dingDOng Documentation

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Installation Configuration

Why ding DONG

dingDONG is an IT integration tool which was built to enable fast and easy design, implementation and maintain complex data and machine learning projects. dingDONG support end to end development cycle includes code versioning, maintenance automation and propagation mechanism that enable developers to maintain, extend and scale complex data projects.

dingDONG give an advantage for machine-learning and deep-learning project by providing simple data preparation layer and experiment version-control layers which give input/output flexibility and full development life- cycle monitoring.

dingDong main goals are

- to model (on the fly) diverse SQL and NO-SQL DBS

- extract and load data optimizing our machine CPU / IO (multithreading, fast connectors)

- enabling to prepare data easily by adding a new column or manipulating data flow (scaling, normalization..)

- CI / CD - maintain meta-data versioning, for roll-back and revision compare

- CI / CD for machine-learning or Deep learning by using embedded GIT functionality

- enable work-flows flexibility by providing detailed logs and alerts (mail) mechanism

- **extending and improving unique work-flows executers**

    - PL/SQL or complex SQL files multiprocess executers

    - OLAP executers

    - REST Apis executers

- batch or real-time scheduling mechanism

This documentation is the first version of dingDONG, we are open to help from other developers, and we like to receive your comments and feedback.

Please, fill free to contact me at tal@biSkilled.com

We hope to extend dingDONG to be one of the major open-source integration platforms.

Come and join us!

1.1 Installation

You can download dingDong from or by using pip install

```
pip install dingDong
```

1.2 Configuration

```python
from dingDong import Config
```

1.2.1 Connection URL dictionary

Config.CONN_URL Connection URL dictionary for setting all connectors connections

- key -> general connection name or connection type (sql, oracle, file ..)

- value -> can be string or dictionary * String –> Connection string URL (key defined connection type: sql, oracle, mySql. . . .) * Dictionary –> must have 'conn' (connection type) and 'url' (connection string).

Available connection can be found at dingDong.misc.enumsJson.eConn:

```
Config.CONN_URL   = {    'sql'   :"DRIVER={SQL Server};SERVER=server,1433;
↪DATABASE=database;UID=uid;PWD=pass;",
                        'oracle' :"DRIVER={SQL Server};SERVER=server,1433;
↪DATABASE=database;UID=uid;PWD=pass;",
                        'mysql'  :"host=host, user=user, passwd=pass, db=db",
                        'vertica':"DRIVER=HPVertica;SERVER=server;DATABASE=database;
↪PORT=5433;UID=user;PWD=pass",
                        'file'   :{'delimiter':',','header':True, 'folder':""}
                    }
```

Config.QUERY_PARAMS query parameters dictionary for loading parameters into complex queries

```
Config.QUERY_PARAMS    = {}
```

Config.SQL_FOLDER_DIR SQL folder directory for SQL PL/SQL scripts

```
Config.SQL_FOLDER_DIR  = None
```

Config.PARSER_SQL_MAIN_KEY default key for extracting SQL queries from SQL files

```
Config.PARSER_SQL_MAIN_KEY = "dingDong"
```

Config.DECODE query decoding

```
Config.DECODE          = "windows-1255"
```

Config.TRACK_HISTORY Store old object structure with data when schema changed is detected. format [object_name_YYYYMMDD]

```
Config.TRACK_HISTORY   = True
```

Config.LOOP_ON_ERROR Try to insert row by row in a batch loading commit failure

```
Config.LOOP_ON_ERROR    = True
```

Config.NUM_OF_PROCESSES Number of parallel threading for dong module (loading and exttracing)

```
Config.NUM_OF_PROCESSES= 4
```

Config.LOGS_<Prop> Logs files properties

```
Config.LOGS_DEBUG       = logging.DEBUG     --> set logging level (logging.DEBUG,
→logging.WARNING...)
Config.LOGS_DIR         = None              --> if Directory is set, logs files will
→be created
Config.LOGS_INFO_NAME   = 'log'            --> default info log    : log.info
Config.LOGS_ERR_NAME    = 'log'            --> default error log   : log.err
Config.LOGS_TMP_NAME    = 'lastLog'        --> store last execution log lastLog.err
→and lastLog.warning, used for send logs at the end of the work flow
Config.LOGS_HISTORY_DAYS= 5                 --> will delete files older than 5 days
```

Config.SMTP_<Prop> SMTP configuration for sending workflow massages (ERROR, SUCCESS, WARNING)

```
Config.SMTP_SERVER            = ''
Config.SMTP_SERVER_USER       = ''
Config.SMTP_SERVER_PASS       = ''
Config.SMTP_SENDER            = ''
Config.SMTP_RECEIVERS         = ['info@biSkilled.com']
```

1.3 Ding module

Ding module is used for managing overall metadata structure. any schema change in source object will be propagated to all target or merge object as well. It is possible to create different workflows which maintain different data storage and will be maintained in one single point.

