

2018 Citi Financial Innovation Application Competition

Database Design Documentation



Title : Li Jin--A REITs platform for securitization
of housing lease assets

Captain : Chu Tianshuo

Tutor : Gao Ming, Sui Cong

School : Dongbei University of Finance and Economics

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1. Part One: The introduction

1.1 purpose

In order to make it easy for the reader to be familiar with the database content quickly and operate on the database to modify the data, this document was written.

Intended readers: requirements analysts, application developers, testers

1.2 project background

Project name:

Project name meaning:

Project task proposer:

Project developer:

User group: yirong has three ports, which are enterprise port, investor port and SPV port.

First, the enterprise port is targeted at small and medium-sized enterprises with financing needs. With asset securities as the core, the platform integrates and packages specific asset portfolio or specific cash flow provided by small and medium-sized enterprises in a specific way, so as to issue tradable asset-backed securities. Therefore, for small and medium-sized enterprises with assets that do not meet the bank's credit requirements, yirong can reasonably package and control the risks of their assets by means specific to the platform, reduce the financing threshold and cost of enterprises, and increase the possibility of successful financing for small and medium-sized enterprises.

Second, the investor port is targeted at the vast number of investors with investment demand. Yirong scientifically and reasonably controls the credit risk of the asset pool through specific methods, and introduces the institution guarantee mechanism, which can provide investors with safe, stable and higher-yielding investment channels.

Finally, SPV port is targeted at operation managers of the platform. Operation managers can comprehensively master the formation of asset pools through SPV terminal, complete bond classification and issuance, and at the same time, can master the bond transaction and circulation through this port, so as to better construct new asset pools and issue bonds in the future.

1.3 definitions

1. E-r Diagram: Entity Relationship Diagram, which provides a way to represent Entity types, attributes and connections to describe the conceptual model of the real world.
2. Agreement: the naming of specific attributes of the system database is translated into English according to the Chinese meaning and has the actual literal meaning.

2 Part Two: database conceptual model design

2.1 data entity – diagram

表名	实体属性	
	属性名	中文名
bond 基金	Bid	基金编号
	Bname	基金名称
	Level	基金所属级别
	Deadline	基金期限
	Denomination	面值
	Financingscale	融资规模
	Annualinterestrate	年利率
	Releasestarttime	申购起始时间
	Releasestoptime	申购结束时间
	Issueprice	申购价格
	Issueturnover	申购总量

	Purchasedturnover	已被申购份数
	Listingdate	上市时间
	Totaltransactionamount	总成交额
	totalTurnover	总交易量（手）
	bstatement	基金状态（1:申购期 2:上市期 3: 到期）
bond_loan_loss_provision	Bid	基金编号
	loanLossProvision	基金风险准备金

bond_company_financing	bid	基金编号
基金与公司对应的关系	cfiid	企业融资项目编号

company_basic_info (公司基本信息)	cid	企业编号
	ctel	登录帐号 (注册人手机号码)
	cpassword	登录密码
	cmailBox	企业邮箱
	cregisterName	注册人姓名 (也是持卡人)
	cregisterIDtype	注册人证件类型
	cregisterIDCard	注册人证件号码
	cregisterBankAccount	注册人银行账户就
	Crad	银行卡号码
	cname	企业名
	coffice	企业所在地
	clCRegistrationNum	企业工商登记号

	Cindustry	企业所属行业
	cintroduction	企业简介
	corpName	法人姓名
	corpIDtype	法人证件类型
	corpIDcard	法人证件号码
	corpTel	法人手机号码
	cfiid	企业融资详情编号
	cid	企业编号
	cfiApplyDate	企业申请融资日期
	cfiGetMoneyDate	企业获得融资日期
	financingProjectName	融资项目名称
	financingDeadlin	融资期限 (月)
	financingAmount	融资金额 (元)
	introductionOfAssets	资产简介
	exceptCashFlow3	预计 3 个月的现金流
	exceptCashFlow6	预计 6 个月的现金流
	exceptCashFlow9	预计 9 个月的现金流
	exceptCashFlow12	预计 12 个月的现金
	exceptCashFlow24	预计 24 个月的现金流
	exceptCashFlow	融资日期对应的对应现金流
	materialPath	材料路径(三张表，文件夹以公 司名命名)

