liquibase在SpringBoot项目中的使用

简介

Liquibase 是一个用于跟踪、管理和应用数据库变化的开源的数据库重构工具。它将所有数据库的变化（包括结构和数据）都保存在 changelog文件中，便于版本控制，它的目标是提供一种数据库类型无关的解决方案，通过执行 schema 类型的文件来达到迁移。

官方文档：(https://docs.liquibase.com/tools-integrations/springboot/using-springboot-with-maven.html)

使用效果展示

```
2020-07-21 11:07:22.398  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : SELECT COUNT(*) FROM
hzcx.DATABASECHANGELOGLOCK
2020-07-21 11:07:22.430  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : CREATE TABLE hzcx.DATABASECHANGELOGLOCK (ID
INT NOT NULL, `LOCKED` BIT(1) NOT NULL, LOCKGRANTED datetime NULL, LOCKEDBY
VARCHAR(255) NULL, CONSTRAINT PK_DATABASECHANGELOGLOCK PRIMARY KEY (ID))
2020-07-21 11:07:22.452  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : SELECT COUNT(*) FROM
hzcx.DATABASECHANGELOGLOCK
2020-07-21 11:07:22.461  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : DELETE FROM hzcx.DATABASECHANGELOGLOCK
2020-07-21 11:07:22.462  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : INSERT INTO hzcx.DATABASECHANGELOGLOCK (ID,
`LOCKED`) VALUES (1, 0)
2020-07-21 11:07:22.464  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : SELECT `LOCKED` FROM
hzcx.DATABASECHANGELOGLOCK WHERE ID=1
2020-07-21 11:07:22.472  INFO 11157 --- [           main]
l.lockservice.StandardLockService        : Successfully acquired change log lock
2020-07-21 11:07:22.488  INFO 11157 --- [           main]
l.c.StandardChangeLogHistoryService      : Creating database history table with name:
hzcx.DATABASECHANGELOG
2020-07-21 11:07:22.490  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : CREATE TABLE hzcx.DATABASECHANGELOG (ID
VARCHAR(255) NOT NULL, AUTHOR VARCHAR(255) NOT NULL, FILENAME VARCHAR(255) NOT NULL,
DATEEXECUTED datetime NOT NULL, ORDEREXECUTED INT NOT NULL, EXECTYPE VARCHAR(10) NOT
NULL, MD5SUM VARCHAR(35) NULL, `DESCRIPTION` VARCHAR(255) NULL, COMMENTS VARCHAR(255)
NULL, TAG VARCHAR(255) NULL, LIQUIBASE VARCHAR(20) NULL, CONTEXTS VARCHAR(255) NULL,
LABELS VARCHAR(255) NULL, DEPLOYMENT_ID VARCHAR(10) NULL)
2020-07-21 11:07:22.510  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : SELECT COUNT(*) FROM hzcx.DATABASECHANGELOG
2020-07-21 11:07:22.512  INFO 11157 --- [           main]
l.c.StandardChangeLogHistoryService      : Reading from hzcx.DATABASECHANGELOG
```

```
2020-07-21 11:07:22.513  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : SELECT * FROM hzcx.DATABASECHANGELOG ORDER
BY DATEEXECUTED ASC, ORDEREXECUTED ASC
2020-07-21 11:07:22.514  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : SELECT COUNT(*) FROM
hzcx.DATABASECHANGELOGLOCK
2020-07-21 11:07:22.532  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : DROP TABLE IF EXISTS
`ums_member_user_relation`
2020-07-21 11:07:22.533  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : CREATE TABLE `ums_member_user_relation`  (
  `id` int(11) NOT NULL AUTO_INCREMENT COMMENT '主键ID',
  `user_id` int(11) DEFAULT NULL COMMENT '邀请人',
  `member_id` int(11) DEFAULT NULL COMMENT '被邀请人',
  `create_time` datetime NULL DEFAULT CURRENT_TIMESTAMP COMMENT '创建时间',
  PRIMARY KEY (`id`) USING BTREE,
  KEY `user_relation_idx1_user_id` (`user_id`) USING BTREE
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COMMENT='会员用户关系表'
2020-07-21 11:07:22.547  INFO 11157 --- [           main]
liquibase.changelog.ChangeSet            : Custom SQL executed
2020-07-21 11:07:22.548  INFO 11157 --- [           main]
liquibase.changelog.ChangeSet            : ChangeSet
classpath:/db/changelog/hzcx_change.sql::ums_member_user_relation::hzc ran
successfully in 26ms
2020-07-21 11:07:22.549  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : SELECT MAX(ORDEREXECUTED) FROM
hzcx.DATABASECHANGELOG
2020-07-21 11:07:23.590  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : INSERT INTO hzcx.DATABASECHANGELOG (ID,
AUTHOR, FILENAME, DATEEXECUTED, ORDEREXECUTED, MD5SUM, `DESCRIPTION`, COMMENTS,
EXECTYPE, CONTEXTS, LABELS, LIQUIBASE, DEPLOYMENT_ID) VALUES
('ums_member_user_relation', 'hzc', 'classpath:/db/changelog/hzcx_change.sql', NOW(),
1, '8:551f63d0a4cfada560aee75487a867b4', 'sql', '', 'EXECUTED', NULL, NULL, '3.8.0',
'5300842515')
2020-07-21 11:07:23.596  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : DROP TABLE IF EXISTS
`ums_integration_change_history`
