

Do. 21.11.24, DOAG-Konferenz 2024

# Quasto 24.1


## Qualitätssicherung einfach und kostenfrei

Oliver Lemm

code of change



# über mich

Fachbereichsleiter APEX / stellv. Leiter Low Code @  Hyand  
Architekt, Projekt Manager & Entwickler



6,144 posts



**Oliver Lemm**  
@OliverLemm

APEX & Oracle DB architect and specialist from Germany  
DevOps, Testing and all about PL/SQL  
Oracle ACE Pro ♠

📁 Science & Technology 📍 Germany 📅 Joined February 2011

65 Following 1,785 Followers

Index, Hyand Px Grotesk Light, 15 pt

1. Einleitung

2. Architektur „Update“

3. Release 24.1

4. Live Demo

5. Fazit

# Quasto - <https://github.com/mt-ag/quasto>

 quasto Public








 Edit Pins ▾  Unwatch 9 ▾  Fork 3 ▾  Star 9 ▾

 dev ▾  16 Branches  8 Tags

 Add file ▾  Code ▾

About 

a project for checking guidelines and code quality for oracle databases

-  Readme
  -  MIT license
  -  Activity
  -  Custom properties
  -  9 stars
  -  9 watching
  -  3 forks
- [Report repository](#)

Releases 6

 Release 24.1 Latest  
on Jun 28

[+ 5 releases](#)

Contributors 5



 README  MIT license  

## QUASTO - The Quality Assurance Tool for Oracle databases

### Table of Contents

- [QUASTO framework](#)
  - [What is QUASTO?](#)
  - [Installing QUASTO](#)
  - [Using QUASTO](#)
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  - [Installing utPLSQL](#)
- [Logger framework](#)
  - [What is the logger?](#)
  - [Using the logger](#)
- [Upcoming Features](#)

# utPLSQL - <https://github.com/utPLSQL/utPLSQL>

utPLSQL Public

Watch 61

Fork 186

Starred 563

develop

26 Branches 30 Tags

Go to file

Add file

Code

## About

Testing Framework for PL/SQL

[www.utplsql.org/](http://www.utplsql.org/)

unit-testing coverage oracle oracle-db  
code-coverage utplsql oracle-database  
pl-sql

