数据层服务简介

一个基于阿里巴巴Canal，实时同步mysql数据到Elasticsearch的工具。轻量，易于配置，部署简单，支持数据回滚。整个服务包含服务端和客户端程序，服务端负责读取mysql实例中binlog位点信息，并负责将位点信息写入zookeeper,客户端通过canal提供的API读取循环读取位点信息，拉取数据。

服务端配置

canal的部署可以参考官方文档：https://github.com/alibaba/canal/wiki/QuickStart 配置的时候要注意：

- conf/canal.properties是canal本身的配置文件，基本上默认即可

- conf/example/instance.properties:应用的配置参数,一般需要修改其中的数据库连接配置

```
#########################################
## mysql serverId
canal.instance.mysql.slaveId = 57001

# position info
canal.instance.master.address = 192.168.5.200:3306         配置主库信息
canal.instance.master.journal.name =
canal.instance.master.position =
canal.instance.master.timestamp =

#canal.instance.standby.address =
#canal.instance.standby.journal.name =
#canal.instance.standby.position =
#canal.instance.standby.timestamp =

# username/password
canal.instance.dbUsername = canal          配置主库用户信息
canal.instance.dbPassword = canal
canal.instance.defaultDatabaseName =
canal.instance.connectionCharset = UTF-8                        配置库表信息

# table regex
canal.instance.filter.regex = product.cmc_item_desc,product.aus_at_picture_list,
product.cmc_category,product.cmc_brand,product.cmc_item,product.cmc_item_line,product.cmc_item_price,product.cmc_spu
# table black regex
canal.instance.filter.black.regex =

#########################################
[root@test1 product]#
```

客户端服务代码重要说明

1、两个重要枚举类，用来定义要读取的库和表信息

```java
/**
 * Created by wangchengli on 2018/1/22
 * 定义读取数据库Schema信息
 */
@Target({ElementType.TYPE})
@Retention(RetentionPolicy.RUNTIME)
@Documented
@Component
public @interface Schema {
    String value() default "";
}
```

```java
/**
 * Created by wangchengli on 2018/1/22
 */
@Target({ElementType.METHOD,ElementType.TYPE})
@Retention(RetentionPolicy.RUNTIME)
@Documented
public @interface Table {
    String value() default "";

    CanalEntry.EventType[] event() default {};
}
```

在服务启动时通过SpringUtil类读取此注解类信息，保存在内存中

```java
@Override
    public void setApplicationContext(ApplicationContext
applicationContext) {
        if (SpringUtil.applicationContext == null) {
            SpringUtil.applicationContext = applicationContext;
            //初始化instanceMap数据
            instanceMap();
            //初始化handlerMap数据
            handlerMap();
        }
    }

    private void instanceMap() {
        Map<String, Object> beans =
applicationContext.getBeansWithAnnotation(Schema.class);
        for (Object bean : beans.values()) {
            Class<?> clazz = bean.getClass();
            Object instance = applicationContext.getBean(clazz);
            Schema schema = clazz.getAnnotation(Schema.class);
            String key = schema.value();
            instanceMap.put(key, instance);
            logger.info("instanceMap [{}:{}]", key, bean == null ? "null" :
clazz.getName());
        }
    }

    private void handlerMap() {
        if (instanceMap.size() <= 0)
            return;
        for (Map.Entry<String, Object> entry : instanceMap.entrySet()) {
            if
(entry.getValue().getClass().isAnnotationPresent(Schema.class)) {
                Schema schema =
entry.getValue().getClass().getAnnotation(Schema.class);
```

```
                String schemeName = schema.value();
                Method[] methods =
entry.getValue().getClass().getMethods();
                for (Method method : methods) {
                    if (method.isAnnotationPresent(Table.class)) {
                        Table table = method.getAnnotation(Table.class);
                        String tName = table.value();
                        CanalEntry.EventType[] events = table.event();
                        //未标明数据事件类型的方法不做映射
                        if (events.length < 1) {
                            continue;
                        }
                        //同一个方法可以映射多张表
                        for (int i = 0; i < events.length; i++) {
                            String path = "/" + schemeName + "/" + tName +
"/" + events[i].getNumber();
                            handlerMap.put(path, method);
                            logger.info("handlerMap [{}:{}]", path,
method.getName());
                        }
                    } else {
                        continue;
                    }
                }
            } else {
                continue;
            }

        }
    }
```

2、通过ApplicationListener处理对应增，删，改三个DML操作

```
InsertCanalListener
UpdateCanalListener
DeleteCanalListener
InsertCanalEvent
UpdateCanalEvent
DeleteCanalEvent
```

当客户端拉取到数据时，根据此数据对应的DML操作，发布对应的DMLEvent，此时事件处理器进行
处理

```
    /**
     * ApplicationContext发布事件
     *
     * @param entry
```

```java
     */
    @SuppressWarnings("all")
    private void publishCanalEvent(CanalEntry.Entry entry) {
        CanalEntry.EventType eventType = entry.getHeader().getEventType();
        switch (eventType) {
            case INSERT:
                applicationContext.publishEvent(new
InsertCanalEvent(entry));
                break;
            case UPDATE:
                applicationContext.publishEvent(new
UpdateCanalEvent(entry));
                break;
            case DELETE:
                applicationContext.publishEvent(new
DeleteCanalEvent(entry));
                break;
            default:
                break;
        }
    }
```

ItemAggService

数据聚合接口，有新增的数据聚合业务，都需要放在此接口中处理

```java
    /**
    *item表发生更新操作时，此方法会被自动调用，@Table注解起到的作用
    */
    @Table(value = "item", event = {CanalEntry.EventType.UPDATE})
    public void aggUpdateItem(Map<String, Object> map, IndexTypeModel
indexTypeModel)
```

索引别名

索引别名就像一个快捷方式或软连接，可以指向一个或多个索引，也可以给任务需要索引名的API使用。

可以检测这个别名指向哪个索引：

GET /*/_alias/my_index

或哪些别名指向这个索引：

GET /my_index/_alias/*

创建别名：

POST /_aliases

```
{

"actions":[

{"remove":{"index":"my_index_v1","alias":"my_index"}},

{"add":{"index":"my_index_v2","alias":"my_index"}}

]

}
```