company_financing_info 公司 融资信息	expectPaymentTime	预计还款时间
	actualPaymentTime	实际还款时间
	statement	融资状态 (1234567) 8 : 失败
	liquidityRati	流动比
	quickRatio	速冻比率
	cashRatio	现金比率
	WorkingCapitalpercent	营运资本/总资产
	debttoassetsRatio	资产负债率
	Property ratio	产权比率
	Cash flow ratio	现金流量比率
	Debt security rate	债务保障率
	Operating income cash ratio	营业收入现金比率
	Net interest rate on sales	销售净利率
	ROA1	总资产报酬率 ROA
	ROA2	总资产净利率 ROA
	ROE	净资产收益率 ROE
	Turnover rate of accounts receivable	应收账款周转率
	Inventory turnover rate	存货周转率
	Current asset turnover rate	流动资产周转率

	Total assets turnover	总资产周转率
	Total assets growth rat	总资产同比增长率
	Operating income growth	营业收入同比增长率
	Total retained earnings / assets	留存收益/资产总计
datamaintenance	dmid	数据维护编号
	x1	无风险利率
	x	汇率
	x3	通货膨胀率
	x4	GDP 增长率
	x5	居民消费水
	x	提前偿付率
	x7	违约率
company_financing_money 公 司融资	cfiid	企业融资项目编号
	actualPaymentAmount	企业实际融资总额
	loanRate	企业融资利率
	financingAmount	企业借款总
user_basic_info 个人信息表	uid	客户编号
	utel	客户电话号码
	umailBox	邮箱地址
	upassword	密码
	uRealname	真实姓名

	unickName	昵称
	ulDType	证件类型
	ulDCard	证件号码
	riskLevel	风险偏好类型
	registerTime	注册时间
	lastLogin	上次登录时间
	flag	账户类型 (1:用户 2:公司 3:管理 员)
	question	密保问题
	answer	密保答案
	photo	照片存储路径
message 消息中心	mid	消息序号
	type	消息类型 (1:公告 2:申购 3:交易)
	receiverID	接受人编号
	senderid	发送人编号
	date	日期
	head	消息标题
	context	内容
	isRead	是否已读 (1 : 未读 2 : 已读)
user_balance 用户账户余额信息	uid	用户编号
	balance	余额

user_own_bond 用户持有基金的信息	uobid	用户当前持有基金编号
	ownerid	用户编号
	bi	基金编号
	ubturnover	正持有基金份额 (手)
	uobprice	买入加权平均价格
	statement	状态 (1 有效 2 售出 3 过期)
	startdate	拥有基金日期
	end	清仓日期
user_trade_bond 用户交易记录	utbid	用户交易记录编号
	bid	基金编号
	buyerid	购买用户编号
	sellerid	出售用户编号
	utbdate	交易日期
	utbprice	交易单价
	utbturnover	交易量 (手)
	type	类型 1 : 申购 (购买) 中 (未付款) 2 : 成功 , 3 : 失败
	statement	状态 : 1 : 申购 2 : 二级购买
	failedResult	失败理由

user_collect_bond 用户收藏的基金信	ucbid	用户收藏基金编号
	bid	基金编号
user_trust_deed (用户委托单	utdid	用户委托单编号
	Ownerid	用户编号
	bid	基金编号
	startDate	委托起始日期
	utbturnover	委托交易份数
	utbprice	委托交易单价
	type	交易类型 (1 挂售 2 求购)
user_or_com_bank 用户或企 业的银行卡	baid	用户或企业持有银行卡编号
	cid	企业编号 (企业用户二选一)
	uid	用户编号 (企业用户二选一)
	bankAccoun	银行卡编号
spv_basic_info spv 的基本信 息	spvid	spv 编号
	spvname	spv 姓名
	spvlevel	spv 等级
	flag	用户类型
	spvtel	spv 手机号码
	spvpassword	spv 密码

3. Part Three: Database backup

In order to ensure the security of MySQL data, the database should be backed up

regularly, and different backup database backup strategies should be adopted under different circumstances. On the one hand, data security should be maintained, and on the other hand, MySQL can be kept running smoothly. Try your best to reduce the loss to the customer due to data damage.