Readme  
Apache-2.0 license  
Code of conduct  
Activity  
Custom properties















563 stars  
61 watching  
186 forks

Report repository

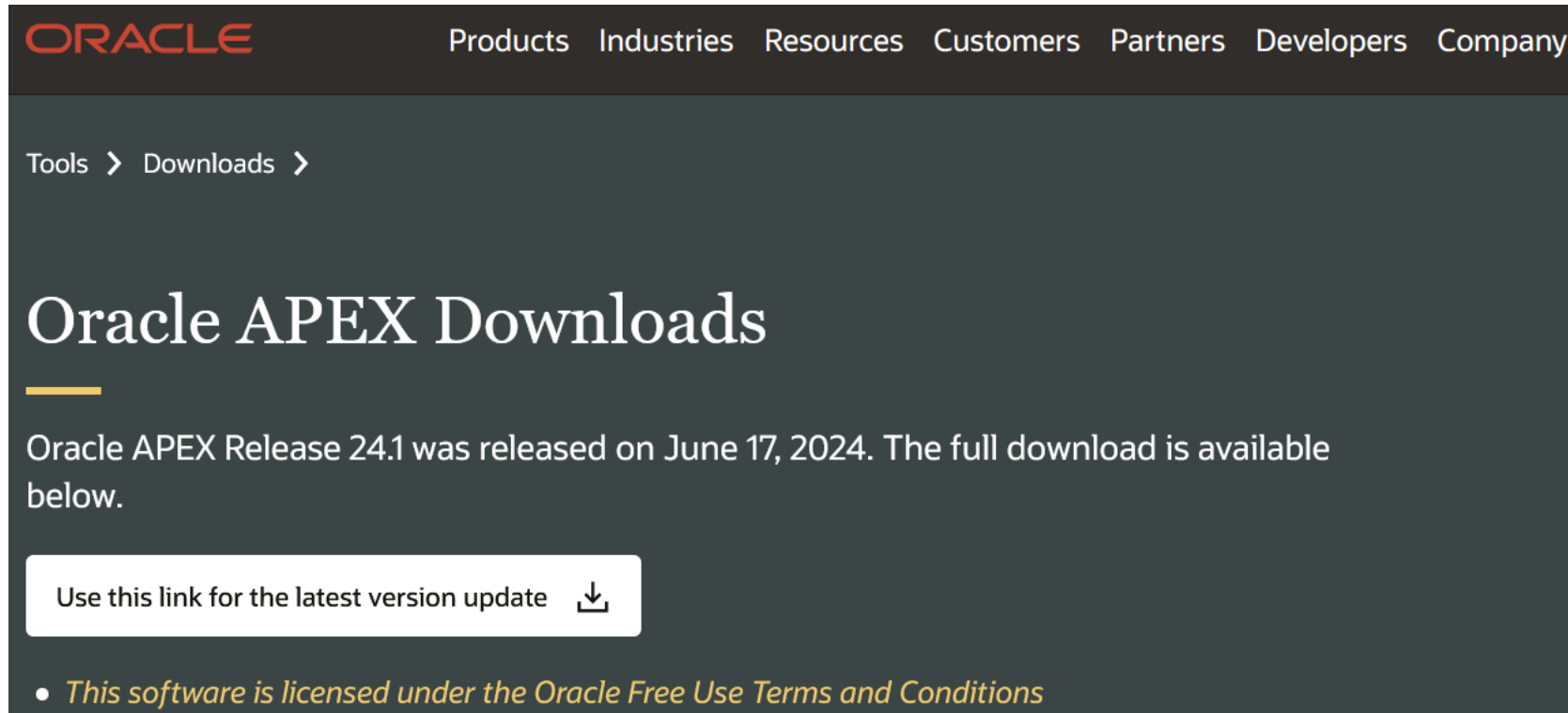
Releases 29

v3.1.14 Latest  
on Feb 19

+ 28 releases

 <b>github-actions[bot]</b> Updated project version after build [skip ci]	1819ca7 · last month	🕒 3,460 Commits
 .github	Update build.yml to use actions/upload-artifact@v4	2 months ago
 development	Remove deprecated github actions and update releasing do...	9 months ago
 docs	Updated project version after build [skip ci]	last month
 examples	Update RunExampleTestSuiteWithCompositeReporter.sql	last year
 source	Updated project version after build [skip ci]	last month
 test	Update test_documentation_reporter.pkb	last month
 .gitattributes	Removed unneeded files from the release archives.	9 months ago
 .gitignore	ignore cobertura.xml which is created by a test run (#965)	5 years ago
 .gitmodules	Markdown Documentation Framework	8 years ago
 BUILD_NO	Updated project version after build [skip ci]	last month
 CODE_OF_CONDUCT.md	Create CODE_OF_CONDUCT.md	5 years ago
 CONTRIBUTING.md	Fix for unit-test results reporting into Sonar	2 years ago
 LICENSE	Updated copyright year	5 years ago

# Oracle Application Express – “APEX”




The screenshot shows the Oracle APEX Downloads page. At the top, the Oracle logo is on the left, and navigation links for Products, Industries, Resources, Customers, Partners, Developers, and Company are on the right. Below the navigation, there is a breadcrumb trail: Tools > Downloads >. The main heading is "Oracle APEX Downloads" with a yellow underline. Below the heading, a paragraph states: "Oracle APEX Release 24.1 was released on June 17, 2024. The full download is available below." A white button with a black border contains the text "Use this link for the latest version update" followed by a download icon. At the bottom, there is a bullet point: "• *This software is licensed under the Oracle Free Use Terms and Conditions*".


<https://www.oracle.com/tools/downloads/apex-downloads/>

# Logger\* - <https://github.com/OraOpenSource/Logger>


 **Logger** Public


 Watch 75


 Fork 119

 Starred 311

forked from [tmuth/Logger---A-PL-SQL-Logging-Utility](#)

 master

 2 Branches  7 Tags


 Go to file


t










Add file

 Code

This branch is [201 commits ahead of](#), [1 commit behind](#) [tmuth/Logger---A-PL-SQL-Logging-Utility:master](#).

