导出模块化设计及导出性能优化

1 导出模块化设计

1.1 导出模块主要文件

PSServiceWorkProcessExportModule.h

PSServiceWorkProcessExportModule.c

1.2 导出模块实例化示例

1.2.1 主模块

1.2.1.1 为主模块新建主模块文件

例:

PSServiceWorkProcessCRMCustomer.c

PSServiceWorkProcessCRMCustomer.h

1.2.1.2 主模块类型应以web的展示列表为基准，一个展示列表一个主模块类型

例:

1.2.1.3 主模块代码除对应的子模块的处理分支外完全一致

```
int PSServiceWorkProcessPreviewCall(PSSInternalData *intData)
{
    PSSCoreData *pCoreData = PSSCoreDataGet();
    int sub_module_type = -1, ret = -1;
    EMICALL_DB_CM_ASYNC_TASK *taskData = NULL;
    CmAsyncTask_REQUEST_PARAM reqParam;
    CmAsyncTask_RESPONSE_DATA rspData;
    int index = Get_DB_Index_Quick();

    memset(&rspData, 0x0, sizeof(CmAsyncTask_RESPONSE_DATA));
    memset(&reqParam, 0x0, sizeof(CmAsyncTask_REQUEST_PARAM));
    reqParam.actionType = DB_ACCESS_ACTION_CM_ASYNC_TASK_GET_BY_ID;
    reqParam.requestParam.GetById.seid = intData->seid;
```

```
    reqParam.requestParam.GetById.ccgeid = intData->ccgeid;
    reqParam.requestParam.GetById.id = intData->task_id;

    // 获取数据库表async_task
    ret = DbChannelCmAsyncTask(index, &reqParam, &rspData);
    if( 0 != ret )
    {
        EmicCmLog(LOG_LEVEL_DEBUG,__FUNCTION__,"ccgeid=%lu moduleType=%d, get asyncTask table failed.",
                  intData->ccgeid, intData->moduleType);
        return ret;
    }

    taskData = &(rspData.respData.GetData);

    sub_module_type = taskData->sub_module_id;

    EmicCmLog(LOG_LEVEL_DEBUG,__FUNCTION__,"ccgeid=%lu moduleType=%d, sub_module_type=%d, %s,%s,condition:%s work process seat...",
              intData->ccgeid, intData->moduleType, taskData->sub_module_id, taskData->file_path,  taskData->err_result_file,
              taskData->condition);

    /*子模块处理分支
    switch(sub_module_type)
    {
        case PSS_SUB_MODULE_TYPE_Preview_Call_Detail_Import:
            ret = PSServiceWorkProcess_Import( intData, taskData, FALSE);
            break;
        case PSS_SUB_MODULE_TYPE_Preview_Call_Detail_Export:
            ret = PSServiceWorkProcessPreviewCallDetail_Export(taskData);
            break;
        case PSS_SUB_MODULE_TYPE_Preview_Call_Export:
            ret = PSServiceWorkProcessPreviewCall_Export(taskData);
            break;
        case PSS_SUB_MODULE_TYPE_P_Statistics_CM_Result_Export:
            ret = PSServiceWorkProcessPStatisticsCMResult_Export(taskData);
            break;
        case PSS_SUB_MODULE_TYPE_P_Statistics_Seat_Export:
            ret = PSServiceWorkProcessPSeatStatis_Export(taskData);
            break;
        case PSS_SUB_MODULE_TYPE_p_Statistics_Group_Export:
            ret = PSServiceWorkProcessPGroupStatis_Export(taskData);
            break;
        case PSS_SUB_MODULE_TYPE_P_Statistics_Call_Result_Export:
            ret = PSServiceWorkProcessPCallResultStatis_Export(taskData);
            break;
        case PSS_SUB_MODULE_TYPE_Preview_Call_BATCH_Export:
            ret = PSServiceWorkProcessPreviewCallBatch_Export(taskData);
            break;
    }
    */
    return ret;
}
```

