

CPAO Sharing session

Liquibase

Capgemini 

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CPAO Sharing session - Liquibase

What is it? Why to use it?

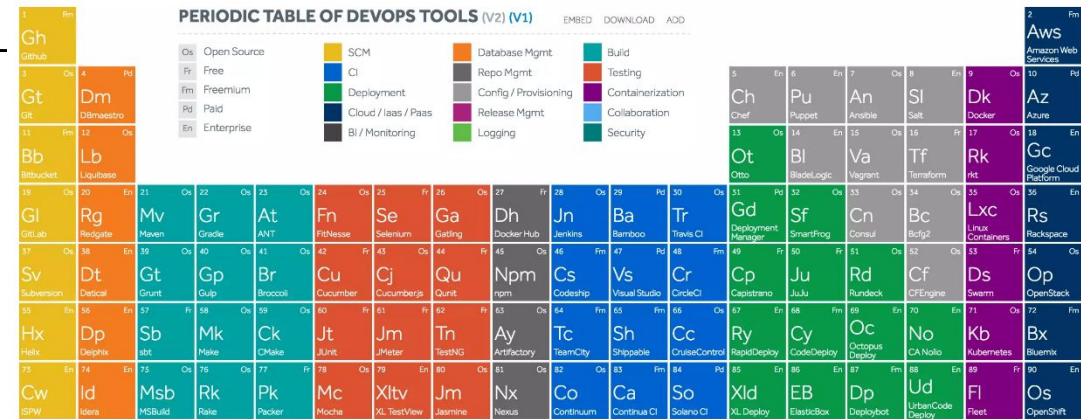
~~Liquidbase, Liquidbased~~ Liquibase

What is it?

- DevOps environment
- Database Management
 - Flexible database change: define changes in SQL, XML, JSON, or YAML
 - Version control for your database
 - Order changes and standardize development
- Automatic Deployment
 - Control when, where, and how database changes are deployed.

Why to use it?

- Auto-generate SQL scripts
- Repeatable migrations
- Integrations and extensions (Maven, Spring boot...)
- Rollbacks
- Context-dependent logic
- Use contexts and preconditions to fine-tune script execution



CPAO Sharing session - Liquibase

Installation 1/2



- Liquibase standalone jar
 - Download from <https://download.liquibase.org/>
 - No database configuration needed, information are given as parameters

```
liquibase --driver=oracle.jdbc.OracleDriver --classpath=\path\to\classes;jdbcdriver.jar  
--changeLogFile=com/example/db/changelog.xml  
--url="jdbc:oracle:thin:@localhost:1521:XE" --username=scott --password=tiger generateChangeLog
```

- non-spring project such as ACMM could use this method
- Maven plugin integration

```
<plugin>  
  <groupId>org.liquibase</groupId>  
  <artifactId>liquibase-maven-plugin</artifactId>  
  <configuration>  
    <propertyFile>src/main/resources/liquibase.properties</propertyFile>  
  </configuration>  
</plugin>
```

```
driver: oracle.jdbc.OracleDriver  
url: jdbc:oracle:thin:@//192.168.99.100:1521/x  
username: O470_CMPM  
password: cmpm  
verbose: true  
dropFirst: false  
outputChangeLogFile=src/main/resources/liquibase-outputChangeLog.xml  
changeLogFile=src/main/resources/db/changelog/liquibase-changeLog.xml
```

CPAO Sharing session - Liquibase

Installation 2/2



- Spring (Boot) integration:
- ACP, ICC-CUSTO
 - Configuration in application.properties

```
<dependency>
  <groupId>org.liquibase</groupId>
  <artifactId>liquibase-core</artifactId>
</dependency>
```

```
#LiquiBase
liquibase.enabled=true
liquibase.change-log=classpath:/db/changelog/liquibase-changeLog.xml
liquibase.drop-first=false
liquibase.contexts=@liquibase.context@
```