3.1 the concept

(1) backup work plan:

The stability of computer hardware and software has not reached a very stable state, there is still loss or damage to the data in the computer. The data existing in the computer is not safe, even if the fault-tolerant device is adopted, the database is not 100% secure. The cost of computer hardware can be high, but computer data is more precious, and good data backup ensures that database integrity can be maintained in all kinds of unexpected situations. Administrators have to take the time to back up the database, but MySQL also provides a lot of automation.

(2) backup mode:

Database -- full backup

Back up the entire database. If you back up the entire database, you will need a lot of storage space to store the backup data, but the advantage is that when you restore the database, you can simply restore the entire database from a backup to MySQL. It is the basis for other backups and people have to make backups this way before they do any other backups.

Database - differential backup

Only data that has changed since the last "complete" database backup is backed up, so it requires less backup time and space than the "complete" method, so it is best used as a regular backup.

The transaction log

Only backup the contents of the transaction record file. Since the transaction log file only records the process of changes to the database after the previous database backup,

that is, changes to the database only for a certain period of time, it is necessary to make a "complete" database backup before doing the transaction record backup.

3.2 principles for making backup plans

To plan the backup strategy for the database, we need to take into account the variables of the backup, and must also consider the implementation of the restore job. When making backups, consider the following.

- (1) how much time and during which time periods can be backed up
- (2) how often does the database change
- (3) database size
- (4) when the database goes wrong, how long the user is willing to wait for the database to be restored
- (5) what kind of backup method should be adopted, what kind of matching should be made,
- (6) which storage medium to use

3.3 backup plan

(1) full database backup and transaction log backup are relatively large for database data, but the contents changed daily are small. This method can be considered. You can do a full database backup periodically, for example, once a week or once a month. Then back up with a shorter cycle, such as doing a transaction log backup every day or every two days. So peacetime backup workload is relatively light, in the event of accidents, data can be restored to the most recent state.

(2) full database backup with difference backup

This is to change the transaction log backup mode in the previous mode to differential backup. The advantage is that when doing restore, we only need to restore with the difference backup of the previous day after finishing the restore of the last database backup. The disadvantages is that in the days after the comparison, the amount of time

and space required for each difference backup will increase.

(3) comprehensive use of three backup modes

Since transaction record backups and differential backups each have their advantages and disadvantages, we can use both approaches together. It is very important for data information. If you back up every 1 or 2 hours, the possible loss is only 1 or 2 hours of data.

3.4 selection of backup media and backup time

Backup medium has hard disk and tape two kinds. According to our application, data should be backed up to a separate hard disk first, and then back up to tape from hard disk. Backup time should be selected for less user time, such as early Saturday morning or early morning everyday.

4. Part Four: Database security

4.1 multiple database storage

Considering the insecurity of network transaction, the platform uses multiple databases to store data

Multi-database storage refers to the peripheral and core systems of Banks, divides all platform data into peripheral data and core data into database storage, and further encrypts the core data, thus achieving the effect of further improving the security of the data and relatively reducing the cost of encrypted data. The structure is shown in the figure below.

4.2 SSL connection encryption

MySQL5.7 supports SSL encryption, SSL(Secure Sockets Layer) protocol, and its successor, TLS (Transport Layer Security Transport Layer Security) protocol, is a Security protocol that provides Security and data integrity for network communications. SSL authenticates each other, USES digital signatures to ensure

integrity, and USES encryption to ensure confidentiality to enable secure communication between clients and servers. The protocol consists of two layers: SSL protocol recording protocol and SSL handshake protocol. By adding the root certificate and server certificate to the MySQL server and server key, the client must have the client certificate to connect to the MySQL server to achieve high security.