

DB Interface Library Tutorial



ORIGIN SYSTEMS OF MIDDLE EAST 	DB Interface Library Tutorial	
	Revision No.	01
DB Interface Library Tutorial	Date	13/06/2021

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Objective:

This library is user interface which allows for the ability to input queries to a database like CRUD (Create, read, update and delete) by using communication reference with ODBC.

To run any database command, you have to follow these steps:

1. Create DB using MySQL workbench
2. Create ODBC using ODBC32
3. Open DB connection from LabVIEW

You can replace step 1,2,3 by using DB_Modules_API (main)

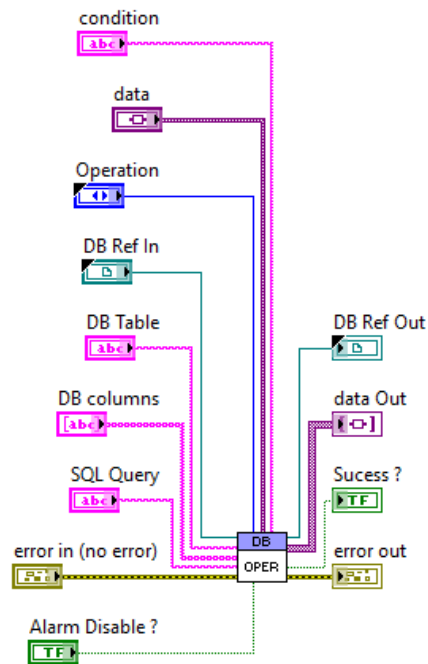
4. Run all queries you need
5. Close connection reference

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DB Interface main blocks

DB Interface

this vi block is used to run any type of query (insert-select-update-delete-drop- Execute-fetch-List tables), inputs of this block depends on the type of operation will be run

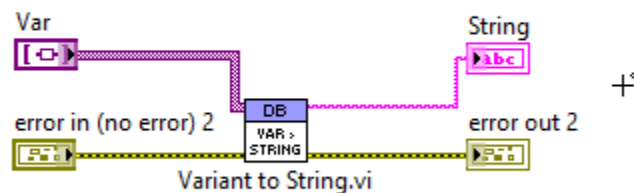


inputs (Data ref in - operation - data in - DB Table name - DB columns - SQL query - condition - Disable alarms?)

outputs (DB ref out - success -data out)

Variant to string.vi

This VI is used to convert any variant data output (resulted from DB execution) into string output



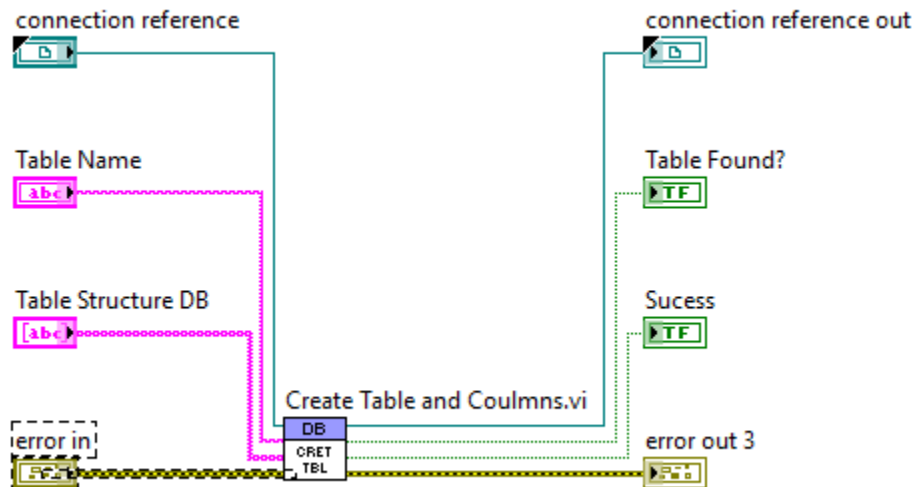
Inputs ---> 1. variant data

outputs---> 2. string output

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create table and coulmsns.vi

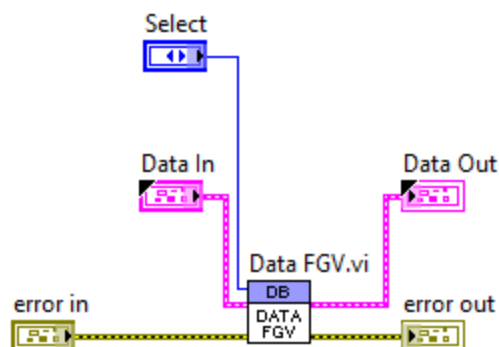
this VI is mainly used to create a specific table with a specific structure if table is not found



inputs ---> 1. connection ref in 2. Table name 3. Table structure
outputs ---> 1. connection ref out 2. table already found? 3. success?