- MODMGT
 - Double datasource Oracle/DB2: configuration with Spring beans

```
@Primary
@Bean
public SpringLiquibase oracleLiquibase(@Qualifier("OracleDataSourceNOMENCLATURE")DataSource dataSource) {
    SpringLiquibase liquibase = new SpringLiquibase();
    liquibase.setDataSource(dataSource);
    liquibase.setChangeLog(ConfigurationConstants.LIQUIBASE_ORACLE_CHANGELOG_CLASSPATH);
    liquibase.setDropFirst(false);
    String liquibaseContext = env.getProperty(ConfigurationConstants.ENV_PROPERTY_KEY_LIQUIBASE_CONTEXT);
    LOGGER.info( message: "oracleLiquibase() > context={}", liquibaseContext);
    liquibase.setContexts(liquibaseContext);
    liquibase.setDatabaseChangeLogTable(ConfigurationConstants.LIQUIBASE_ORACLE_CHANGELOG_TABLE);
    liquibase.setDatabaseChangeLogLockTable(ConfigurationConstants.LIQUIBASE_ORACLE_CHANGELOG_LOCK_TABLE);
    return liquibase;
}
```

```
@Bean
@ConditionalOnProperty(name = "dev.mode", havingValue = "true")
public SpringLiquibase ibmLiquibase(@Qualifier("Db2DataSourceNOMENCLATURE")DataSource dataSource) {
    SpringLiquibase liquibase = new SpringLiquibase();
    liquibase.setDataSource(dataSource);
    liquibase.setChangeLog(ConfigurationConstants.LIQUIBASE_DB2_CHANGELOG_CLASSPATH);
    liquibase.setDropFirst(false);
    String liquibaseContext = env.getProperty(ConfigurationConstants.ENV_PROPERTY_KEY_LIQUIBASE_CONTEXT);
    LOGGER.info( message: "ibmLiquibase() > context={}", liquibaseContext);
    liquibase.setContexts(liquibaseContext);
    liquibase.setDatabaseChangeLogTable(ConfigurationConstants.LIQUIBASE_DB2_CHANGELOG_TABLE);
    liquibase.setDatabaseChangeLogLockTable(ConfigurationConstants.LIQUIBASE_DB2_CHANGELOG_LOCK_TABLE);
    return liquibase;
}
```

CPAO Sharing session - Liquibase

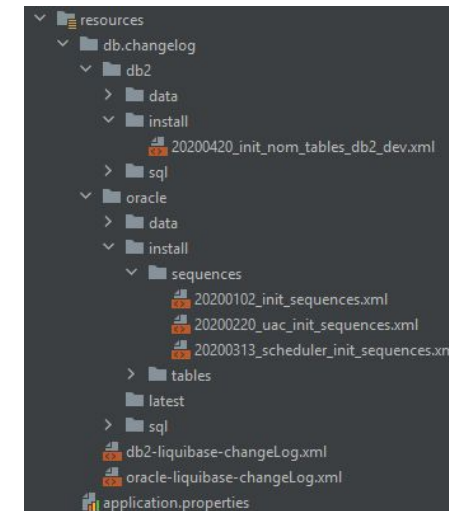
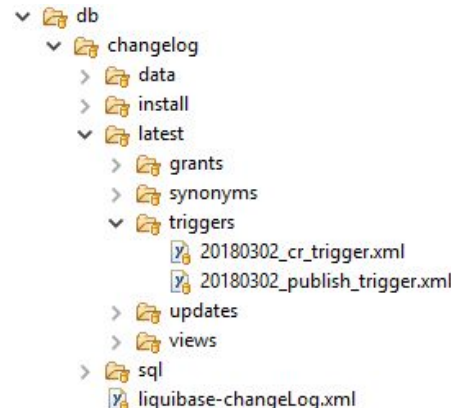
Configuration and architecture



- Tree configuration
 - liquibase-changeLog.xml

```
<?xml version="1.1" encoding="UTF-8" standalone="no"?>
<databaseChangeLog xmlns="http://www.liquibase.org/xml/ns/dbchangelog"
  <includeAll path="classpath:/db/changelog/install/sequences/" />
  <includeAll path="classpath:/db/changelog/install/tables/" />
  <includeAll path="classpath:/db/changelog/install/index/" />
  <includeAll path="classpath:/db/changelog/install/constants/" />
  <includeAll path="classpath:/db/changelog/latest/synonyms/" />
  <includeAll path="classpath:/db/changelog/latest/triggers/" />
  <includeAll path="classpath:/db/changelog/latest/views/" />
  <includeAll path="classpath:/db/changelog/data/" />
  <includeAll path="classpath:/db/changelog/latest/updates/" />
</databaseChangeLog>
```