gms索引映射

```
{
  "settings" : {
    "analysis" : {
      "analyzer" : {
        "pinyin_analyzer" : {
          "tokenizer" : "my_pinyin",
          "filter" : "word_delimiter"
        },
        "optimizeIK":{
          "type":"custom",
          "tokenizer":"ik_smart",
          "filter":["stemmer","word_delimiter","lowercase"]
        }
      },
      "tokenizer" : {
        "my_pinyin" : {
          "type" : "pinyin",
          "first_letter" : "none",
          "padding_char" : " "
        }
      }
    }
  },
  "mappings": {
    "_default_":{
      "_all":{
        "enabled":false
      }
    },

    "aus_at_picture_list":{
      "dynamic":"false",
      "properties": {
        "PICTURE_ID":{
          "type": "string",
          "index": "not_analyzed"
        },
```

```
"BILL_NO":{
  "type": "string",
  "index": "not_analyzed"
},
"BILL_TYPE":{
  "type": "string",
  "index": "not_analyzed"
},
"PIC_NAME":{
  "type": "string",
  "index": "not_analyzed"
},
"PIC_TYPE":{
  "type": "string",
  "index": "not_analyzed"
},
"FILE_PATH":{
  "type": "string",
  "index": "not_analyzed"
},
"PIC_SIZE":{
  "type": "double",
  "index": "not_analyzed"
},
"PIC_STORAGE_NAME":{
  "type": "string",
  "index": "not_analyzed"
},
"PIC_EX_FILEID":{
  "type": "string",
  "index": "not_analyzed"
},
"SMALL_SIZE_NAME":{
  "type": "string",
  "index": "not_analyzed"
},
"SMALL_SIZE_EX_FILE_ID":{
  "type": "string",
  "index": "not_analyzed"
},
"MIDDLE_SIZE_NAME":{
  "type": "string",
  "index": "not_analyzed"
},
"MIDDLE_SIZE_EX_FILE_ID":{
  "type": "string",
  "index": "not_analyzed"
},
"PIC_STATUS":{
```

```
        "type": "string",
        "index": "not_analyzed"
      },
      "CREATE_USER_ID":{
        "type":"string",
        "index":"not_analyzed"
      },
      "CREATE_DATE":{
        "type": "date",
        "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
      },
      "CREATE_USER_NAME":{
        "type":"string",
        "index":"not_analyzed"
      },

      "MODIFY_USER_ID":{
        "type":"string",
        "index":"not_analyzed"
      },
      "MODIFY_DATE":{
        "type": "date",
        "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
      },
      "MODIFY_USER_NAME":{
        "type":"string",
        "index":"not_analyzed"
      },
      "ORG_ID":{
        "type":"string",
        "index":"not_analyzed"
      },
      "BOOK_ID":{
        "type":"string",
        "index":"not_analyzed"
      },
      "GROUP_ID":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL1":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL2":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL3":{
```

```json
          "type":"string",
          "index":"not_analyzed"
        },
        "EXT_COL4":{
          "type":"string",
          "index":"not_analyzed"
        },
        "EXT_COL5":{
          "type":"string",
          "index":"not_analyzed"
        },
        "EXT_COL6":{
          "type":"string",
          "index":"not_analyzed"
        },
        "EXT_COL7":{
          "type":"string",
          "index":"not_analyzed"
        },
        "EXT_COL8":{
          "type":"string",
          "index":"not_analyzed"
        },
        "EXT_COL9":{
          "type":"string",
          "index":"not_analyzed"
        },
        "EXT_COL10":{
          "type":"string",
          "index":"not_analyzed"
        }
      }
    },
    "spu":{
      "dynamic":"false",
      "properties": {
        "SPU_ID":{
          "type": "string",
          "index": "not_analyzed"
        },
        "CATEGORY_ID":{
          "type": "string",
          "index": "not_analyzed"
        },
        "SPEC_HEAD_ID":{
          "type": "string",
          "index": "not_analyzed"
        },
        "SPU_CODE":{
```

```json
            "type": "string",
            "index": "not_analyzed"
          },
          "SPU_NAME": {
            "type": "multi_field",
            "fields": {
              "pinyin": {
                "type": "string",
                "store": "no",
                "term_vector": "with_positions_offsets",
                "analyzer": "pinyin_analyzer",
                "boost": 10
              },
              "SPU_NAME": {
                "type": "string",
                "term_vector": "with_positions_offsets",
                "index": "analyzed",
                "analyzer": "optimizeIK",
                "search_analyzer": "optimizeIK",
                "include_in_all": "true"
              }
            }
          },
          "SPU_STATUS":{
            "type": "string",
            "index": "not_analyzed"
          },
          "SPU_TYPE":{
            "type": "string",
            "index": "not_analyzed"
          },
          "SPU_DESC":{
            "type": "string",
            "term_vector": "with_positions_offsets",
            "index": "analyzed",
            "analyzer": "optimizeIK",
            "search_analyzer": "optimizeIK",
            "include_in_all": "true"
          },
          "BRAND":{
            "type": "string",
            "index": "not_analyzed"
          },
          "PRIMARY_UNIT_CODE":{
            "type": "string",
            "index": "not_analyzed"
          },
          "TAX_RATE":{
            "type": "string",
```

```
        "index": "not_analyzed"
      },
      "SPEC_VALUE1": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE2": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE3": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE4": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE5": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE6": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE7": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE8": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE9": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE10": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE11": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE12": {
        "type": "string",
        "index": "not_analyzed"
```

```json
        },
        "SPEC_VALUE13": {
          "type": "string",
          "index": "not_analyzed"
        },
        "SPEC_VALUE14": {
          "type": "string",
          "index": "not_analyzed"
        },
        "SPEC_VALUE15": {
          "type": "string",
          "index": "not_analyzed"
        },
        "SPEC_VALUE16": {
          "type": "string",
          "index": "not_analyzed"
        },
        "SPEC_VALUE17": {
          "type": "string",
          "index": "not_analyzed"
        },
        "SPEC_VALUE18": {
          "type": "string",
          "index": "not_analyzed"
        },
        "SPEC_VALUE19": {
          "type": "string",
          "index": "not_analyzed"
        },
        "SPEC_VALUE20": {
          "type": "string",
          "index": "not_analyzed"
        },
        "CREATE_USER_ID":{
          "type":"string",
          "index":"not_analyzed"
        },
        "CREATE_DATE":{
          "type": "date",
          "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
        },
        "CREATE_USER_NAME":{
          "type":"string",
          "index":"not_analyzed"
        },

        "MODIFY_USER_ID":{
          "type":"string",
          "index":"not_analyzed"
```

```json
    },
    "MODIFY_DATE":{
      "type": "date",
      "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
    },
    "MODIFY_USER_NAME":{
      "type":"string",
      "index":"not_analyzed"
    },
    "ORG_ID":{
      "type":"string",
      "index":"not_analyzed"
    },
    "BOOK_ID":{
      "type":"string",
      "index":"not_analyzed"
    },
    "GROUP_ID":{
      "type":"string",
      "index":"not_analyzed"
    },
    "EXT_COL1":{
      "type":"string",
      "index":"not_analyzed"
    },
    "EXT_COL2":{
      "type":"string",
      "index":"not_analyzed"
    },
    "EXT_COL3":{
      "type":"string",
      "index":"not_analyzed"
    },
    "EXT_COL4":{
      "type":"string",
      "index":"not_analyzed"
    },
    "EXT_COL5":{
      "type":"string",
      "index":"not_analyzed"
    },
    "EXT_COL6":{
      "type":"string",
      "index":"not_analyzed"
    },
    "EXT_COL7":{
      "type":"string",
      "index":"not_analyzed"
    },
```

```json
      "EXT_COL8":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL9":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL10":{
        "type":"string",
        "index":"not_analyzed"
      },
      "TAX_CODE_TYPE":{
        "type":"string",
        "index":"not_analyzed"
      },
      "SPU_DETAIL_NOTES":{
        "type": "string",
        "term_vector": "with_positions_offsets",
        "index": "analyzed",
        "analyzer": "optimizeIK",
        "search_analyzer": "optimizeIK",
        "include_in_all": "true"
      }
    }
  },
  "item_price":{
    "dynamic":"false",
    "properties": {
      "ITEM_PRICE_ID":{
        "type": "string",
        "index": "not_analyzed"
      },
      "ITEM_LINE_ID":{
        "type": "string",
        "index": "not_analyzed"
      },
      "PRICE_TYPE":{
        "type": "string",
        "index": "not_analyzed"
      },
      "PUR_PRICE1":{
        "type": "double",
        "index": "not_analyzed"
      },
      "PUR_PRICE2":{
        "type": "double",
        "index": "not_analyzed"
      },
```

```json
      "PUR_PRICE3":{
        "type": "double",
        "index": "not_analyzed"
      },
      "PUR_PRICE4": {
        "type": "double",
        "index": "not_analyzed"
      }, "PUR_PRICE5":{
        "type": "double",
        "index": "not_analyzed"
      },
      "SALE_PRICE1":{
        "type": "double",
        "index": "not_analyzed"
      },
      "SALE_PRICE2":{
        "type": "double",
        "index": "not_analyzed"
      },
      "SALE_PRICE3":{
        "type": "double",
        "index": "not_analyzed"
      },
      "SALE_PRICE4":{
        "type": "double",
        "index": "not_analyzed"
      },
      "SALE_PRICE5":{
        "type": "double",
        "index": "not_analyzed"
      },
      "VALID_DATE":{
        "type": "date",
        "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
      },
      "INVALID_DATE":{
        "type": "date",
        "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
      },
      "CREATE_USER_ID":{