1.2.1 子模块

在开发过程中，发现导出子模块的操作具有相似性，于是希望创建一个导出类将重复的操作进行封装，只对外暴露特殊化的属性以供不同的子模块操作实例化。

下面是类执行流程：

```
int PSSExportCommonFuncStart(
    EMICALL_DB_CM_ASYNC_TASK *pTaskData,
    PSS_EXPORT_HEADER *header
)
{
    char file_path[256] = {0};
    PSSCoreData *pCoreData = PSSCoreDataGet();
    PSSExportFileData *fileData = NULL;
    int ret = 0;

    PSSCoreData *coreData = PSSCoreDataGet();
    do {
        ret = PSServiceMysqlInit2(&(header->control_header.db_conn), coreData->bootcfg);
        if (ret != DB_RET_NO_ERROR)
        {
           sleep(1);
           continue;
        }
        break;
    } while (1);

    header->control_header.seid = pTaskData->seid;
    header->control_header.ccgeid = pTaskData->ccgeid;
    header->control_header.async_task_id = pTaskData->id;

    EmicCmLog(LOG_LEVEL_INFO, __FUNCTION__, "start parse_func");
    /* 解析需要导出的参数信息 */
    if(header->callback.parse_func != NULL)
    {
        ret = header->callback.parse_func(pTaskData->condition, &(header->control_header));
        if(ret != 0)
        {
            EmicCmLog(LOG_LEVEL_ERROR, __FUNCTION__, "parse_func failed, condition:%s",
                pTaskData->condition);
            goto _exit;
        }
    }
    else
    {
        EmicCmLog(LOG_LEVEL_ERROR, __FUNCTION__, "theres no parse_func");
        goto _exit;
    }

    /* 初始化导出文本 */

    snprintf(file_path, sizeof(file_path), "%s%s", EXPORT_NAS_PATH, pTaskData->file_path);

    PSServiceFileProcessExportTaskInit(&fileData, file_path);
```

```
49      header->control_header.fileData = fileData;
50      /* 插入文件头 */
51      PSServiceWorkProcess_WriteFileHeader(header);
52
53      EmicCmLog(LOG_LEVEL_INFO, __FUNCTION__, "start count_func");
54      //更新本次任务的导出数量的估计值estimated_count,要区分两种情况ids和condition
55      if(header->callback.count_func != NULL)
56      {
57          header->callback.count_func(&(header->control_header));
58          if(ret != 0)
59          {
60              EmicCmLog(LOG_LEVEL_ERROR, __FUNCTION__, "count_func failed,
condition:%s",
61                  pTaskData->condition);
62              goto _exit;
63          }
64      }
65      else
66      {
67          EmicCmLog(LOG_LEVEL_ERROR, __FUNCTION__, "theres no count_func");
68          goto _exit;
69      }
70
71      DBInitCmAsyncTaskCounts(header->control_header.db_conn,
"emicall_cc_man", header->control_header.seid, header-
>control_header.ccgeid,
72          header->control_header.async_task_id, header-
>control_header.estimated_count, time(NULL));
73
74      //需要在整个导出过程中缓存数据
75      if(header->callback.init_cache_func != NULL){
76          header->callback.init_cache_func(&(header->control_header));
77          if(ret != 0)
78          {
79              EmicCmLog(LOG_LEVEL_ERROR, __FUNCTION__, "init_cache_func
failed");
80              goto _exit;
81          }
82      }
83      /*
84      if(header->control_header.ids != NULL && header->control_header.ids[0]
!= '\0')
85      {
86          // 导出指定id的数据
87          ret = PSServiceExportCommonfuncByIds(header);
88          if(ret)
89          {
90              EmicCmLog(LOG_LEVEL_ERROR, __FUNCTION__,
"PSServiceExportPreviewCallByIds failed, ret:%d", ret);
91              goto _exit;
92          }
93      }
94      else
95      {
96
97      */
98          /* 根据查询条件查找需要导出的数据 */
99          ret = PSServiceExportCommonfuncBySelectedCondition(header);
```

```
        if(ret)
        {
            EmicCmLog(LOG_LEVEL_ERROR, __FUNCTION__,
"PSServiceExportPreviewCallBySelectedCondition failed, ret:%d", ret);
            goto _exit;
        }
    /*
    }
    */
    //释放除了start期间申请的空间
    EmicCmLog(LOG_LEVEL_INFO, __FUNCTION__, "start free_func");
    if(header->callback.free_func != NULL)
    {
        ret = header->callback.free_func(&(header->control_header));
        if(ret)
        {
            EmicCmLog(LOG_LEVEL_ERROR, __FUNCTION__, "free_func failed,
ret:%d", ret);
            goto _exit;
        }
    }
    else
    {
        EmicCmLog(LOG_LEVEL_ERROR, __FUNCTION__, "theres no free_func");
        goto _exit;
    }

    if(header->callback.init_cache_func != NULL){
        if(header->callback.free_cache_func != NULL){
            ret = header->callback.free_cache_func(&(header-
>control_header));
            if(ret)
            {
                EmicCmLog(LOG_LEVEL_ERROR, __FUNCTION__, "free_cache_func
failed, ret:%d", ret);
                goto _exit;
            }
        }else{
            EmicCmLog(LOG_LEVEL_ERROR, __FUNCTION__, "theres no
free_cache_func");
            goto _exit;
        }
    }
_exit:
    PSServFileProExportTaskReleaseForMoudle(fileData, &(header-
>control_header));

    if (header->control_header.db_conn != NULL)
    {
        PSServiceMysqlClose2(header->control_header.db_conn);
        header->control_header.db_conn = NULL;
    }
    return ret;
}
```

1.2.1.1 子模块属性

分为两部分：

1、子模块执行中所需的静态或者动态属性

2、子模块的执行动作

```
typedef struct __pss_export_header__
{
    PSS_EXPORT_CONTROL_HEADER control_header;    //属性
    PSS_EXPORT_CALLBACK callback;                //动作
}PSS_EXPORT_HEADER;
```

```
typedef struct __pss_export_control_header__
{
    unsigned long seid;
    unsigned long ccgeid;
    unsigned long async_task_id;

    PSSExportColumnMask *o_mark;    //顺序标识
    int o_mark_len;    //顺序标识的个数
    const fieldData *header_list;    //文件头对照表

    MYSQL                                *db_conn;

    PSSExportFileData *fileData;    //导出文件信息

    /* 查询条件 */
    char          *ids;
    void *condition;
    unsigned long    estimated_count;    //这次导出任务的估计值
    unsigned long    last_handle_id; //作为condition偏移量，初始化为0
    int    last_handle_count;  //判断何时可以终止循环

    char *cache;         //缓冲区，在本次导出任务中分配，对于那些希望在导出中过程中缓存数据的任务来说，这是有用的
}PSS_EXPORT_CONTROL_HEADER;
```

```
typedef struct __pss_export_callback__
{
    PSServiceExportParseCondionAndColumn parse_func;    //解析参数，更新o_mark，o_mark_len，condition
    PSServiceExportConfirmTotalCountOfTask count_func;  //实现导出数量预估函数，更新estimated_count
    PSServiceExportInfoByIdsfunc ids_func;              //实现id迭代函数的单词获取
    PSServiceExportInfoByCondition condition_func;      //实现条件迭代函数的单次获取，更新last_handle_count和last_handle_id
    PSServiceExportHeaderExpandFunc ex_col_text_func;   //扩展处理函数,获取扩展列名称
    PSServiceExportFreeConditionContent free_func;      //内存释放函数，释放condition指向的实例化结构中分配的空间

    PSSExportType expand_type;    //扩展处理类型
}PSS_EXPORT_CALLBACK;
```

1.2.1.2 子模块实例化

将子模块处理类实例化为对应的处理对象，然后开始让子模块对象开始执行。

```
static int PSServiceWorkProcessCRMCustomer_Export(
    EMICALL_DB_CM_ASYNC_TASK *pTaskData
    )
{
    if(pTaskData == NULL)
    {
        return -1;
    }
    int  ret = 0;

    PSS_EXPORT_HEADER *header = NULL;
    header = PSServiceExportCommonHandlerNew();

    PSServiceExportCRMControlHeaderInit(header);

    PSSExportCommonFuncStart(pTaskData, header);

    PSSExportCommonFree(header);

    return 0;
}
```