Ding used for:

- Creating new schema or modify existing for target or merge objects
- Schema structure can be based on source meta-data object or on query structure
- Support adding a column and updating column types
- Support source to target column mapping
- Support adding indexes
- Schema modifications are documented at logs or in the internal repo for history track changes

1.3.1 Schema modification policy

There are three option to set if the object exists and modified:

-1 DEFAULT The old structure is copied and stored with all data in it. naming format: `object name_[YYYYMMDD]`. New schema structure is created with no data

1 ADD DATA The old structure is copied and stored with all data in it. naming format: `object name_[YYYYMMDD]`. New schema structure is created with data in columns with the same name as an old object structure

2 NO CHANGE object structure cannot be modified

1.3.2 JSON work-flow

All work-flows takes using *Connection URL dictionary* (`Config.CONN_URL` in the config file) as a source for all connection properties. with merging connection properties and JSON vales there are all available properties for each work-flow node (connection URL object, pre-execution, post-execution, etc)

full JSON keys can be found at enum config file located at GitHub listed below available JSON key and values

- **TARGET**: destination connection. data structure depends on source object. strucuture can be modified by using `columns`, `mapping`, `stt` or `sttappend` nodes. keys: `t`, `target`. possible values:

- **object name:** search for `target` or `t` as connection name, set object name

- **[connection name, object name]:** set connection from connection properties, set object name

- **[connection name, object name, delete where clouse]:** set connection from connection properties, set object name, execute pre loading *delete data* from target (Dong module)

- **[connection name, object name, [-1,1,2]]:** set connection from connection properties, set object name, set *Schema modification policy*

- **[connection name, object name, delete where clouse, [-1,1,2]]:** set connection from connection properties, set object name, execute pre loading *delete data* from target (Dong module), set *Schema modification policy*

- **{'conn':'connection name', 'obj':'object name','filter':'delete where clouse..','update':[-1,1,2]....}:** dictionay to set all properties. avaialbe propertis keys can be found under jValues at github

- **SOURCE**: source object that used to extract data from. keys: `s`, `source`. possible values:

- **object name:** search for `source` or `s` as connection name, set object name

- **[connection name, object name]:** set connection from connection properties, set object name

- **[connection name, object name, filter where clouse]:** set connection from connection properties, set object name, execute pre loading *filter data* from source (Dong module)

- **QUERY**: Query that used to extract data from. keys: `q`, `query`. possible values:

- **query:** search for `query` or `q` as connection name, set query as object to load

- **[connection name, query]:** set connection from connection properties, set query as object name

- **MERGE**: merge object with target or source (if target object not exists) at the same connection. merge need to have identical columns names as column keys and identical column names as update columns. keys: `m`, `merge`. possible values:

- **merge object name:** search for `merge` or `m` as connection name, set source to merge from target node (or source if target not exists). merge will use all identical column names as column key

- **[merge object name, [-1,1,2]]:** set connection from connection properties, set target merge from merge object name, set merge :ref:'tag_schema_modify

- **[merge object name, list merge keys]:** set connection from connection properties, set target to merge from the merge object name, set merge column from list merge keys. all remaining identical column will be updated

- **[merge object name, list merge keys, [-1,1,2]]:** set connection from connection properties, set target to merge from the merge object name, set merge column from list merge keys. all remaining identical column will be updated, set merge :ref:'tag_schema_modify

- **Map source to target-stt**: a dictionary to define target column schema properties. using stt will define all target object structure. keys: `stt`, `sourcetotarget`. value is a dictionary include key as column properties and value as property. sample value: {'target column name':{'type':XXX, 'source':YYY …} …}. key: value are listed below

- **Map source to target-sttappend**: dictionary to define target column schema properties. using sttappend will add new target column if column not exists in source or update target column properties. keys: `sttappend`, `only`. value is a dictionary include key as column properties and value as property. sample value: {'target column name':{'type':XXX, 'source':YYY …} …}. key: value are listed below