 **martindsouza** doc fixes

600f0c4 · 7 years ago  334 Commits

 build	<a href="#">#127: Add logger_prefs.pref_type</a>	9 years ago
 demos	<a href="#">#127: Add logger_prefs.pref_type</a>	9 years ago
 docs	doc fixes	7 years ago
 releases	<a href="#">#136</a> fix (still needs to be cleaned up)	9 years ago
 source	fixed typo: using -> uses	9 years ago
 tests	Added test for log_params	10 years ago
 .gitignore	Minor	9 years ago
 LICENSE	<a href="#">#90: Change license to MIT</a>	9 years ago
 README.md	Fix Github Markdown header issues, broken links to docume...	7 years ago

## About


Logger is used by Oracle developers to instrument their PL/SQL code

 [www.oraopensource.com/logger/](http://www.oraopensource.com/logger/)

 Readme

 MIT license

 Activity

 Custom properties


 311 stars

 75 watching

 119 forks


Report repository

## Releases 3

 **3.1.1** Latest  
on Aug 17, 2015

[+ 2 releases](#)

# clone oder direkter Download?

 Clone ? ×

Repository to clone:  Browse

Destination:  Browse

Subdirectory to create:

Branch:

The repository will be cloned to a new directory located here:  
E:\20241119 - DOAG 2024\Quasto 24.1\quasto (New directory)

Releases 6

 **Release 24.1** Latest  
on Jun 28

+ 5 releases

Releases / v24.1

## Release 24.1 Latest

 OliverLemm released this Jun 28 v24.1 0fa

### New Features:

- Improved Usability of our APEX Quasto App
- Real Time Execution of Rules in the Quasto App
- Upload Rules as JSON and edit them with the App
- new Region Plugin to show Rule execution Result
- improved installation process
- closer Integration of Execution of APEX Rulesets

### Assets 2

 [Source code \(zip\)](#)



# Quasto installieren

Schema „QUASTO“ erstellen

SYS - SQL>grant create procedure, public synonym, sequence, table, trigger, type, view, job, session to quasto;

QUASTO – SQL>@install [1/0] [1/0] [1/0] [1/0]