2020-07-21 11:07:23.597  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : CREATE TABLE
`ums_integration_change_history`  (
  `id` int(11) NOT NULL AUTO_INCREMENT COMMENT '主键ID',
  `user_id` int(11) NOT NULL COMMENT '会员ID',
  `change_type` char(1) DEFAULT '0' COMMENT '改变类型：0->增加；1->减少',
  `change_count` int(11) DEFAULT '0' COMMENT '积分改变的值',
  `change_value` int(11) DEFAULT '0' COMMENT '积分改变的值（正负计数）',
  `integral` int(11) NOT NULL DEFAULT '0' COMMENT '剩余积分',
  `source_type` varchar(100) DEFAULT NULL COMMENT  '积分赠送场景字典表：
（donate_type_sign->签到；donate_type_shop->商城消费；donate_type_admin_obtain->管理员修
改，手动增加；donate_type_admin_lose->管理员修改，手动减少）',
  `operate_man` varchar(100) DEFAULT NULL COMMENT '管理员修改，记录积分操作人',
  `operate_note` varchar(100) DEFAULT NULL COMMENT '操作备注',
  `create_time` datetime NULL DEFAULT CURRENT_TIMESTAMP COMMENT '创建时间',
  `update_time` datetime NULL DEFAULT NULL ON UPDATE CURRENT_TIMESTAMP COMMENT '修改时
间',
  PRIMARY KEY (`id`) USING BTREE,
  KEY `integration_change_history_user_id` (`user_id`) USING BTREE
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COMMENT='积分变化历史记录表'
2020-07-21 11:07:23.616  INFO 11157 --- [           main]
liquibase.changelog.ChangeSet            : Custom SQL executed
2020-07-21 11:07:23.617  INFO 11157 --- [           main]
liquibase.changelog.ChangeSet            : ChangeSet
classpath:/db/changelog/hzcx_change.sql::ums_integration_change_history::hzc ran
successfully in 23ms
2020-07-21 11:07:23.618  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : INSERT INTO hzcx.DATABASECHANGELOG (ID,
AUTHOR, FILENAME, DATEEXECUTED, ORDEREXECUTED, MD5SUM, `DESCRIPTION`, COMMENTS,
EXECTYPE, CONTEXTS, LABELS, LIQUIBASE, DEPLOYMENT_ID) VALUES
('ums_integration_change_history', 'hzc', 'classpath:/db/changelog/hzcx_change.sql',
NOW(), 2, '8:8c5d60ebc3707410b833c9a617d60b05', 'sql', '', 'EXECUTED', NULL, NULL,
'3.8.0', '5300842515')
2020-07-21 11:07:23.622  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : DROP TABLE IF EXISTS
`ums_member_integration_statistic`
2020-07-21 11:07:23.623  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : CREATE TABLE
`ums_member_integration_statistic`  (
  `id` int(11) NOT NULL AUTO_INCREMENT COMMENT '主键ID',
  `user_integration_count` int(11) DEFAULT '0' COMMENT '当前可用总积分',
  `obtain_integration_count` int(11) DEFAULT '0' COMMENT '累计获得总积分',
  `lose_integration_count` int(11) DEFAULT '0' COMMENT '累计消耗总积分',
  `add_date` date DEFAULT NULL COMMENT '添加日期',
  `create_time` datetime NULL DEFAULT CURRENT_TIMESTAMP COMMENT '创建时间',
  `update_time` datetime NULL DEFAULT NULL ON UPDATE CURRENT_TIMESTAMP COMMENT '修改时
间',
  PRIMARY KEY (`id`) USING BTREE,
  INDEX `add_date`(`add_date`) USING BTREE,
  INDEX `create_time`(`create_time`) USING BTREE
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COMMENT='积分统计历史记录表'
2020-07-21 11:07:23.640  INFO 11157 --- [           main]
liquibase.changelog.ChangeSet            : Custom SQL executed
2020-07-21 11:07:23.641  INFO 11157 --- [           main]
liquibase.changelog.ChangeSet            : ChangeSet
classpath:/db/changelog/hzcx_change.sql::ums_member_integration_statistic::hzc ran
successfully in 21ms
```

```
2020-07-21 11:07:23.642  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : INSERT INTO hzcx.DATABASECHANGELOG (ID,
AUTHOR, FILENAME, DATEEXECUTED, ORDEREXECUTED, MD5SUM, `DESCRIPTION`, COMMENTS,
EXECTYPE, CONTEXTS, LABELS, LIQUIBASE, DEPLOYMENT_ID) VALUES
('ums_member_integration_statistic', 'hzc', 'classpath:/db/changelog/hzcx_change.sql',
NOW(), 3, '8:db5cb62c1bfbfd577432eeb39d53e3e9', 'sql', '', 'EXECUTED', NULL, NULL,
'3.8.0', '5300842515')
2020-07-21 11:07:23.646  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : DROP TABLE IF EXISTS
`ums_member_integral_task`
2020-07-21 11:07:23.647  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : CREATE TABLE `ums_member_integral_task`  (
  `id` int(11) NOT NULL AUTO_INCREMENT COMMENT '主键ID',
  `name` varchar(100) DEFAULT NULL COMMENT '任务名称',
  `task_type` char(1) DEFAULT '1' COMMENT '任务类型：0->新手任务；1->日常任务',
  `task_type_title` varchar(100) DEFAULT NULL COMMENT '任务类型说明：（例如 日常任务：每
个任务，每个用户每天只能完成一次，第二天可以继续完成）',
  `donate_type` varchar(100) DEFAULT NULL COMMENT '任务编码（积分赠送场景字典表子集）',
  `illustrate` varchar(255) DEFAULT NULL COMMENT '任务内容',
  `sort` int(11) DEFAULT '1' COMMENT '排序值',