PSServiceExportCRMControlHeaderInit(header)属性初始化函数，不同的子模块需要具体实现。

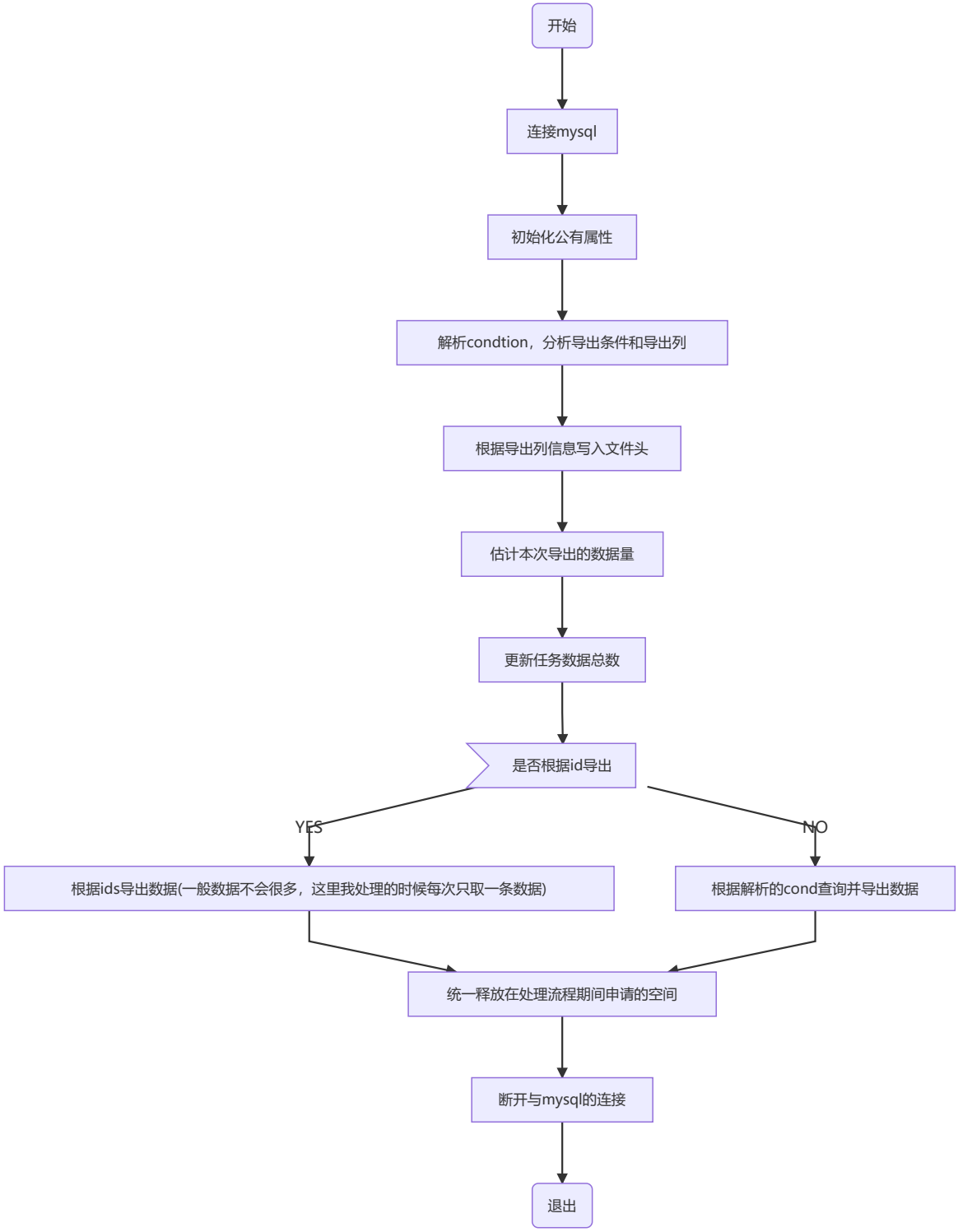
```
static PSS_EXPORT_HEADER
*PSServiceExportCRMControlHeaderInit(PSS_EXPORT_HEADER *header)
{
    header->callback.ex_col_text_func = &PSServiceHeaderExpandFuncCRM;
    header->callback.expand_type = PSSExportTypeCRMCustomerDefined;

    header->control_header.header_list = CRMCustomerFields;
    header->callback.count_func = &PSServiceExportCRMCountTaskTotalNum;
    header->callback.parse_func =
&CRMCustomerExportParseConditionAndColumn;
    header->callback.ids_func = &PSServiceExportCRMCustomerByIds;
    header->callback.condition_func = &PSServiceExportCRMByCondition;
    header->callback.free_func = &PSServiceExportCRMFreeConditionContent;
    return header;
}
```