Parameter

1. Parameter => utPLSQL Unterstützung
2. Parameter => APEX Unterstützung
3. Parameter => Jenkins Unterstützung
4. Parameter => Logger Unterstützung

```
SQL> @install 1 1 1 1
Running SQL file to install the objects on the database. Run
SQL file for installing all necessary objects on the database.
'-----'
The install scripts expects 4 different arguments.
These arguments are expected in a certain order, as follows

example usage:
@install [1/0] [1/0] [1/0] [1/0]

Argument 1:
Do you want to install supporting objects for utPLSQL?
(yes/no) (1/0)
'-----'
Argument 2:
Do you want to install supporting objects for Oracle APEX?
(yes/no) (1/0)
'-----'
Argument 3:
Do you want to install supporting objects for Jenkins?
(yes/no) (1/0)
'-----'
Argument 4:
Do you wish to install a lightweight logger functionality f
(yes/no) (1/0)
'-----'

PL/SQL-Prozedur erfolgreich abgeschlossen.

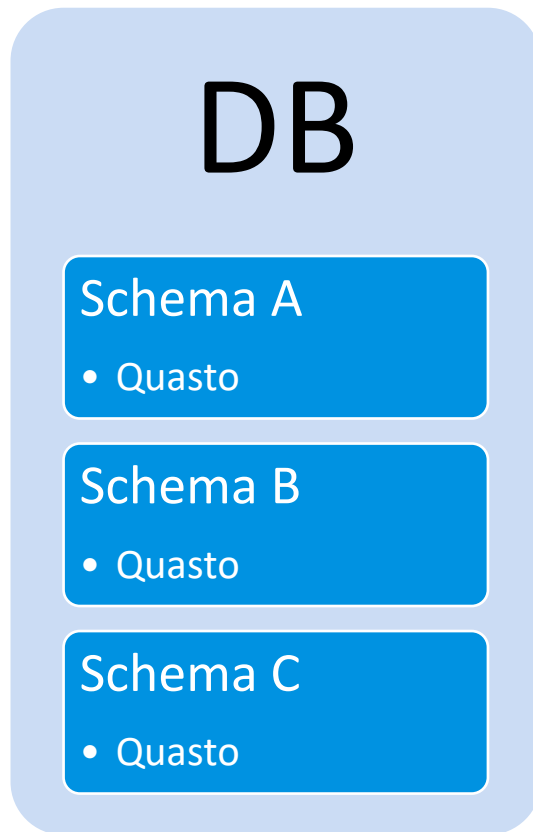
PL/SQL-Prozedur erfolgreich abgeschlossen.

install_utplsql_objects.sql
scripts/recompile_utplsql_objects.sql
scripts/recompile_apex_objects.sql
install_apex_objects.sql

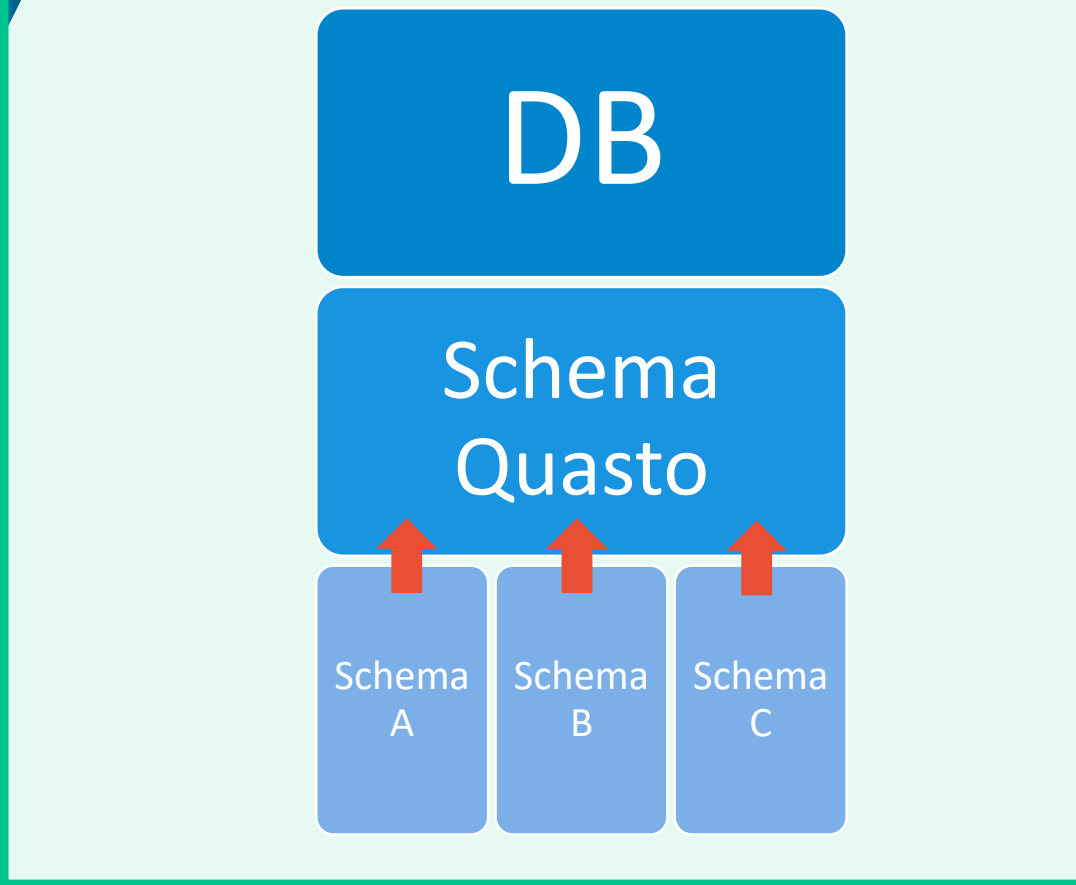
PL/SQL-Prozedur erfolgreich abgeschlossen.
```