  `publish_status` char(1) DEFAULT '1' COMMENT '上架状态：0->下架；1->上架',
  `donate_integration` int(11) NOT NULL DEFAULT '0' COMMENT '赠送积分',
  `period_frequency` varchar(100) DEFAULT NULL COMMENT '周期频次',
  `del_flag` char(1) DEFAULT '0',
  `operate_man` varchar(100) DEFAULT NULL COMMENT '操作人',
  `create_time` datetime NULL DEFAULT CURRENT_TIMESTAMP COMMENT '创建时间',
  `update_time` datetime NULL DEFAULT NULL ON UPDATE CURRENT_TIMESTAMP COMMENT '修改时
间',
  PRIMARY KEY (`id`) USING BTREE
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COMMENT = '积分任务管理'
2020-07-21 11:07:23.691  INFO 11157 --- [           main]
liquibase.changelog.ChangeSet            : Custom SQL executed
2020-07-21 11:07:23.692  INFO 11157 --- [           main]
liquibase.changelog.ChangeSet            : ChangeSet
classpath:/db/changelog/hzcx_change.sql::ums_member_integral_task_1::hzc ran
successfully in 48ms
2020-07-21 11:07:23.694  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : INSERT INTO hzcx.DATABASECHANGELOG (ID,
AUTHOR, FILENAME, DATEEXECUTED, ORDEREXECUTED, MD5SUM, `DESCRIPTION`, COMMENTS,
EXECTYPE, CONTEXTS, LABELS, LIQUIBASE, DEPLOYMENT_ID) VALUES
('ums_member_integral_task_1', 'hzc', 'classpath:/db/changelog/hzcx_change.sql',
NOW(), 4, '8:b8ca34ff365214871201b7fdb9ed552a', 'sql', '', 'EXECUTED', NULL, NULL,
'3.8.0', '5300842515')
2020-07-21 11:07:23.696  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : BEGIN
```

```
2020-07-21 11:07:23.697  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : INSERT INTO
`hzcx`.`ums_member_integral_task`(`id`, `name`, `task_type`, `task_type_title`,
`donate_type`, `illustrate`, `sort`, `publish_status`, `donate_integration`,
`period_frequency`, `del_flag`, `operate_man`, `create_time`, `update_time`) VALUES
(1, '每日签到', '1', '日常任务', 'donate_type_sign', NULL, 1, '1', 10,
'sign_once_a_day', '0', 'zhangjinkui', '2020-06-16 13:29:20', '2020-06-16 13:30:58')
2020-07-21 11:07:23.698  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : COMMIT
2020-07-21 11:07:23.699  INFO 11157 --- [           main]
liquibase.changelog.ChangeSet            : Custom SQL executed
2020-07-21 11:07:23.700  INFO 11157 --- [           main]
liquibase.changelog.ChangeSet            : ChangeSet
classpath:/db/changelog/hzcx_change.sql::ums_member_integral_task_2::hzc ran
successfully in 4ms
2020-07-21 11:07:23.701  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : INSERT INTO hzcx.DATABASECHANGELOG (ID,
AUTHOR, FILENAME, DATEEXECUTED, ORDEREXECUTED, MD5SUM, `DESCRIPTION`, COMMENTS,
EXECTYPE, CONTEXTS, LABELS, LIQUIBASE, DEPLOYMENT_ID) VALUES
('ums_member_integral_task_2', 'hzc', 'classpath:/db/changelog/hzcx_change.sql',
NOW(), 5, '8:0f420a0c1676efcc0e37c537c4b4bca4', 'sql', '', 'EXECUTED', NULL, NULL,
'3.8.0', '5300842515')
2020-07-21 11:07:23.703  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : DROP TABLE IF EXISTS
`ums_member_task_finish`
2020-07-21 11:07:23.704  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : CREATE TABLE `ums_member_task_finish`  (
  `id` int(11) NOT NULL AUTO_INCREMENT COMMENT '主键ID',
  `task_id` int(11) NOT NULL DEFAULT '0' COMMENT '任务ID',
  `user_id` int(11) NOT NULL DEFAULT '0' COMMENT '会员ID',
  `status` char(1) NOT NULL DEFAULT '1' COMMENT '是否有效：0->否，1->是',
  `add_time` datetime NULL DEFAULT CURRENT_TIMESTAMP COMMENT '添加时间',
  PRIMARY KEY (`id`) USING BTREE
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COMMENT = '用户任务完成记录表'
2020-07-21 11:07:23.719  INFO 11157 --- [           main]
liquibase.changelog.ChangeSet            : Custom SQL executed
2020-07-21 11:07:23.720  INFO 11157 --- [           main]
liquibase.changelog.ChangeSet            : ChangeSet
classpath:/db/changelog/hzcx_change.sql::ums_member_task_finish::hzc ran successfully
in 18ms
2020-07-21 11:07:23.722  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : INSERT INTO hzcx.DATABASECHANGELOG (ID,
AUTHOR, FILENAME, DATEEXECUTED, ORDEREXECUTED, MD5SUM, `DESCRIPTION`, COMMENTS,
EXECTYPE, CONTEXTS, LABELS, LIQUIBASE, DEPLOYMENT_ID) VALUES
('ums_member_task_finish', 'hzc', 'classpath:/db/changelog/hzcx_change.sql', NOW(), 6,
'8:ca0772b881529e6cb7e2a6ba3dd6f641', 'sql', '', 'EXECUTED', NULL, NULL, '3.8.0',
'5300842515')
2020-07-21 11:07:23.725  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : DROP TABLE IF EXISTS `ums_member_sign`
```

