

CS - BudgetInput

Technical Reference

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This document is intended to both highlight key features and design elements as well as to assist support staff involved in maintenance and enhancement of the BudgetInput application. It is not a detailed technical reference, but rather a high-level overview that provides a starting point for anyone interested in understanding the general design and architecture of this application. Ample comments are included in the code itself that hopefully will assist developers or support staff working with this application.

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1. Introduction and Overview

The BudgetInput application was developed to replace the Excel worksheet driven budget creating processes that were used in the Computing Division for many years. Its main goals are:

- Provide an easy to use tool for creating budget requests
- Enable users to easily share their budget request data during the budget drafting process
- Facilitate division-wide budget consolidation needed to create the division's fiscal year budget request

Originally, BudgetInput was used to create the initial fiscal year budget request. Therefore it was used only during the last few months of a fiscal year and a few months at the beginning of the next fiscal year. Later it was enhanced to provide budget change requests/workflow throughout the fiscal year.

2. Features

- Web-based database application
- Browser user interface supported on multiple browser including Internet Explorer, Firefox and Safari
- Worksheet like data entry with column heading sort controls
- Searchable data
- Report Suite
- Online/offline functionality via worksheet upload/download features
- Draft unconstrained data entry enabling later stage data cleanup
- Workflow for approval processes including email notifications
- Integration with MISER requisition system and Activity management processes
- Export function for data transfer to Filemaker BudgetLineItems db
- Export/Import functions for Activity synchronization with Kronos

3. Design Issues and Deficiencies

- Key tables for Projects and Tasks are not connected to master data sources.
- Activities table is not maintained hierarchically as its mirror in Oracle
- Workflow during fiscal year is lacking needed functionality
- Style sheets/themes inconsistent between pages
- Lack of transaction logs
- Redundant code and html
- Large number of queries to maintain (~200)

4. Application Environment

A. CodeCharge RAD environments

CodeCharge Studio is a Rapid Application Development (RAD) IDE tool for building web-based database applications. It is essentially database agnostic, i.e. one can use virtually any database or multiple databases for any given CodeCharge application. The tool automatically generates application code in one of the following languages:

- ASP
- ASP.NET C#
- ASP.NET VB
- PHP
- JSP 1.1 JDK 1.3
- ColdFusion
- Servlets 2.2 JDK 1.3
- Perl 5.0

In addition to tool/wizard driven auto-generated code for grids, record forms, search forms, etc., CodeCharge provides an organized way to create and manage custom code. Context based hints, examples and reference documentation are also provided to assist during the application build process. Vendor support is available via a web form accessible in the IDE and technical assistance has historically been very good. Usually a support person responds to help requests or even how-to questions in the same business day.

The BudgetInput application was built mostly using the Grid and Record Builder tool. This tool creates 3 forms on a single web page. The Record form is used to insert new or edit existing records. The Grid form displays a filtered set of records specified by entries in the Search form. On some pages, the Search form is defined but hidden to allow for future enhancements.

B. CodeCharge Studio Licensing and Vendor Support

CodeCharge Studio licenses may be purchased from YesSoftware, <http://www.yessoftware.com> . We have purchased at least one perpetual license for CodeCharge Studio. With this license and the purchase of an Annual Maintenance and Support Agreement, we are entitled to technical support as well as any new releases or upgrades.

Technical support is provided via a web form accessible from the CodeCharge Studio IDE. Our experience with using technical support has been very positive. Normally, a first and often final answer is received on the same business day. How-to questions are also answered even when they are web development rather than CodeCharge-specific questions. There is also an online forum that provides many solutions.

C. Database and Programming Languages

BudgetInput is written using ASP (Classic and not .NET). ASP uses VBScript, which is a subset of Visual Basic, as its language. Because of this, this application must run on a Microsoft Internet Information System (IIS) server. Wherever possible, CodeCharge provided Actions were used for Events and application properties exposed in the IDE were used. Use of Actions instead of Custom Code enables the CodeCharge generated language to be changed without requiring manual conversion of the language as would be needed for Custom Code pieces. However most of the application functionality is provided using Custom Code (written in VBScript) for Events.

BudgetInput uses a Microsoft Access 2003 database. Most database queries are defined directly in the database but a few are designed and maintained using the CodeCharge Visual Query Builder.

D. Other Software Requirements

ASPUUpload product from Persits Software, Inc. is used to provide the basic upload functionality. It also enables limiting uploads so that a single large upload cannot overwhelm the system. The maximum file size permitted for upload is currently set to 4 Mbytes.

Oracle ODBC connectivity to MISCOMP databases is required for writing approved Task, Activity and line item to MISCOMP.

E. Application Folder Structure

The current implementation of BudgetInput allows a single application instance to connect to any of the available fiscal year databases. The file upload folders (for security purposes) are separate from the application and the databases folders. The development folders follow the structure the production folders and the folder name are appended by the string in the {}.

