

Do. 21.11.24, DOAG Konferenz 2024

Flyway vs Liquibase vs SQLcl vs Custom

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

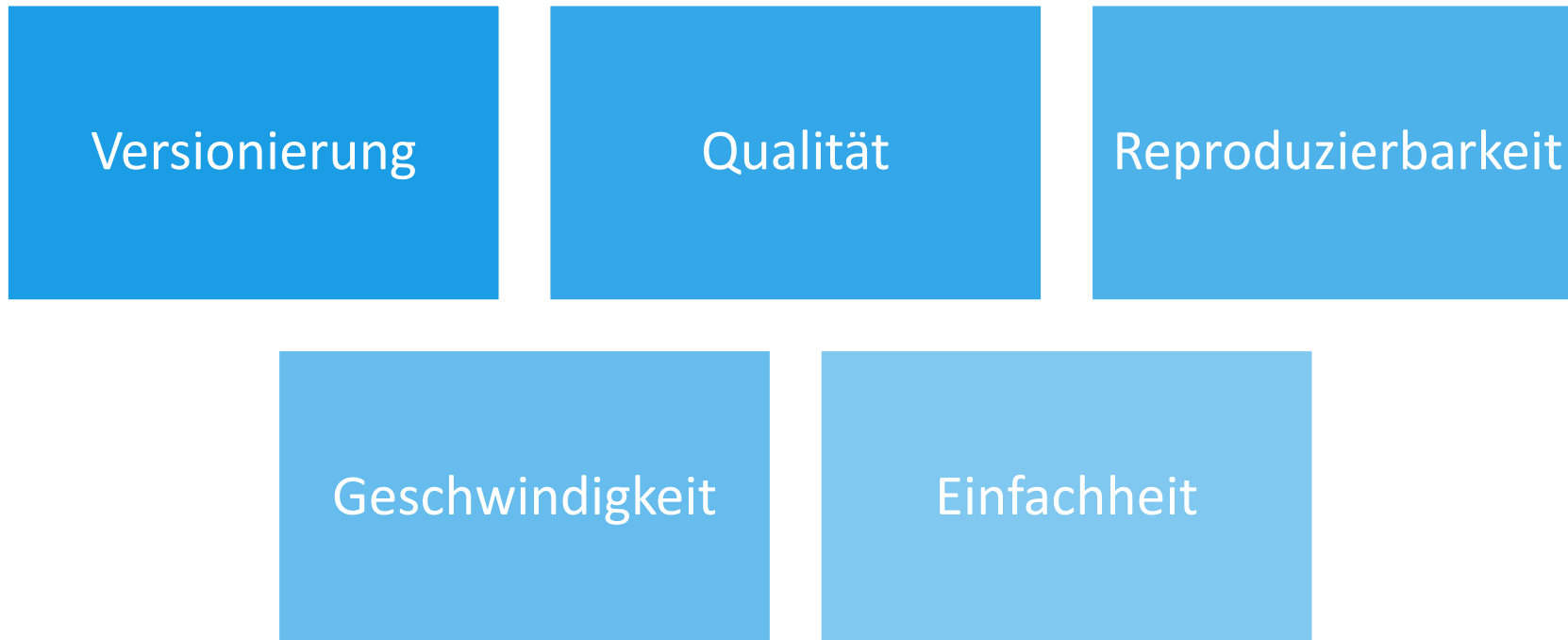
65 Following 1,785 Followers



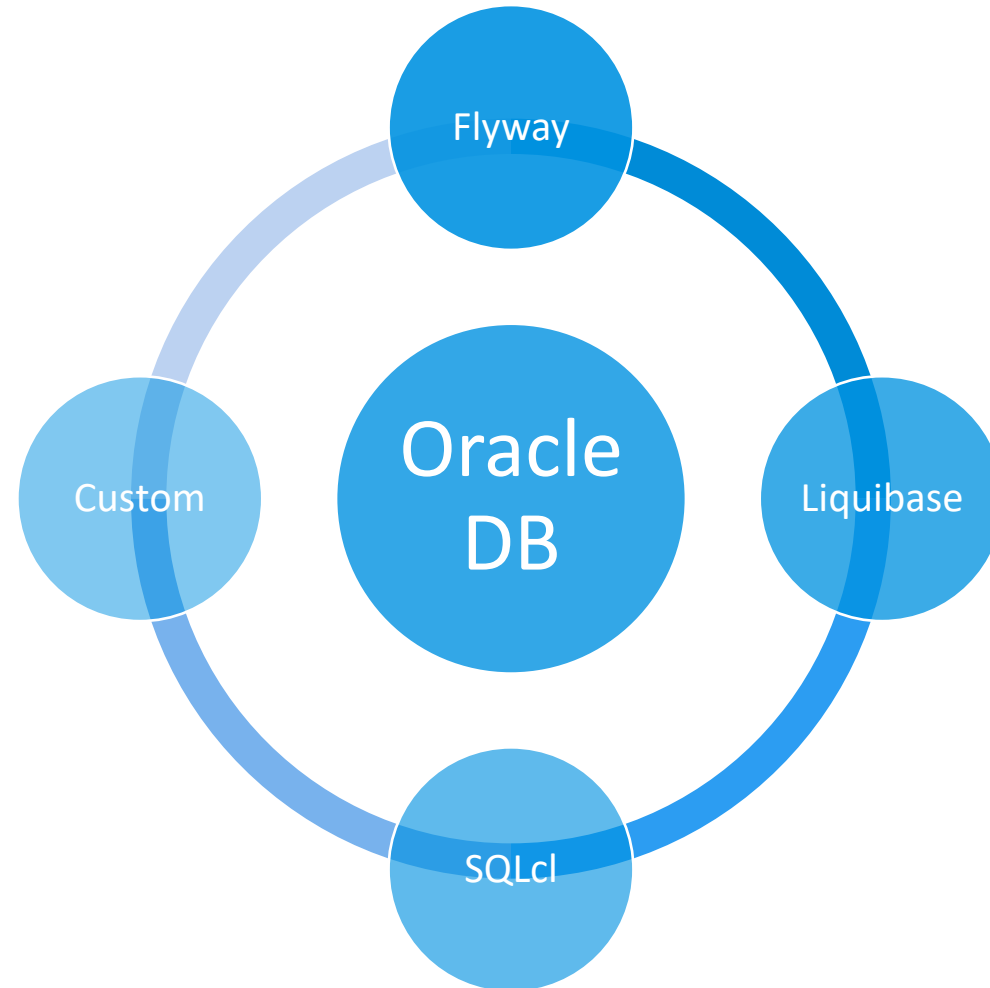
Index, Hyand Px Grotesk Light, 15 pt

1. Einleitung
2. Flyway
3. Liquibase
4. SQLcl
5. Custom
6. Vergleich
7. Fazit

Datenbankentwicklung mit ...



Dieser Vortrag vergleicht



Dieser Vortrag macht nicht...

- Einen detaillierten Einblick in jedes Tool
- Wird keine eiermilchlegende Wollmichsau präsentieren
- Nimmt keinen Bezug auf Frameworks wie Orcas (Opitz), opal-tools (Dietmar Aust) und weitere die als weitere Alternativen existieren
- Beschäftigt sich nicht mit CI/CD Tools wie Jenkins, Azure DevOps, Gitlab usw.



Flyway

picture by [By Jackeasley - Own work, CC BY-SA 4.0](#)

Flyway ist ...

- Datenbankversionierung- und Migrationstool
- seit 2010 verfügbar
- 2019 von Redgate aufgekauft
- Command line Tool
- Open Source / Apache 2.0 Lizenz
- Quellen

<https://flywaydb.org/>

<https://www.red-gate.com/products/flyway/community/>

<https://github.com/flyway/flyway> (aktuelle Version 10.21.0, 7.11.2024)

Flyway bietet ...