Data FGV.vi

this FGV has two modes to read/write into Data Cluster FGV

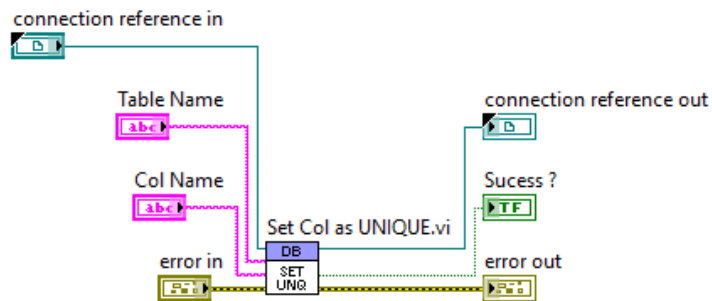


inputs --> 1. Select enum (read/write) 2. Data in cluster
outputs --> Data out cluster

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Set Col as unique.vi

this VI is used to make any selected col as unique column

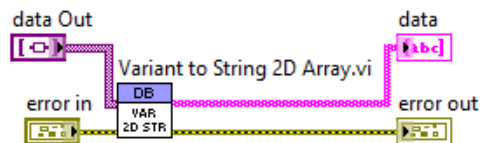


inputs --> 1. connection reference in 2. Table name 3. Column name

outputs --> 1. connection reference out 2. success?

Variant to string 1D Array.vi

this VI is used to convert any variant data output (resulted from DB execution) into 1D array output

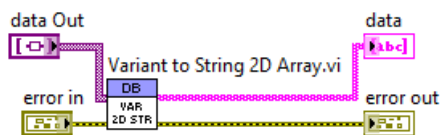


Inputs --> 1. variant data

outputs--> 2. 1D array of strings

Variant to string 2D Array.vi

this VI is used to convert any variant data output (resulted from DB execution) into 2D array output



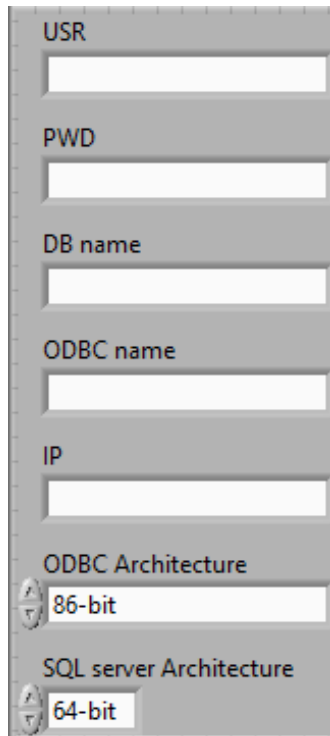
Inputs --> 1. variant data

outputs--> 2. 2D array of strings

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DB Import & Export Blocks

The main input for all Import Export Blocks is Database Cluster



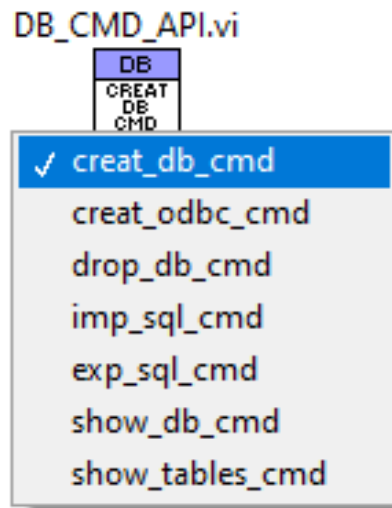
A vertical form with the following fields:

- USR**: Text input field.
- PWD**: Text input field.
- DB name**: Text input field.
- ODBC name**: Text input field.
- IP**: Text input field.
- ODBC Architecture**: Dropdown menu showing "86-bit".
- SQL server Architecture**: Dropdown menu showing "64-bit".