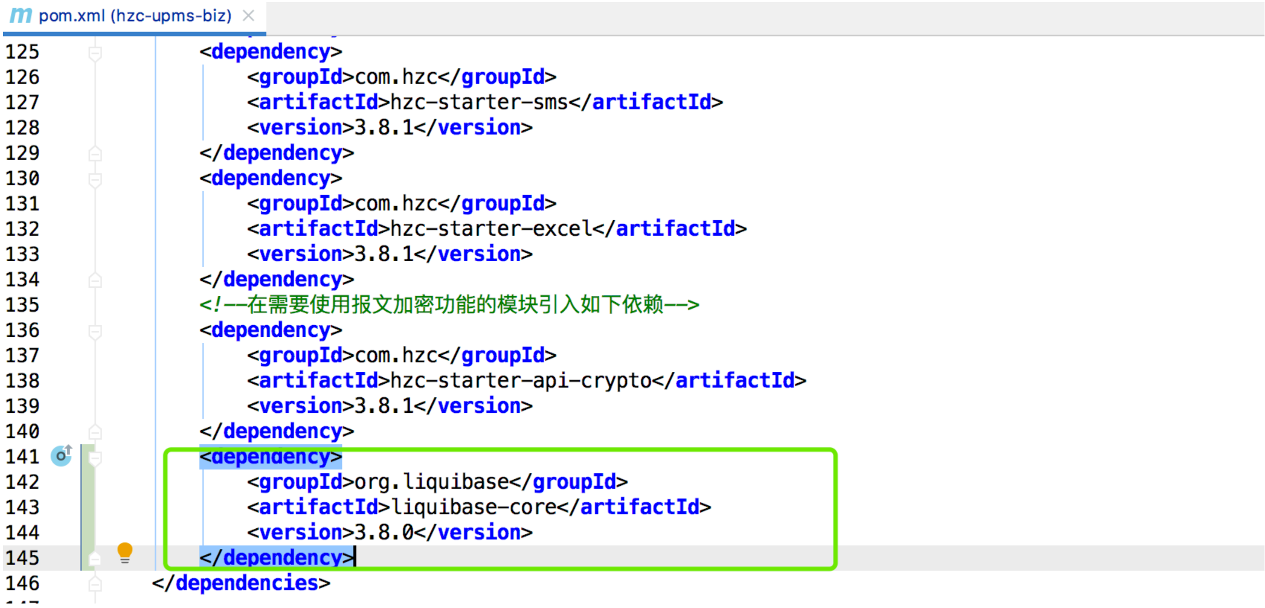
```
2020-07-21 11:07:23.726  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : CREATE TABLE `ums_member_sign`  (
  `id` int(11) NOT NULL AUTO_INCREMENT COMMENT '主键ID',
  `user_id` int(11) NOT NULL DEFAULT '0' COMMENT '会员ID',
  `title` varchar(255) DEFAULT NULL COMMENT '签到说明',
  `number` int(11) NOT NULL DEFAULT '0' COMMENT '获得积分',
  `add_time` datetime NULL DEFAULT CURRENT_TIMESTAMP COMMENT '添加时间',
  PRIMARY KEY (`id`) USING BTREE,
  KEY `sign_user_id` (`user_id`) USING BTREE
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COMMENT = '签到记录表'
2020-07-21 11:07:23.745  INFO 11157 --- [           main]
liquibase.changelog.ChangeSet            : Custom SQL executed
2020-07-21 11:07:23.746  INFO 11157 --- [           main]
liquibase.changelog.ChangeSet            : ChangeSet
classpath:/db/changelog/hzcx_change.sql::ums_member_sign::hzc ran successfully in 22ms
2020-07-21 11:07:23.748  INFO 11157 --- [           main]
liquibase.executor.jvm.JdbcExecutor      : INSERT INTO hzcx.DATABASECHANGELOG (ID,
AUTHOR, FILENAME, DATEEXECUTED, ORDEREXECUTED, MD5SUM, `DESCRIPTION`, COMMENTS,
EXECTYPE, CONTEXTS, LABELS, LIQUIBASE, DEPLOYMENT_ID) VALUES ('ums_member_sign',
'hzc', 'classpath:/db/changelog/hzcx_change.sql', NOW(), 7,
'8:3ac00b4561f1b94eb46aed505f69e47a', 'sql', '', 'EXECUTED', NULL, NULL, '3.8.0',
'5300842515')
2020-07-21 11:07:23.751  INFO 11157 --- [           main]
l.lockservice.StandardLockService        : Successfully released change log lock
2020-07-21 11:07:23.856  INFO 11157 --- [           main]
.s.s.UserDetailsServiceAutoConfiguration :
```