Databases:

```
\\cd-entreport\cd_databases\BudgetInput{-Dev}  
    \CurrentFY  
    \FYnn
```

Application:

```
\\cd-entreport\cd_reportsandmetrics\BudgetInput{-Dev}  
    \js  
    \services  
    \Styles  
    \Themes
```

File Upload:

```
\\cd-entreport\BudgetInput_Staging
\\cd-entreport\BudgetInput_Uploads{ _Dev}
    \FYnn
        \BLI_Uploads
        \Downloads
        \FTL_Uploads
```

F. Code Maintenance & Version Control

All code (all the web page definitions and code necessary to build the application in CodeCharge and a sample Access database) is maintained in the Computing Sector CVS repository:

```
:ext:cvsuser@cdcvs.fnal.gov:/cvs/cd/BudgetInput
```

G. Database Documentation

A software tool, Total Access Analyzer 2007 from FMS Inc. <http://www.fmsinc.com> , has been licensed to enable documentation for the database tables and views to be easily created. The license is for a single user, but additional licenses could be purchased as needed for a few hundred dollars each. One key report created by this tool is an Object Cross Reference that shows where and how each object references tables, queries and fields. This tool can be used to provide a wealth of information about all of the tables, queries and fields in an Access database.

Note: The current version of this product does not work with MS Access 2010 and with the previous version of MS Access it has a bug which causes the tool to execute very slowly when generating documentation for a fully populated BudgetInput database. To use it, one must strip out most records in tables that contain more than a few hundred records such as BudgetItems, Activities, PATasks etc.

H. IIS Configuration

Virtual directories and application names are defined for the application instances. Thus the following virtual directories are configured:

```
BudgetInput
BudgetInput-Dev
```

Two application pools

```
BudgetInput
BudgetInput-Dev
```

are defined to isolate the production and development application instances from one another.

5. Runtime Initialization

A. Application Initialization

An initialization file, global.asa, is located in the application root folder. This file contains the session timeout value which determines how long a browser session can be idle before logging of the user and upon session end, the database cleanup.

B. Application Configuration

The Application Configuration consists of a number of key variables that enable one to easily manage multiple instances of the application and db's (for multiple fiscal years and development versions) and to control the application when moving to new budget phases during the fiscal year (see Intra-FY Phases section). Persistent values are maintained in the single record in the ApplicationConfig table. When the application starts (when the first user references a page in the application, typically the login page) Application variables are created from the values in the ApplicationConfig table. Variables, where the function is turned on or off, use the value 1 for enabled and 0 for disabled.

Application Variables	Function	ApplicationConfig Field
Email_LIChange_Not	Enable/disable email notification when a line item has been approved in MISER	Email_LIChange_Not
Email_LIChange_List	Email address list for notifications	Email_LIChange_List
LI_Deletes_Allowed	Enable/disable line item deletes.	LI_Deletes_Allowed
downloadpath	Folder path for building downloadable Excel worksheet	downloadpath
upldsave	Folder path for saving uploaded Excel worksheets	upldsave
FTLUpload	Folder path holding uploaded Excel worksheets related to activities	FTLUpload
WS_Uploads_Allowed	Enable/disable Excel worksheet uploads	WS_Uploads_Allowed
User_Access_Level	Minimum Application RoleID allowed for login (See Roles section for permitted values)	User_Access_Level
FY_Title	Fiscal year title to be used in reports	FY_Title
FiscalYear_Start	Fiscal year start date, e.g. 10/1/2009	FiscalYear_Start
FiscalYear_End	Fiscal year end date, e.g.	FiscalYear_End

	9/30/2010	
User_Access_Level_Message	Message to display when users denied access because of role less than User_Access_Level	User_Access_Level_Message

C. New Fiscal Year

Following is a list of tables that must be initialized with data needed before opening up BI for new fiscal year input:

Table	Contents	Notes
Activities	Current CD Activities	Cleared out, preloaded with previous FY or mass uploaded from spreadsheet
BudgetItems	Budget line items	Cleared out or preloaded with previous FY data
BudgetItems_updatesave	Log to track line item changes	Clear out after first export of line items to Oracle (Miser)
CDExpendType	CD Expenditure Types	
CDExpendSType	CD Expenditure Subtypes	Must be < 100. This field and CDExpendType form a calculated key used for validation and display purposes.
Department	CD Departments	Used for worksheet ownership and as report parameter. Use provided functions to synchronize with MISCOMP
PATasks	Project Accounting Tasks	
Projects	Project Accounting Projects	
Roles	CD list of functional roles	Table is maintained in Oracle
SWFResource	List of current staff to be budgeted	Use provided functions to synchronize with MISCOMP
Worksheets	Worksheet names and additional attributes	Cleared out or preloaded with previous FY data

If previous fiscal year worksheets are preloaded into new fiscal year BI, care will have to be taken to ensure that Activities that are Parent Activities for preloaded worksheets are maintained in new FY Activity table.