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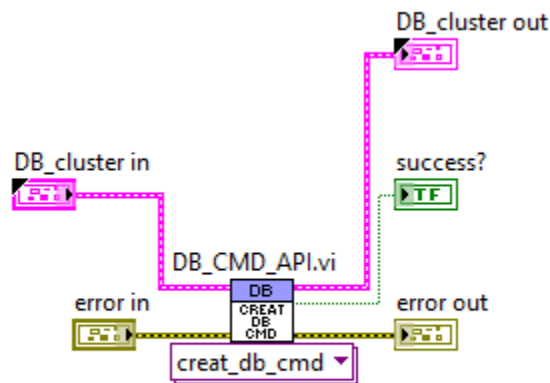
DB_CMD_API.vi

This API is used to run any (MySQL / MySQL dump / ODBC) commands



The DB_CMD_API Has many functions:

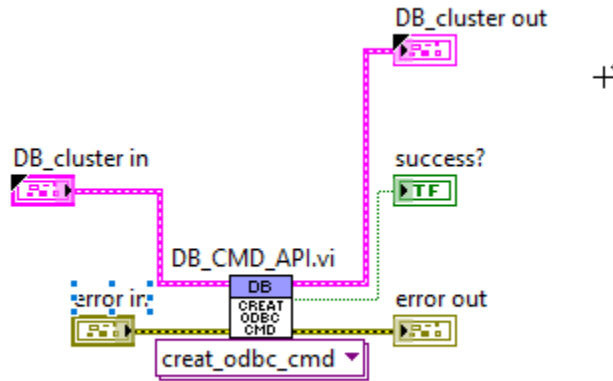
- Create DB CMD
this block is used to create database CMD



input --> main DB cluster in

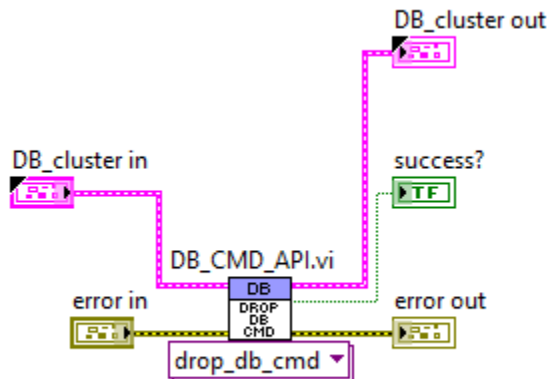
output --> main DB cluster out, success?

- Create ODBC CMD
this block is used to create OBDC CMD



input --> main DB cluster in
output --> main DB cluster out, success?

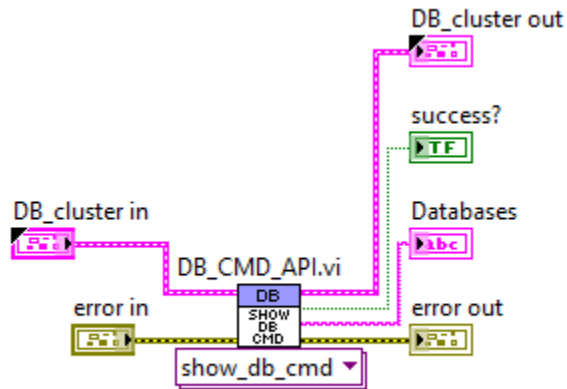
- Drop DB CMD
this block is used to drop database CMD



input --> main DB cluster in
output --> main DB cluster out, success?

- Show DB CMD

this block is used to show database CMD

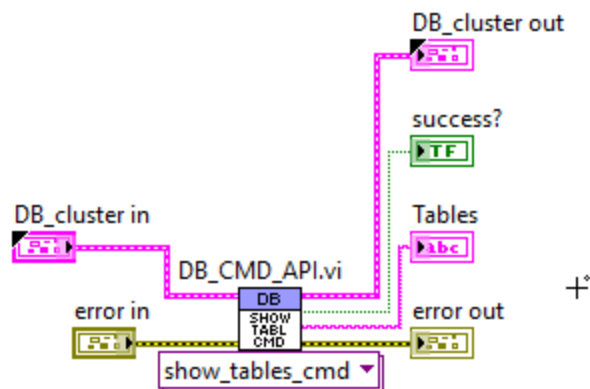


input --> main DB cluster in, .sql file path

output --> main DB cluster out, databases array, success?

- Show Tables CMD

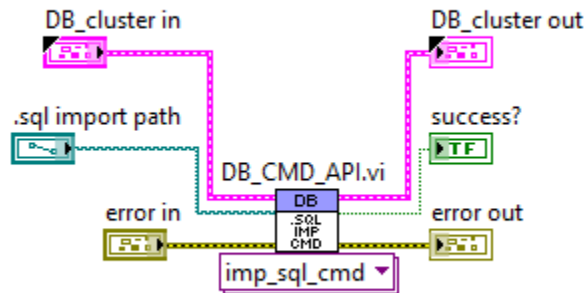
this block is used to show all tables in database CMD