1.2.1.3 子模块处理流程图

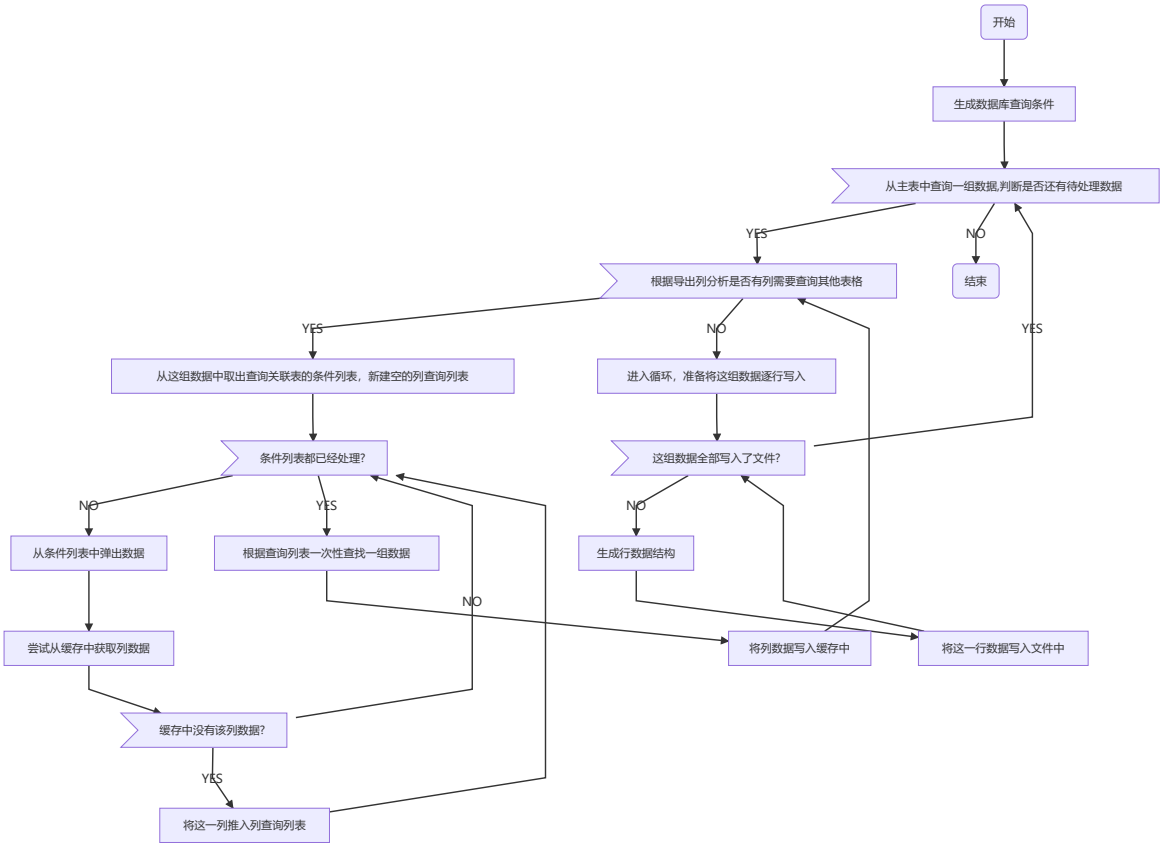
1.2.1.3.1 通用处理流程

（数据获取和导出流程(ids和cond基本一致，考虑以后会将两者合并提升ids的效率)



1.2.1.3.2 具体导出处理流程实例

(不同的导出处理大相径庭，这里只是列举典型的导出CRM客户的处理流程。这意味着在导出处理中我们无法进行代码复用，而是需要特殊化处理，拷贝代码然后修改特殊化的字段)



1.2.1.3.3 另外需要注意的是两种处理技巧，一个是列的顺序标识，一个是扩展处理函数的使用。

1. 列的顺序

```
    PSSExportColumnMask *o_mark;    //顺序标识
    int o_mark_len;     //顺序标识的个数
    const fieldData *header_list;    //文件头对照表
```

```
typedef struct __pss_export_column_mask__ {
    int sort_index;

    int id_by_type; //根据id和索引sort_index来确定列顺序

    PSSExportType type;

    int sub_type;    //扩展字段目前用于自定义字段类型
    //0-文本,1-数值,2-日期,3-单选框,4-复选框,5-下拉列表
} PSSExportColumnMask;
```

```
typedef enum
{
    PSSExportTypePreviewCallDetail,
    PSSExportTypePreviewCall,
    PSSExportTypeCRMCustomerFixed,
    PSSExportTypePSeatStatis,
    PSSExportTypePGroupStatis,
    PSSExportTypePStatisticsCMResult,
    PSSExportTypePStatisticsCallResult,
    PSSExportTypePreviewCallBatch,

    //expand type
```

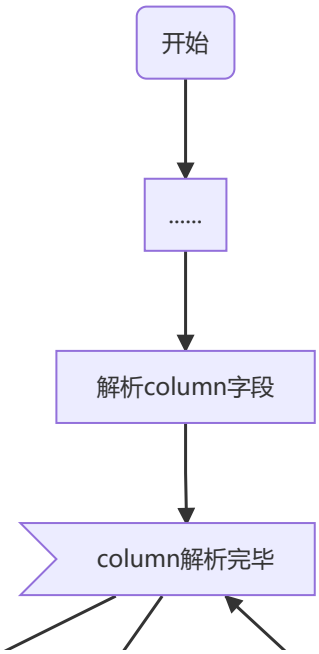
```
    PSSExportTypeDefinedStart,
    PSSExportTypeCRMCustomerDefined
}PSSExportType;
```

