Guide to using the Cost Calculator

Overview

The Cost Calculator is a web-based intelligence tool designed to support local authorities in analysing the use of the services they provide. It uses the cost of service provision as the primary measure of service use.

The tool is capable of:

- processing data sets that contain financial information about the users of services;
- matching individuals across the different data sets to produce a "client index", which is used to calculate all costs associated with those clients;
- producing three types of reports about service use, which can be filtered in different ways to aid analysis.

The three types of included report are:

- Total Spend by Client
- Breakdown of Spend by Client
- Total Spend by Service

The tool operates as a web application and includes user management and authentication features, the ability to assign different user permissions, and file upload capabilities.

The objective of the tool is to facilitate those working in local authorities and other public services to be able to analyse financial information and to gain an understanding of the pattern of service use of an individual, or group of individuals, beyond one particular service.

The source code and full technical documentation for the tool is available on GitHub. Go to: https://github.com/LBHounslow/cost-calc

The tool was primarily built in PHP using the Laravel framework and works with SQL Server and MySQL databases.

The tool is made available as open source software under the MIT license.

Installation

The tool is a web application so needs to be installed as a website accessible to web browsers via an internal network or the internet.

To run the tool it needs to be set up on a web server running PHP 5.6.4 or above with access to a SQL Server or MySQL database. The web server also needs to have Composer and Laravel installed.

Full installation instructions are available on GitHub here:
https://github.com/LBHounslow/cost-calc/wiki/Installation

How It Works

The tool provides the user with three main functions:

- The ability to upload cost data
- The ability to query the uploaded data to produce reports
- And a client look up function that allows the user to see details about an individual that can help to identify them

The tool also has a number of settings that a user can use to configure different aspects of the tools operation, and some logs that monitor activity as the tool is being used.

Upload Process and Client Matching

The tool allows the user to upload and import standard Microsoft Excel files containing data. The structure of each file needs to conform to one of the schemas included in the tool (see below).

Each uploaded file is validated against the related schema and processed according to rules set out in an import script associated with the schema. The data is then stored in import tables within the database.

Once the data has been imported further processing takes place to match each record against an index of individual clients.

This 'client index' is queried to see if the details of the client specified in each record of the imported data matches the details of a client we have already recorded. This matching process currently uses the following personal identifiers:

- Last Name
- Postcode
- Date of Birth

If we have a match against an existing record in the client index then we attach the cost data to it. If we don't have a match then we create a new record in the client index and attach the cost data to it.

Attaching the cost to an individual is done by assigning a unique ID number that represents the individual to the cost record. These ID numbers are used throughout the tool to represent individual

clients. This means that we do not need to display identifiable personal information about clients in the tool, thus helping to preserve their privacy. The exception to this is obviously the Client Lookup function (see below).

Using this process, as more data is added, the user is able to build up a databases of cost information that is all indexed against specific individuals.

Cost Calculation

The cost data from the individual import tables is combined (using a SQL view) into a structure with common column headers. This enables the tool to run various database queries against the data which will result in cost calculations.

The common column headers are:

- Client_id
- Surname
- Dob
- Postcode
- Service
- Service_type
- Frequency
- Start_date
- End_date
- Unit_cost

Making sure that the data fits into the above format is generally done by the import scripts during the upload process. The bits of logic that the queries carrying out the cost calculations do are:

- Working out the date range of service use (Report Date vs Service use Date)
- Working out the cost of the service use for above date range (Frequency * Unit_cost)
- Applying filters to include or exclude different service types

Reports and Filters

Using the cost calculations the tool presents the following three types of report to the user:

- **Total Spend by Client**: this lists the individuals in the client index in the order of the total amount of cost they have generated through service use.
- **Breakdown of Spend by Client**: this shows the details of the cost of service use incurred by a specific individual.
- **Total Spend by Service**: this shows the total amount of cost incurred by the different types of service.

The above reports can have the following filters applied to them:

- The date range covered by the report
- The type of services to be included in the output

In addition, an advanced filter can be used to change the pool of clients that the reports are looking at. These filters can be used to include or exclude clients based on whether they have *ever* received the specified service or group of services. Currently the tool can apply this kind of filter for the following type of services:

- Any temporary accommodation
- Membership of the Troubled Families programme
- Client having had the payment of their housing benefit switched from being paid to them, to being paid directly to their landlord

In the later two cases the "services" are acting as a form of status assigned to the clients (see below for types of schema).

Client Lookup

In order to protect the privacy of the clients whose information is used by the tool we use a unique ID number to represent these individuals. This means we do not need to display personal information that could be used to identify an individual within the tool.

However, there may be circumstances that require an individual to be identified. The client lookup feature is used to convert a unique client ID into personal information (last name, date of birth, and postcode). Future development of the tool could enable further personal details to be displayed.

File Types and Data Schemas

The tool allows the user to upload and import standard Microsoft Excel files containing data. Each data file needs to be associated with one of the file types already set up in the tool. Each of these file types is associated with one of the included data schemas and its accompanying import script.