input --> main DB cluster in

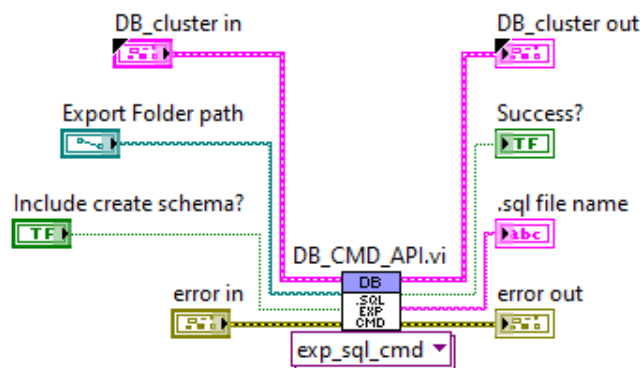
output --> main DB cluster out, success, tables.

- Import .sql CMD
this block is used to import .sql CMD



input --> main DB cluster in, import file path.
output --> main DB cluster out, success

- Export .sql CMD
this block is used to import .sql CMD

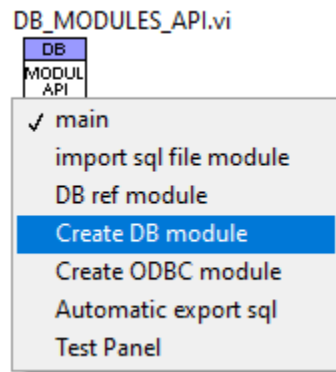


input --> main DB cluster in, Export folder path, include create schema?
output --> main DB cluster out, success, .sql file name.

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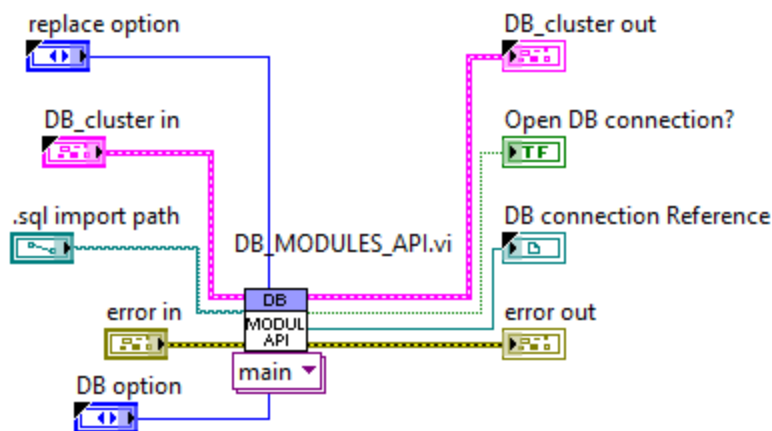
DB_MODULES_API.vi

This API modules are builds on the DB_CMD_API



The DB_CMD_API Has many functions:

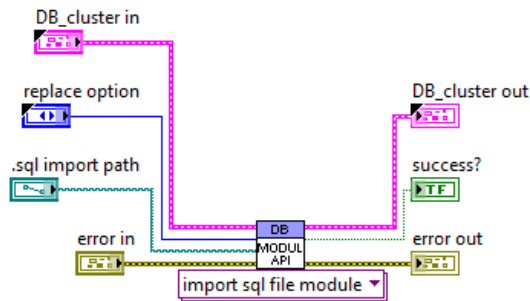
- Main module:
this block is the generic block which is used to open database connection with the enticed data
if database connection is not found (the system block is used to make these actions
create New or import database
create the required ODBC depends on the database
reconnect to this database to create DB connection reference



inputs ---> DB cluster in, DB option (New/Import), replace option (replace if found), .sql file path "in case of importing database"

outputs ---> DB cluster out, success, DB connection ref.

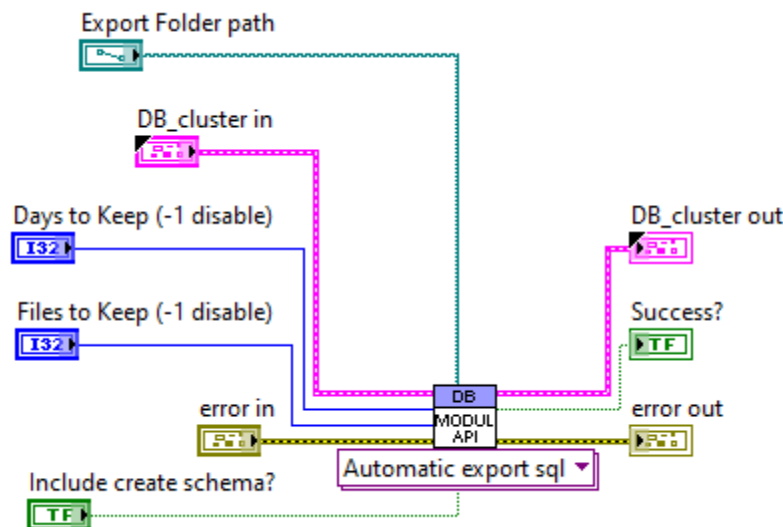
- Import .sql module
this block is used to check and import database from desired file path
if replace option is to create only (that's mean if database is found it won't be replaced)



input --> main DB cluster in, Export file path, replace option?

output --> main DB cluster out, success?

