return sponsors.showLogo(iSponsorI           36  'return sponsors.showLogo(iSponsorI
37  '                        iHeight             37  '                        iHeight
```

Discard Changes

⌃ dummy*   ⊗ 0   ⚠ 0   ⚲ You, 1 second ago   Ln 23, Col 1   Spaces: 4   UTF-8   LF   PLSQL

Type here to search   10:06 AM 9/1/2023

COMMIT only REAL changes

- pick **<u>your</u>** APEX changes

- styling is irrelevant

  - auto format - for changed objects

  - (re)apply formatted code

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Trivadis / **plsql-formatter-settings**   Public

🔔 Notifications   Fork 41   ⭐ Star 117

<> Code   ⊙ Issues   Pull requests 1   ▷ Actions   ⊟ Projects   ⊘ Security   Insights

⌥ main ⌄   2 branches   18 tags

Go to file   Code ⌄

PhilippSalvisberg back to snapshot version 23.1.1-SNAPSHOT   e077947 · 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

```bash
        if [ "$SHOW_COMMAND" = true ]; then
          echo "Schema = ${schema} > Type = ${type}"
          echo "lb generate-object -object-type ${objecttype} -object-name ${objectna
        fi
        xmlfile="${objectname}_${objecttype}.xml"
        sql $SQLCL_OPTS <<EOF
${login}
prompt Info: Compile $f to ${login} (1/4)
set define off
@@$f
set define on

prompt Info: Generate Liquibase object for ${objectname} (2/4)
lb generate-object -object-type ${objecttype} -object-name ${objectname} ${runalway

prompt Info: Move Liquibase file to Liquibase directory (3/4)
!mv -f &_PWD./${xmlfile} &_PWD./${schema}/liquibase/${objecttype}

prompt Info: Done! (4/4)
exit
EOF
        # Ensure Liquibase files are considered in this commit
        git add ${schema}\\liquibase\\${objecttype}\\${xmlfile}
    done
}
```

COMMIT only REAL changes

- pick **<u>your</u>** APEX changes

- styling is irrelevant

  - auto format - for changed objects

  - (re)apply formatted code

- push changes

my_contact_staging_vw.sql M ✕   my_site_staging_vw.sql M   my_inst

SOURCE CONTROL

psiXchange > PSIXCTM > views > ≡ my_contact_staging_vw.sql > ...

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

You, 1 second ago | 3 authors (You and others)

```sql
create or replace view my_contact_staging_vw as
   select *
     from contact_staging csg
    where (uploaded_by = sys_context('APEX$SESSION', 'APP_USER') -- My u|
              or exists (
                 select 1
                   from my_studies_vw mst
                  where csg.study_id = mst.study_id
                    and mst.access_flag <> 'R'
              ))
      and csg.sponsor_id = to_number(sys_context('psix$session', 'current
/
```
                Roel Hartman, 16 months ago • Feedback week14 ...

D2241*   ⊗ 0 ⚠ 0   ◇ Roel Hartman, 16 months ago   Ln 12, Col 1   Spaces: 2   UTF-8   CRLF   PLSQL

code pushed to GitLab > GitLab trigger GitLab Runner > install dependencies, run tests job

MERGE REQUEST

MERGE REQUEST - pipeline

- run unit test
- code review
- approve

```yaml
# after merging with master >> update test environment
Deploy to test database (bash):
  <<: *bash_template
  script:
    - export DTAP_ENV="test"
    - ${CI_PROJECT_DIR}/common/sqlcl/bin/sql /nolog @./scripts/jobs/update.sql
  artifacts:
    when: always
    paths:
      - $CI_PROJECT_DIR/build/*.log
  only:
    - master
  except:
    - schedules

# upon schedule >> calculate difference between TEST and DEV
Diff TEST and DEV (bash):
  <<: *bash_template
  script:
    - export DTAP_ENV="test"
    - sql /nolog @./scripts/jobs/diff.sql
    - sh ./scripts/jobs/diff-check.sh
  artifacts:
    when: always
    paths:
```

Search GitLab

psiXchange > psiX Development > Merge requests > !702

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 ⋮

```
@@ -4,12 +4,7 @@                                    @@ -4,12 +4,7 @@
4   xmlns:xsi="http://www.w3.org/2001/XM          4   xmlns:xsi="http://www.w3.org/2001/XM
    LSchema-instance"                                  LSchema-instance"

5   xsi:schemaLocation="http://www.liqui         5   xsi:schemaLocation="http://www.liqui
    base.org/xml/ns/dbchangelog                        base.org/xml/ns/dbchangelog

6   http://www.liquibase.org/xml/ns/dbch         6   http://www.liquibase.org/xml/ns/dbch
    angelog/dbchangelog-latest.xsd">                   angelog/dbchangelog-latest.xsd">

7 -     <include                                   7 +     <includeAll path="sequence\"/>
        file="sequence\aop_pdf_form_seq_sequ
        ence.xml"/>

8 -     <include
        file="sequence\aop_sample_cust_seq_s
```

Not secure | ~~https~~://git.pharmasol.local/psixchange/psix-development/-/merge_requests

Search GitLab /

psiX Development

psiXchange > psiX Development > **Merge requests**

Project information

Repository

Merge requests   1

CI/CD

Deployments

Wiki

External wiki

Snippets

Settings

Open 1   Merged 684   Closed 16   All 701

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Created date ▾

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

Collapse sidebar

https://git.pharmasol.local/psixchange/psix-development/-/snippets

RELEASE

- Tag a commit

- Download the repo from that point in time

- Use Liquibase for deployment

GIT BRANCHING STRATEGY

v3.2	v3.1	v3.0
develop	validation	release

DEV → **DEV** → **DEV** → DEV-CDB

TEST **VAL** **TEST** TST-CDB

develop validation release

branch └→ feature branch └→ defect branch └→ hotfix

Merge backwards

TAKE AWAYS

- Learn / use Git

- Learn / use SQLcl - Liquibase

- Automate & script

- Easy to use

Answers 1km →

@RoelH
roel@apexconsulting.nl