- dateibasiertes Deployment
- Keine Abhängigkeit zu weiteren Tools
- Plugins für Spring Boot, Dropwizard, Grails, Play, SBT, Ant, Griffon, Grunt, Ninja
- Kann mittels SQL oder Java genutzt werden
- DB2, Google Cloud SQL, H2, HSQL, Maria DB, MS SQL Server, MySQL, Oracle, PostgreSQL, SQL Azure, SQLite
- Versionsinformationen in der Datenbank “SCHEMA_VERSION” Table

Flyway benötigt ...

- Eine spezielle Ordnerstruktur
- Nutzt die Dateinamen als Reihenfolge innerhalb von Ordnern
- Pro Datenbankobjekt eine Datei

Flyway Editions <https://www.red-gate.com/products/flyway/editions>

| | Community Free | Teams \$597 /user | Enterprise Contact | | Enterprise Contact us |
|---|--------------------------|-----------------------------|------------------------------|--|---------------------------------|
| Native SQL migrations runner | ✔ | ✔ | ✔ | Change reports | ✔ |
| CLI, API and GUI | ✔ | ✔ | ✔ | Drift detection | ✔ |
| Built-in Git client | ✔ | ✔ | ✔ | Custom code analysis rules | ✔ |
| Choice of state- or migrations-based projects | – | ✔ | ✔ | Schema comparison tool | ✔ |
| Maintain object level history | – | ✔ | ✔ | Data comparison tool | ✔ |
| Support for older DB versions | – | ✔ | ✔ | Static data versioning | ✔ |
| Undo | – | ✔ | ✔ | Save schema snapshots | ✔ |
| Migration script auto-generation | – | – | ✔ | Fire up databases using Docker | ✔ Preview |
| Undo script auto-generation | – | – | ✔ | Integration with secrets managers | ✔ |
| Automate state-based deployments | – | – | ✔ | Integration with Redgate TDM | ✔ Preview |
| Auto-generate baseline scripts | – | – | ✔ | Integration with Redgate Monitor | ✔ |
| Detect invalid objects | – | – | ✔ | Unlimited data retention in Redgate Flyway Pipelines | ✔ Preview |



picture by liquibase.com

Liquibase ist ...

- Datenbankversionierung- und Migrationstool
- seit 2006 verfügbar
- Liquibase selber ist eine eigene Firma, Nathan Voxland hat das Open Source Projekt gegründet
- Command line Tool
- Open Source / Apache 2.0 Lizenz
- Quellen

<https://www.liquibase.com/>

<https://www.liquibase.com/download> aktuelle Version 4.30.0 (5.11.24)

<https://github.com/liquibase/liquibase>




Liquibase bietet ...

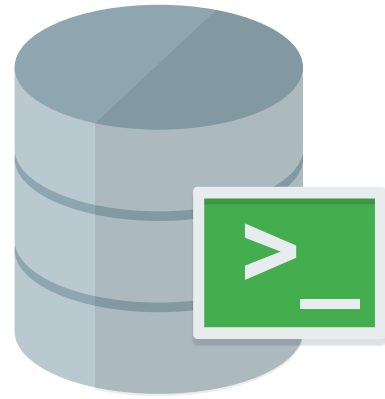
- Dateibasiertes Deployment
- Keine Abhängigkeit zu weiteren Tools
- Plugins für Maven, Spring Boot, Ant, Jenkins, GitHub Actions und weitere
- Kann mittels SQL oder Java genutzt werden
- Apache Derby, DB2, Informix, Maria DB, MS SQL Server, MySQL, Oracle, PostgreSQL, SQLite
- Versionsinformationen in der Datenbank “DATABASECHANGELOG”, “DATABASECHANGELOG_ACTIONS” und “DATABASECHANGELOGLOCK”

Liquibase benötigt ...