        "type":"string",
        "index":"not_analyzed"
      },
      "CREATE_DATE":{
        "type": "date",
        "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
      },
      "CREATE_USER_NAME":{
        "type":"string",
```

```
        "index":"not_analyzed"
      },

      "MODIFY_USER_ID":{
        "type":"string",
        "index":"not_analyzed"
      },
      "MODIFY_DATE":{
        "type": "date",
        "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
      },
      "MODIFY_USER_NAME":{
        "type":"string",
        "index":"not_analyzed"
      },
      "ORG_ID":{
        "type":"string",
        "index":"not_analyzed"
      },
      "BOOK_ID":{
        "type":"string",
        "index":"not_analyzed"
      },
      "GROUP_ID":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL1":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL2":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL3":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL4":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL5":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL6":{
        "type":"string",
```

```json
        "index":"not_analyzed"
      },
      "EXT_COL7":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL8":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL9":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL10":{
        "type":"string",
        "index":"not_analyzed"
      }
    }
  },
  "item_line":{
    "dynamic":"false",
    "properties": {
      "ITEM_LINE_ID":{
        "type": "string",
        "index": "not_analyzed"
      },
      "ITEM_ID":{
        "type": "string",
        "index": "not_analyzed"
      },
      "ITEM_LINE_CODE":{
        "type": "string",
        "index": "not_analyzed"
      },
      "MATERIAL_TYPE_CODE":{
        "type": "string",
        "index": "not_analyzed"
      },
      "SUPPLIER_ID":{
        "type": "string",
        "index": "not_analyzed"
      },
      "TAX_CODE_TYPE":{
        "type": "string",
        "index": "not_analyzed"
      },
      "TAX_CODE":{
        "type": "string",
```

```json
      "index": "not_analyzed"
    },
    "MIN_ORDER_NUM":{
      "type": "double",
      "index": "not_analyzed"
    },
    "PACKAGE_NUM":{
      "type": "double",
      "index": "not_analyzed"
    },
    "LEAD_TIME":{
      "type": "double",
      "index": "not_analyzed"
    },
    "ITEM_VALID_DATE":{
      "type": "date",
      "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
    },
    "ITEM_INVALID_DATE":{
      "type": "date",
      "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
    },
    "MATERIAL_ACCOUNT":{
      "type": "string",
      "index": "not_analyzed"
    },
    "DOWN_PRICE_ACCOUNT":{
      "type": "string",
      "index": "not_analyzed"
    },
    "COST_ACCOUNT":{
      "type": "string",
      "index": "not_analyzed"
    },
    "REVENUE_ACCOUNT":{
      "type": "string",
      "index": "not_analyzed"
    },
    "RECEIVE_ACCOUNT":{
      "type": "string",
      "index": "not_analyzed"
    },
    "REVE_ADV_ACCOUNT":{
      "type": "string",
      "index": "not_analyzed"
    },
    "PAY_ACCOUNT":{
      "type": "string",
      "index": "not_analyzed"
```

```
        },
        "PREPAY_ACCOUNT":{
          "type": "string",
          "index": "not_analyzed"
        },
        "EXPENSE_ACCOUNT":{
          "type": "string",
          "index": "not_analyzed"
        },
        "GTP_COST_ACCOUNT":{
          "type": "string",
          "index": "not_analyzed"
        },
        "GTP_REVENUE_ACCOUNT":{
          "type": "string",
          "index": "not_analyzed"
        },
        "MATCH_FLAG":{
          "type": "string",
          "index": "not_analyzed"
        },
        "EFFECT_USER_ID":{
          "type": "string",
          "index": "not_analyzed"
        },
        "EFFECT_DATE":{
          "type": "date",
          "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
        },
        "INVALID_USER_ID":{
          "type": "string",
          "index": "not_analyzed"
        },
        "INVALID_DATE":{
          "type": "date",
          "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
        },
        "DISPLAY_FLAG":{
          "type": "string",
          "index": "not_analyzed"
        },
        "STATUS":{
          "type": "string",
          "index": "not_analyzed"
        },
        "CREATE_USER_ID":{
          "type":"string",
          "index":"not_analyzed"
        },
```

```json
"CREATE_DATE":{
  "type": "date",
  "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
},
"CREATE_USER_NAME":{
  "type":"string",
  "index":"not_analyzed"
},

"MODIFY_USER_ID":{
  "type":"string",
  "index":"not_analyzed"
},
"MODIFY_DATE":{
  "type": "date",
  "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
},
"MODIFY_USER_NAME":{
  "type":"string",
  "index":"not_analyzed"
},
"ORG_ID":{
  "type":"string",
  "index":"not_analyzed"
},
"BOOK_ID":{
  "type":"string",
  "index":"not_analyzed"
},
"GROUP_ID":{
  "type":"string",
  "index":"not_analyzed"
},
"EXT_COL1":{
  "type":"string",
  "index":"not_analyzed"
},
"EXT_COL2":{
  "type":"string",
  "index":"not_analyzed"
},
"EXT_COL3":{
  "type":"string",
  "index":"not_analyzed"
},
"EXT_COL4":{
  "type":"string",
  "index":"not_analyzed"
},
```

```json
      "EXT_COL5":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL6":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL7":{
        "type":"string",
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      "EXT_COL8":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL9":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL10":{
        "type":"string",
        "index":"not_analyzed"
      },
      "AREA_NAME":{
        "type":"string",
        "index":"not_analyzed"
      },
      "AREA_CODE":{
        "type":"string",
        "index":"not_analyzed"
      },
      "SUPPLIER_CODE":{
        "type":"string",
        "index":"not_analyzed"
      },
      "SUPPLIER_NAME":{
        "type":"string",
        "index":"not_analyzed"
      },
      "ITEM_LINE_OUTSYS_CODE":{
        "type":"string",
        "index":"not_analyzed"
      }
    }
  },
  "item":{
    "dynamic":"false",
    "properties": {
```

```json
"ITEM_ID": {
  "type": "string",
  "index": "not_analyzed"
},
"CATEGORY_ID": {
  "type": "string",
  "index": "not_analyzed"
},
"SPU_ID": {
  "type": "string",
  "index": "not_analyzed"
},
"ITEM_TYPE": {
  "type": "string",
  "index": "not_analyzed"
},
"SPEC_HEAD_ID": {
  "type": "string",
  "index": "not_analyzed"
},
"ITEM_CODE": {
  "type": "string",
  "index": "not_analyzed"
},
"ITEM_NAME": {
  "type": "multi_field",
  "fields": {
    "pinyin": {
      "type": "string",
      "store": "no",
      "term_vector": "with_positions_offsets",
      "analyzer": "pinyin_analyzer",
      "boost": 10
    },
    "ITEM_NAME": {
      "type": "string",
      "term_vector": "with_positions_offsets",
      "index": "analyzed",
      "analyzer": "optimizeIK",
      "search_analyzer": "optimizeIK",
      "include_in_all": "true"
    }
  }
},
"ITEM_SHORTNAME": {
  "type": "multi_field",
  "fields": {
    "pinyin": {
      "type": "string",
```

```
          "store": "no",
          "term_vector": "with_positions_offsets",
          "analyzer": "pinyin_analyzer",
          "boost": 10
        },
        "ITEM_SHORTNAME": {
          "type": "string",
          "term_vector": "with_positions_offsets",
          "index": "analyzed",
          "analyzer": "optimizeIK",
          "search_analyzer": "optimizeIK",
          "include_in_all": "true"
        }
      }
    },
    "ITEM_STATUS": {
      "type": "string",
      "index": "not_analyzed"
    },
    "ITEM_DESC": {
      "type": "string",
      "term_vector": "with_positions_offsets",
      "index": "analyzed",
      "analyzer": "optimizeIK",
      "search_analyzer": "optimizeIK",
      "include_in_all": "true"
    },
    "TRADEMARK": {
      "type": "string",
      "index": "not_analyzed"
    },
    "PRIMARY_UNIT_CODE":{
      "type": "string",
      "index": "not_analyzed"
    },
    "VALID_START":{
      "type": "date",
      "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
    },
    "VALID_END":{
      "type": "date",
      "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
    },
    "EFFECT_USER_ID":{
      "type": "string",
      "index": "not_analyzed"
    },
    "EFFECT_DATE":{
      "type": "date",
```

```
                    "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
                  },
                  "INVALID_USER_ID":{
                    "type": "string",
                    "index": "not_analyzed"
                  },
                  "INVALID_DATE":{
                    "type": "date",
                    "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
                  },
                  "SECONDARY_UNIT_CODE":{
                    "type": "string",
                    "index": "not_analyzed"
                  },
                  "PO_MOREORLESS_UP":{
                    "type":"double",
                    "index": "not_analyzed"
                  },
                  "PO_MOREORLESS_DOWN":{
                    "type":"double",
                    "index": "not_analyzed"
                  },
                  "ONT_MOREORLESS_UP":{
                    "type":"double",
                    "index": "not_analyzed"
                  },
                  "ONT_MOREORLESS_DOWN":{
                    "type":"double",
                    "index": "not_analyzed"
                  },
                  "UOM_WIDTH":{
                    "type": "string",
                    "index": "not_analyzed"
                  },
                  "UOM_HEIGHT":{
                    "type": "string",
                    "index": "not_analyzed"
                  },
                  "UOM_LENGTH":{
                    "type": "string",
                    "index": "not_analyzed"
                  },
                  "UOM_DENSITY":{
                    "type": "string",
                    "index": "not_analyzed"
                  },
                  "UOM_WEIGHT":{
                    "type": "string",
                    "index": "not_analyzed"
```