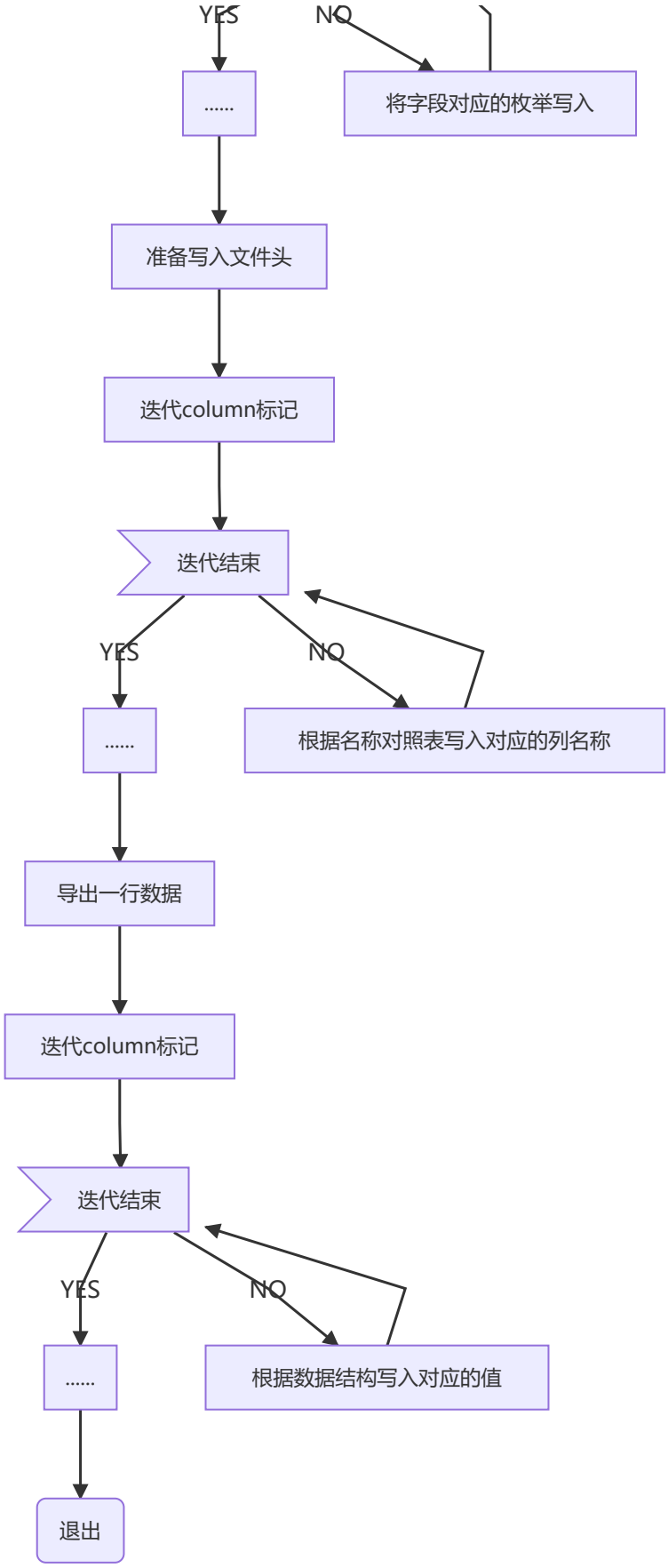
列的顺序由PSS_EXPORT_CONTROL_HEADER中的这三个字段决定，解析cm的列字段后，我们可以确定导出列的顺序。顺序有两处用到，一是文件头信息，一个是导出每行数据的时候。在流程开始前，需要新建子模块特有的数据结构，列枚举和列名称对照表。

```
typedef enum
{
    CRMCustomerExportCmName,
    CRMCustomerExportCmTel,
    CRMCustomerExportHomeTel,
    CRMCustomerExportCopTel,
    CRMCustomerExportCmGender,
    CRMCustomerExportCmEmail,
    CRMCustomerExportCmCopAddress,
    CRMCustomerExportCmCopName,
    CRMCustomerExportCmWebsite,
    CRMCustomerExportCmDetail,
    CRMCustomerExportModifyTime
}CRMCustomerExportColumnMarkOrder;
```

```
static const fieldData CRMCustomerFields[] = {
    { CRMCustomerExportCmName,              "客户姓名" },
    { CRMCustomerExportCmTel,               "客户号码" },
    { CRMCustomerExportHomeTel,               "家庭号码" },
    { CRMCustomerExportCopTel,              "公司号码" },
    { CRMCustomerExportCmGender,              "性别" },
    { CRMCustomerExportCmEmail,               "邮箱" },
    { CRMCustomerExportCmCopAddress,                "公司地址" },
    { CRMCustomerExportCmCopName,               "公司名称" },
    { CRMCustomerExportCmWebsite,               "网址" },
    { CRMCustomerExportCmDetail,              "客户描述" },
    { CRMCustomerExportModifyTime,                "最后编辑时间" },
};

```





2. 自定义扩展字段

在CRM功能中新增了自定义字段功能，目前实现了一种可扩展的自定义处理机制

在新增扩展字段时(以自定义字段为例)，我们需要进行如下操作

```
1 typedef enum
```

```
{
    PSSExportTypePreviewCallDetail,
    PSSExportTypePreviewCall,
    PSSExportTypeCRMCustomerFixed,
    PSSExportTypePSeatStatis,
    PSSExportTypePGroupStatis,
    PSSExportTypePStatisticsCMResult,
    PSSExportTypePStatisticsCallResult,
    PSSExportTypePreviewCallBatch,

    //expand type
    PSSExportTypeDefinedStart = 100,
    PSSExportTypeCRMCustomerDefined
}PSSExportType;
```