spring boot简单集成liquibase

添加依赖

因为 Spring Boot 已经内置支持整合 Liquibase，我们只需要在项目工程中引入 Liquibase 的依赖进行配置即可。

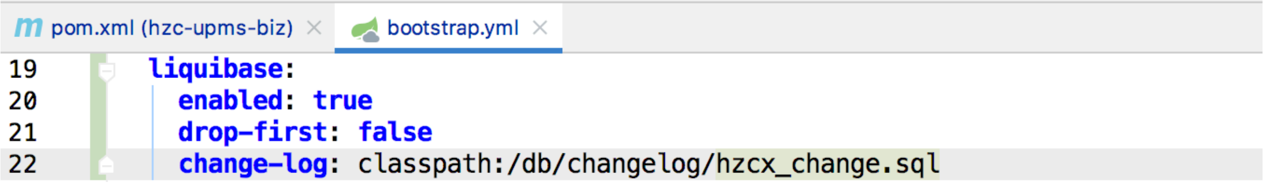
```
        <dependency>
            <groupId>org.liquibase</groupId>
            <artifactId>liquibase-core</artifactId>
            <version>3.8.0</version>
        </dependency>
```



```xml
        <dependency>
            <groupId>com.hzc</groupId>
            <artifactId>hzc-starter-sms</artifactId>
            <version>3.8.1</version>
        </dependency>
        <dependency>
            <groupId>com.hzc</groupId>
            <artifactId>hzc-starter-excel</artifactId>
            <version>3.8.1</version>
        </dependency>
        <!--在需要使用报文加密功能的模块引入如下依赖-->
        <dependency>
            <groupId>com.hzc</groupId>
            <artifactId>hzc-starter-api-crypto</artifactId>
            <version>3.8.1</version>
        </dependency>
        <dependency>
            <groupId>org.liquibase</groupId>
            <artifactId>liquibase-core</artifactId>
            <version>3.8.0</version>
        </dependency>
    </dependencies>
```

添加配置

```yaml
spring:
  liquibase:
    enabled: true
    drop-first: false
    change-log: classpath:/db/changelog/hzcx_change.sql
```



```yaml
  liquibase:
    enabled: true
    drop-first: false
    change-log: classpath:/db/changelog/hzcx_change.sql
```

changelog 编写讲解

SQL 格式的 changelogs 文件

SQL 格式的 `changelog` 文件使用 SQL 注释作为元数据，为确保这个文件被 Liquibase 识别为 `changelog`文件，，SQL 文件必须以以下注释开头：