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    },
    "HS_CODE":{
      "type": "string",
      "index": "not_analyzed"
    },
    "MARK_CODE":{
      "type": "string",
      "index": "not_analyzed"
    },
    "MANUFACTURER_NAME":{
      "type": "string",
      "index": "not_analyzed"
    },
    "TECHNICAL_STANDARD":{
      "type": "string",
      "index": "not_analyzed"
    },
    "GOLDEN_TAX_CODE":{
      "type": "string",
      "index": "not_analyzed"
    },
    "LOSS_RATE":{
      "type": "double",
      "index": "not_analyzed"
    },
    "STANDARD_FLAG":{
      "type": "string",
      "index": "not_analyzed"
    },
    "ORIGIN":{
      "type": "string",
      "index": "not_analyzed"
    },
    "LOCK_FLAG":{
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE1": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE2": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE3": {
      "type": "string",
      "index": "not_analyzed"
    },
```

```json
    "SPEC_VALUE4": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE5": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE6": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE7": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE8": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE9": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE10": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE11": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE12": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE13": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE14": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE15": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE16": {
```

```json
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE17": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE18": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE19": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE20": {
        "type": "string",
        "index": "not_analyzed"
      },
      "CREATE_USER_ID":{
        "type":"string",
        "index":"not_analyzed"
      },
      "CREATE_DATE":{
        "type": "date",
        "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
      },
      "CREATE_USER_NAME":{
        "type":"string",
        "index":"not_analyzed"
      },

      "MODIFY_USER_ID":{
        "type":"string",
        "index":"not_analyzed"
      },
      "MODIFY_DATE":{
        "type": "date",
        "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
      },
      "MODIFY_USER_NAME":{
        "type":"string",
        "index":"not_analyzed"
      },
      "ORG_ID":{
        "type":"string",
        "index":"not_analyzed"
      },
      "BOOK_ID":{
```

```json
        "type":"string",
        "index":"not_analyzed"
      },
      "GROUP_ID":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL1":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL2":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL3":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL4":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL5":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL6":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL7":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL8":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL9":{
        "type":"string",
        "index":"not_analyzed"
      },
      "EXT_COL10":{
        "type":"string",
        "index":"not_analyzed"
      },

      "FROM_TYPE":{
```

```json
          "type":"string",
          "index":"not_analyzed"
        },
        "FROM_ID":{
          "type":"string",
          "index":"not_analyzed"
        },
        "TAX_CODE_TYPE":{
          "type":"string",
          "index":"not_analyzed"
        },
        "TAX_RATE":{
          "type":"string",
          "index":"not_analyzed"
        },
        "ITEM_DETAIL_NOTES":{
          "type": "string",
          "term_vector": "with_positions_offsets",
          "index": "analyzed",
          "analyzer": "optimizeIK",
          "search_analyzer": "optimizeIK",
          "include_in_all": "true"
        }
      }
    },
    "brand":{
      "dynamic":"false",
      "properties":{
        "BRAND_ID":{
          "type":"string",
          "index":"not_analyzed"
        },
        "BRAND_NAME":{
          "type": "string",
          "term_vector": "with_positions_offsets",
          "index": "analyzed",
          "analyzer": "optimizeIK",
          "search_analyzer": "optimizeIK",
          "include_in_all": "true"
        },
        "STATUS":{
          "type":"string",
          "index":"not_analyzed"
        },
        "BRIEF_NAME":{
          "type": "string",
          "term_vector": "with_positions_offsets",
          "index": "analyzed",
          "analyzer": "optimizeIK",
```

```
        "search_analyzer": "optimizeIK",
        "include_in_all": "true"
      },
      "WEBSITE":{
        "type":"string",
        "index":"not_analyzed"
      },
      "CATEGORY_ID":{
        "type":"string",
        "index":"not_analyzed"
      },
      "LOGO_URL":{
        "type":"string",
        "index":"not_analyzed"
      },
      "BRAND_STORY_TITLE":{
        "type": "string",
        "term_vector": "with_positions_offsets",
        "index": "analyzed",
        "analyzer": "optimizeIK",
        "search_analyzer": "optimizeIK",
        "include_in_all": "true"
      },
      "BELONG_COUNTRY":{
        "type":"string",
        "index":"not_analyzed"
      },
      "BELONG_COMPANY":{
        "type":"string",
        "index":"not_analyzed"
      },
      "FOUND_YEAR":{
        "type":"string",
        "index":"not_analyzed"
      },
      "CREATE_USER_ID":{
        "type":"string",
        "index":"not_analyzed"
      },
      "CREATE_DATE":{
        "type": "date",
        "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
      },
      "CREATE_USER_NAME":{
        "type":"string",
        "index":"not_analyzed"
      },

      "MODIFY_USER_ID":{
```

```json
      "type":"string",
      "index":"not_analyzed"
    },
    "MODIFY_DATE":{
      "type": "date",
      "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
    },
    "MODIFY_USER_NAME":{
      "type":"string",
      "index":"not_analyzed"
    },
    "ORG_ID":{
      "type":"string",
      "index":"not_analyzed"
    },
    "BOOK_ID":{
      "type":"string",
      "index":"not_analyzed"
    },
    "GROUP_ID":{
      "type":"string",
      "index":"not_analyzed"
    },
    "EXT_COL1":{
      "type":"string",
      "index":"not_analyzed"
    },
    "EXT_COL2":{
      "type":"string",
      "index":"not_analyzed"
    },
    "EXT_COL3":{
      "type":"string",
      "index":"not_analyzed"
    },
    "EXT_COL4":{
      "type":"string",
      "index":"not_analyzed"
    },
    "EXT_COL5":{
      "type":"string",
      "index":"not_analyzed"
    },
    "EXT_COL6":{
      "type":"string",
      "index":"not_analyzed"
    },
    "EXT_COL7":{
      "type":"string",
```

```json
          "index":"not_analyzed"
        },
        "EXT_COL8":{
          "type":"string",
          "index":"not_analyzed"
        },
        "EXT_COL9":{
          "type":"string",
          "index":"not_analyzed"
        },
        "EXT_COL10":{
          "type":"string",
          "index":"not_analyzed"
        },
        "BRAND_INTRODUCTION_NOTES":{
          "type": "string",
          "term_vector": "with_positions_offsets",
          "index": "analyzed",
          "analyzer": "optimizeIK",
          "search_analyzer": "optimizeIK",
          "include_in_all": "true"
        },
        "BRAND_STORY_NOTES":{
          "type": "string",
          "term_vector": "with_positions_offsets",
          "index": "analyzed",
          "analyzer": "optimizeIK",
          "search_analyzer": "optimizeIK",
          "include_in_all": "true"
        }
      }
    },
    "category":{
      "dynamic":"false",
      "properties": {
        "CATEGORY_ID": {
          "type": "string",
          "index": "not_analyzed"
        },
        "CATEGORY_CODE":{
          "type": "string",
          "index": "not_analyzed"
        },
        "CATEGORY_NAME":{
          "type": "string",
          "index": "not_analyzed"
        },
        "CATEGORY_DESC":{
          "type": "string",
```

```json
      "index": "not_analyzed"
    },
    "PARENT_CATEGORY_ID":{
      "type": "string",
      "index": "not_analyzed"
    },
    "CATEGORY_FULL_CODE":{
      "type": "string",
      "index": "not_analyzed"
    },
    "CATEGORY_FULL_NAME":{
      "type": "string",
      "index": "not_analyzed"
    },
    "CATEGORY_LEVEL":{
      "type": "string",
      "index": "not_analyzed"
    },
    "CATEGORY_SORT":{
      "type":"double",
      "index": "not_analyzed"
    },
    "STATUS":{
      "type": "string",
      "index": "not_analyzed"
    },
    "CATEGORY_MANAGER":{
      "type": "string",
      "index": "not_analyzed"
    },
    "EFFECT_USER_ID":{
      "type":"string",
      "index": "not_analyzed"
    },
    "EFFECT_DATE":{
      "type": "date",
      "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
    },
    "INVALID_USER_ID":{
      "type": "string",
      "index": "not_analyzed"
    },
    "INVALID_DATE":{
      "type": "date",
      "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
    },
    "SPEC_DEFINE_ID":{
      "type": "string",
      "index": "not_analyzed"
```

```
  },
  "CREATE_USER_ID":{
    "type":"string",
    "index":"not_analyzed"
  },
  "CREATE_DATE":{
    "type": "date",
    "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
  },
  "CREATE_USER_NAME":{
    "type":"string",
    "index":"not_analyzed"
  },