- 在枚举中新增PSSExportTypeCRMCustomerDefined枚举类型

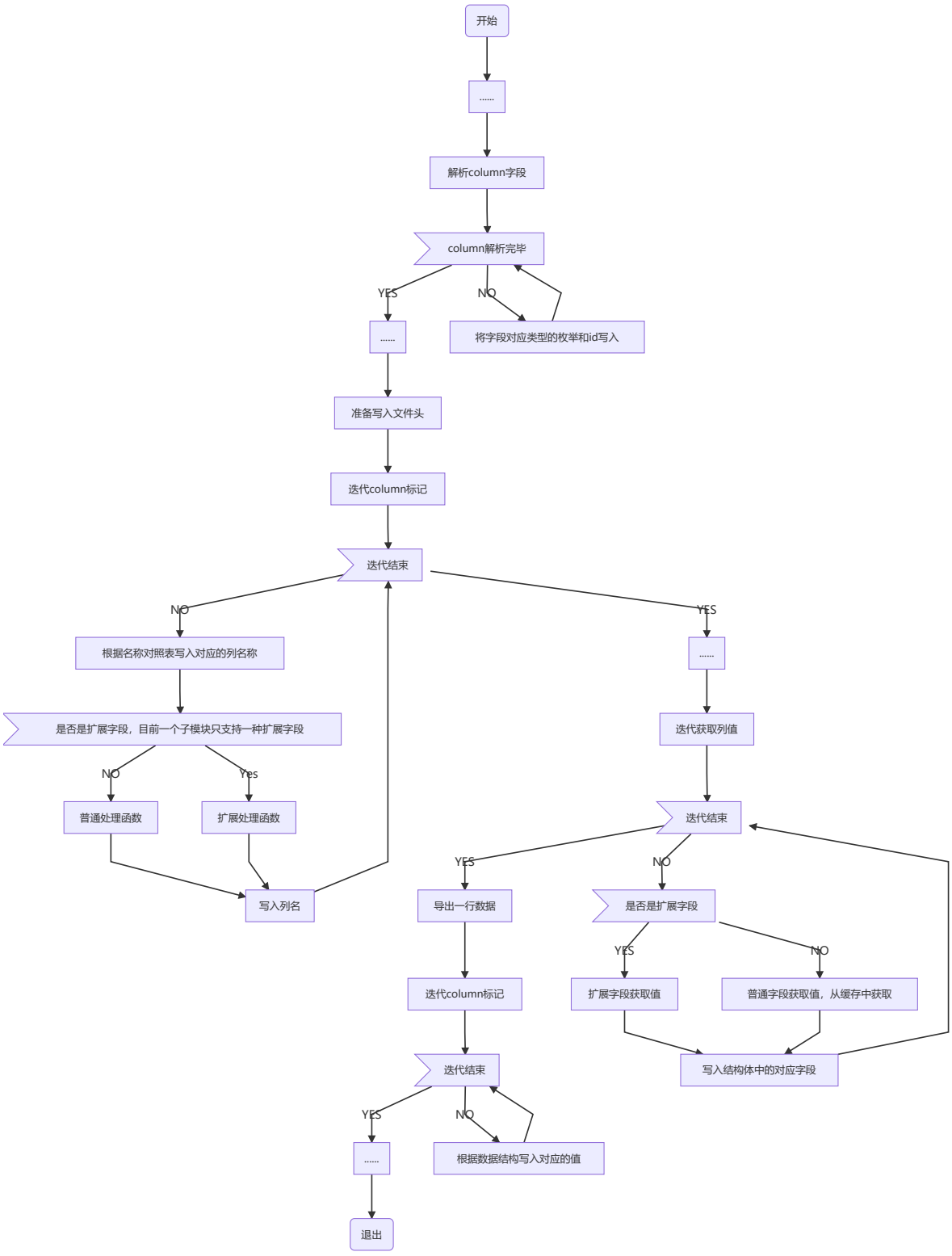
```
static PSS_EXPORT_HEADER
*PSServiceExportCRMControlHeaderInit(PSS_EXPORT_HEADER *header)
{
    header->callback.ex_col_text_func = &PSServiceHeaderExpandFuncCRM;
    header->callback.expand_type = PSSExportTypeCRMCustomerDefined;

    header->control_header.header_list = CRMCustomerFields;
    header->callback.count_func = &PSServiceExportCRMCountTaskTotalNum;
    header->callback.parse_func =
&CRMCustomerExportParseConditionAndColumn;
    header->callback.ids_func = &PSServiceExportCRMCustomerByIds;
    header->callback.condition_func = &PSServiceExportCRMByCondition;
    header->callback.free_func = &PSServiceExportCRMFreeConditionContent;
    return header;
}
```

- 在初始化特有属性时指定　header->callback.expand_type = PSSExportTypeCRMCustomerDefined;
- 指定自定义字段处理函数　header->callback.ex_col_text_func = &PSServiceHeaderExpandFuncCRM;

```
#define EXPORT_COL_DEFINEED_MARK  "defineField_"
```

- 设定自定义字段鉴别标识　#define EXPORT_COL_DEFINEED_MARK "defineField_"
- 实现自定义字段值获取函数　目前自定义字段的处理放在每列数据导出的时候，暂时没有更好的办法