6. Budget Processes

A. Intra-FY Phases

From the time (usually around August) when the budget for the new fiscal year is prepared to the end of the new fiscal year, there are several milestones that occur:

Milestone	Schedule
Budget draft/Initial input	July - September, new FY
Division Head directed changes (executed by budget submitters)	July – September, new FY
Export to MISCOMP all approved Projects, Tasks, Activities and Line Items	September 30, new FY IMPORTANT: Worksheet Upload must be disabled at this time
Export to Filemaker budget db's	September, new FY and as needed
Division Head adjustments for Director's Budget Review	November, CurrentFY
Resync BI with all adjustments and changes in Filemaker db's	October - November, CurrentFY and as needed
Financial Group adjustments (e.g. previous FY carryover)	Early in CurrentFY and as needed during FY
Additional adjustments in Filemaker reconciled with BI	Division head adjustments for various reasons

B. BudgetInput-Filemaker Adjustments and Reconciliation

Because major changes to the budget are made outside of BudgetInput, e.g. the Division Head's adjustments to tie out to the lab guidance, these changes must be brought back into the BudgetInput database. The script ExportCR-BudgetLineItems in the Filemaker BudgetLineItems database should be used to export all line items to an Excel worksheet. This worksheet can then be imported into BudgetInput. Lineitems in BudgetLineItems are adjusted using two fields, Disallow Flag and Item ScaleItembyPercent. In BudgetInput, the field DisallowFlag is set to 1 (line item allowed) when the corresponding Filemaker field is empty. If the Filemaker field contains an "x" (line item off budget), the BudgetInput Disallow flag is set to 0. See the section "Procedures for Synchronizing BudgetInput Database..." for details on the reconciliation process.

7. User Authentication and Permissions

A. Users and Authentication

To access BudgetInput the users must authenticate using their services account. Access is restricted to computing sector employees unless there is an entry in the Oracle control table (schema: BudgetInput) BudgetInput_SpecialUsers.

This table contains the following key fields needed for logging in to the application with a role other than the User role:

Field Name	Usage
userName	Login name – set to Kerberos principal
userPass	Login password, used only for test users purposes
ApplicationRoleID	See Application Access Roles section for value definitions; not to be confused with the Roles table)
ApplicationRole	Application Access Role description (for displaying purposes)

B. Application Access Roles

BudgetInput users have a predefined access role based on their needs and role during the budget drafting process. Almost all of CD staff is given the role of *General User*. This role enables one to create Worksheets and Line Items and to request new Activities and Tasks. The table below lists access roles and the functions that are permitted from low to high level. Access Roles and their permitted functions are inclusive from high to low level, e.g. BudgetInput Application Administrator can execute all functions.

Access Role	ApplicationRoleID	Function
General User	1	Budget requesting functions.
Manager	2	No additional privileges at this time
Administrator	3	Add users, approve Activities and Tasks and BudgetAdmin menu tasks (<i>this should be moved to Database Administrator or above</i>)
Database Administrator	4	Approve new Tasks and Activities
BudgetApprover	5	Approve line items
BudgetInput Application Administrator	6	Modify application configuration

The Application Access Role is set only for the non-General Users in the Oracle Table BudgetInput_SpecialUsers. At the moment, the CodeCharge “Project >> Settings / Security” and “Project >> Settings / Security Groups” reference the old BudgetInput database tables (Users and ApplicationRoles) as there is no other easy way to reference by default the created session variables.

8. Web Pages and Application Components

A. Worksheets

A worksheet in this application is a construct that is primarily used to contain related sets of line items. To create line items, one must first create a worksheet after which, the worksheet may be opened and line items created. Worksheets can be of two types, M&S and SWF and can exist in one of two states,

Preparation or Submitted. When a worksheet is in Preparation state, an Excel worksheet containing appropriate column headers and line item rows may be uploaded into it. Data from the worksheet that is not valid, e.g. a Project/Task that does not exist, is handled by creating a flagged entry for this data. Before this data will be accepted (see Upload/Download section for more details on this) and the container worksheet enabled to be changed to Submitted state, flagged data must be replaced with valid data or values used must be approved by a person in the Budget Approver role (e.g. a new Project/Task).

Worksheets may be opened in write mode by only one user at a time. A Database Administrator, however, has the ability to change line items in a worksheet that is open by another user.

B. Worksheet Line Item Entry Pages

These pages are entered by “opening” a worksheet from the Worksheets page. M&S and SWF line items are entered by budget submitters using separate web pages because their respective input data is quite different. There are two pages used for M&S data entry and for SWF. The M&S and SWF pages allow users to enter line item records that do not have data in all of the required fields needed for final budget submission. This Preparation (draft) line item entry mode also allows resaving line items that may contain unapproved Task and/or Activities. Worksheets that contain such incomplete line items are in Preparation mode. Worksheets can be changed to Submitted mode only when data for all line items on the worksheet is completed and contains valid values for Activities, Tasks and other controlled value entry field such as CD ExpenditureType for M&S worksheets and Resource (Person) for SWF worksheets.

Page Name	Function
ItemsMS	Handles line items for M&S worksheets
ItemsSWF	Handles line items for SWF worksheets

C. Line Items (ALL) Pages

The pages ItemsMS and ItemsSWF provide views of all line items independent of which worksheet contains them. These pages may be used for editing line items without opening the containing worksheet.