  "MODIFY_USER_ID":{
    "type":"string",
    "index":"not_analyzed"
  },
  "MODIFY_DATE":{
    "type": "date",
    "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
  },
  "MODIFY_USER_NAME":{
    "type":"string",
    "index":"not_analyzed"
  },
  "ORG_ID":{
    "type":"string",
    "index":"not_analyzed"
  },
  "BOOK_ID":{
    "type":"string",
    "index":"not_analyzed"
  },
  "GROUP_ID":{
    "type":"string",
    "index":"not_analyzed"
  },
  "EXT_COL1":{
    "type":"string",
    "index":"not_analyzed"
  },
  "EXT_COL2":{
    "type":"string",
    "index":"not_analyzed"
  },
  "EXT_COL3":{
    "type":"string",
    "index":"not_analyzed"
```

```json
        },
        "EXT_COL4":{
          "type":"string",
          "index":"not_analyzed"
        },
        "EXT_COL5":{
          "type":"string",
          "index":"not_analyzed"
        },
        "EXT_COL6":{
          "type":"string",
          "index":"not_analyzed"
        },
        "EXT_COL7":{
          "type":"string",
          "index":"not_analyzed"
        },
        "EXT_COL8":{
          "type":"string",
          "index":"not_analyzed"
        },
        "EXT_COL9":{
          "type":"string",
          "index":"not_analyzed"
        },
        "EXT_COL10":{
          "type":"string",
          "index":"not_analyzed"
        }

      }
    },
    "item_agg": {
      "properties": {
        "ITEM_ID": {
          "type": "string",
          "index": "not_analyzed"
        },
        "CATEGORY_ID": {
          "type": "string",
          "index": "not_analyzed"
        },
        "SPU_ID": {
          "type": "string",
          "index": "not_analyzed"
        },
        "ITEM_TYPE": {
          "type": "string",
          "index": "not_analyzed"
```

```json
        },
        "SPEC_HEAD_ID":{
          "type":"string",
          "index": "not_analyzed"
        },
        "ITEM_CODE": {
          "type": "string",
          "index": "not_analyzed"
        },
        "ITEM_NAME": {
          "type": "multi_field",
          "fields": {
            "pinyin": {
              "type": "string",
              "store": "no",
              "term_vector": "with_positions_offsets",
              "analyzer": "pinyin_analyzer",
              "boost": 10
            },
            "ITEM_NAME": {
              "type": "string",
              "term_vector": "with_positions_offsets",
              "index": "analyzed",
              "analyzer": "optimizeIK",
              "search_analyzer": "optimizeIK",
              "include_in_all": "true"
            }
          }
        },
        "ITEM_SHORTNAME": {
          "type": "string",
          "term_vector": "with_positions_offsets",
          "index": "analyzed",
          "analyzer": "optimizeIK",
          "search_analyzer": "optimizeIK",
          "include_in_all": "true"
        },
        "ITEM_STATUS": {
          "type": "string",
          "index": "not_analyzed"
        },
        "ITEM_DESC": {
          "type": "string",
          "term_vector": "with_positions_offsets",
          "index": "analyzed",
          "analyzer": "optimizeIK",
          "search_analyzer": "optimizeIK",
          "include_in_all": "true"
        },
```

```
"TRADEMARK": {
  "type": "string",
  "index": "not_analyzed"
},
"PRIMARY_UNIT_CODE":{
  "type":"string",
  "index": "not_analyzed"
},
"VALID_START":{
  "type": "date",
  "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
},
"VALID_END":{
  "type": "date",
  "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
},
"EFFECT_USER_ID":{
  "type":"string",
  "index": "not_analyzed"
},
"EFFECT_DATE":{
  "type": "date",
  "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
},
"INVALID_USER_ID":{
  "type":"string",
  "index": "not_analyzed"
},
"INVALID_DATE":{
  "type": "date",
  "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
},
"SECONDARY_UNIT_CODE":{
  "type":"string",
  "index": "not_analyzed"
},
"PO_MOREORLESS_UP":{
  "type":"double"
},
"PO_MOREORLESS_DOWN":{
  "type":"double"
},
"ONT_MOREORLESS_UP":{
  "type":"double"
},
"ONT_MOREORLESS_DOWN":{
  "type":"double"
},
"UOM_WIDTH":{
```

```json
      "type":"string",
      "index": "not_analyzed"
    },
    "UOM_HEIGHT":{
      "type":"string",
      "index": "not_analyzed"
    },
    "UOM_LENGTH":{
      "type":"string",
      "index": "not_analyzed"
    },
    "UOM_DENSITY":{
      "type":"string",
      "index": "not_analyzed"
    },
    "UOM_WEIGHT":{
      "type":"string",
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    },
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    },
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      "index": "not_analyzed"
    },
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    },
    "LOSS_RATE":{
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    },
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      "index": "not_analyzed"
    },
    "ORIGIN":{
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      "index": "not_analyzed"
```

```
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    "SPEC_VALUE2": {
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    },
    "SPEC_VALUE3": {
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      "index": "not_analyzed"
    },
    "SPEC_VALUE4": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE5": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE6": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE7": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE8": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE9": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE10": {
      "type": "string",
      "index": "not_analyzed"
    },
    "SPEC_VALUE11": {
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      "index": "not_analyzed"
    },
```

```json
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    "SPEC_VALUE13": {
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      "index": "not_analyzed"
    },
    "SPEC_VALUE14": {
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    },
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    },
    "SPEC_VALUE16": {
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    },
    "SPEC_VALUE17": {
      "type": "string",
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    },
    "SPEC_VALUE18": {
      "type": "string",
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    },
    "SPEC_VALUE19": {
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    "SPEC_VALUE20": {
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      "index": "not_analyzed"
    },
    "CREATE_USER_ID": {
      "type": "string",
      "index": "not_analyzed"
    },
    "CREATE_DATE": {
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      "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
    },
    "CREATE_USER_NAME": {
      "type": "string",
      "index": "not_analyzed"
    },
    "MODIFY_USER_ID": {
```

```
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      },
      "MODIFY_USER_NAME": {
        "type": "string",
        "index": "not_analyzed"
      },
      "MODIFY_DATE": {
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        "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
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        "type": "string",
        "index": "not_analyzed"
      },
      "GROUP_ID": {
        "type": "string",
        "index": "not_analyzed"
      },
      "BOOK_ID": {
        "type": "string",
        "index": "not_analyzed"
      },
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        "index": "not_analyzed"
      },
      "EXT_COL2": {
        "type": "string",
        "index": "not_analyzed"
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      "EXT_COL3": {
        "type": "string",
        "index": "not_analyzed"
      },
      "EXT_COL4": {
        "type": "string",
        "index": "not_analyzed"
      },
      "EXT_COL5": {
        "type": "string",
        "index": "not_analyzed"
      },
      "EXT_COL6": {
        "type": "string",
        "index": "not_analyzed"
      },
      "EXT_COL7": {
        "type": "string",
```

```
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        },
        "EXT_COL8": {
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          "index": "not_analyzed"
        },
        "EXT_COL9": {
          "type": "string",
          "index": "not_analyzed"
        },
        "EXT_COL10": {
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          "index": "not_analyzed"
        },
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          "index": "not_analyzed"
        },
        "FROM_ID":{
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        },
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          "index": "not_analyzed"
        },
        "TAX_RATE":{
          "type":"string",
          "index": "not_analyzed"
        },
        "ITEM_DETAIL_NOTES": {
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          "index": "analyzed",
          "analyzer": "optimizeIK",
          "search_analyzer": "optimizeIK",
          "include_in_all": "true"
        },
        "cmc_brand": {
          "properties": {
            "BRAND_ID": {
              "type": "string",
              "index": "not_analyzed"
            },
            "BRAND_NAME": {
              "type": "multi_field",
              "fields": {
                "pinyin": {
                  "type": "string",
```

```json
          "store": "no",
          "term_vector": "with_positions_offsets",
          "analyzer": "pinyin_analyzer",
          "boost": 10
        },
        "BRAND_NAME": {
          "type": "string",
          "term_vector": "with_positions_offsets",
          "index": "analyzed",
          "analyzer": "optimizeIK",
          "search_analyzer": "optimizeIK",
          "include_in_all": "true"
        }
      }
    },
    "STATUS": {
      "type": "string",
      "index": "not_analyzed"
    },
    "BRIEF_NAME": {
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      "fields": {
        "pinyin": {
          "type": "string",
          "store": "no",
          "term_vector": "with_positions_offsets",
          "analyzer": "pinyin_analyzer",
          "boost": 10
        },
        "BRIEF_NAME": {
          "type": "string",
          "term_vector": "with_positions_offsets",
          "index": "analyzed",
          "analyzer": "optimizeIK",
          "search_analyzer": "optimizeIK",
          "include_in_all": "true"
        }
      }
    },
    "WEBSITE": {
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      "index": "not_analyzed"
    },
    "CATEGORY_ID": {
      "type": "string",
      "index": "not_analyzed"
    },
    "LOGO_URL":{
      "type":"string",
```