# Architektur “Update”

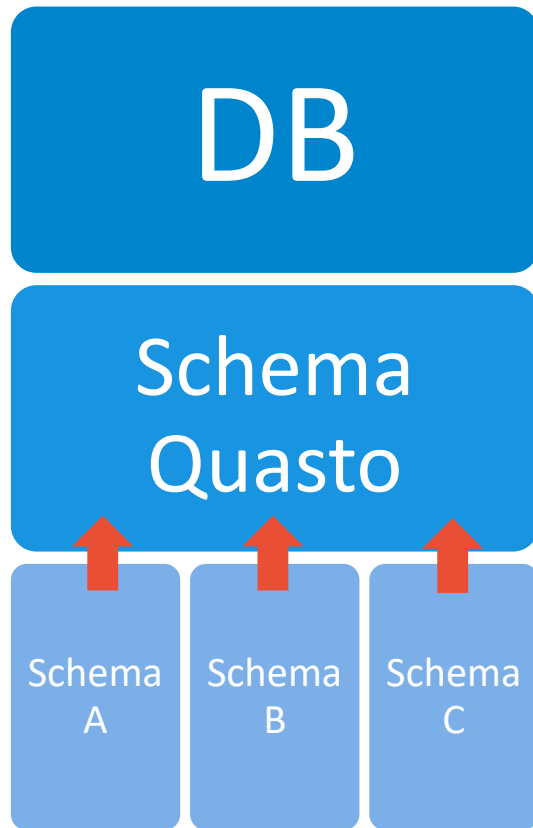
# Quasto jeweils im Testschema



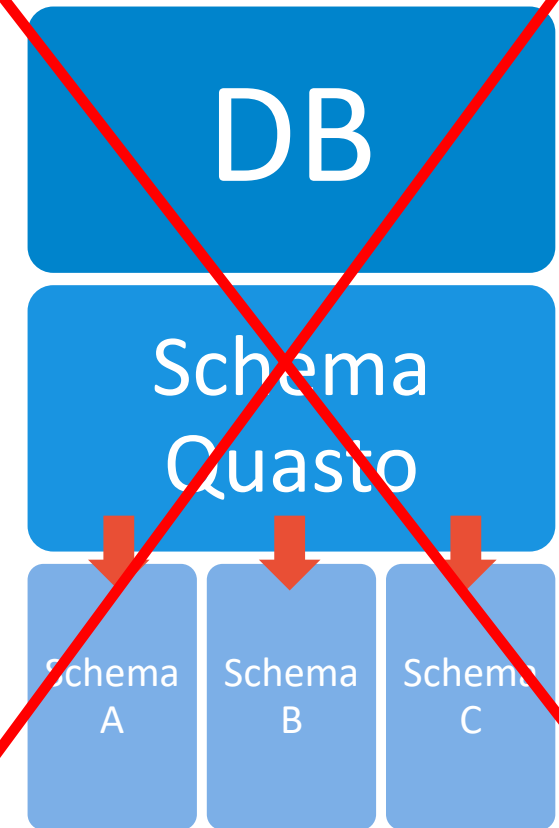
# Zentrales Quastoschema wird aufgerufen



# Zentrales Quastoschema wird aufgerufen



# Zentrales Quastoschema mit "Remote Call"



# Livedemo

# Release 24.1

# Quasto 24.1

## Release 24.1 Latest

 OliverLemm released this Jun 28  v24.1  0fa7e70

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### New Features:

- Improved Usability of our APEX Quasto App
- Real Time Execution of Rules in the Quasto App
- Upload Rules as JSON and edit them with the App
- new Region Plugin to show Rule execution Results
- improved installation process
- closer Integration of Execution of APEX Rulesets

# Maintain rules in APEX App

## Add/Edit Rule

Rule Number  
1

Client Name  
hyand

Name  
Tables without PK

Category \*  
 APEX  DATA  DDL

Layer \*  
 APPLICATION  DATABASE  PAGE

Error Level \*  
 Error  Info  Warning

Active \*

Comment

Error Message  
The table has no Primary Key.

Object Types  
TABLE

Exclude Objects

PROCESS, TABLE, VIEW, PACKAGE, PACKAGE BODY, ITEM  
Use a colon (:) to separate each object type.

Use a colon (:) to separate each object.