- **source column name: s:** `{'s':'Source column name'}` is a key for using source column type for target column and mapping source to target for extracting and loading data (dong module)

- **data type: t:** `{'t':'VARCHAR(255)'}` is key to map target column data type

- **aliase name: a:** `{'a':'New column name'}` is using to use alias name as target column name

- **function: f:** `{'f':'fDcast()'}` set fuction using inout as source and output as target. more details and sample can be found at dong module

- **execution function: e:** ``{'e':'{column1}{column2}{column3}'}``set excecution method to use multiple source column as input fuction using inout as source and output as target. more details and sample can be found at dong module

- **Index: i:** `{'i':[{'ic':True,'iu':True}...{}..]]` set index to target column `ic` set if index is clusterd or not. default for first `ic=True`, all the rest `ic=False`. `iu` set UNIQUE to True/False. default: `iu=False`

- **COLUMNS**: keys:`col`, `columns`, `column`, value: dictionary mapp column name to column data type. sample: `{'target column name':'VARCHAR (255)'}`

- **MAPPING**: keys:`map`, `mapping`, value: dictionary that map target column to source column name. sample: `{'target column name':'source column name'}`

1.3.3 Mapping samples

```
Config.CONN_URL = {'target':{'conn':'sql', url:"DRIVER={SQL Server};
↪SERVER=server,1433;DATABASE=database;UID=uid;PWD=pass;"}}


""" TARGET JSON MAPPING """
work-Flow = [{ "target":"targetTableName" }]
work-Flow = [{ "t":    ["sql","targetTableName"] }]
work-Flow = [{ "t":    ["sql","targetTableName",2] }]   #If target exists -␣
↪Udate are not allowed
work-Flow = [{ "t":    ["sql","targetTableName","CreationDate<DATEADD␣
↪(MONTH, -2, GETDATE())"] }]   #Delete last 2 months from target object␣
↪(Dong model)


""" SOURCE JSON MAPPING """
```

1.4 Dong module

Dong module is used to extract and load massive data volume. there are built-in functions that can be used for column manipulation, It is possible to add functionality for any data manipulations. the function can use one of more column as source function input. the output will be a target column. Dong support multi-threading mechanism which allows executing several work-flow at a time.

Dong support two main loading methods:

- **Truncate-> Insert:** Loading data to an empty object

- **delete-> Insert:** Loading incremental data into an object

The goals of this module:

- extract and load data

- data cleansing by using the calculated function on columns

- Ability to add a calculated column

- fast massive loading into diverse connection types

Main Configuration properties:

- Config.SQL_FOLDER_DIR -> executing queries/ PL SQL function from SQL file located at SQL_FOLDER_DIR

- Config.LOOP_ON_ERROR -> will load row by row if batch insert failed

- Config.NUM_OF_PROCESSES-> maximum threading that will run in parallel

- Config.LOGS_DEBUG -> set logging level (ERROR, WARNING, DEBUG, INFO)

- Config.LOGS_DIR -> log files folder

1.4.1 JSON work-flow

All work-flows takes using *Connection URL dictionary* (`Config.CONN_URL` in the config file) as a source for all connection properties. with merging connection properties and JSON vales there are all available properties for each work-flow node (connection URL object, pre-execution, post-execution, etc)

full JSON keys can be found at enum config file located at GitHub listed below available JSON key and values

- **TARGET**: destination connection. target connection to load data into. defult pre loading method - truncate data. pre ;oading change to delete if there is a filter clouse. keys: `t`, `target`. possible values:

- **object name:** search for `target` or `t` as connection name, set object name. truncate data before starting to load

- **[connection name, object name]:** set connection from connection properties, set object name. truncate data before starting to load

- **[connection name, object name, delete where clouse]:** set connection from connection properties, set object name, **delete data** from target object before starting to load

- **{'conn':'connection name', 'obj':'object name','filter':'delete where clouse..'}:** Using a dictionay to set all target loading properties

- **SOURCE**: source object that used to extract data from. adding filter will load only filtered data by adding **WHERE** clause. keys: `s`, `source`. possible values:

- **object name:** search for `source` or `s` as connection name, set object name. truncate data before starting to load

- **[connection name, object name]:** set connection from connection properties, set object name. truncate data before starting to load

- **[connection name, object name, filter where clouse]:** set connection from connection properties, set object name, **filter data** from the source object

- **QUERY**: source query to extract data from divers objects. keys: `q`, `query`. possible values:

- **query:** search for `query` or `q` as connection name, set query as object to load

- **[connection name, query]:** set connection from connection properties, set query as object name

- **MERGE**: merge object with target or source (if target object not exists) at the same connection. merge need to have identical columns names as column keys and identical column names as update columns. keys: m, `merge`. possible values:

- **merge object name:** search for `merge` or `m` as connection name, set source to merge from target node (or source if target not exists). merge will use all identical column names as column key

- **[merge object name, [-1,1,2]]:** set connection from connection properties, set target merge from merge object name, set merge :ref:'tag_schema_modify

- **[merge object name, list merge keys]:** set connection from connection properties, set target to merge from the merge object name, set merge column from list merge keys. all remaining identical column will be updated

- **Map source to target-set**: a dictionary to map target to data transformation functions and adding calculated columns. sample value: `{'target column name':{'type':XXX, 'source':YYY, 'f':'fDate()', ..} ...}`. key: value for Dong listed below

- **Map source to target-sttappend**: this is used to add column to all existing column in the source object. if the column exists than sttappend update properties accordingly. key: value for Dong listed below

  - **source column name: s:** `{'s':'Source column name'}` source column name as inout for tranforming data

  - **function: f:** `{'f':'function_name()'}` set fuction method to transform data. new function can be added (samples below)

    - full available functions can be found under function list in github existing function:

    - **fDCast()**: `{'f':'fDcast()'}`: Convert: None-> current; not valid data->None; 'YYYYMMDD'->'MM/DD/YYYY'

    - **fDTCast**: `{'f':'fDTCast'}`: Convert: input: 'YYYYMMDD' or 'YYYYMMD-DHHmmSS', output: MM/DD/YYYY. if value is None return current date. if value not valid retunr None

  - **execution function: e:** ''`{'e':'{column1}{column2}{column3}'}`''set execution method to use multiple source column as input function using input as source and output as target. more details and sample can be found at dong module

1.4.2 Extract functions

function class can be found in github and can be added by inherited fncBase class

Built in functions:

fDCast Date string format convert. *YYYYMMDD* to *mm/dd/yyyy* format. None - if string not valid

fDTCast DateTime string format convert. *YYYYMMDDHHMMSS* to *mm/dd/yyyy hh/mm/ss* format. None - if string not valid

fDFile Date string format convert. *dd/mm/yy* to *mm/dd/yyyy* format. None - if string not valid

fDCurr Return current system dataTime

fTCast Time string format convert. *HHMMSS* to *HH:MM:SS* format. None - if string not valid

fR Replace column string with another string. *fR(searchString, newString)*

fNull Return default value if column is None. *fNull(defaultValue)*

fClob return None if string is empty

fDecode Convert unicode string to STR

fPhone Not fully implemented: phone validation

fAddress Not fully implemented: address validation

1.5 SOURCE CONTROL

dingDONG provides full metadata version control mechanism. On identified object changes such as new, update or delete - meta-data is stored at dingDONG DB. Version numbers update automatically by execution sequential number.

For example, if execution level is set to 1 and new objects found, dingDONG will mark new release <main_version>.<new_release> and store all created object scripts related to current release number. A new release will be added when a change is detected. The main version is managed at the configuration file.

To enable dingDONG versioning you have to initialize version number and set dingDONG MongoDB repository.

More details can be found under install page

1.5.1 MACHINE LEARNING OR EXTERANL CODE

dingDONG using GIT embedded functionality for managing folder and files content versions. It has full integration with `GITHUB` repository which stores all revisions

The release is defined by local folder structure. Release usage sample -

- `C:\ML` defined as the main root for local code.
- **The release will increase on any new update at the folder or file directly under `C:\ML` path.**
    - Changes under certain folder will be considered as a new release
    - Changes under file directly under `C:\ML` will be considered as a new release

1.5.2 MACHINE LEARNING RESULTS

dingDONG store experience results related to each release at dingDONG DB. Results data-set can be defined by developers and divided into two main properties:

- **Shared measures - calculated measures for any experience**
    - Sample: `count total inserted rows,  count total output rows,  total execution time...`
- **Private measures - shares measures for all experiments**
    - Sample: `meusre1`

1.6 Global configuration

Global configuration can be stored in config file or in each work-flow. Usually used for SMTP massaging, logging level and for folder locations

