

BSGtest

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Overview

BSGtest is a Windows forms application that help the users to track any errors with ETL processes.

Scenarios

In designing products, it helps to track any errors with ETL processes with MS Access database. With system script based on daily schedule, the actual Access desktop database is copied from MS Dynamics 2015 SL to the working location of BSGtest app, where the executable module BSGtest.exe is presented. User will analyze the set of errors with ETL processes based on screen information. Connection to database should use Windows authentication (should not ask for a password, use Windows network/user account).

Program requirements

Using VB.NET, create the following a screen with a header and 2 tabs underneath to display the data that is in the attached MS Access 2010 test database (MDTAJOBSQL15T.accdb). Header (top of screen) should have all the elements for the FileType table. Allow user to select a File Type from a drop-down. Expect that there will be more File Types in addition to the 1 record there currently.

Create a function to mask and convert the FTP password (encrypt / decrypt) to English and back (128 shift). Display the resulting password on the screen header using a hide/unhide button.

Bottom screen contains 2 tabs for the following with linked sub-forms:

- Control Log (displays all data from ControlLog table on the screen in this tab). Depending on the Control Log selected, populate the Process Issues screen.
- Process Issues (displays all data from ProcessIssues table on the screen in this tab)

Pop-up window (from a button) to display the ErrorHandle. Filter by ETL package name using the File Type name (PackName). All data should have the column header same as the columns on the table.

Finally, create a Design Document that explains your process, why you selected this design method, and how you implemented it.

Restrictions of use

This version does not support database selection by name and location. The database name should be "MDTAJOBSQL15T.accdb". The database should be in the working folder of the application (installation folder). The database version must be at least Microsoft Access 2007 or later (tested on Microsoft Office 365 only) with MS Access Database Engine 2010 Redistributable. Supported Operating Systems: Windows 10/ Windows Server versions 1803 or later (app designed on .NET Framework 4.7.2). Table fields (name and type) cannot be changed. Connection to database should use Windows authentication. Screen resolution of monitor should be at least 800x600 SVGA or better (tested on 1920x1080 FHD, aspect ratio 16:9).

Installation process

First, download and install the MS Access Database Engine 2010 Redistributable from Microsoft.

Second, download and install the .NET Framework 4.7.2 from Microsoft. Choose the version (32-bit or 64-bit) depend on your host system (tested on 32-bit only).

Third, run the setup file "Setup.msi" and follow on-screen instructions. Select installation folder (default folder is C:\Program Files (x86)\BSG\BGS Test\). Select who will use the app – Everyone/Just me. After

setup, the shortcut “BSG Test” will be placed on your primary screen desktop and will be added to general menu of Windows (“Win” button on keyboard), in the “App” folder. Database MDTAJOBSQL15T.accdb default location is C:\Program Files (x86)\BSG\BGS Test\ (depend on your installation folder choose). Feel free to replace this file with the actual one (with same name and tables structure).

Uninstall process

Select “Uninstall” button on the “Apps & features” page of “Windows Settings” of your Windows 10 computer. Shortcuts and installed folder (\BSG\BGS Test) with database file will be deleted.

Screen Specification

BSGtest app consists of only one window. This window is created programmatically with initializing in VB.NET Designer (only to declare all of controls without real locations, sizes, and parameters). Initially the window was developed for 1366x768 resolution. When the app will be start, the current screen resolution will be adopted to fill the full size of your primary screen (multi-screen configuration). User can minimize the BSGtest app window or move it to another screen if needed. After loading, the BSGtest app window will look like this (full screen mode):

The screenshot shows the BSGtest application interface. At the top, there's a title bar and a menu bar. Below that, there are several configuration fields:

- Select File Type from drop-down list: CMAPS
- File Type ID: 1
- Dyn Server: MDTAICCSQLS
- Dyn Sys_DB: MDTRAN50SYS
- Dyn App_DB: CONSOLIDATEAPP
- From Server: \\cfsicvfler1\shared
- From Dir: \shared\SFTP Files\CMAPS
- To Server: sftp1
- To Dir: \project17\hr\From SFTP\SMAPS
- FTP User: mtdynamics
- FTP Password: [Hidden]
- File Naming Format: MDTA_DSlexport_ldate.bt

Below the configuration fields, there are two tabs: "Control Log" and "Process Issues". The "Control Log" tab is active, showing a table with the following data:

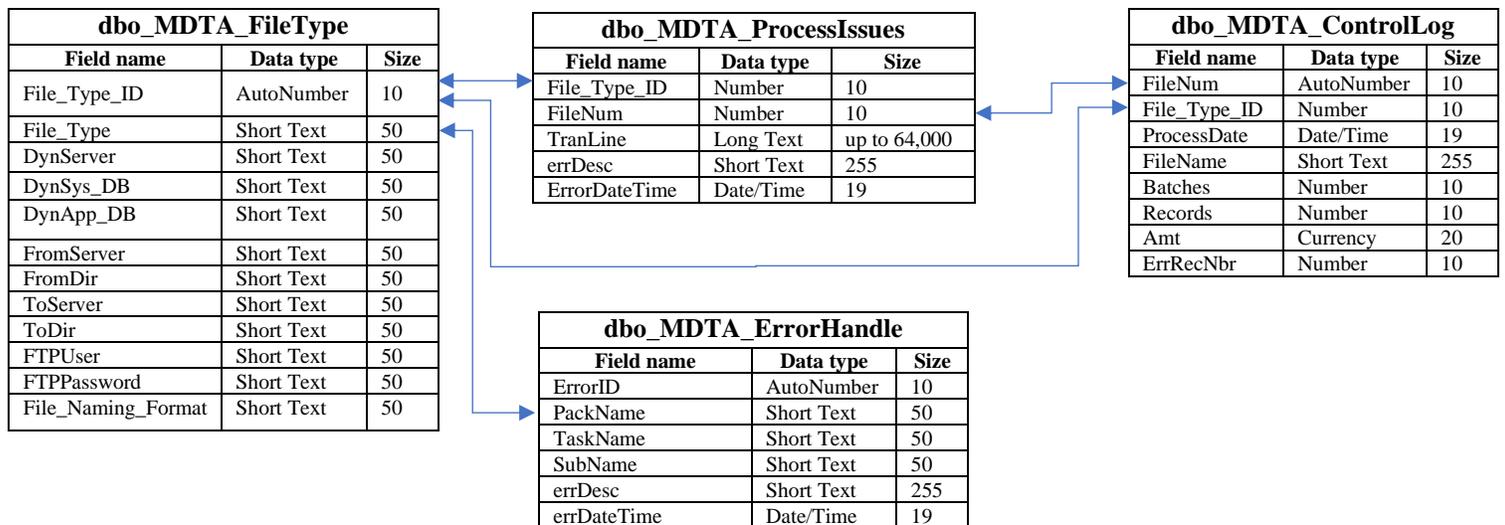
File Number	File Type ID	Process Date	File Name	Batches	Records	Amount	Error Record Number
15	1	12/18/2019 7:03 AM	MDTA_DSlexport_20191218070231.bt		496		
16	1	12/19/2019 11:00 AM	MDTA_DSlexport_20191219110003.bt		496		
17	1	12/20/2019 11:00 AM	MDTA_DSlexport_20191220110002.bt		497		
18	1	12/23/2019 11:00 AM	MDTA_DSlexport_20191223110004.bt		498		
19	1	12/24/2019 11:00 AM	MDTA_DSlexport_20191224110003.bt		498		
24	1	12/31/2019 11:00 AM	MDTA_DSlexport_20191231110002.bt		498		
25	1	1/1/2020 11:00 AM	MDTA_DSlexport_20200101110001.bt		498		
26	1	1/2/2020 11:00 AM	MDTA_DSlexport_20200102110002.bt		498		
27	1	1/3/2020 11:00 AM	MDTA_DSlexport_20200103110001.bt		498		
28	1	1/6/2020 11:00 AM	MDTA_DSlexport_20200106110006.bt		498		
30	1	1/8/2020 11:00 AM	MDTA_DSlexport_20200108110001.bt		502		
34	1	1/14/2020 11:00 AM	MDTA_DSlexport_20200114110002.bt		503		
38	1	1/20/2020 11:00 AM	MDTA_DSlexport_20200120110006.bt		510		
46	1	1/31/2020 11:00 AM	MDTA_DSlexport_20200131110001.bt		512		
48	1	2/4/2020 11:00 AM	MDTA_DSlexport_20200204110001.bt		513		
59	1	2/19/2020 11:00 AM	MDTA_DSlexport_20200219110003.bt		515		
64	1	2/26/2020 11:00 AM	MDTA_DSlexport_20200226110001.bt		515		
65	1	2/27/2020 11:00 AM	MDTA_DSlexport_20200227110002.bt		517		
68	1	3/3/2020 11:00 AM	MDTA_DSlexport_20200303110001.bt		520		
71	1	3/6/2020 11:02 AM	MDTA_DSlexport_20200306110204.bt		520		
73	1	3/10/2020 9:30 AM	MDTA_DSlexport_20200310093002.bt		520		
76	1	3/12/2020 9:30 AM	MDTA_DSlexport_20200312093002.bt		523		
77	1	3/13/2020 9:30 AM	MDTA_DSlexport_20200313093001.bt		523		
78	1	3/16/2020 9:30 AM	MDTA_DSlexport_20200316093005.bt		523		
80	1	3/18/2020 9:30 AM	MDTA_DSlexport_20200318093001.bt		523		
81	1	3/19/2020 9:30 AM	MDTA_DSlexport_20200319093002.bt		523		
82	1	3/20/2020 9:30 AM	MDTA_DSlexport_20200320093001.bt		523		
85	1	3/25/2020 9:30 AM	MDTA_DSlexport_20200325093001.bt		523		
86	1	3/26/2020 9:30 AM	MDTA_DSlexport_20200326093002.bt		523		