SQL Statement

```
with param as
(select :1 scheme
,;2 qaru_id
,;3 qaru_category
,;4 qaru_error_level
,;5 qaru_object_types
,;6 qaru_error_message
,;7 qaru_sql
from dual)
select qa_rule_t(pi_qaru_id => p.qaru_id
,pi_qaru_category => p.qaru_category
,pi_qaru_error_level => p.qaru_error_level
,pi_qaru_error_message => p.qaru_error_message
,pi_qaru_object_types => p.qaru_object_types
,pi_qaru_sql => p.qaru_sql
,pi_scheme_name => p.scheme
,pi_object_id => ao.object_id
,pi_object_name => ao.object_name
,pi_object_details => ao.object_name || ' without primary key'
,pi_object_type => 'TABLE'
,pi_object_value => null
,pi_object_updated_user => null
,pi_object_updated_date => ao.last_ddl_time)
from param p
cross join all_tables at
join all_objects ao on at.table_name = ao.object_name
where (ao.owner = p.scheme or p.scheme is null)
and not exists (select null
from all_constraints cons
join all_cons_columns cols on cols.constraint_name = cons.constraint_name
where cols.table_name = at.table_name
and cons.constraint_type = 'P'
and cons.status = 'ENABLED')
```

Close

Create



# DDL, DML und APEX Vorlagen

## ▼ Example 3: APEX based rule for checking if "Never" Condition is used

## ▼ Example 2: DML based rule for checking if tables

```
with param as
(select :1 scheme
, :2 qaru_id
, :3 qaru_category
, :4 qaru_error_level
, :5 qaru_object_types
, :6 qaru_error_message
, :7 qaru_sql
from dual)
select qa_rule_t(pi_qaru_id => p.q
, pi_qaru_category => p.q
, pi_qaru_error_level => p.q
, pi_qaru_error_message => p.q
, pi_qaru_object_types => p.q
, pi_qaru_sql => p.q
, pi_scheme_name => p.s
, pi_object_id => src
, pi_object_name => src
, pi_object_details => src
, pi_object_type => 'TA
, pi_object_value => src
, pi_object_updated_user => src
, pi_object_updated_date => src
from param p
cross join (select null as object_id
, 'QA_RULES' as object_name
```

## ▼ Example 1: DDL based rule for checking p

```
with param as
(select :1 scheme
, :2 qaru_id
, :3 qaru_category
, :4 qaru_error_level
, :5 qaru_object_types
, :6 qaru_error_message
, :7 qaru_sql
from dual)
select qa_rule_t(pi_qaru_id
, pi_qaru_category
, pi_qaru_error_level
, pi_qaru_error_message
, pi_qaru_object_types
, pi_qaru_sql
, pi_scheme_name
, pi_object_id
, pi_object_name
, pi_object_details
, pi_object_type
, pi_object_value
, pi_object_updated_user
, pi_object_updated_date
```

```
with param as
(select :1 scheme
, :2 qaru_id
, :3 qaru_category
, :4 qaru_error_level
, :5 qaru_object_types
, :6 qaru_error_message
, :7 qaru_sql
, :8 apex_app_id
, :9 apex_page_id
from dual)
select qa_rule_t(pi_qaru_id => qaru_id
, pi_qaru_category => qaru_category
, pi_qaru_error_level => qaru_error_level
, pi_qaru_error_message => qaru_error_message
, pi_qaru_object_types => qaru_object_types
, pi_qaru_sql => qaru_sql
, pi_scheme_name => scheme
, pi_object_id => object_id
, pi_object_name => object_name
, pi_object_details => 'The Item ' || object_name || ' on Page
, pi_object_type => object_type
, pi_object_value => object_value
, pi_object_updated_user => object_updated_user
, pi_object_updated_date => object_updated_date
, pi_apex_app_id => c.apex_app_id
, pi_apex_page_id => c.apex_page_id)
from param p
cross join (select 'ITEM' object_type
```

# Regeln per Job ausführen

Rules Search...


## Config Scheduler Job ✕

**Overview**

First Start 07-JUL-2023 01:00	Last Start	Last Duration ::	Next Run	Repeat Interval FREQ=DAILY	Job State DISABLED
----------------------------------	------------	---------------------	----------	-------------------------------	-----------------------

[▶ Run Cronjob Now](#)

**Job History**

 The following report shows the execution status of recent runs of the scheduler cronjob. Please note that the output only shows process states as well as errors if the execution of the Unit test logics failed. It does not indicate whether invalid objects that do not comply with the QUASTO rules were found or not.

The Cronjob has not run recently.

Close Enable schedule for Cronjob  [Save](#)

# Generate Unit Test Packages

## Unit Test Generation



Select the scheme names for which you want to generate or delete the Unit Tests for. If you don't select any schemes, all schemes listed below will be affected. In case of generation, a Unit Test procedure will be created for each QUAστο rule. If Unit Test procedures already existed for an affected scheme, they will be removed before they get recreated.