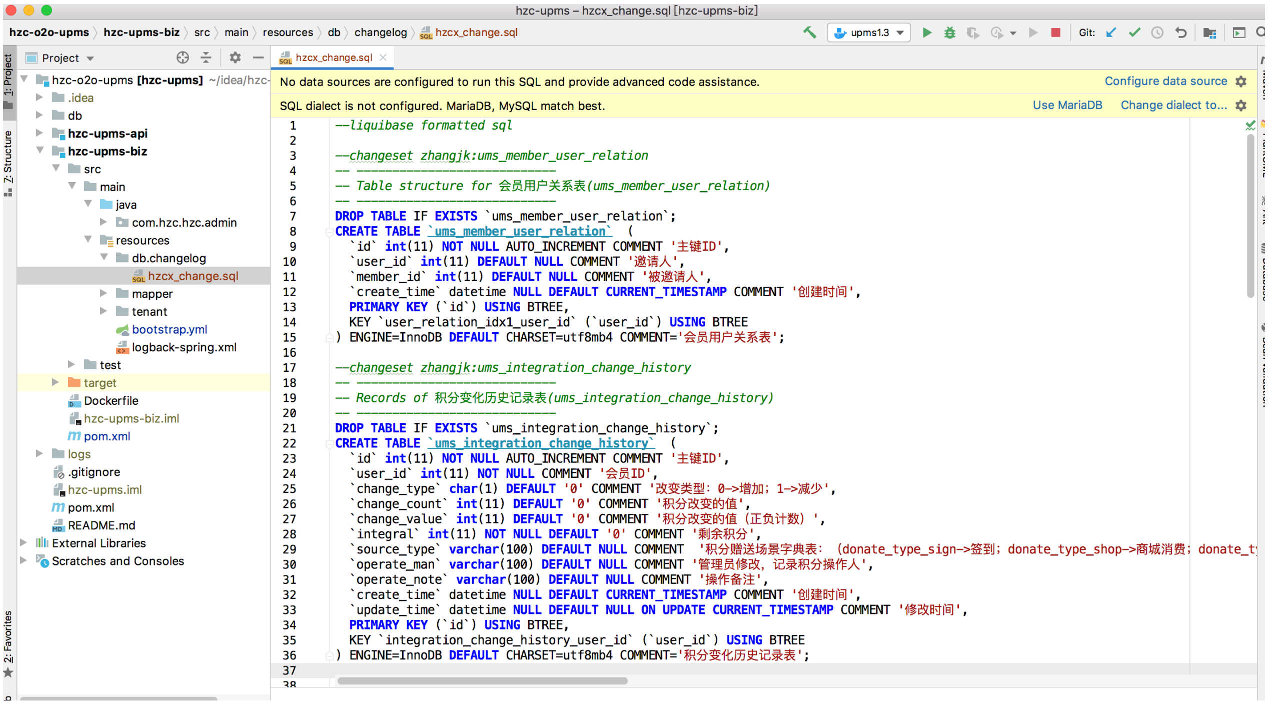
```
--liquibase formatted sql
```

changeset 变更

SQL 格式的 `changelog` 文件中在变更的 SQL 前需要加上以下注释，表示为一个 `changeset`变更集：

```
--changeset hzc:ums_member_user_relation
```

变更集 `changeset` 是通过 `author + id` 的方式来保证唯一性



No data sources are configured to run this SQL and provide advanced code assistance. Configure data source

SQL dialect is not configured. MariaDB, MySQL match best. Use MariaDB Change dialect to...

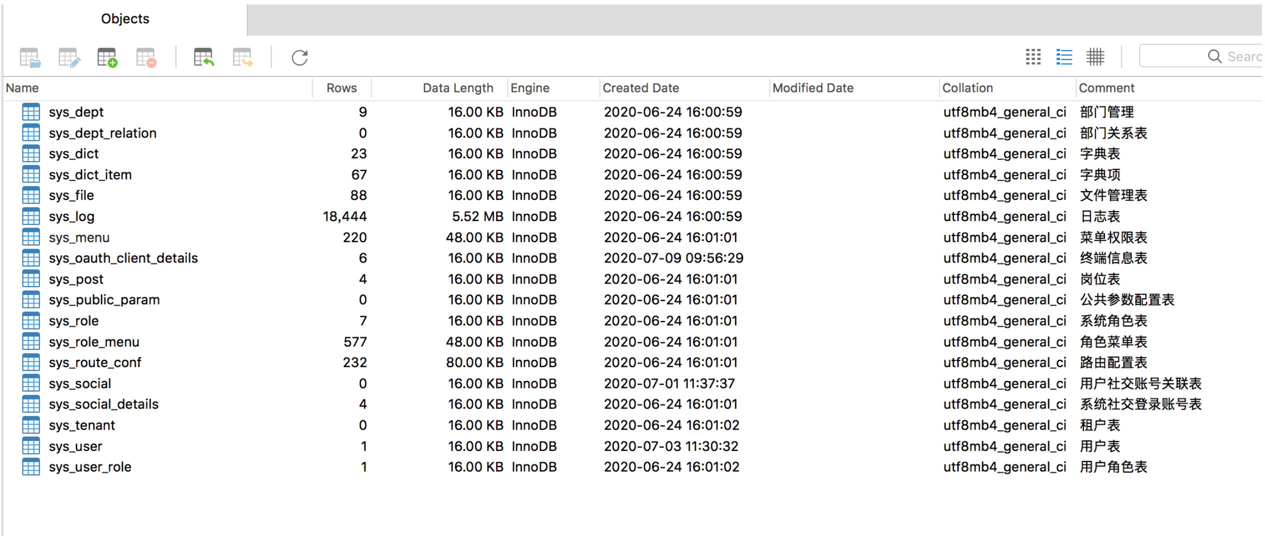
```sql
--liquibase formatted sql

--changeset zhangjk:ums_member_user_relation
-- ----------------------------
-- Table structure for 会员用户关系表(ums_member_user_relation)
-- ----------------------------
DROP TABLE IF EXISTS `ums_member_user_relation`;
CREATE TABLE `ums_member_user_relation`  (
  `id` int(11) NOT NULL AUTO_INCREMENT COMMENT '主键ID',
  `user_id` int(11) DEFAULT NULL COMMENT '邀请人',
  `member_id` int(11) DEFAULT NULL COMMENT '被邀请人',
  `create_time` datetime NULL DEFAULT CURRENT_TIMESTAMP COMMENT '创建时间',
  PRIMARY KEY (`id`) USING BTREE,
  KEY `user_relation_idx1_user_id` (`user_id`) USING BTREE
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COMMENT='会员用户关系表';

--changeset zhangjk:ums_integration_change_history
-- ----------------------------
-- Records of 积分变化历史记录表(ums_integration_change_history)
-- ----------------------------
DROP TABLE IF EXISTS `ums_integration_change_history`;
CREATE TABLE `ums_integration_change_history`  (
  `id` int(11) NOT NULL AUTO_INCREMENT COMMENT '主键ID',
  `user_id` int(11) NOT NULL COMMENT '会员ID',
  `change_type` char(1) DEFAULT '0' COMMENT '改变类型：0->增加；1->减少',
  `change_count` int(11) DEFAULT '0' COMMENT '积分改变的值',
  `change_value` int(11) DEFAULT '0' COMMENT '积分改变的值（正负计数）',
  `integral` int(11) NOT NULL DEFAULT '0' COMMENT '剩余积分',
  `source_type` varchar(100) DEFAULT NULL COMMENT  '积分赠送场景字典表：（donate_type_sign->签到；donate_type_shop->商城消费；donate_t
  `operate_man` varchar(100) DEFAULT NULL COMMENT '管理员修改，记录积分操作人',
  `operate_note` varchar(100) DEFAULT NULL COMMENT '操作备注',
  `create_time` datetime NULL DEFAULT CURRENT_TIMESTAMP COMMENT '创建时间',
  `update_time` datetime NULL DEFAULT NULL ON UPDATE CURRENT_TIMESTAMP COMMENT '修改时间',
  PRIMARY KEY (`id`) USING BTREE,
  KEY `integration_change_history_user_id` (`user_id`) USING BTREE
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COMMENT='积分变化历史记录表';
```