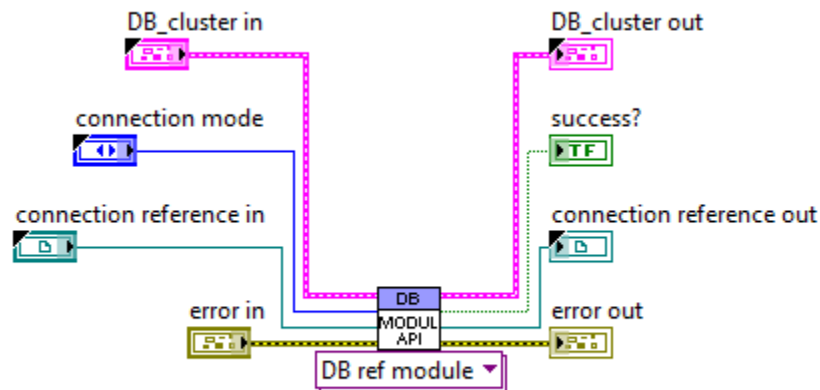
- Automatic Export .sql module
this block is used to make automatic backup for the required database
the block is also used to delete the old ,sql file by selection the no of files to keep or by the no of days to keep
if one of them is equal to -1 that's mean the option is disabled
if any option of them equal to 0 that's mean that the backup folder will contain only one back up (the recent one)



input --> main DB cluster in , Export folder path , Include create schema? , Files to Keep (-1 disable) ,Days to Keep (-1 disable)

output --> main DB cluster out , success?

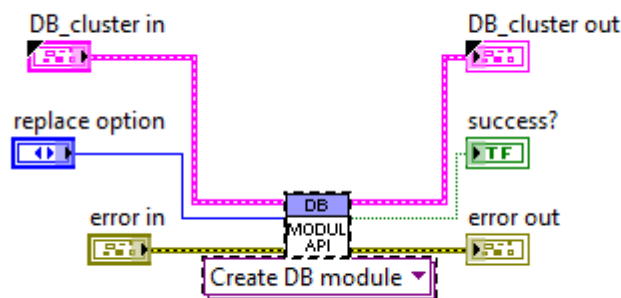
- DB ref module
this VI is used to control database connection
(open, close or reconnect to database connection)



inputs ---> DB cluster in, connection mode

outputs ---> DB cluster out, connection reference out, success?

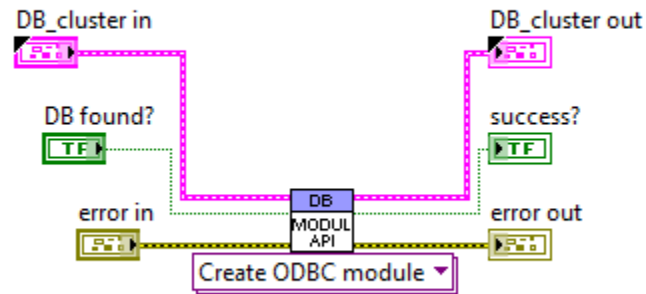
- Create DB Module
this block is used to verify and create local database
at the first the block is used to check if all data are valid (user and pwd)
then if database is already found database will be created if replace option is enabled



inputs --> DB cluster in, replace option

outputs --> DB cluster out, success?

- Create ODBC Module
this block is used to verify and to create ODBC by using ODBC_CMD for local and remote connection