D. Other Key Pages

NewTask	Provides user interface for requesting and approving new Tasks
NewActivity	Provides user interface for requesting, modifying and approving new Activities.
Worksheet	Provides user interface for creating worksheets, uploading into and downloading from worksheets and selecting worksheets for editing.

9. Relationship to Other Applications

A. Miser Integration

BudgetInput provides the user interfaces to request new Projects, Tasks, Activities and Budget Line Items. For each of these, an individual in the Database Administrator role must approve the requested item to enable it to be formally used in the budget and MISER requisition processes. When an item is approved, a record is inserted into the corresponding `_APPROVED` table in MISCOMP. Oracle triggers detect the insert and execute additional code to properly build the appropriate normalized record(s) in MISCOMP.

- `PROJECTS_APPROVED`
- `PATASKS_APPROVED`
- `ACTIVITIES_APPROVED`
- `BUDGETITEMS_APPROVED`

Tables for defining the columns for the MISCOMP (Oracle) INSERT command are included at the end of Common.asp.

B. Effort/FTL Integration

Activities are initially defined using the Request New Activity page. The following fields are required to define an Activity:

Activity Name (Level0, 1, 2, 3, 4)

Short Activity Name is automatically constructed using a predefined algorithm

Default Task

Activity Owning Organization

When an Activity is approved in BudgetInput, it is recorded in the Activity tables in MISCOMP/EFFORT. Activity special mappings can then be defined by following the link on the Activity Name list in the Request New Activity

Note: The Activity Short name is generated automatically using a predefined algorithm that combines the various activity levels. A BudgetInput application administrator has the ability to change this automatically generated short name. If though the activity name is changed, care must be taken to also modify appropriately the short name (further documentation is under `ftl_util_py`)

10. Key Processes

A. Basic Approval Workflow for Activities and Task

New Activities and Tasks may be requested using the NewActivity and NewTask pages. Activity records are created directly in the Activities table and Task records are created directly in the PATasks table. The ValueStatusID field in new request records is set to 3. When requests are approved, the corresponding ValueStatusID field is set to 2.

B. Worksheet Upload/Download

1. Upload

The table BItem(m, n) at the beginning of Uploadx_Events.asp is used to configure the worksheet upload formats for M&S and SWF Excel uploads. Uploads are executed using "Sheet1". For every valid column in an uploadable worksheet, the following properties are specified in the BItem table.

Excel worksheet column header	Column name used in Excel worksheet
Field name in database	Corresponding field name used in BudgetItems.mdb
Worksheet type (M&S, SWF or Both)	M&S, SWF or Both
Datatype	Number, text or lookup
Lookup table	*
Lookup field name	*
Lookup key field name	*

* These properties are specified only when the Data Type for a field is lookup.

When a worksheet is uploaded, each field whose Datatype is lookup is compared against values in the corresponding lookup table for that field. If the value is found, the corresponding primary key for that value in the lookup table is written into the corresponding foreign key for that {record:field} in the BudgetItems table. If the value is not found, a new record is created in the lookup table for that value and the ValueStatusID for that record is set to 4 indicating that this is a non-approved value. The primary key for this new record is then written into the foreign key for that {record:field}. This enables queries to display uploaded values for fields, whether or not they are valid and to also flag the invalid ones by displaying their values in red.

IMPORTANT: After line items have been approved and sent to MISER for the first time, the Allow Excel Worksheets Upload setting in the Application Configuration should be set to "No". This is necessary as new ItemID's are created for uploaded line items, whether or not they are actually new or existing line items. Line item ID's in MISER MUST correspond to the ItemID's in BudgetInput as they existed when the first export to MISER was executed.

2. Download

Download functionality is provided through the code in Worksheet_download1 and Worksheet_download2 asp pages. Two Access queries are used to define the fields to be downloaded, qlItemsMS_dl for M&S worksheet downloads and qlItemsSWF_dl for SWF worksheets. This code is also

used to provide for downloading any table or query in the database. The table DownloadQueries lists tables/queries available for downloading.

C. Activity Maintenance

Activities are created and modified via the Request New Activity web form. Activity Names have up to 5 levels of name parts, ActLevel 0, 1, ... 4). Each Activity that will be used as an effort reporting activity in the FTL system (Kronos) also has a corresponding Short Activity Name. The short activity name is automatically generated using a predefined algorithm.

Currently, BudgetInput does **NOT** view Activity Names in a hierarchal sense. For example, if you have Activities whose names are

Nam0 / Nam1 / A
 Nam0 / Nam1 / B

and you change the first one to Nam0 / Nam1a / A , the Activity Nam0 / Nam1 / B remains unchanged as well as any other Activities whose names start with Nam0 / Nam1 .

IMPORTANT: Because Oracle manages the Activity names hierarchically, **ALL** Activities starting with Nam0 / Nam1 would automatically be renamed to Nam0 / Nam1a / In order to keep Oracle and BudgetInput Activity tables identical, in BudgetInput one must explicitly rename all Activities where a name part that is not at the bottom of the hierarchy has been changed.