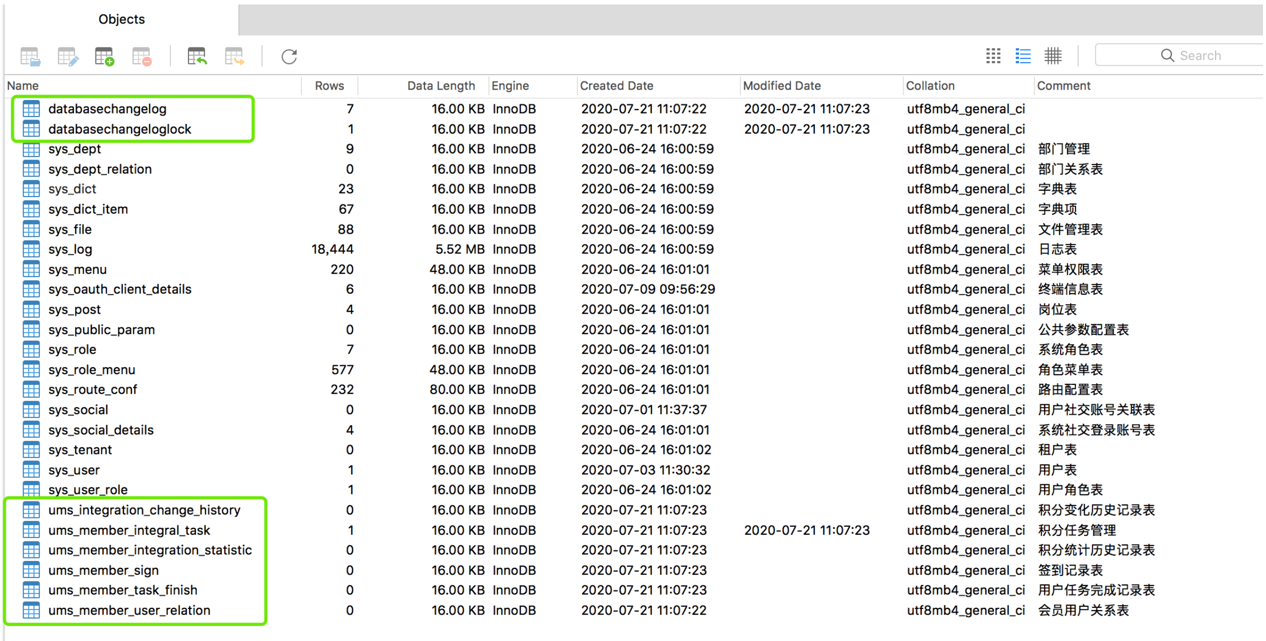
注意：如果使用工程已配置的 `datasource` 数据源，则 `liquibase.url、liquibase.user` 和 `liquibase.password` 这个三个参数可不配置，目标数据源即为工程已配置好的数据源。因为 Spring 会自动为 liquibase 获取可用的数据源，详情可查看这个类：`org.springframework.boot.autoconfigure.liquibase.LiquibaseAutoConfiguration`。

观察变化



Name	Rows	Data Length	Engine	Created Date	Modified Date	Collation	Comment
sys_dept	9	16.00 KB	InnoDB	2020-06-24 16:00:59		utf8mb4_general_ci	部门管理
sys_dept_relation	0	16.00 KB	InnoDB	2020-06-24 16:00:59		utf8mb4_general_ci	部门关系表
sys_dict	23	16.00 KB	InnoDB	2020-06-24 16:00:59		utf8mb4_general_ci	字典表
sys_dict_item	67	16.00 KB	InnoDB	2020-06-24 16:00:59		utf8mb4_general_ci	字典项
sys_file	88	16.00 KB	InnoDB	2020-06-24 16:00:59		utf8mb4_general_ci	文件管理表
sys_log	18,444	5.52 MB	InnoDB	2020-06-24 16:00:59		utf8mb4_general_ci	日志表
sys_menu	220	48.00 KB	InnoDB	2020-06-24 16:01:01		utf8mb4_general_ci	菜单权限表
sys_oauth_client_details	6	16.00 KB	InnoDB	2020-07-09 09:56:29		utf8mb4_general_ci	终端信息表
sys_post	4	16.00 KB	InnoDB	2020-06-24 16:01:01		utf8mb4_general_ci	岗位表
sys_public_param	0	16.00 KB	InnoDB	2020-06-24 16:01:01		utf8mb4_general_ci	公共参数配置表
sys_role	7	16.00 KB	InnoDB	2020-06-24 16:01:01		utf8mb4_general_ci	系统角色表
sys_role_menu	577	48.00 KB	InnoDB	2020-06-24 16:01:01		utf8mb4_general_ci	角色菜单表
sys_route_conf	232	80.00 KB	InnoDB	2020-06-24 16:01:01		utf8mb4_general_ci	路由配置表
sys_social	0	16.00 KB	InnoDB	2020-07-01 11:37:37		utf8mb4_general_ci	用户社交账号关联表
sys_social_details	4	16.00 KB	InnoDB	2020-06-24 16:01:01		utf8mb4_general_ci	系统社交登录账号表
sys_tenant	0	16.00 KB	InnoDB	2020-06-24 16:01:02		utf8mb4_general_ci	租户表
sys_user	1	16.00 KB	InnoDB	2020-07-03 11:30:32		utf8mb4_general_ci	用户表
sys_user_role	1	16.00 KB	InnoDB	2020-06-24 16:01:02		utf8mb4_general_ci	用户角色表