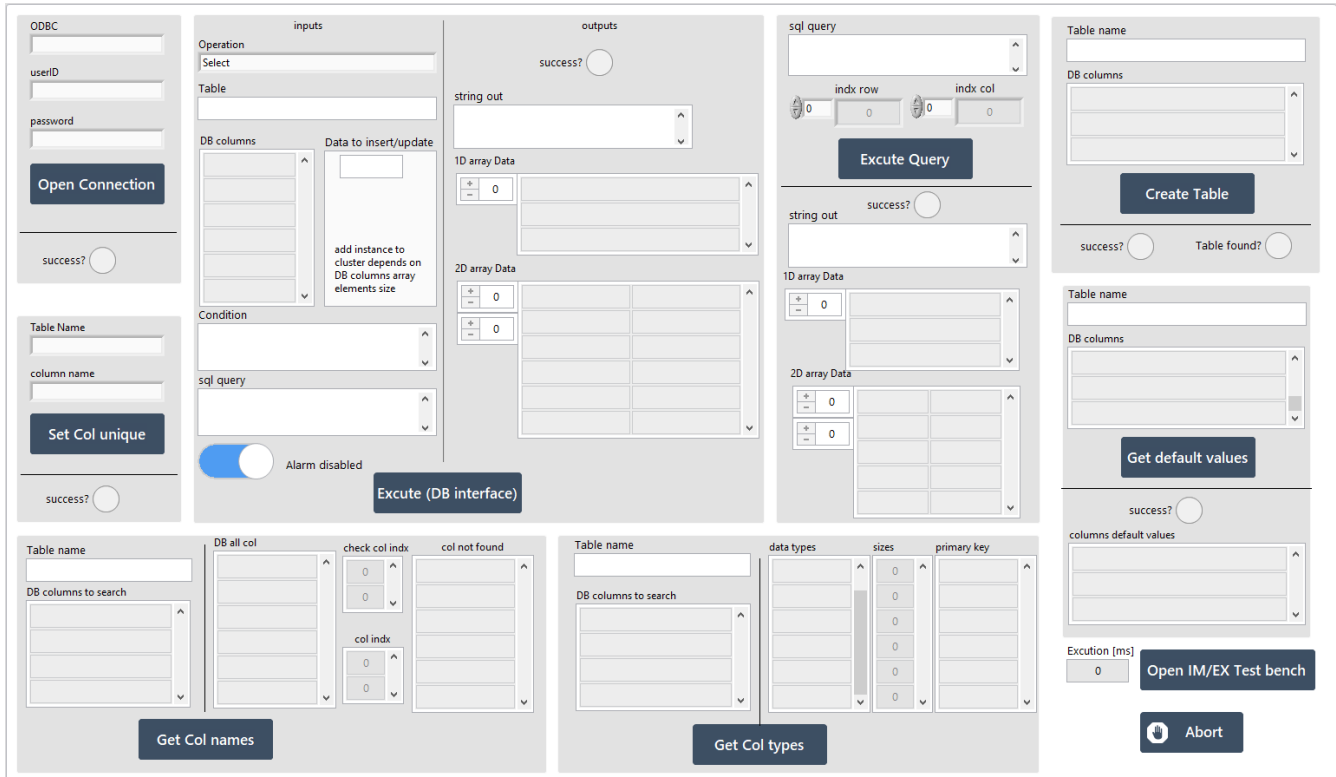
inputs ---> DB cluster in, DB found?

outputs ---> DB cluster out, success?

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Test Bench:

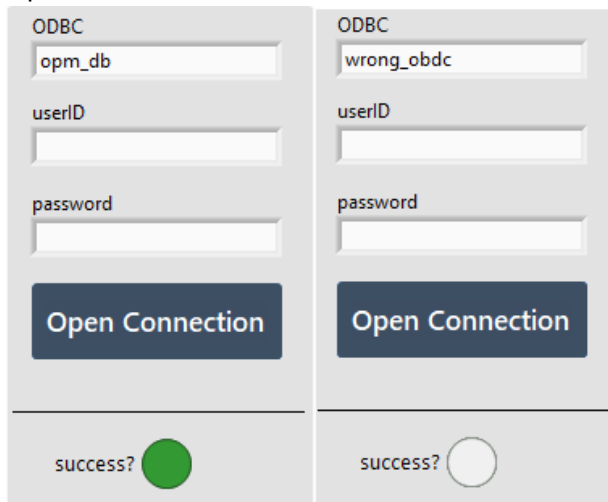
This test bench contains many modules



The screenshot displays a comprehensive test bench interface with multiple modules for database interaction:

- ODBC Module:** Includes fields for ODBC, userID, and password, with an "Open Connection" button and a success indicator.
- Table Name Module:** Features a "Table Name" field, "column name" field, and a "Set Col unique" button.
- Inputs/Outputs Module:** Contains "Operation" (Select), "Table", "DB columns", "Data to insert/update", "Condition", and "sql query" fields. It also has "string out", "1D array Data", and "2D array Data" output sections, along with an "Excute (DB interface)" button.
- SQL Query Module:** Includes a "sql query" field, "indx row", "indx col", and "Excute Query" button.
- Create Table Module:** Features a "Table name" field, "DB columns" list, and a "Create Table" button.
- Get default values Module:** Includes a "Table name" field, "DB columns" list, and a "Get default values" button.
- Get Col names Module:** Includes a "Table name" field, "DB columns to search" list, and a "Get Col names" button.
- Get Col types Module:** Includes a "Table name" field, "DB columns to search" list, and a "Get Col types" button.
- Excution [ms] Module:** Includes an "Excution [ms]" field and an "Open IM/EX Test bench" button.
- Abort Module:** Includes an "Abort" button.