11. Data Definitions and Web Pages

A. Key Tables

Table	Description
Activities	All approved, requested and uploaded Activities
ApplicationConfig	Global configuration values (see Application Configuration section)
BudgetItems	All budget line items, both M&S and SWF (Personnel)
BudgetItems_updatesave	This table contains history of line item changes and must have the same structure as the BudgetItems table (with one additional field, an autonumbered ID field)
CDExpType	CD Expenditure Types – together with CDExpSType are mapped to lab Expenditure Types
CDExpSType	CD Expenditure SubTypes
Department	List of CD departments. This is used only to help manage worksheets by department and to identify staffing requests outside of submitter’s department
DownloadQueries	List of queries and tables available for downloading
EFFORT_REPORTED	Linked table to EFFORT_REPORTED table in Oracle. ***Note. This needs to be changed to V_EFFORT_ARCHIVE before CD Effort Reporting system is turned off when Weekly employees move to FTL.
FundTypeMap	Used together with CDExpType to define which Fund Types can be

Table	Description
	used for each CD Expenditure Type
PATasks	Project Accounting Tasks that may be used for budgeting. This table includes both PARENT and CHARGEABLE tasks but limits budgeting to only CHARGEABLE tasks
Projects	Project Accounting Projects.
Roles	CD define job roles for use in Personnel (SWF) budget line items
SWFResource	Personnel list of CD employees who can be selected for SWF budget line items
Worksheets	List of defined M&S and SWF worksheets. Also used to write lock worksheets when they are opened in R/W.

B. HTML and ASP Pages

Page Name	Function
Active Users	Displays active BudgetInput sessions
Active Worksheets	Displays open worksheets
Admin	ADMIN: Provides Budget Administrator functions such as batch exporting of all approved Activities, Tasks and line items
AppStatus	ADMIN: Provides interface for display and modifying the Application Configuration
BudgetMenu	Main application menu
ClosetItem_Force & ClosetItem_Force1	ADMIN: Not used at this time. Intended for use when running application in multi-user r/w mode (multiple users can edit a worksheet at the same time)
Closews	ADMIN: Code to close worksheet
Closews_all	ADMIN: Administrator function for closing all open worksheets
CloseWS_Force , CloseWS_Force1	ADMIN: Administrator function for viewing open worksheets and selectively closing them
DownloadTables & DownloadTables2	User interface for downloading tables/queries
EquipGuidance	Text for explaining when equipment Task codes can be used
FTEBudgeted	Displays summary of Activities assigned to a specific staff person. Called from ItemsSWF pages.
FTL_CreatelImports	ADMIN: Create an excel spreadsheet of the new activities suitable for the Kronos system.
FTL_UploadActivities	ADMIN: Upload the Kronos Activities to Oracle to be used by the effort reporting software
ImportActivities_FromExcel	ADMIN: Import new activities from excel spreadsheet
Header	Main page header with Logoff link
ItemsMS, ItemsSWF	M&S and SWF line item entry pages
Login	Login page
LoginToFiscalYear	Sets the appropriate session variables for the selected FY database
Logoff	Logoff code
ManageMiserFYs	ADMIN: manages the database state for a FY (READONLY,

Page Name	Function
	MISEROPEN, PREPARATION)
ManagePostedOpenings	ADMIN: manages the posted opening entries in SWFResources
MenuAdmin	ADMIN: Administrator Functions Menu
NewActivity	Request or Update Activities
NewProject	ADMIN: Add Project page
NewStaff	Updates BI SWFResource table from MISCOMP ACTORS
NewTask	Request or Update Tasks
NoAccess	Error page when denied access due to insufficient permissions
Report_ActivityMappings	Report to display all activities and their Task mappings
Reports_currentFY	Menu for accessing the current fiscal year reports
Reports_PreviousFY	ADMIN: Menu for accessing the previous fiscal year reports
RevertLineItem	ADMIN: Code to revert line item to previously approved state.
StaffandDept_update	Updates Department and Staff from MISCOMP ACTORS (has link to NewStaff page)
SystemDown	Page display System unavailable message
TaskNotes	Enables notes to be attached to tasks (currently not used)
Translog	Display transaction logs
Update_FTLShortName	ADMIN: Updates the Activities short name using the latest algorithm
Update_PATasksSvcTypeCode	ADMIN: Update the ServiceTypeCode in the Tasks table
UploadComplete	Upload successful completion message
UploadError	Upload error message
UploadsOff	Upload function unavailability message
Uploadx	Upload user interface and code
Users	Add/edit users with special permissions
Worksheet_download	Download worksheet code
Worksheets	Main Worksheets page and code for editing, opening, downloading and uploading worksheets