Based on the program requirements, the user can only view data from database tables. To do this, the following user interface elements are available to him:

- Drop-down menu (ComboBox) to select a FileType. Data will show in read-only text boxes and grids.
- Button to hide/unhide and encrypt/decrypt the FTP password. Result will be displayed in same text box.
- Button to show/hide the pop-up window to display ErrorHandler, filtered by ETL package name.
- Grid with data from ControlLog table (1st tab). Selected row will populate the 2nd tab by FileNum.
- Grid with data from ProcessIssues table (2nd tab), filtered by FileNum.

Database structure

The following tables are included in database:



Based on the program requirements, at each moment in time the program screen displays:

- One record from the table FileType, filtered by File_Type_ID (primary key).
- Set of records from the table ControlLog, filtered by File_Type_ID, selected in FileType table.

When the user changes the ComboBox control, the data on the screen will be updated from FileType table, filtered by selected File_Type_ID and from ControlLog table, filtered by selected File_Type_ID.

When the user selects the ComboBox row, 2nd tab will be displayed with data from ProcessIssues table, filtered by FileNum, selected in ControlLog table and File_Type_ID, selected in FileType table.

When the user clicks the Help button, the pop-up window will be displayed with data from ErrorHandle table, filtered by FileNum, selected in FileType table.

Design Implementation

Windows Forms App should be implemented, because:

- one screen with grids, text boxes and buttons;
- one user per app installed;
- desktop database MS Access;
- MS Windows authentication;
- MS VB.NET.

.NET Framework4.7.2 (runtime version v4.0) should be implemented, because:

- MS Access database is part of MS Dynamics SL, with supported .NET Framework4.7;
- there is a plan to upgrade the system to a modern version of MS Dynamics;
- there is a need to rewrite the code of all modules from scratch, creating a new design patterns.

MS Visual Studio 2019 should be implemented, because:

- it is compatible with MS Dynamics SL and will be great with later versions of MS Dynamics;
- it is a programming tool from Microsoft, included VB.NET, .NET Frameworks;
- it is the right tool for Windows Forms App;
- It has free useful extensions, e.g. MS Visual Studio Installer Projects and MSTest Test Project.

For backward compatibility with existing modules of MS Dynamics SL, standard controls of VB.NET should be used. This will facilitate and speed up the new development process. Therefore, it is not practical to use ADO.NET, Entity Framework, LINQ etc. In this regard, OLE DB API should be applied for connectivity with MS Access database. BSGtest app imported the following namespaces:

- System.Data.OleDb (.NET Platform Extensions 3.1);
- System.IO (.NET Platform Extensions 3.1);
- System.Security.Cryptography (.NET Platform Extensions 3.1);
- System.Runtime.CompilerServices (.NET Platform Extensions 3.1);
- System.Text (.NET Core 3.1);
- System.Text.RegularExpressions (.NET Core 3.1).

First version of BSGtest app (July 7, 2020) was Solution Prototype – light version, prone to performance issues. If the database size will be large, we really need to improve performance.

Second version of BSGtest app (July 12, 2020) implemented:

- indexes to database tables, uses in SQL statements;
- SQL stored procedures, calls from app;
- SQL transactions.

To ensure reliability, the function of preliminary check of the database was developed – CheckDB() – first statement in Form1_Load. Missed or wrong indexes or stored procedures will be recreated before using.

Based on the program requirements, a button was developed – one button with 4 different actions: unhide FTP password / encode FTP password / decode FTP password / hide FTP password.

Designed functions to encrypt, decrypt, hide, and unhide passwords. For password testing proposals, a function to enable and validate user input was designed (option disabled in Release configuration).

A Microsoft Visual Studio Installer Projects has been applied to create an installation application for installing a BSGtest app on a user's computer. This is a free extension for Visual Studio 2019.

Testing

There is no real data for a sufficient period and in sufficient volume. Therefore, it is impossible to prepare data for test automation (e.g. MSTest Test Project extension for Visual Studio). BSGtest app was tested manually only.

Unresolved Issues

There is no real data for a sufficient period and in sufficient volume. Therefore, it is impossible to configure the app's logic to conveniently present data. Some table columns potentially include a lot of data – errDesc (255 characters) in ProcessIssues table, errDesc (255 characters) in ErrorHandle table, FileName (255 characters) in ControlLog table, TranLine (up to 64,000 characters) in ProcessIssues table. It is not known which part of large fields is most significant for visual analysis of tracking errors with ETL processes. It would be possible to display an important part of large field using multi-line scrolling tooltips when you hover over the field. The perception of data can be significantly improved by displaying only an important part of the field in the table columns. The rest can be accessed by scrolling.