**Unit Tests created.**

Scheme Names

APEX  
APEX\_230200  
APEX\_240100  
APEX\_PUBLIC\_ROUTER  
APEX\_VISUALIZER  
APEX\_WORLD\_2024



>> DOAG\_2024  
>  
<  
<<

▶ **Generated Unit Test Packages**

Option

**Single Package per Scheme**  Single Package per Scheme and Rule

Close

**Delete Unit Tests**

**Generate**

# Work with results

🕒 Config Scheduler Job
📄 Test Result Files

Success - 67%

Failure - 33%

Σ Amount of Tests

11/18/2024

Execution Dates

Date	Scheme Name	ID	Test Result	Details	Restart	Category	Rule Name	Layer	Error Level	Active	Runtime Error	Program Name
Client Name: hyand												
11/18/2024	DOAG_2024	3	Success		▶	APEX	No use of never condition	PAGE	Error	Yes		QA_UT_DOAG_2024_HYAND_PKG.
		2	Success		▶	DATA	Table with no Data	DATABASE	Warning	Yes		QA_UT_DOAG_2024_HYAND_PKG.
		1	Failure	👁	▶	DDL	Tables without PK	DATABASE	Error	Yes		QA_UT_DOAG_2024_HYAND_PKG.

1 - 3

**Filter**

🔍 Search...

**Categories** ⋮

APEX (1)

DATA (1)

DDL (1)

**Clients/Projects** ⋮

hyand (3)

**Schemes** ⋮

DOAG\_2024 (3)

**Test Results** ⋮

Success (2)

Failure (1)

**Error Levels** ⋮

Error (2)

Warning (1)

# Region Plugin

Demonstration - EMP / DEPT

Home Dashboard Employees Departments Administration

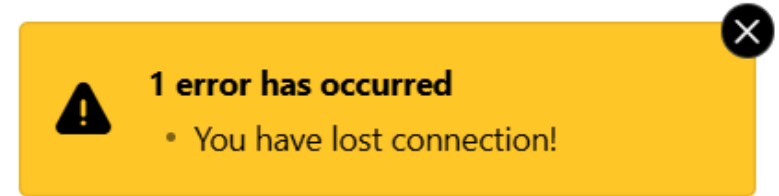
Dashboard

Quasto

#	Error Level	Rule Number	Rule Name	Object Type	Object Name	Details
1	1	No use of never condition	3	BUTTON	New	The Item New on Page 2 in Demonstration - EMP / DEPT has a never condition!
2	1	No use of never condition	3	BUTTON	New_1	The Item New_1 on Page 2 in Demonstration - EMP / DEPT has a never condition!
3	1	No use of never condition	3	DA	New	The Item New on Page 2 in Demonstration - EMP / DEPT has a never condition!
4	1	No use of never condition	3	ITEM	P2_NEW	The Item P2_NEW on Page 2 in Demonstration - EMP / DEPT has a never condition!
5	1	No use of never condition	3	ITEM	P2_NEW_1	The Item P2_NEW_1 on Page 2 in Demonstration - EMP / DEPT has a never condition!
6	1	No use of never condition	3	REGION	Employees per Job	The Item Employees per Job on Page 2 in Demonstration - EMP / DEPT has a never condition!
7	1	No use of never condition	3	REGION	Total Salary per Department	The Item Total Salary per Department on Page 2 in Demonstration - EMP / DEPT has a never condition!

# Fazit

# APEX & Offlinefähigkeit by Hyand



- Nutzung von APEX-Anwendungen auch ohne aktive Verbindung zur Datenbank
- Vermeidung von Datenverlust
- Look & Feel der APEX-Komponenten bleibt erhalten
- Datenansicht und -bearbeitung
- Geräteunabhängige und persistente Speicherung im Browser Storage
- Mechanismen zum Synchronisieren von lokalen Änderungen
- Wiederverwendbarkeit durch Plugins