- Ein Metadatenschema
- Pro Datenbankobjekt eine Datei
- Alle Datenbankänderungen müssen über Liquibase laufen
- Ein abgestimmtes Vorgehen bzgl. der Outputfiles (xml, SQL, DIFF, PL/SQL)

Liquibase Editions <https://www.liquibase.com/pricing>

| | | |
|---|--|--|
|  | <h2>Open Source</h2> <p>Version, track, and deploy database changes.</p> <p>Get Started ></p> | <h2>Liquibase Pro</h2> <p>Agility, observability, and governance for SQL and NoSQL databases with white-glove professional services.</p> <p>Get Started ></p> |
| <h3>Change Management</h3> | | |
| <h3>Native SQL Dialect</h3> <p>Support for PL/SQL, SQLPL, T-SQL, and more</p> |  |  |
| <h3>Change format</h3> <p>How scripts are formatted</p> | SQL, XML, YAML, JSON | SQL, XML, YAML, JSON |
| <h3>Change creation & management</h3> <p>Where changes are created and how they are</p> | CLI or 3rd party automation tools | CLI or 3rd party automation tools |



SQLcl

picture by [oracle.com](https://www.oracle.com)

SQLcl ist ...

- Client zur Kommunikation mit der Oracle DB
- seit 2015 verfügbar
- Ein kostenfreies Produkt von Oracle
- Command line Tool

- Quellen

- <https://www.oracle.com/database/sqldeveloper/technologies/sqlcl/>

- <https://www.oracle.com/database/sqldeveloper/technologies/sqlcl/download/>
aktuelle Version 24.3.1 (8.11.24)

SQLcl benötigt ...

- Java 11, 17 oder 21
- APEX 18 für Liquibase support bei Nutzung von APEX
- Neueste SQLcl Version 24.3 für Project “Command”

SQLcl bietet ...

- vollständige Kommunikation mittels SQL, PL/SQL und Liquibase mit der DB
- Oracle DB, OCI
- Komplette Mechanik / Nutzung von Oracle internen Packages
- Nutzung der integrierten Liquibase Mechanik mittels “lb” Kommando
- SQLcl “projects” Command
- src und dist Struktur

SQLcl mit Liquibase

3 Using Liquibase

This chapter covers the Liquibase feature in SQLcl. It has the following topics:

- About Liquibase in SQLcl
- Requirements for Using Liquibase
- Supported Types
- Supported Liquibase Commands in SQLcl
- Using SQLcl Liquibase Functionality with Open-Source Liquibase
- Dynamic Object Transformation with SQLcl Liquibase and DBMS_METADATA Oracle Database Package
- Liquibase Open-Source Changesets with SQLcl Liquibase
- DATABASECHANGELOG_DETAILS VIEW
- ChangeSets in Liquibase
- Tips for Liquibase Settings
- Important 23.4 Update with Liquibase Changelog Files
- Examples Using Liquibase

<https://docs.oracle.com/en/database/oracle/sql-developer-command-line/24.3/sqcug/using-liquibase.html>

SQLcl neue Funktion “PROJECT” command

New Features in 24.3

Database Development Workflow: PROJECT command

The project command is a powerful tool designed to standardize database software versioning and create releasable artifacts, including APEX applications. It supports a consistent model of development and operations, enabling repeatable builds that can be applied in a specific order.

- Key features include versioned feature management, release artifact creation, ordered installation, source control integration, and automated release packaging.
- The command uses various subcommands such as init, config, export, ticket, release, gen-artifact, deploy, and verify to manage the entire lifecycle of database changes, from initial project setup to deployment in production environments.
- It leverages Git for branching and diffing, and uses Liquibase for creating immutable changesets, allowing for structured and controlled database development processes.