从数据库中可以看到变化



Name	Rows	Data Length	Engine	Created Date	Modified Date	Collation	Comment
databasechangelog	7	16.00 KB	InnoDB	2020-07-21 11:07:22	2020-07-21 11:07:23	utf8mb4_general_ci	
databasechangeloglock	1	16.00 KB	InnoDB	2020-07-21 11:07:22	2020-07-21 11:07:23	utf8mb4_general_ci	
sys_dept	9	16.00 KB	InnoDB	2020-06-24 16:00:59		utf8mb4_general_ci	部门管理
sys_dept_relation	0	16.00 KB	InnoDB	2020-06-24 16:00:59		utf8mb4_general_ci	部门关系表
sys_dict	23	16.00 KB	InnoDB	2020-06-24 16:00:59		utf8mb4_general_ci	字典表
sys_dict_item	67	16.00 KB	InnoDB	2020-06-24 16:00:59		utf8mb4_general_ci	字典项
sys_file	88	16.00 KB	InnoDB	2020-06-24 16:00:59		utf8mb4_general_ci	文件管理表
sys_log	18,444	5.52 MB	InnoDB	2020-06-24 16:00:59		utf8mb4_general_ci	日志表
sys_menu	220	48.00 KB	InnoDB	2020-06-24 16:01:01		utf8mb4_general_ci	菜单权限表
sys_oauth_client_details	6	16.00 KB	InnoDB	2020-07-09 09:56:29		utf8mb4_general_ci	终端信息表
sys_post	4	16.00 KB	InnoDB	2020-06-24 16:01:01		utf8mb4_general_ci	岗位表
sys_public_param	0	16.00 KB	InnoDB	2020-06-24 16:01:01		utf8mb4_general_ci	公共参数配置表
sys_role	7	16.00 KB	InnoDB	2020-06-24 16:01:01		utf8mb4_general_ci	系统角色表
sys_role_menu	577	48.00 KB	InnoDB	2020-06-24 16:01:01		utf8mb4_general_ci	角色菜单表
sys_route_conf	232	80.00 KB	InnoDB	2020-06-24 16:01:01		utf8mb4_general_ci	路由配置表
sys_social	0	16.00 KB	InnoDB	2020-07-01 11:37:37		utf8mb4_general_ci	用户社交账号关联表
sys_social_details	4	16.00 KB	InnoDB	2020-06-24 16:01:01		utf8mb4_general_ci	系统社交登录账号表
sys_tenant	0	16.00 KB	InnoDB	2020-06-24 16:01:02		utf8mb4_general_ci	租户表
sys_user	1	16.00 KB	InnoDB	2020-07-03 11:30:32		utf8mb4_general_ci	用户表
sys_user_role	1	16.00 KB	InnoDB	2020-06-24 16:01:02		utf8mb4_general_ci	用户角色表
ums_integration_change_history	0	16.00 KB	InnoDB	2020-07-21 11:07:23		utf8mb4_general_ci	积分变化历史记录表
ums_member_integral_task	1	16.00 KB	InnoDB	2020-07-21 11:07:23	2020-07-21 11:07:23	utf8mb4_general_ci	积分任务管理
ums_member_integration_statistic	0	16.00 KB	InnoDB	2020-07-21 11:07:23		utf8mb4_general_ci	积分统计历史记录表
ums_member_sign	0	16.00 KB	InnoDB	2020-07-21 11:07:23		utf8mb4_general_ci	签到记录表
ums_member_task_finish	0	16.00 KB	InnoDB	2020-07-21 11:07:23		utf8mb4_general_ci	用户任务完成记录表
ums_member_user_relation	0	16.00 KB	InnoDB	2020-07-21 11:07:22		utf8mb4_general_ci	会员用户关系表

其中`DATABASECHANGELOG` 和 `DATABASECHANGELOGLOCK` 表是 Liquibase 自动生成的。

Liquibase 最佳实践

一个变更集只设置一次更改

尽可能地避免对一个变更集进行多次更改，以避免自动提交 SQL 语句而可能使数据库处于非预期状态。如 `--changeset zhangjk:ums_member_user_relation` 变更集，只新建一张 `ums_member_user_relation` 表，后面不再修改该变更集，如果需要变更，可以新增一条变更集。

变更集的 ID

选择适合您的方法。有的人是使用从 1 开始的序列号, 并且在更改日志中是唯一的，也有些人选择一个描述性的名称（例如：`ums_member_user_relation`）