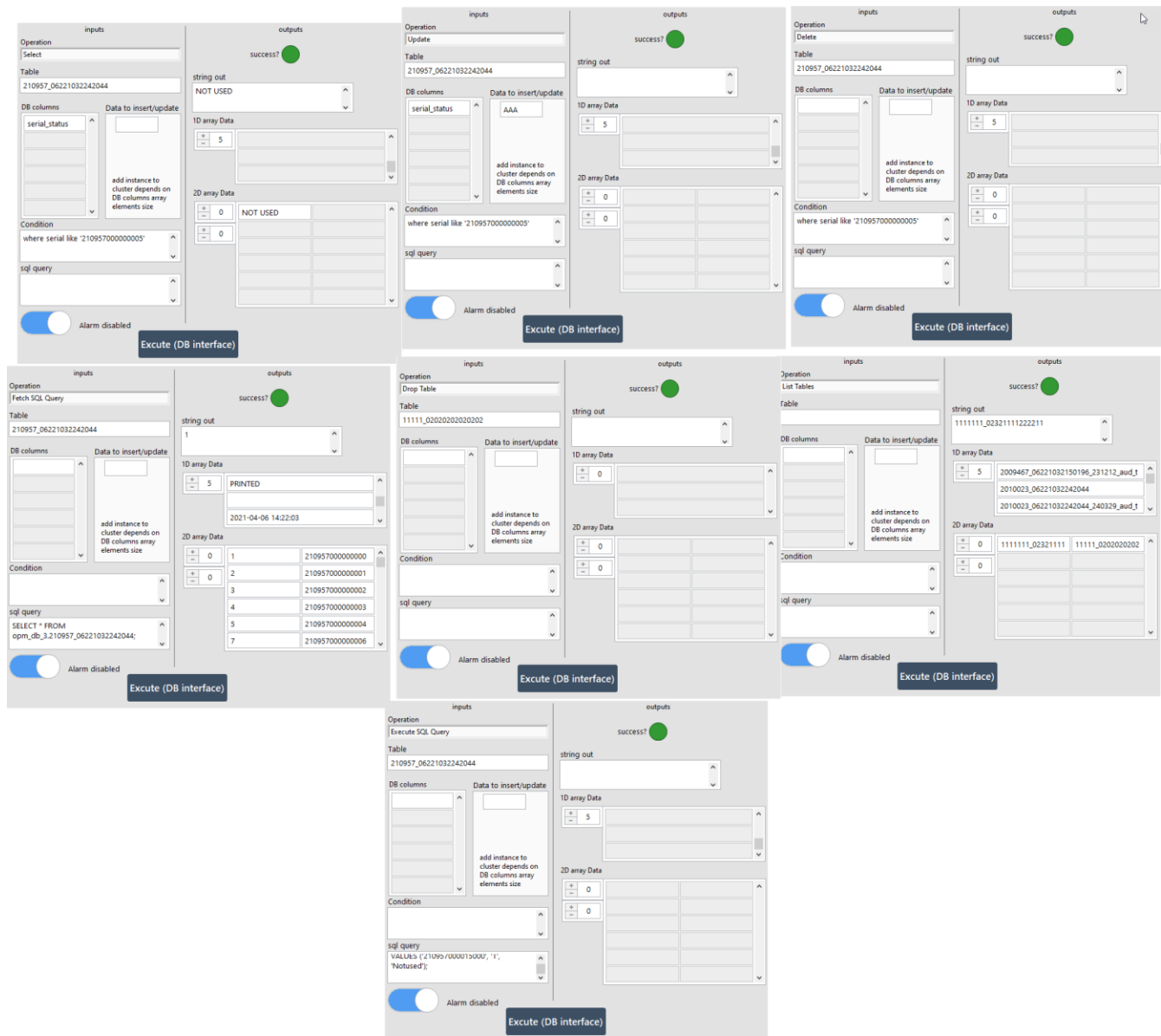
1. Open connection module: this module is used to open DB connection and return connection reference



The image shows two side-by-side "Open Connection" modules to illustrate the success and failure states:

- Left Module (Success):** ODBC is set to "opm_db", userID and password are empty. The "Open Connection" button is highlighted, and the "success?" indicator is a green circle.
- Right Module (Failure):** ODBC is set to "wrong_obdc", userID and password are empty. The "Open Connection" button is highlighted, and the "success?" indicator is a white circle.