Global varaible will be used at dingDong init

```python
from dingDONG import DingDONG
from dingDONG import Config

Config.SMTP_RECEIVERS  = [<email1>, <email2>...]   # SEND EMAIL: TO
Config.SMTP_SERVER      = "<SMTP server>"
Config.SMTP_SERVER_USER = "email@address.com"
Config.SMTP_SERVER_PASS = "<email password>"
Config.SMTP_SENDER      = "<email from>"           # SEND EMAIL: FROM


PROJECT_FOLDER      = <folder path>\JSON    # main folder to store all JSON work-flow
→files
LOGS_FOLDER         = <folder path>\LOGS    # logs folder
SQL_FOLDER          = <folder path>\SQL     # SQL files to execute


FILES_NOT_INCLUDE   = ['<jsonFile.json>', '<jsonFile1>']    # JSON files to ignore
→while using JSON folder
FILES_INCLUDE       = ['<jsonFile5.json>','<jsonFile8>']    # Load only this JSON
→files

CONN_DICT = {
            'dwh' : {"conn":"sql" , "url":<URL string>,"file":"sample.sql"},
            'sap' : {"conn":"oracle", 'dsn':<dnn> , 'user':<user>,'pass':<pass>,'nls':
→<local nls language>},
            'crm' : {"conn":"sql" , "url":<URL string>},
            'file': {'delimiter':'~','header':True, 'folder':<folder path>,'replace':r
→'\"|\t'}
            }
```

1.7 Ding-Dong (mapp-load)

Sample of extracting 3 CSV files into temporal SqlLite tables. Creating a query to store aggragated data into results table, and extracting all results into CSV file.

```python
""" import modules -> logging used fr setting log level"""
import logging
from dingDong import DingDong
from dingDong import Config


""" set log level: logging.INFO, logging.DEBUG, logging.ERROR """
Config.LOGS_DEBUG = logging.DEBUG


""" Config all connection URl
    Can be used by update Config.CONN_URL property or by send dictionary into
→connDict property at DingDong class init`
    key : can be general connection name , or connection type (sql, oracle, file .. )
    value:
        String--> connection string URL (key will be used to defined connection type:
→sql, oracle, mySql....
        Dictionary -->
            'conn' -> connenction type. full type list can be found at dingDong.misc.
→enumsJson.eConn static class
            'url'  -> connection URL
"""
```

(continues on next page)

```
Config.CONN_URL = {
    'sampleSql': {'conn': 'sql',"url": "<Sql server connection string>;UID=USER;
↪PWD=PWD;"},
    'file': "C:\\dingDong\\",
    'sqlite': "C:\\dingDong\\sqlLiteDB.db"}

""" This is sample JSON configuration format for:
    1. mapping and loading CSV file named DATAELEMENTDESCRIPTION into SQLLite table␣
↪named dateElements_Desc
    2. mapping and loading CSV file named DEMOGRAPHICS into SQLLite table named␣
↪demographics
    3. mapping and loading CSV file named MEASURESOFBIRTHANDDEATH into SQLLite table␣
↪named birthDate
    4. create a new query based on demographics and birthDate  into new table named␣
↪`Final`
    5. Update sample field at `Final` table by using direct PL/SQL query
    6. Extract Final table data into a CSV file

    file default datatype can be found at dingDong.conn.baseBatch under DEFAULTS␣
↪values (currently set to VARCHAR(200) for all relation Dbs
"""
nodesToLoad = [
    {"source": ["file", "DATAELEMENTDESCRIPTION.csv"],
     "target": ["sqlite", "dateElements_Desc"]},

    {"source": ["file", "DEMOGRAPHICS.csv"],
     "target": ["sqlite", "demographics"]},

    {"source": ["file", "MEASURESOFBIRTHANDDEATH.csv"],
     "target": ["sqlite", "birthDate"]},

    {"query": ["sqlite", """   Select d.[State_FIPS_Code] AS A, d.[County_FIPS_Code]␣
↪AS B, d.[County_FIPS_Code] AS G,d.[County_FIPS_Code], d.[CHSI_County_Name], d.[CHSI_
↪State_Name],[Population_Size],[Total_Births],[Total_Deaths]
                                From demographics d INNER JOIN birthDate b ON d.
↪[County_FIPS_Code] = b.[County_FIPS_Code] AND d.[State_FIPS_Code] = b.[State_FIPS_
↪Code]"""],
     "target": ["sqlite", "Final", 2]},

    {"myexec": ["sqlite", "Update dateElements_Desc Set [Data_Type] = 'dingDong';"]},

    {"source": ["sqlite", "Final"],
     "target": ["file", "finall.csv"]}
]

"""
    Init class DingDong"
        dicObj -> loading node mapping dictionay (as the listed sample)
        dirData-> will load all JSON configuration file located at this folder
        includeFiles   -> FILTER to load list of files in dirData folder
        notIncldeFiles -> FILTER to remove list of files in dirData folder
        connDixt -> update all connection url. same property as Config.CONN_URL
        processes -> number of parrallel processing for loading data (DONG module)
"""

dd = DingDong(dicObj=nodesToLoad, filePath=None, dirData=None,
            includeFiles=None,notIncludeFiles=None,connDict=None, processes=1)
```

```
dd.msg.addState("Start Ding")

""" Mapping files structure into a table structure
    Target not exists  -> create new target table based on source table definitions
    Target exists      -> if there is change, there are 3 option to update the
→target table structure
        1. copy old data into the table with date prefix and create a new table with
→updated metadata (default, CODE:-1)
        2. create new table schema, store old schema in a copied table with date
→prefix and merge data from the old structure into a new structure (CODE: 1, updated
→at target or merge key values)
        3. no change can be made into this table. CODE number 2. can be added only to
→target or merge objects
"""
dd.ding()

""" Extracting and loading data from source to target or to merge
    if STT node exists in JSON mapping -> will update fields accordingly
    if the column node exists -> will map column types by column node definition
    if mapping node exists-> will map source to target accordingly

    more detild can be found at decumentation
"""
dd.msg.addState("Start Dong")
dd.dong()

dd.msg.end(msg="FINISHED",pr=True)
```