C. Key Queries

Query Name	Description or Use
qBudgetItemsALL-remapped	For use in Crystal Reports
qBudgetItemsFMExport	Use to export "Approved" data for BudgetLineItems in FileMaker.
qBudgetItemsFMExport1	Use to export all data (including unapproved) for BudgetLineItems in FileMaker. Field names match BudgetLineItems field names.
qEffortbyActivityandTask	Summary of Effort reported by Activity and Task
qEffortbyActivityTaskandMonth	Summary of Effort reported by Activity and Task
qltemsMS	Shows all M&S budget items
qltemsMS_MISER	Use to write approved M&S records to Oracle.
qltemsMS_valid	Selects M&S budget items that have valid data entries. Handles Fund Type-CD Expenditure Type incompatibilities.
qltemsMS_FundType_inv	M&S items with incompatible Fund Type and CD Expenditure Type
qMSinv	Selects M&S budget items that have invalid data entries. Handles Fund Type-CD Expenditure Type incompatibilities.
qltemsSWF	Shows all SWF budget items
qltemsSWF_MISER	Use to write approved SWF records to Oracle.
qltemsSWF_valid	
qltemsSWF_inv	Selects SWF budget items that have invalid data entries
qitemsmSadj_dl	Use for M&S Adjustment worksheet download
qRECON-BI NOT in BLI	Selects line items in BI that are not in BLI.
qRECON-BLI NOT in BI	Selects line items in BLI that are not in BI.
qSYNC-CD Departments in MISCOMP	CD Departments in MISCOMP (<i>Passthrough query requires ODBC connection string in properties</i>)
qSYNC-CD Staff in MISCOMP	CD Staff in MISCOMP (<i>Passthrough query requires ODBC connection string in properties</i>)

D. Macros

Macro	Description
Create SWFResource table	***Deprecated*** Builds staff and group records inSWFResource table based on Users tables
Import BudgetLineItems	Imports line item in BudgetLineItems Filemaker db exported with the ExportCR-BudgetLineItems script. BudgetLineItems-import table is created.
Import Tasks	Imports tasks data from the Filemaker Tasks db into the table Tasks-import.

Note: Deprecated macros have been left in the database to provide examples and templates for future needs.

E. Modules/Functions

Module	Function	Description
basParse	GetCSWord	Used to parse fully specified Activity name into its ActLevel0 – n parts
	CountCSWords	Used by GetCSWords function
TableExists	fTableExists	General use function for macros to detect when table exists. It is often used in Macros to skip Delete steps if table does not exist. and
Import BudgetLineItems	ImportBLI	***Must be updated along with BudgetLineItems Import SPecification
Import Tasks	ImportTasks	***Deprecated***

Note: Deprecated modules and functions have been in the database to provide examples and templates for future needs.

F. Required Fields for Line Items

Field	M&S Required	SWF Required	Type	Range	Size	Notes
itemID	y	y	integer	1-		
Activity_Name	y	y	text		255	
Project Number	y	y	text		8	
Task Number	y	y	text		32	
xlws_Name	y	y	text		50	
Budget Requesting Org	y	y	text		64	
Item ScaleItembypercent	y	y	integer	0-		

Disallow Flag	y	y	string	x	1	
Expenditure_Category	y		text	"M&S" or "SWF"		
Item_description	y		text		128	
Cost_per_item	y		integer	0-		
Item_num_units	y		integer	0-		
CD Expenditure Type Code	y		text		3	
CD Expenditure Subtype	y		text		32	
BadgeNumber		y	text		32	"00NP0" for new hire, "00NPnn" for posted openings
FTE_Role		y	text		64	
Taskmonths		y	integer	0-12		
FTE_People_num		y	float/double	0-		

12. Procedure for Synchronizing BudgetInput with BudgetLineItems (Filemaker)

A. Acronyms:

- BudgetLineItems database (Filemaker db) BLI
- BudgetInput database (Access db) BI

In BLI, export BLI data to an Excel workbook using the ExportCR-BudgetLineItems script.

In the BI web interface for Budget Administration, execute the command Upload BudgetLineItems Export from FM db. This upload will copy the file one selects into the table BudgetLineItems-recon1 in the BI db. The BudgetLineItems-recon1 table will now be the source data to use for updating BI.

To get a quick view of data issues in the Filemaker export, select BLI Upload Errors in the Administrator Functions of the Main Menu for BI.

After this, the RECON process will require running various queries manually in the BI db to synchronize its data with the Filemaker data. The names of the queries in BI that are used for the recon/synchronization start with “qRECON-...”.

B. Projects, Tasks and Activities

The first things that must be synchronized between BLI and BI are the Projects, Task and Activities. The following queries can be used to help with this process:

Query	Displays
qRECON-BLI Tasks NOT in BI Tasks	Task used in BLI that are not in the BI PATasks table.
qRECON-BLI Activities NOT in BI Activities	Activities used in BLI that are not in the BI Activities table.

The next thing to check is for duplicate itemID’s in BudgetLineItems-recon1. This can occur during the budget adjustment process that is executed in BLI. The duplicate ones need to be identified and their itemID’s cleared so that the various checking and recon queries that join on itemID pick the correct line items in the joins.

The next check is for whether there are records in either table that do not exist in the other. The following queries do this using the key itemID :

Query	Displays
qRECON-BLI NOT in BI	Line items in BLI but not in BI
qRECON-BI NOT in BLI	Line items in BI but not in BLI

In most cases, there may be line items in BLI that are not in BI, but usually not visa versa. These would result from line items being created in BLI after importing BI data into BLI.