- Liquibase tree example
 - XML naming convention
 - AAAAMMJJ_name.xml



CPAO Sharing session - Liquibase

ChangeLog Initialization



- For existing tables, indexes, PK/FK...
- ChangeLog generation threw commands

- Standalone Liquibase

```
liquibase --driver=oracle.jdbc.OracleDriver --classpath=\path\to\classes;jdbcdriver.jar  
--changeLogFile=com/example/db.changelog.xml  
--url="jdbc:oracle:thin:@localhost:1521:XE" --username=scott --password=tiger generateChangeLog
```

https://www.liquibase.org/documentation/generating_changelogs.html

- Maven plugin:

```
mvn liquibase:generateChangeLog
```

http://www.liquibase.org/documentation/maven/maven_generateChangeLog.html

- Views, synonyms have to be done manually
- Context have to be set manually

CPAO Sharing session - Liquibase

What is a changeset



- Description of a Database Change
- Contains Metadata of information
 - id (required),
 - author (required),
 - dbms,
 - failOnError (default value: true),
 - runAlways (default value: false),
 - runOnChange (default value: false), ...
- Specific changes, sql, ...

```
<changeSet author="cmpm" id="CMPM-DEV-ACPROGRAM" context="dev" runOnChange="true">  
  <sqlFile path="classpath:/db/changelog/sql/acprogram.sql" />  
</changeSet>
```

CPAO Sharing session - Liquibase

What is a changeset - configuration



- Precondition
 - primaryKeyExists,
 - indexExists,
 - tableExists, ...

```
<changeSet author="cmpm" id="CMPM-INDEX-CR-CREATOR_NEW">
  <preConditions onFail="MARK_RAN">
    <sqlCheck expectedResult="0">SELECT COUNT(1) FROM USER_INDEXES WHERE TABLE_NAME = 'CHANGEREQUEST' AND INDEX_NAME = 'IDX_CR_CREATOR'</sqlCheck>
  </preConditions>
  <createIndex indexName="idx_cr_creator" tableName="CHANGEREQUEST">
    <column name="CREATOR" type="varchar(128)" />
  </createIndex>
  <rollback>
  </rollback>
</changeSet>
```

- Rollback
 - Tag,
 - Date,
 - Changeset count, ...

- Profile (context="dev", context="prod", no context)

```
<changeSet author="cmpm" id="CMPM-DEV-ACPROGRAM" context="dev" runOnChange="true">
  <sqlFile path="classpath:/db/changelog/sql/acprogram.sql" />
</changeSet>
```


CPAO Sharing session - Liquibase

What is a changeset - some examples



- Create Table

```
<changeSet author="liquibase-docs" id="createTable-example">
  <createTable catalogName="cat"
    remarks="A String"
    schemaName="public"
    tableName="person"
    tablespace="A String">
    <column name="address" type="varchar(255)" />
  </createTable>
</changeSet>
```

- Drop Table

```
<changeSet author="liquibase-docs" id="dropTable-example">
  <dropTable cascadeConstraints="true"
    catalogName="cat"
    schemaName="public"
    tableName="person" />
</changeSet>
```

CPAO Sharing session - Liquibase

What is a changeset - some examples



- Insert

```
<changeSet author="liquibase-docs" id="insert-example">
  <insert catalogName="cat"
    dbms="!h2, mysql"
    schemaName="public"
    tableName="person">
    <column name="address" value="address value"/>
  </insert>
</changeSet>
```

- Delete

```
<changeSet author="liquibase-docs" id="delete-example">
  <delete catalogName="cat"
    schemaName="public"
    tableName="person">
    <where>name='Bob'</where>
  </delete>
</changeSet>
```



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What is a changeset - some examples

- SQL

```
<changeSet author="liquibase-docs" id="sql-example">
  <sql dbms="!h2, oracle, mysql"
    endDelimiter="\nGO"
    splitStatements="true"
    stripComments="true">insert into person (name) values ('Bob')

  <comment>What about Bob?</comment>
</sql>
</changeSet>
```

- SQL File

```
<changeSet author="liquibase-docs" id="sqlFile-example">
  <sqlFile dbms="!h2, oracle, mysql"
    encoding="UTF-8"
    endDelimiter="\nGO"
    path="my/path/file.sql"
    relativeToChangelogFile="true"
    splitStatements="true"
    stripComments="true"/>
</changeSet>
```

- More commands on [liquibase doc](https://www.liquibase.org).