1.8 PLSql Executor

dingDong using execution methods to allow managing all business logic workflows the simple below using a private function to set query parameters. execution is done in parallel by define priorities. in our sample all priority number 1 will execute in parallel, same for priority 2 and so on. Each execution can reciave paramters as a dcitioanry. each step is moitored by the logging mechanism **dd.msg.addState("step desc")** is used for adding massages and **dd.msg.sendSMTPmsg** send an HTML massage using SMTP confguration.

```
# sample of private function to manage start date and end date parameters for SQL
→queries
# current sample - receive days and return startDate and endDate in %Y%m%d format

def setStartEndTime (e=1, s=400, f="%Y%m%d"):
    dataRange, curDate = (e,s,f,) , datetime.datetime.today()
    startDay = (curDate - datetime.timedelta(days=dataRange[1])).
→strftime(dataRange[2])
    endDay  = (curDate - datetime.timedelta(days=dataRange[0])).
→strftime(dataRange[2])
    return startDay, endDay

# update SQL queries parameters

startDay, endDay =  setStartEndTime (e=1, s=1000, f="%Y%m%d")
config.QUERY_PARAMS = {
    "$start" : startDay,
```

```
    "$end"   : endDay
}

ddSQLExecution = [
    (1, SQL_FOLDER+"\\updateDWH.sql", {}),
    (2, "exec Procedure_1_SQL", {}),
    (3, "exec Procedure_2_SQL", {}),
    (3, "exec Procedure_3_SQL" , {}),
    (4, "exec Procedure_4_SQL", {}),
    (5, "exec Procedure_5_SQL @last_etl_date='$start'" ,{'$start':config.QUERY_
→PARAMS['$start']}),
    (5, "exec Procedure_6_SQL", {})
]

dd = dingDong(  dicObj=None, filePath=None, dirData=PROJECT_FOLDER,
                includeFiles=FILES_INCLUDE, notIncludeFiles=FILES_NOT_INCLUDE,
                dirLogs=LOGS_FOLDER, connDict=CONN_DICT, processes=4)

dd.setLoggingLevel(val=logging.DEBUG)
dd.execDbSql(queries=qs, connName='sql')
dd.msg.addState("FINISH ALL SQL QUERIES !")

dd.msg.sendSMTPmsg (msgName="FINISHED EXECUTING WORK-FLOW", onlyOnErr=False,
→withErr=True, )
```