```json
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      },

      "BRAND_STORY_TITLE":{
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        "index": "not_analyzed"
      },
      "BELONG_COUNTRY": {
        "type": "string",
        "index": "not_analyzed"
      },
      "BELONG_COMPANY":{
        "type":"string",
        "index": "not_analyzed"
      },
      "FOUND_YEAR":{
        "type":"string",
        "index": "not_analyzed"
      },

      "CREATE_USER_ID":{
        "type":"string",
        "index": "not_analyzed"
      },
      "CREATE_DATE":{
        "type": "date",
        "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
      },

      "MODIFY_USER_ID":{
        "type":"string",
        "index": "not_analyzed"
      },
      "MODIFY_DATE":{
        "type": "date",
        "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
      },
      "ORG_ID": {
        "type": "string",
        "index": "not_analyzed"
      },
      "BOOK_ID": {
        "type": "string",
        "index": "not_analyzed"
      },
      "GROUP_ID": {
        "type": "string",
        "index": "not_analyzed"
      },
```

```json
        "EXT_COL1": {
          "type": "string",
          "index": "not_analyzed"
        },
        "EXT_COL2": {
          "type": "string",
          "index": "not_analyzed"
        },
        "EXT_COL3": {
          "type": "string",
          "index": "not_analyzed"
        },
        "EXT_COL4": {
          "type": "string",
          "index": "not_analyzed"
        },
        "EXT_COL5": {
          "type": "string",
          "index": "not_analyzed"
        },
        "EXT_COL6": {
          "type": "string",
          "index": "not_analyzed"
        },
        "EXT_COL7": {
          "type": "string",
          "index": "not_analyzed"
        },
        "EXT_COL8": {
          "type": "string",
          "index": "not_analyzed"
        },
        "EXT_COL9": {
          "type": "string",
          "index": "not_analyzed"
        },
        "EXT_COL10": {
          "type": "string",
          "index": "not_analyzed"
        },
        "CREATE_USER_NAME":{
          "type":"string",
          "index": "not_analyzed"
        },
        "MODIFY_USER_NAME":{
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          "index": "not_analyzed"
        },
```

```
        "BRAND_INTRODUCTION_NOTES":{
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        },
        "BRAND_STORY_NOTES":{
          "type": "string",
          "term_vector": "with_positions_offsets",
          "index": "analyzed",
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          "search_analyzer": "optimizeIK",
          "include_in_all": "true"
        }
      }
    },
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          "index": "not_analyzed"
        },
        "ATTRIBUTE_VALUE": {
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          "index": "not_analyzed"
        }
      }
    },
    "cmc_category": {
      "properties": {
        "CATEGORY_CODE": {
          "type": "string",
          "index": "not_analyzed"
        },
        "CATEGORY_ID": {
          "type": "string",
          "index": "not_analyzed"
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        "CATEGORY_NAME": {
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          "index": "analyzed",
```

```
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                    "search_analyzer": "optimizeIK",
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                    "index": "not_analyzed"
                },
                "BILL_TYPE": {
                    "type": "string",
                    "index": "not_analyzed"
                },
                "PIC_NAME": {
                    "type": "string",
                    "index": "not_analyzed"
                },
                "PIC_TYPE": {
                    "type": "string",
                    "index": "not_analyzed"
                },
                "FILE_PATH": {
                    "type": "string",
                    "index": "not_analyzed"
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                "PIC_SIZE": {
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                },
                "PIC_STORAGE_NAME":{
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                    "index": "not_analyzed"
                },

                "PIC_EX_FILEID":{
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                    "index": "not_analyzed"
                },
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                    "index": "not_analyzed"
                },
                "SMALL_SIZE_EX_FILE_ID":{
```

```json
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    },
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      "index": "not_analyzed"
    },
    "MIDDLE_SIZE_EX_FILE_ID":{
      "type": "string",
      "index": "not_analyzed"
    },

    "PIC_STATUS":{
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    },
    "CREATE_USER_NAME": {
      "type": "string",
      "index": "not_analyzed"
    },

    "BOOK_ID": {
      "type": "string",
      "index": "not_analyzed"
    },

    "GROUP_ID": {
      "type": "string",
      "index": "not_analyzed"
    },
    "ORG_ID": {
      "type": "string",
      "index": "not_analyzed"
    },