# LCT – An Apex App to test Apex Apps

LCT – Low Code Testing
LLENFFER@MT-AG.COM

- Worksheets
- Queue
- Import/Export
- Test Suites
- Administration

Queue \

Search: All Text Columns

General			Execution				Audit Values		
Actions	Execution Name	Version	Execution Point	Status	Successful/Total Cases	(min)	Output Log	Created By	Created On
	testTestSuite - Test switch Step - PLA...	#24	28.02.24 11:48					LCT	27.02.2024 11:49:50.36
	testTestSuite - Test checkforError Ste...	#20	27.02.24 11:49		4/4	00:26		LCT	27.02.2024 11:49:09.77
	testTestSuite - Test switch Step - PLA...	#24	27.02.24 11:48		0/1	00:13		LCT	26.02.2024 11:49:38.21
	testTestSuite - Test checkforError Ste...	#20	26.02.24 11:48		4/4	00:25		LCT	26.02.2024 11:48:57.88
	testTestSuite - Test switch Step - PLA...	#24	26.02.24 11:48		0/1	00:14		LCT	25.02.2024 11:50:30.33
	testTestSuite - Test checkforError Ste...	#20	25.02.24 11:49		3/4	00:48		LCT	25.02.2024 11:49:27.34
	testTestSuite - Test switch Step - PLA...	#24	25.02.24 11:48		0/1	00:14		LCT	24.02.2024 11:49:52.25
	testTestSuite - Test checkforError Ste...	#20	24.02.24 11:49		4/4	00:26		LCT	24.02.2024 11:49:13.97
	testTestSuite - Test switch Step - PLA...	#24	24.02.24 11:48		0/1	00:16		LCT	23.02.2024 11:49:46.41
	testTestSuite - Test checkforError Ste...	#20	23.02.24 11:48		3/4	00:51		LCT	23.02.2024 11:48:34.31
	testTestSuite - Test switch Step - PLA...	#24	23.02.24 11:48		0/1	00:10		LCT	22.02.2024 11:49:16.51
	Test test Data Browser Step...	#0	23.02.24 10:40		1/1	00:04		LLENFFER@MT	23.02.2024 10:40:30.36

LiveLog - Queue ID: 623

```

249 locator.click(iframe // internal:control-enter-frame // [role=
action=save]) (118 ms)
250 /* |> StepEnd: #913 (120ms) */
251 /* |> StepStart: #910 */
252   ✓ page.waitForLoadState (3 ms)
253   ✓ locator.count(iframe >> internal:control-enter-frame >>
#t_Alert_Notification) (18 ms)
254   ✓ locator.innerText(iframe >> internal:control-enter-frame >>
#t_Alert_Notification >> nth=0) (17 ms)
255   ✓ locator.count([role=alertdialog]) (11 ms)
256   ✓ locator.count(iframe >> internal:control-enter-frame >>
span[class="a-Form-error u-visible"] .t-Form-error) (11 ms)
257   ✓ locator.count(iframe >> internal:control-enter-frame >> .a-IG-
body td[role=gridcell][class=--is-error]) (10 ms)
258   ✓ locator.innerText(iframe >> internal:control-enter-frame >> .a-
IG-body td[role=gridcell][class=--is-error] >> nth=0) (10 ms)
259   ✓ locator.innerText(iframe >> internal:control-enter-frame >> .a-
IG-body td[role=gridcell][class=--is-error] >> nth=1) (17 ms)
260   ✓ locator.count(iframe >> internal:control-enter-frame >>
[class=t-Alert--wizard]) (16 ms)
261 /* |> Error of Type "Notification Error" found 1 time(s). */
262 /* |> Error of Type "Interactive Grid Cell Error" found 2 time(s). */
263 /* |> StepEnd: #918 (370ms) */
264 /* |> StepStart: #907 */
265   ✓ page.screenshot (140 ms)
266 /* |> StepEnd: #907 (144ms) */
267   ✓ apiRequestContext.dispose (1 ms)
268   ✓ fixture: request (3 ms)
269   ✓ fixture: page (0 ms)
270   ✓ fixture: context (0 ms)

```



Say Hy\_

+49 (0) 2102 30 961-0

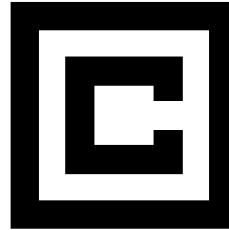
[oliver.lemm@hyand.com](mailto:oliver.lemm@hyand.com)



<https://x.com/OliverLemm>



@oliverlemm.bsky.social



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