In order for the import process to work the structure of each data file needs to conform to the relevant data schemas. These schemas define what columns need to be included in the file and the format of the data in each column.

File Types

File Types have 3 properties:

- Service Name: The name of the service providing the data. This property will be combined with the "service_type" field, where included, to produce the service type label in the data.

- Schema: The schema that the data files for this file type needs to conform to.
- Import Script: Which script is used to handle the import of the file.

The tool initially contains the following four File Types:

- Temporary Accommodation
- Adult Social Care
- Housing Benefit Switch
- Troubled Families

Adding New File Types

New file types can be created from within settings section of the tool.

Data Schemas

The tool currently includes the following five data schemas:

- Temporary Accommodation
- Adult Social Care
- Troubled Families
- Housing Benefit Switch
- General Service

The first four schemas have been developed to handle specific sets of data available within the the London Borough of Hounslow and match the four File Types included. The import scripts that process these schemas include custom code designed to meet the specific requirements of this data (e.g. there is some custom logic around getting the dates from Adult Social Care).

The General Service schema has been included to allow for additional data sources to be included in the tool without requiring further development. Provided that the files containing this data adhere to the schema they can be imported into the tool without any customisation.

Full definitions for these schemas can also be found on GitHub [https://github.com/LBHounslow/cost-calc-schema].

Types of Data Schemas

There are currently two types of data schemas:

- Service Cost (costs incurred for service use, against each client)
- Service Status (use of a service, but no costs associated)

The Service Cost schemas are the standard type of schema that tool has been designed to work with. These provide the service use and cost information that are analysed and reported on in the tool. The Temporary Accommodation, Adult Social Care, and General Service schemas are of this type.

The Service Status schemas allow the tool to work with data about the use of a service where there is no cost information. Including this information means that in effect the use of a service by an individual can flag that individual as having a particular "status". The Housing Benefit Switch and Troubled Families schemas are of this type. The tool uses these two schemas to provide two of the "status" criteria available in the advanced filter that can be used to change the pool of clients that the reports are looking at.

Adding New Data Schemas

It is possible to add new data schemas to the tool. Unfortunately, adding new schemas currently does require some additional development, although the process itself is relatively straightforward. A developer can do this by defining the schema, writing an accompanying import script, and registering the new schema with the tool. The developer should be able to use the existing schemas as a model when they do this.

Further instructions about adding new schemas can be found in the technical documentation on GitHub here:
https://github.com/LBHounslow/cost-calc/wiki/File-Types-and-Data-Schemas#adding-new-data-schemas

User and Provider Administration

Users

Access to the tool is controlled by authentication against user accounts. Users need an email address and password in order to login to the tool. There is also a "forgotten password" process to allow users to reset their password.

User accounts can be managed from within the settings section of the tool.

Access to the different elements of the tool is also controlled by setting permissions for each user account. The following permissions are available:

- Upload Files
- Reports and Analysis
- Client Lookup
- Settings

User accounts can also be temporarily suspended.

Recommended User Permission Scheme

The tool was built in order to meet the needs of three distinct user groups. These were Data Providers (those who supplied the data about services), Service Managers (those who would want to analyse the data and receive reports), and Caseworkers (those who *potentially* would be working with the individuals and groups identified by the analysis). The different user permissions in the tool enable these different user groups to be given access only to those elements of the tool that they require.

It should be noted that, in order to conform with information governance best practice, access to the client lookup element of the tool, which provides personal information that can be used to identify an individual, should only be given to those who have a legitimate reason for contacting identified individuals.

The recommended user permission scheme is therefore as follows:

Data Providers
- Upload Files

Service Managers
- Upload Files
- Reports and Analysis

Caseworkers
- Client Lookup

Tool Administrators
- Upload Files
- Reports and Analysis
- Settings

Providers

The tool was built with the assumption that data would be provided by different departments within a local authority and by a range of partner organisations. In order to restrict the data files that these different data providers can upload to only those they have responsibility for the tool allows for the configuration of different providers.

Providers can be set up with a unique name and associated with some or all of the file types available in the tool.

Each user account has to be associated with one of the providers available in the tool. The file types that users with the "upload file" permission are allowed upload are then restricted to just those

associated with that provider.

Providers can be managed from within the settings section of the tool.

The tool currently includes the following providers:

- Hounslow MADM
- Hounslow Housing
- Hounslow Adult Social Care
- West London Mental Health

Logs

In order to help with administration and monitor security the tool logs various activities for later review.

The Upload File section of the tool includes details of the current status of the data in tool and logs new uploads and other changes.

The Settings section of the tool includes two logs that help monitor the use of the tool. The User Login Log records both successful and unsuccessful attempts and accessing the tool. The User Change Log records changes to user accounts.

Technical Information

The tool was primarily built in PHP using the following Open Source Libraries:

- Laravel 5.3
- Bootstrap 3
- Bootstrap Tables
- Chart JS
- jQuery
- Select 2
- Date Picker

It works with SQL Server and MySQL databases.