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```

```json
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      },
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        "index": "not_analyzed"
      },
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        "index": "not_analyzed"
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      "EXT_COL3": {
        "type": "string",
        "index": "not_analyzed"
      },
      "EXT_COL4": {
        "type": "string",
        "index": "not_analyzed"
      },
      "EXT_COL5": {
        "type": "string",
        "index": "not_analyzed"
      },
      "EXT_COL6": {
        "type": "string",
        "index": "not_analyzed"
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      "EXT_COL7": {
        "type": "string",
        "index": "not_analyzed"
      },
      "EXT_COL8": {
        "type": "string",
        "index": "not_analyzed"
      },
      "EXT_COL9": {
        "type": "string",
        "index": "not_analyzed"
      },
      "EXT_COL10": {
        "type": "string",
        "index": "not_analyzed"
      },
      "EXT_COL11": {
        "type": "string",
```

```
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    "EXT_COL13": {
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      "index": "not_analyzed"
    },
    "EXT_COL14": {
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      "index": "not_analyzed"
    },
    "EXT_COL15": {
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      "index": "not_analyzed"
    },
    "EXT_COL16": {
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      "index": "not_analyzed"
    },
    "EXT_COL17": {
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      "index": "not_analyzed"
    },
    "EXT_COL18": {
      "type": "string",
      "index": "not_analyzed"
    },
    "EXT_COL19": {
      "type": "string",
      "index": "not_analyzed"
    },
    "EXT_COL20": {
      "type": "string",
      "index": "not_analyzed"
    }
  }
},
"cmc_spu": {
  "properties": {
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      "index": "not_analyzed"
    },
    "CATEGORY_ID": {
      "type": "string",
      "index": "not_analyzed"
```

```json
      },
      "SPEC_HEAD_ID": {
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        "index": "not_analyzed"
      },
      "SPU_CODE": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPU_NAME": {
        "type": "multi_field",
        "fields": {
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            "type": "string",
            "store": "no",
            "term_vector": "with_positions_offsets",
            "analyzer": "pinyin_analyzer",
            "boost": 10
          },
          "SPU_NAME": {
            "type": "string",
            "term_vector": "with_positions_offsets",
            "index": "analyzed",
            "analyzer": "optimizeIK",
            "search_analyzer": "optimizeIK",
            "include_in_all": "true"
          }
        }
      },
      "SPU_STATUS": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPU_TYPE": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPU_DESC": {
        "type": "string",
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        "analyzer": "optimizeIK",
        "search_analyzer": "optimizeIK",
        "include_in_all": "true"
      },

      "SPU_DETAIL":{
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        "term_vector": "with_positions_offsets",
```

```
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        "search_analyzer": "optimizeIK",
        "include_in_all": "true"
      },
      "BRAND":{
        "type":"string",
        "index": "not_analyzed"
      },

      "PRIMARY_UNIT_CODE":{
        "type":"string",
        "index": "not_analyzed"
      },

      "TAX_RATE": {
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        "index": "not_analyzed"
      },
      "SPEC_VALUE1": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE2": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE3": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE4": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE5": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE6": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE7": {
        "type": "string",
        "index": "not_analyzed"
      },
      "SPEC_VALUE8": {
        "type": "string",
```
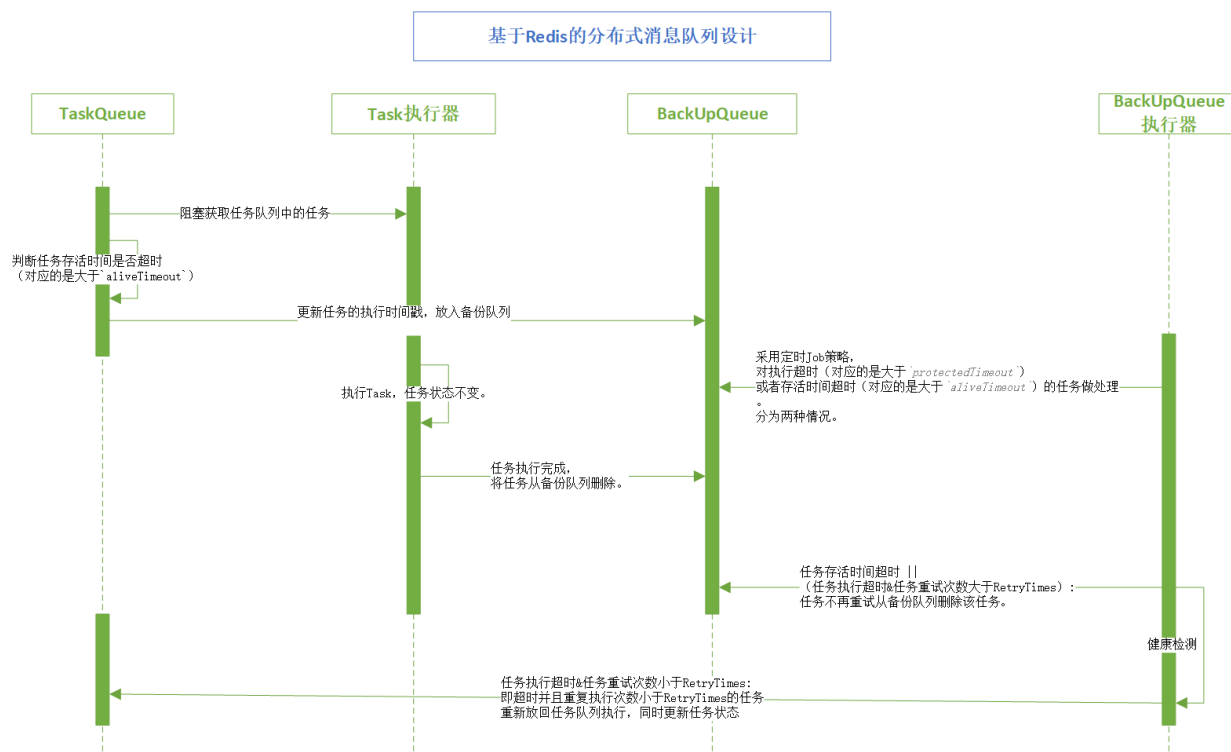
```json
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        },

        "SPEC_VALUE9": {
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        },
        "SPEC_VALUE10": {
          "type": "string",
          "index": "not_analyzed"
        },
        "SPEC_VALUE11": {
          "type": "string",
          "index": "not_analyzed"
        },
        "SPEC_VALUE12": {
          "type": "string",
          "index": "not_analyzed"
        },
        "SPEC_VALUE13": {
          "type": "string",
          "index": "not_analyzed"
        },
        "SPEC_VALUE14": {
          "type": "string",
          "index": "not_analyzed"
        },
        "SPEC_VALUE15": {
          "type": "string",
          "index": "not_analyzed"
        },
        "SPEC_VALUE16": {
          "type": "string",
          "index": "not_analyzed"
        },
        "SPEC_VALUE17": {
          "type": "string",
          "index": "not_analyzed"
        },
        "SPEC_VALUE18": {
          "type": "string",
          "index": "not_analyzed"
        },
        "SPEC_VALUE19": {
          "type": "string",
          "index": "not_analyzed"
        },
        "SPEC_VALUE20": {
          "type": "string",
```

```json
      "index": "not_analyzed"
    },
    "CREATE_USER_ID":{
      "type":"string",
      "index": "not_analyzed"
    },
    "CREATE_DATE":{
      "type": "date",
      "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
    },

    "MODIFY_USER_ID":{
      "type":"string",
      "index": "not_analyzed"
    },
    "MODIFY_DATE":{
      "type": "date",
      "format": "yyyy-MM-dd HH:mm:ss||yyyy-MM-dd||epoch_millis"
    },
    "ORG_ID": {
      "type": "string",
      "index": "not_analyzed"
    },
    "BOOK_ID": {
      "type": "string",
      "index": "not_analyzed"
    },

    "GROUP_ID": {
      "type": "string",
      "index": "not_analyzed"
    },
    "EXT_COL1": {
      "type": "string",
      "index": "not_analyzed"
    },
    "EXT_COL2": {
      "type": "string",
      "index": "not_analyzed"
    },
    "EXT_COL3": {
      "type": "string",
      "index": "not_analyzed"
    },
    "EXT_COL4": {
      "type": "string",
      "index": "not_analyzed"
    },
    "EXT_COL5": {
```

```json
          "type": "string",
          "index": "not_analyzed"
        },
        "EXT_COL6": {
          "type": "string",
          "index": "not_analyzed"
        },
        "EXT_COL7": {
          "type": "string",
          "index": "not_analyzed"
        },
        "EXT_COL8": {
          "type": "string",
          "index": "not_analyzed"
        },
        "EXT_COL9": {
          "type": "string",
          "index": "not_analyzed"
        },
        "EXT_COL10": {
          "type": "string",
          "index": "not_analyzed"
        },
        "CREATE_USER_NAME":{
          "type":"string",
          "index": "not_analyzed"
        },
        "MODIFY_USER_NAME":{
          "type":"string",
          "index": "not_analyzed"
        },
        "TAX_CODE_TYPE":{
          "type":"string",
          "index": "not_analyzed"
        },
        "SPU_DETAIL_NOTES":{
          "type": "string",
          "term_vector": "with_positions_offsets",
          "index": "analyzed",
          "analyzer": "optimizeIK",
          "search_analyzer": "optimizeIK",
          "include_in_all": "true"
        }
      }
    }
  }
}
```

KMQueue

当数据聚合或处理失败时，用来做数据补偿，以达到数据的最终一致性，基于Redis队列实现。

KMQueue队列分为两种模式:

- `default` - 简单队列
- `safe` - 安全队列

其中默认为 `default` 。

可以以 `queueName:queueMode` 格式设置队列的模式。

- queueName 队列名称

  default 为默认队列，可以不指定，默认值。 特性：队列任务可能会丢失，队列任务没有超时限制。

- queueMode 队列模式，可选值有：default、safe。

  safe 为安全队列，任务有重试策略，达到重试次数依旧失败或者任务存活超时（这里说的超时是指AliveTimeout）（这两者都称为最终失败），Monitor会发出通知， 这样可以根据业务做一些处理，推荐将这些失败的任务持久化到数据库作为日志记录。当然或许你还有更好的处理方式。

  > 注意：需要开启备份队列监听程序BackupQueueMonitor， 否则安全队列中最终失败的任务只会存储在备份队列中，而没有消费者去消费处理，这是很危险的行为

```
new KMQueueManager.Builder("127.0.0.1", 6379, "worker1_queue",
"worker2_queue:safe")
...
```

`worker1_queue` 为简单队列，`worker2_queue` 为安全队列。

> 注意：为了更好的支持业务（将已存在的某个队列的 `DEFAULT` 改为 `SAFE`，并重启服务的情况），做如下处理：当 `new KMQueueManager.Builder` 的**队列名称参数**中，只要有一个队列指定了 `SAFE` 模式，就会创建备份队列（用于队列任务监控，设置任务超时、失败任务重试等），并且该备份队列的名称基于传入的**所有队列名称**生成（无论其队列是否是 `SAFE` 模式）。

上面的例子中，备份队列的生成策略为：

```
base64(md5("worker1_queue" + "worker2_queue"))
```

Task（任务）

构造方法声明如下：

```
public Task(String queue,
            String uid,
            boolean isUnique,
            String type,
            String data,
            Task.TaskStatus status)
```

- uid：如果业务需要区分队列任务的唯一性，请自行生成uid参数，否则队列默认使用uuid生成策略，这会导致即使data数据完全相同的任务也会被当作两个不同的任务处理。
- 是否是唯一任务，即队列中同一时刻只存在一个该任务。
- type：用于业务逻辑的处理，你可以根据不同的type任务类型，调用不同的handler去处理，可以不传。

KMQueueManager（队列管理器）

有三种方式获取Redis连接，详情查看 `KMQueueManager.Builder` 构造方法的三种重载形式。如果你使用spring，建议获取spring中配置的redis连接池对象，并通过如下构造方法创建队列管理器：

```
public Builder(Pool<Jedis> pool, String... queues)
```

RedisTaskQueue（任务队列）

- 1.采用阻塞队列，以阻塞的方式(brpop)获取任务队列中的任务；
- 2.判断任务存活时间是否超时（对应的是大于 `aliveTimeout` ）；
- 3.更新任务的执行时间戳，放入备份队列的队首(lpush)；