CPAO Sharing session - Liquibase

Database Changelog



- Changes logs

- ID
- Author
- Filename
- Date executed
- Order executed
- Exec type (Executed, reran...)
- MD5SUM
- Description
- Comments
- Tag
- Liquibase (Version)
- Contexts
- Labels
- Deployment id

ID	AUTHOR	FILENAME	DATEEXECUTED	ORDEREXEC...	EXECUTY
CMPM-DEV-METADATA	cmpm	db/changelog/data/20180302_metadata.xml	03-JUL-18 14.59.01.783751000	392	RERAN
CMPM-MP-METADATA	cmpm	db/changelog/install/tables/20180703_metadata_mp.xml	03-JUL-18 14.22.51.393987000	391	EXECUTEI
CMPM-TABLE-CHANGEREQUEST_AUD-FFA-CHANGETY...	cmpm	db/changelog/install/tables/20180605_onepagerMigrate.xml	02-JUL-18 14.17.59.452672000	390	EXECUTEI
CMPM-UPDATE-CRSTATUSCLEANUP	cmpm	db/changelog/latest/updates/20180302_crStatusCleanUp.xml	25-JUN-18 13.09.06.200737000	389	EXECUTEI
CMPM-UPDATE-AGENDACLEANUP	cmpm	db/changelog/latest/updates/20180302_agendaCleanUp.xml	25-JUN-18 13.09.05.734329000	388	EXECUTEI
CMPM-DEV-INDUSCHOICE	cmpm	db/changelog/data/20180525_industrialChoice.xml	25-JUN-18 13.09.05.010041000	387	EXECUTEI
CMPM-DEV-DECISIONTYPE	cmpm	db/changelog/data/20180309_decisionType.xml	25-JUN-18 13.09.04.979688000	386	EXECUTEI
CMPM-DEV-VERSIONRANK	cmpm	db/changelog/data/20180302_versionrank.xml	25-JUN-18 13.09.04.569885000	385	EXECUTEI
CMPM-DEV-VERSION	cmpm	db/changelog/data/20180302_version.xml	25-JUN-18 13.08.51.739442000	384	EXECUTEI
CMPM-DEV-TECHPUBMANUAL	cmpm	db/changelog/data/20180302_techPubManual.xml	25-JUN-18 13.08.50.195848000	383	EXECUTEI
CMPM-INSERT-SURVEY	cmpm	db/changelog/data/20180302_survey.xml	25-JUN-18 13.08.50.035559000	382	EXECUTEI
CMPM-DEV-SUPPLIER	cmpm	db/changelog/data/20180302_supplier.xml	25-JUN-18 13.08.49.338768000	381	EXECUTEI
CMPM-DEV-STD	cmpm	db/changelog/data/20180302_standard.xml	25-JUN-18 13.08.49.144266000	380	EXECUTEI
CMPM-DEV-ROLE	cmpm	db/changelog/data/20180302_role.xml	25-JUN-18 13.08.48.999521000	379	EXECUTEI
CMPM-DEV-REASONS	cmpm	db/changelog/data/20180302_reasons.xml	25-JUN-18 13.08.48.966492000	378	EXECUTEI
CMPM-DEV-POLICY	cmpm	db/changelog/data/20180302_policy.xml	25-JUN-18 13.08.48.839532000	377	EXECUTEI
CMPM-DEV-MSN	cmpm	db/changelog/data/20180302_msn.xml	25-JUN-18 13.08.48.501232000	376	EXECUTEI
CMPM-DEV-MP	cmpm	db/changelog/data/20180302_mp.xml	25-JUN-18 13.08.42.323214000	375	EXECUTEI
CMPM-DEV-MODEL	cmpm	db/changelog/data/20180302_model.xml	25-JUN-18 13.08.38.103286000	374	EXECUTEI
CMPM-DEV-MOD	cmpm	db/changelog/data/20180302_mod.xml	25-JUN-18 13.08.37.623145000	373	EXECUTEI
CMPM-DEV-INDUSSTD	cmpm	db/changelog/data/20180302_industrialstandard.xml	25-JUN-18 13.08.33.098707000	371	EXECUTEI

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Database Changelog lock



- Handle parallel execution
 - ID
 - Locked
 - LockGranted
 - LockedBy

ID	LOCKED	LOCKGRANTED	LOCKEDBY
1	0	(null)	(null)



People matter, results count.

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