Custom

Custom Code “Vorteile”

- Sofort startklar
- Keine Tools notwendig
- Keine Einarbeitung notwendig
- Code direkt in der DB

Custom Code “Nachteile”

- Code sieht (immer) “anders” aus
- Extrem viel Handarbeit
- Nicht zwangsläufig versioniert
- Code direkt in der DB

Custom

Templates “Vorteile”

- vorgefertigte Templates für DDL, DML, pl/sql functions & pl/sql procedures
- einfach versionierbar
- Keine Tools notwendig
- Keine Einarbeitung notwendig

Templates “Nachteile”

- Viel Handarbeit
- Neue Templates für neue Sachverhalte

Custom

PL/SQL Generator “Vorteile”

- Sonderlogik abbildbar
- Ergebnis immer gleich
- PL/SQL Know How zur Erweiterung
- Keine Tools notwendig

PL/SQL Generator “Nachteile”

- Initialer Aufwand groß
- Code Escaping
- Pro Skripttyp eine Funktion benötigt

Versionierung & Ordnerstruktur



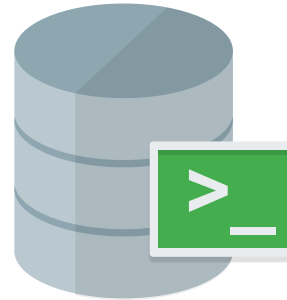
DML



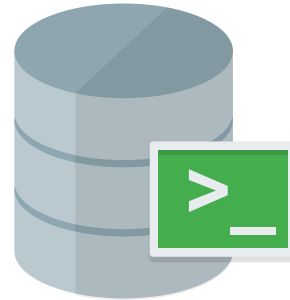
PL/SQL & Recompile



Data & Schema Comparison



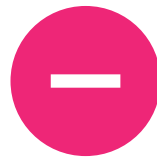
ReRun



Daten Prod -> Test -> Dev



Ticketsystem <-> Changes



Vergleich von SQLcl mit Liquibase und Liquibase standalone

Oracle-enhanced Liquibase SQLcl features vs standalone Liquibase

https://github.com/rgrzegorzcyk/sqlcl_vs_core_liquibase

https://nloug.nl/wp-content/uploads/2023/04/Rafal-Grzegorzcyk_APEX_WORLD_2023_Oracle-enhanced-Liquibase-SQLcl-features-vs-Standalone-Liquibase.-Whats-best-for-you-1.pdf

SQLcl 24.3 with Liquibase and “PROJECT”

The Biggest Database Challenge - App Deployment


Share



- ✓ Session Has Completed - 07 November 2024
- 🕒 1 Hour
- ☰ General Database Office Hours
- 🌐 English
- 👁️ General Database

Heutige Session @ APEX Office Hours

SQLcl Projects: CI/CD Made Easy for APEX


 Share


 Register


Managing the deployment of database objects in the correct sequence can be challenging. Development teams often face the same critical questions: How should developers interact with the source code repository and the development database? How are changes to objects best managed? What's the easiest way to create and deploy artifacts?

SQLcl Projects offers a standardized approach to answering these questions, ensuring that all database objects, including APEX apps, are deployed as part of the correct release and in order. By enforcing best practices, this tool brings order and reliability to continuous integration and delivery (CI/CD) pipelines for Oracle Database applications, helping teams maintain consistency.

 21 November 2024

 10:00 AM - 11:00 AM US/Eastern

 Seats Available

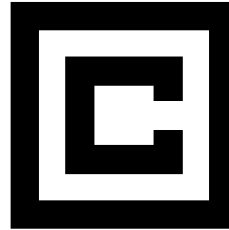
 1 Hour

https://asktom.oracle.com/ords/r/tech/catalog/session-landing-page?p2_event_id=47403500952608462102917247085952286914&p2_source_log=QR

Say Hy_

+49 (0) 2102 30 961-0

oliver.lemm@hyand.com



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