If there are BLI line items not found in BI, the query “qRECON-BLI NOT in BI-mt” should be executed to create a set of these records that will be appended to BI. The following queries can then be executed to append these new line items to BI:

Query	Function
qRECON-mt BLI NOT in BI	Creates table of BLI line items not currently in BI
qRECON-app from BLI NOT in BI-MandS	Appends new M&S records from BLI to BI
qRECON-app from BLI NOT in BI-SWF	Appends new SWF records from BLI to BI

If there are BI line items that are not in BLI, this likely means that these line items were intentionally deleted in BLI and should therefore be deactivated in BI. In the case of M&S line items, in that they may have already been passed to MISER as valid and approve line items, these should have the “Inactive Flag” field set to “Y”. In the case of SWF line items, they should be deleted in BI.

C. DATA CHECKING

All of the significant data fields that will be updated in BI from BLI should first be checked to see if there are substantial differences that might indicate problems with the BLI data. The following fields should be compared (with Access query, e.g.) to see if there are many line items where the BLI values are different than their corresponding BI values (this could indicate a problem with data exported from BLI):

M&S Line Item Field Names	
BudgetLineItems (BLI-Filemaker)	BudgetInput qBudgetItemsFMExport1 (if different than BLI field names)*
Activity Name	Activity_Name
Project_Number	Project Number
Task_Number	Task Number
CD Expenditure Type Code	Same as BLI fieldname
CD Expenditure Subtype	Same as BLI fieldname
Item_num_units	Same as BLI fieldname
Cost_per_item	Same as BLI fieldname

SWF Line Item Field Names	
Activity Name	Activity_Name
Project_Number	Project_Number
Task_Number	Task Number
BadgeNumber	Same as BLI fieldname
FTE_Role	Same as BLI fieldname
Taskmonths	Same as BLI fieldname
FTE_People_num	Same as BLI fieldname

The query qRECON-BLI Error Summary (the same view as seen from the BLI Error Summary on the web) can be used to examine the BLI export(BudgetLineItems-RECON1 in BI) and provide a summary of the following data errors:

- Missing Item Description in M&S lineitem
- Invalid CD Expenditure Type in M&S lineitem
- Invalid Badge Number in SWF lineitem
- Inconsistent Worksheet type (e.g. M&S lineitems on SWF worksheet)
- Invalid Expenditure Category
- Lineitems using unapproved Activities
- Lineitems using unapproved Project/Tasks
- Lineitems using unknown Worksheet

D. Updating BI from BLI

The following queries are used to update the BudgetItems table in BI with the data that has been exported from BLI into the table BudgetLineItems table:

Query	Function
qRECON-Update BI fromBLI-M&S	Updates M&S records from BLI export
qRECON-Update BI fromBLI-SWF	Updates SWF records from BLI export

E. LAST STEPS

After all of the above procedures are completed, MISER budget data must be updated by exporting all of the BI key tables to MISER. This is done through the Budget Administration screen in the BudgetInput web app and selecting and executing each of the following:

- Export all Projects to Oracle
- Export all Approved PA Tasks to Oracle
- Export all Approved Activities to Oracle
- Export all Approved M&S line items to Oracle
- Export all Approved SWF line items to Oracle

13. Reports

A number of Crystal reports are provided for use by budget submitters and budget managers. Because BudgetInput data is maintained in a separate database for each fiscal year (current FY and new FY) and because the reports had been changing from year to year, each fiscal year has its own set of reports. These reports are contained in the Crystal Enterprise folders Financial and Budget/Budget Planning/Fiscal Year 0 and Fiscal Year 1 and the report names have suffixes of –FY0 and –FY1 for the two fiscal years.

Report Name	Datasources (Table or Query Name)
Activity-Task Usage	Activities, PATasks, qBudgetItemsFMExport
BudgetInput Activity Summary	Activities, qBudgetItemsALL-remapped
BudgetInput Activity Summary-FTE	Activities, qBudgetItemsALL
BudgetInput Task Rollup	qPATasksALL-remapped, qBudgetItemsALL-summary_Crosstab, qBudghetItemsALL-remapped
BudgetInput Worksheets	qBudgetItemsALL
New Task Requests	PATasks
Staffing Requests-Act0	qItemsSWF
StaffingRequest2	SWFResource, qItemsSWF, Department
Updated or New Lineitems	qBudgetItems-ApprovedandUpdated
Updated or New Lineitems-ST	qBudgetItems-ApprovedandUpdated

14. Table Management Issues

Most tables do not require any manual management directly in the database except when initializing for a new fiscal year or when executing a RECON process to synchronize data between BudgetInput and Filemaker BudgetLineItems. The following outlines where direct database activities will be needed:

A. Department Changes

1. Delete Department

If a department is to be deleted, any Worksheets belonging to that department must be reassigned to a different department before deleting the department from the Department table. This is done by updating the ReqDeptID field in Worksheets for any worksheets belonging to that department with the DeptID value from the Department table. The old department should remain in the Department table until this is accomplished.