2 导出性能优化

本次性能优化将通过缓存和集中获取数据以减少数据库的访问

见文档第1.2.1.3.2节

2.1 客户信息导出

和cid有关，优化只能通过联表查询

2.1.1 缓存设计

暂时使用hashtable

和预览式外呼任务详情导出不同，每个客户信息相互独立，可能导致导出客户过程中产生巨大的缓存数据量。这里只需要缓存功能，只在导出的一个循环中存在。

但是句柄可以存在于整个导出过程中。

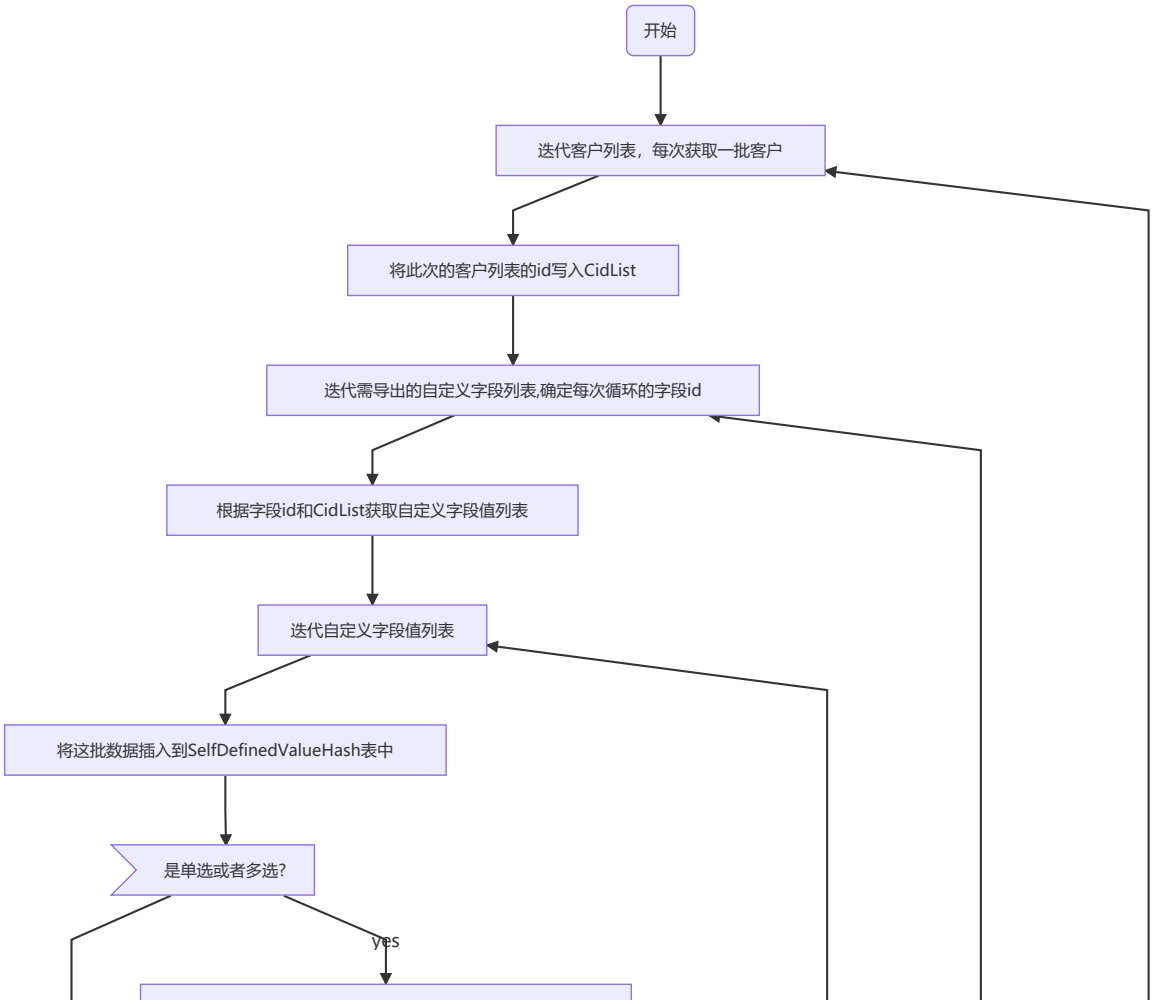
客户号码的缓存自不必说，和下面的预览式外呼任务详情缓存一样。

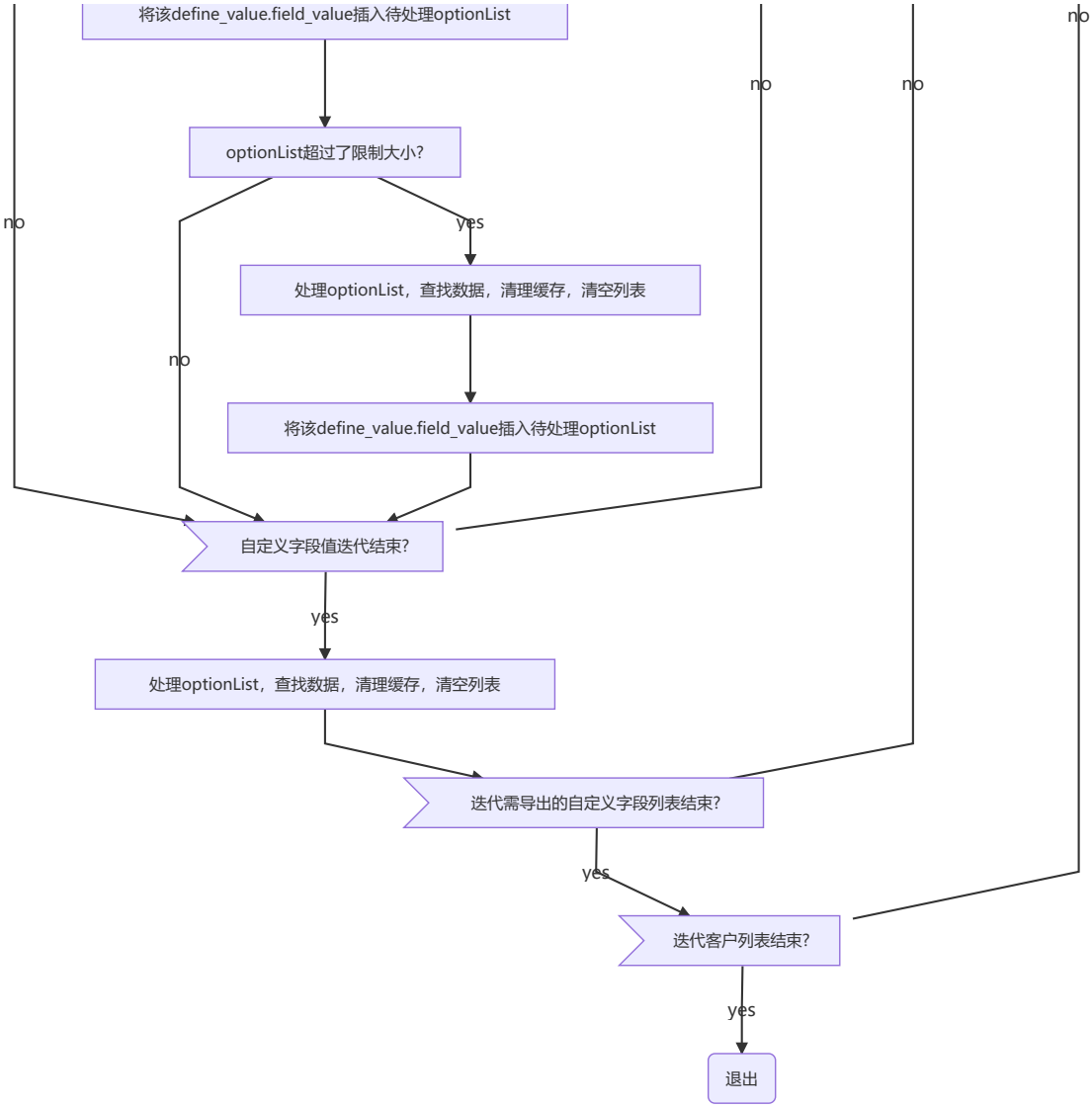
新增缓存的申请和释放回调

```
static PSS_EXPORT_HEADER
*PSServiceExportCRMControlHeaderInit(PSS_EXPORT_HEADER *header)
{
    header->callback.ex_col_text_func = &PSServiceHeaderExpandFuncCRM;
    header->callback.expand_type = PSSExportTypeCRMCustomerDefined;

    header->control_header.header_list = CRMCustomerFields;
    header->callback.count_func = &PSServiceExportCRMCountTaskTotalNum;
    header->callback.parse_func =
&CRMCustomerExportParseConditionAndColumn;
    //header->callback.ids_func = &PSServiceExportCRMCustomerByIds;
    header->callback.init_cache_func = &PSServiceExportCRMInitCache;
    header->callback.free_cache_func = &PSServiceExportCRMFreeCache;
    header->callback.condition_func = &PSServiceExportCRMByCondition;
    header->callback.free_func = &PSServiceExportCRMFreeConditionContent;
    return header;
}
```