2. DB interface module



The screenshot displays five panels of the DB interface module, each showing a configuration window for a specific database operation. The panels are arranged in a grid, with the fifth panel at the bottom center.

Panel 1 (Top Left): Operation: Select. Table: 210957_06221032242044. DB columns: serial_status. Data to insert/update: add instance to cluster depends on DB columns array elements size. Condition: where serial like '210957000000005'. SQL query: (empty). Alarm disabled: (checked). Button: Excute (DB interface).

Panel 2 (Top Middle): Operation: Update. Table: 210957_06221032242044. DB columns: serial_status. Data to insert/update: AAA. Condition: where serial like '210957000000005'. SQL query: (empty). Alarm disabled: (checked). Button: Excute (DB interface).

Panel 3 (Top Right): Operation: Delete. Table: 210957_06221032242044. DB columns: (empty). Data to insert/update: add instance to cluster depends on DB columns array elements size. Condition: where serial like '210957000000005'. SQL query: (empty). Alarm disabled: (checked). Button: Excute (DB interface).

Panel 4 (Middle Left): Operation: Fetch SQL Query. Table: 210957_06221032242044. DB columns: (empty). Data to insert/update: add instance to cluster depends on DB columns array elements size. Condition: (empty). SQL query: SELECT * FROM opm_db_3.210957_06221032242044;. Alarm disabled: (checked). Button: Excute (DB interface).

Panel 5 (Middle Middle): Operation: Drop Table. Table: 11111_02020202020202. DB columns: (empty). Data to insert/update: add instance to cluster depends on DB columns array elements size. Condition: (empty). SQL query: (empty). Alarm disabled: (checked). Button: Excute (DB interface).

Panel 6 (Middle Right): Operation: List Tables. Table: (empty). DB columns: (empty). Data to insert/update: add instance to cluster depends on DB columns array elements size. Condition: (empty). SQL query: (empty). Alarm disabled: (checked). Button: Excute (DB interface).

Panel 7 (Bottom Center): Operation: Execute SQL Query. Table: 210957_06221032242044. DB columns: (empty). Data to insert/update: add instance to cluster depends on DB columns array elements size. Condition: (empty). SQL query: VALUES ('210957000010000', '1', 'Notused');. Alarm disabled: (checked). Button: Excute (DB interface).

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3. Execute Query

sql query
 SELECT * FROM
 opm_db_3.2103001_06221032340108

indx row
 0

indx col
 0

Excute Query

success? ●

string out
 1

1D array Data
 0

2D array Data
 0

sql query
 DELETE FROM
 'opm_db_3':2103001_06221032340108

indx row
 0

indx col
 0

Excute Query

success? ●

string out

1D array Data
 0

2D array Data
 0

4. Create Table

Table name

New_Table

DB columns

COL1

COL2

COL3

Create Table

success? ●
 Table found? ●

Table name

11111_02020202020202

DB columns

Create Table

success? ●
 Table found? ●

5. Get col names

Table name

2103001_06221032340108

DB columns to search

serial

col_not_found

Get Col names

DB all col

id

serial

print_time

print_status

verify_time

serial_status

check col indx

1

0

col indx

0

0

col not found

col_not_found

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6. Get Col types

Table name	data types	sizes	primary key
2103001_06221032340108	int	199999	PRI
	varchar(100)	100	UNI
	varchar(100)	100	
	varchar(100)	100	
	varchar(100)	100	
	varchar(100)	100	

DB columns to search

Get Col types


7. Get Default Values

Table name
2103001_06221032340108

DB columns

serial

Get default values

success? 

columns default values

8. Open Import Export Module

this button is used to open import Export test bench

Open IM/EX Test bench

Import Export Test Bench

DB_cluster input

USR

PWD

DB name

ODBC name

JP

ODBC Architecture

86-bit

SQL server Architecture

64-bit

.sql import path

Export Folder path

Include create schema?

replace option

create

DB option

New DB

Days to Keep (-1 disable)

0

Files to Keep (-1 disable)

0

error in

status code

source

Create DB CMD

Drop DB CMD

Show DB CMD

Show Tables CMD

.SQL import CMD

.SQL Export CMD

Create ODBC CMD

Create DB module

Create ODBC module

import sql file module

Automatic Export

API Main

STOP

Success

DB Ref Valid ?

Data out

Excution time(ms)

0

error out

status code

source

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