BackupQueueMonitor（备份队列监控）

因为初始化备份队列时设置了**循环标记**；所以Monitor这里采用定时Job策略，使用 `brpoplpush backupQueue backupQueue` 循环遍历备份队列，遇到循环标记结束循环遍历。对执行超时（对应的是大于 `protectedTimeout` ）或者存活时间超时（对应的是大于 `aliveTimeout` ）的任务做处理。

分为两种情况:

- 任务存活时间超时 || （任务执行超时&任务重试次数大于RetryTimes）：任务不再重试从备份队列删除该任务。相应的可以通过实现

```
Pipeline
```

，决定这些任务的一些额外处理，比如持久化到数据库做日志记录。

```
// 任务彻底失败后的处理，需要实现Pipeline接口，自行实现处理逻辑
TaskPipeline taskPipeline = new TaskPipeline();
BackupQueueMonitor backupQueueMonitor = new
BackupQueueMonitor.Builder("127.0.0.1", 6379, backUpQueueName)
                ...
                .setPipeline(taskPipeline).build();
```

- 任务执行超时&任务重试次数小于RetryTimes：即超时并且重复执行次数小于

```
RetryTimes
```

的任务重新放回任务队列执行，同时更新任务状态：

  - 放入任务队列，优先处理();
  - 任务state标记为"retry";
  - 重试次数+1;

健康检查

使用方式:

```
// 健康检测
MyAliveDetectHandler detectHandler = new MyAliveDetectHandler();
...
// 构造Monitor监听器
BackupQueueMonitor backupQueueMonitor = new
BackupQueueMonitor.Builder("127.0.0.1", 6379, backUpQueueName)
        ...
        .registerAliveDetectHandler(detectHandler)
        .build();
// 执行监听
backupQueueMonitor.monitor();
```

`registerAliveDetectHandler()` 方法可以设置Null，则不会启用健康检测。

检查正在执行的任务是否还在执行（存活），

为了防止耗时比较久的任务（任务的执行时间超出了通过队列管理器配置的任务执行超时时间 - 默认值：com.kingsoft.wps.mail.queue.config.Constant.PROTECTED_TIMEOUT）会被备份队列监听器检测到并重新放入任务队列执行（因为备份队列监听器会把超出通过队列管理器配置的任务执行超时时间的任务当作是失败的任务（参考 什么是失败任务？）并进行重试）。

通过这种检测机制，可以保证check(Task)返回为true的任务（任务还在执行）不会被备份队列监听器重新放入任务队列重试。这里只是提供一个接口，用户需要自己实现执行任务的健康检测。

目前健康检测机制还只是处于初步阶段，核心的检测逻辑还需要用户自行实现，这里只是提供一个接口。

一个比较简单的实现方式就是起一个定时job，每隔n毫秒检查线程中正在执行任务的状态，在redis中以 "任务的id + ALIVE_KEY_SUFFIX" 为key，ttl 为 n+m 毫秒（m < n, m用于保证两次job的空窗期），标记正在执行的任务。然后AliveDetectHandler的实现类根据task去检查redis中是否存在该key，如果存在，返回true

使用Demo

生产任务

```
@Test
public void pushTaskTest() {
    KMQueueManager kmQueueManager = new KMQueueManager.Builder("127.0.0.1",
6379, "worker1_queue", "worker2_queue:safe")
            .setMaxWaitMillis(-1L)
            .setMaxTotal(600)
            .setMaxIdle(300)
            .setAliveTimeout(Constant.ALIVE_TIMEOUT)
            .build();
    // 初始化队列
    kmQueueManager.init();

    // 1.获取队列
    TaskQueue taskQueue = kmQueueManager.getTaskQueue("worker2_queue");
    // 2.创建任务
    JSONObject ob = new JSONObject();
    ob.put("data", "mail proxy task");
    String data = JSON.toJSONString(ob);
    // 参数 uid: 如果业务需要区分队列任务的唯一性，请自行生成uid参数，
    // 否则队列默认使用uuid生成策略，这会导致即使data数据完全相同的任务也会被当作两个不
同的任务处理。
    // 参数 isUnique: 是否是唯一任务，即队列中同一时刻只存在一个该任务。
    // 只有当该任务所属队列是安全队列时才生效；如果为true，则通过uid判断任务的唯一性。
    // 参数 type: 用于业务逻辑的处理，你可以根据不同的type任务类型，调用不同的handler
去处理，可以不传。
    Task task = new Task(taskQueue.getName(), "", true, "", data, new
Task.TaskStatus());
    // 3.将任务加入队列
```

```
        taskQueue.pushTask(task);
}
```

消费任务

```
@Test
public void popTaskTest() {
    KMQueueManager kmQueueManager = new KMQueueManager.Builder("127.0.0.1",
6379, "worker1_queue", "worker2_queue:safe")
                .setMaxWaitMillis(-1L)
                .setMaxTotal(600)
                .setMaxIdle(300)
                .setAliveTimeout(Constant.ALIVE_TIMEOUT)
                .build();
    // 初始化队列
    kmQueueManager.init();

    // 1.获取队列
    TaskQueue taskQueue = kmQueueManager.getTaskQueue("worker1_queue");
    // 2.获取任务
    Task task = taskQueue.popTask();
    // 业务处理放到TaskConsumersHandler里
    if (task != null) {
        task.doTask(kmQueueManager, MyTaskHandler.class);
    }
}
```

你可以自行实现 `TaskHandler` 接口，创建适合你自己业务逻辑的任务处理类，并通过下面代码执行任务处理。

```
task.doTask(kmQueueManager, TaskHandler.class)
```

此外， `doTask` 方法还支持业务传参，通过第三个参数实现 `params` 。

```
task.doTask(kmQueueManager, TaskHandler.class, params)
```

如果业务处理抛出异常，队列也将其当作任务执行完成处理，

并通过 `taskQueue.finishTask(this)` 完成任务。

```
public void doTask(KMQueueManager kmQueueManager, Class clazz, Object...
params) {

    // 获取任务所属队列
    TaskQueue taskQueue = kmQueueManager.getTaskQueue(this.getQueue());
    String queueMode = taskQueue.getMode();
    if (KMQueueManager.SAFE.equals(queueMode)) {// 安全队列
```

```
        try {
            handleTask(clazz, params);
        } catch (Throwable e) {
            e.printStackTrace();
        }
        // 任务执行完成, 删除备份队列的相应任务
        taskQueue.finishTask(this);
    } else {// 普通队列
        handleTask(clazz);
    }
}
```

不会再进行任务重试操作。

这点可能不太容易理解，为什么任务抛出异常失败了，队列不会执行重试呢?

因为任务执行抛出异常是业务级的错误，队列不做干预。

队列的重试只是针对消费任务的线程被kill掉或者服务器宕机等情况，此时该任务还没执行完，任务的消费者还没告诉队列任务执行完成了。 此时备份队列监控会执行任务的重试。

如果你想在任务抛出异常失败时执行任务重试，可以不使用 `task.doTask` ，当任务抛出异常时，不执行任务的 `taskQueue.finishTask(this)` 操作。 这样备份队列监控会在下一个job对该任务进行检查处理。

> `taskQueue.finishTask(this)` 是一个非常方便的工具方法。

备份队列监控

```
@Test
public void monitorTaskTest() {

    // 健康检测
    MyAliveDetectHandler detectHandler = new MyAliveDetectHandler();
    // 任务彻底失败后的处理, 需要实现Pipeline接口, 自行实现处理逻辑
    MyPipeline pipeline = new MyPipeline();
    // 根据任务队列的名称构造备份队列的名称, 注意: 这里的任务队列参数一定要和
KMQueueManager构造时传入的一一对应。
    String backUpQueueName = KMQUtils.genBackUpQueueName("worker1_queue",
"worker2_queue:safe");
    // 构造Monitor监听器
    BackupQueueMonitor backupQueueMonitor = new
BackupQueueMonitor.Builder("127.0.0.1", 6379, backUpQueueName)
            .setMaxWaitMillis(-1L)
            .setMaxTotal(600)
            .setMaxIdle(300)
            .setAliveTimeout(Constant.ALIVE_TIMEOUT)
            .setProtectedTimeout(Constant.PROTECTED_TIMEOUT)
            .setRetryTimes(Constant.RETRY_TIMES)
            .registerAliveDetectHandler(detectHandler)
            .setPipeline(pipeline).build();
```

```
    // 执行监听
    backupQueueMonitor.monitor();
}
```

重要的事情说三遍：

如果指定了队列的模式为安全队列，一定要开启**备份队列监控**！！！ 一定要开启**备份队列监控**！！！ 一定要开启**备份队列监控**！！！