下面是自定义字段的缓存流程图，自定义字段有可能横跨三张表，所以对这类字段需要单独进行优化。





2.1.2 补充消息批量获取

2.2 预览式外呼任务详情导出

2.2.1 缓存设计

暂时使用hashtable

和客户导出不同，这里缓存的信息不是相互独立的，hashtable有去重和缓存的功能，将在整个导出过程中存在。

2.2.2 补充消息批量获取

2.2.2.1 PreviewCallDetailExportSeatName

根据主表中获取的uid生成uid列表，批量获取并存入数据结构对应的字段中

2.2.2.2 PreviewCallDetailExportEnterpriseName

根据主表中获取的ccgeid生成ccgeid列表，批量获取并存入数据结构对应的字段中

2.2.2.3 PreviewCallDetailExportGroupName

根据主表中获取的gid生成gid列表，批量获取并存入数据结构对应的字段中

2.3 预览式外呼任务导出

没有关联信息需要单独获取，不需要优化

2.4 预览式外呼话后处理结果导出

没有关联信息需要单独获取，不需要优化

2.5 预览式外呼坐席统计导出

没有关联信息需要单独获取，不需要优化

2.6 预览式外呼技能组统计导出

没有关联信息需要单独获取，不需要优化

2.7 预览式外呼结果导出

没有关联信息需要单独获取，不需要优化

2.8 预览式外呼批次导出导出

没有关联信息需要单独获取，不需要优化

3 uthash的封装

以commonHash的封装为例：

UTHashLib.c

```c
#include "UTHashLib.h"

/*init common hash table and return handler*/
CommonHashHandler *InitCommonUTHashTable(){
    CommonHashHandler *handler = NULL;
    handler = EmicMalloc(sizeof(*handler));
    *handler = NULL;
    return handler;
}

/*add element to hashtable*/
void AddCommonInfoIntoUTHashTable(CommonHashHandler *handler, char *key, char *valueStr){
    if(handler == NULL || key == NULL || valueStr == NULL){
        EmicCmLog(LOG_LEVEL_ERROR, __FUNCTION__, "AddCRMTelInfoIntoUTHashTable argument error");
        return;
    }
    CommonHashElement s = NULL;
    s = EmicMalloc(sizeof(*s));
    memset(s, 0, sizeof(*s));
    Emic_strncpy(s->key, key, sizeof(s->key));
    int valueSize = strlen(valueStr) + 1;
    while(TRUE){
        if(s->valueSize == 0){
            s->valueSize = INIT_COMMON_UTHASH_VALUE_SIZE * sizeof(*(s->valueStr));

            s->valueStr = EmicMalloc(s->valueSize);
```

```
        }else if(s->valueSize < valueSize){
            s->valueSize *= 2;
            s->valueStr = EmicRealloc(s->valueStr, s->valueSize);
        }else{
            break;
        }
    }
    Emic_strncpy(s->valueStr, valueStr, s->valueSize);
    HASH_ADD_STR(*handler, key, s);

}


/*get element info from hashtable*/
const char *GetCommonInfoFromUTHashTable(CommonHashHandler *handler, char
*key){
    if(handler == NULL || key == NULL){
        EmicCmLog(LOG_LEVEL_ERROR, __FUNCTION__,
"GetCRMTelInfoFromUTHashTable argument error");
        return NULL;
    }

    CommonHashElement s = NULL;
    HASH_FIND_STR(*handler, key, s);
    if(s != NULL){
        return s->valueStr;
    }else{
        return NULL;
    }
}

/*delete elements*/
void DeleteAllFromCommonUTHashTable(CommonHashHandler *handler){
    if(handler == NULL){
        EmicCmLog(LOG_LEVEL_ERROR, __FUNCTION__,
"DeleteAllFromCRMTelUTHashTable argument error");
        return;
    }
    CommonHashElement current, tmp;

    HASH_ITER(hh, *handler, current, tmp) {
      HASH_DEL(*handler, current);
      FREE_IF_NOT_NULL(current->valueStr);
      FREE_IF_NOT_NULL(current);
    }
}

void RemoveCommonUTHashTable(CommonHashHandler *handler){
    if(handler != NULL){
        DeleteAllFromCommonUTHashTable(handler);
    }
    FREE_IF_NOT_NULL(handler);
}

```

UTHashLib.h

```
```

```c
#include "uthash.h"

#define COMMON_UTHASH_ID_MAX_LEN 64
#define INIT_COMMON_UTHASH_VALUE_SIZE 64
typedef struct _CommonUTHash_ *CommonHashHandler;
typedef struct _CommonUTHash_ *CommonHashElement;
struct _CommonUTHash_{
    char                        key[COMMON_UTHASH_ID_MAX_LEN];
    char                        *valueStr;
    int                         valueSize;
    UT_hash_handle              hh;
};

CommonHashHandler *InitCommonUTHashTable();
void AddCommonInfoIntoUTHashTable(CommonHashHandler *obj, char *key, char *valueStr);
const char *GetCommonInfoFromUTHashTable(CommonHashHandler *handler, char *key);
void DeleteAllFromCommonUTHashTable(CommonHashHandler *obj);
void RemoveCommonUTHashTable(CommonHashHandler *handler);

```

4 ids和cond的合并

过去将根据id导出和根据条件导出分开写，这样开发效率是比较低的，并且一旦有地方修改很有可能只改ids或者cond而忘记另一个。现将ids和cond合并，走cond逻辑即将ids封装成数据库的筛选语句。

5 导出相关顺序

5.1 列顺序

导出哪些列，列顺序如何由cm指定。具体字段存在数据库导出任务表中的condition字段中。

具体处理逻辑已在1.2.1.3.3中说明

5.2 行顺序

导出数据按照什么方式排列需要在具体流程中与cm进行协商，下面是具体协商内容：

5.2.1 客户导出

5.2.1.1 客户导出

order by id desc

5.2.2 预览式外呼任务导出

5.2.2.1 预览式外呼任务导出

order by id desc

5.2.2.2 预览式外呼任务详情导出

order by preview_task_customers.id desc

5.2.2.3 预览式外呼任务批次导出

order by id desc

5.2.2.4 话后处理原因导出

order by result_id

5.2.2.5 通话结束原因导出

order by id

5.2.2.6 技能组通话统计导出

order by gid

5.2.2.7 坐席通话统计导出

order by uid