B. Changes to BudgetItems Fields

If fields in the BudgetItems table are renamed or deleted or if new fields are added, those changes **must** also be applied to the BudgetItems_updatesave table.

15. Design/Usage Issues

A. CD Expenditure Type and Subtype

These fields are combined into a single key value with a calculated key based on the primary keys of each of these. The calculation is

CD Expenditure Type: Subtype key = (CD Expenditure Type key * 100) + CDEXpenditure Subtype key

Thus one must ensure that when building the CDEXpendStype table, the primary keys for values does not exceed 99.

B. Activity Start and End Dates

The following database queries have the Activity's End Date (ActEndDate) set to the Start and/or End of Fiscal year based on the values in the ApplicationConfig table:

```
qActivities
qActivities_approved
qActivities_dl
qActivities_wsparent
```

The ActEndDate is NOT send to MISCOMP when an Activity is approved in BI. Therefore if an Activity is changed from Budgetable to NON Budgetable in BI, the Activity End Date in MISCOMP must be set in MISCOMP using the Activity mapping interface.

Figure 1 - Worksheets - BudgetItems Schema

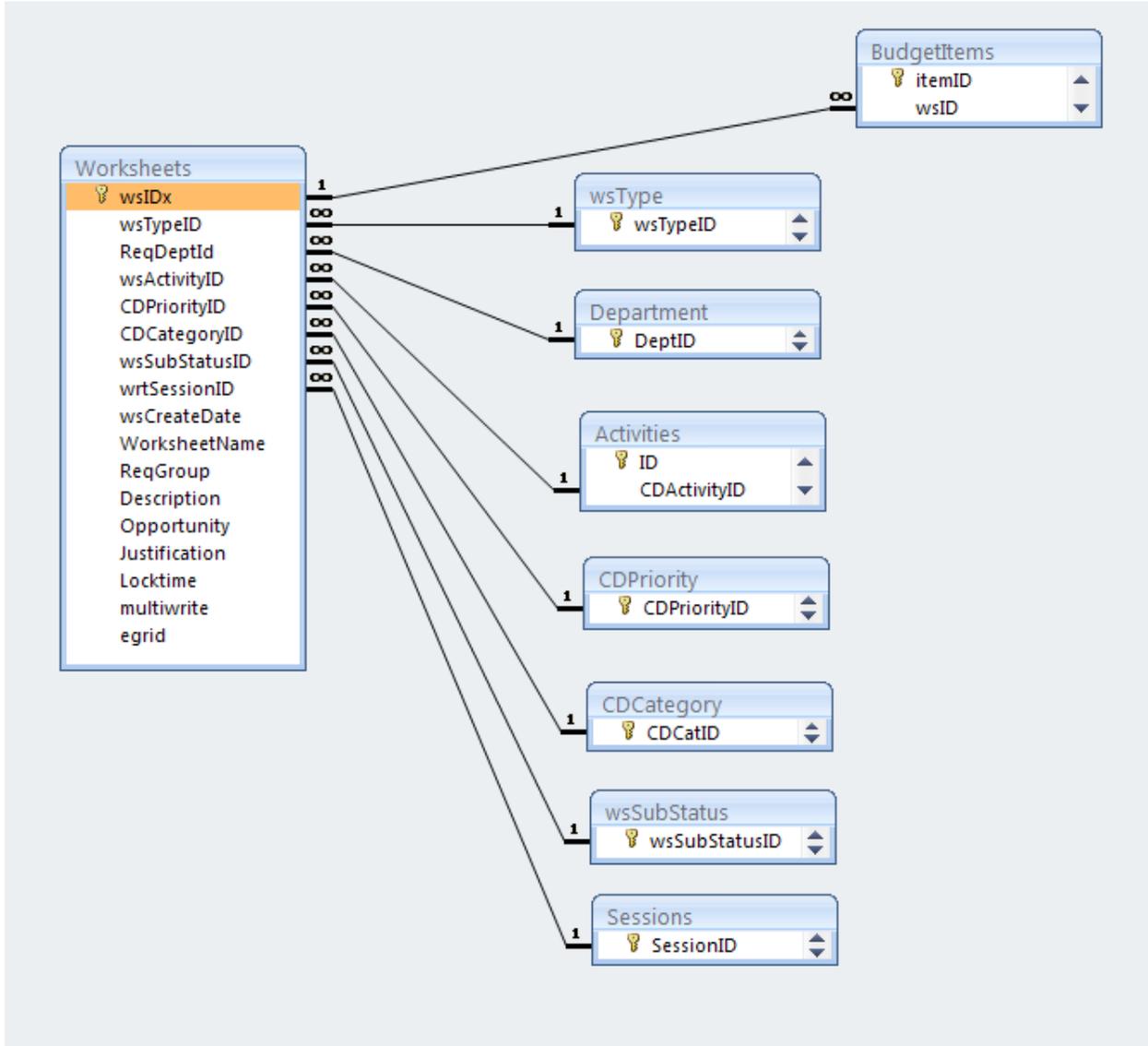


Figure 2 - BudgetItems (Detailed) Schema