1.9 Source to target mapping (STT)

```
################################################
#########       SAMPLE JSON FILE       #########
################################################
[
   {
   "target": ["sql", "STG_Services"],
   "query": ["oracle", [
            "SELECT COL1 as col1_Desc , COL2 as col2_Desc, COL3 as ValidEndDate,
→COL4 as ValidBgDate , COL5 as col5_Desc,",
            "COL6 as col6_Desc, COL7 as col7_Desc, COL8 as col8_Desc, COL9 as
→col8_Desc ",
            "FROM sar.services where COL7 ='B'"]
            ],
   "exec":["sql", "update_Target_STG_Services.sql"],
   "merge":["DWH_Services",["COL1","COL2"]],
   "sttappend":{
       "ValidEndDate":{"s":"COL3", "t":"smalldatetime", "f":"fDCast()"},
       "ValidBgDate": {"s":"COL4", "t":"smalldatetime", "f":"fDCast()"},
       "LongDesc"   : {"t":"nvarchar(500)","e":"{COL6}{COL7}{COL8}"},
       "ETL_Date":    {"t":"smalldatetime","f":"fDCurr()"}
   },
   "index":[{"c":["COL1", "COL2"],"ic":true,"iu":False}]
   }
]

################################################
#########       SAMPLE PYTHON FILE     #########
```

```python
##################################################

# Global configuration

from dingDong.config import config
from dingDong.bl.ddExecuter import dingDong

config.SMTP_RECEIVERS   = [<email1>, <email2>...]   # SEND EMAIL: TO
config.SMTP_SERVER      = "<SMTP server>"
config.SMTP_SERVER_USER = "email@address.com"
config.SMTP_SERVER_PASS = "<email password>"
config.SMTP_SENDER      = "<email from>"            # SEND EMAIL: FROM

# Init folder paths
PROJECT_FOLDER       = <folder path>\JSON    # main folder to store all JSON work-flow
→files
LOGS_FOLDER          = <folder path>\LOGS     # logs folder
SQL_FOLDER           = <folder path>\SQL      # SQL files to execute

FILES_NOT_INCLUDE   = []    # JSON files to ignore while using JSON folder
FILES_INCLUDE       = []    # Load only this JSON files

# Init connection properties
CONN_DICT = {
        'dwh' : {"conn":"sql" , "url":<URL string>,"file":"sample.sql"},
        'sap' : {"conn":"oracle", 'dsn':<dnn> , 'user':<user>,'pass':<pass>,'nls':
→<local nls language>},
        'crm' : {"conn":"sql" , "url":<URL string>},
        'file': {'delimiter':'~','header':True, 'folder':<folder path>,'replace':r'\
→"|\t'}
        }

# list for PL/SQL execution script
ddSQLExecution = [
    (1, SQL_FOLDER+"\\updateDWH.sql", {}),
    (2, "exec Procedure_1_SQL", {}),
    (3, "exec Procedure_2_SQL", {}),
    (3, "exec Procedure_3_SQL" , {}),
    (4, "exec Procedure_4_SQL", {}),
    (5, "exec Procedure_5_SQL @last_etl_date='$start'" ,{'$start':config.QUERY_PARAMS[
→'$start']}),
    (5, "exec Procedure_6_SQL", {})
]

# private function for managing paramteres
def _setStartEndTime (e=1, s=100, f="%Y%m%d"):
    dataRange, curDate = (e,s,f,) , datetime.datetime.today()
    startDay = (curDate - datetime.timedelta(days=dataRange[1])).
→strftime(dataRange[2])
    endDay   = (curDate - datetime.timedelta(days=dataRange[0])).
→strftime(dataRange[2])
    return startDay, endDay

# Internal function in config file
startDay, endDay =  _setStartEndTime (e=1, s=1000, f="%Y%m%d")
config.QUERY_PARAMS = {
        "$start" : startDay,
```

```
        "$end"   : endDay
}


if __name__ == '__main__':
    parser = argparse.ArgumentParser(description='Loading data from json files, cant
→get: source list files or destination list files or append mode () ')
    dd = dingDong(  dicObj=None, filePath=None, dirData=PROJECT_FOLDER,
                    includeFiles=FILES_INCLUDE, notIncludeFiles=FILES_NOT_INCLUDE,
                    dirLogs=LOGS_FOLDER, connDict=CONN_DICT, processes=4)

    dd.setLoggingLevel(val=logging.DEBUG)

    dd.ding()
    dd.msg.addState("DING FINSHED")

    dd.dong()
    dd.msg.addState("DONG FINISHED")

    dd.execDbSql(queries=ddSQLExecution, connName='sql')
    dd.msg.addState("DONE SQL QUERIES")

    dd.execMicrosoftOLAP(serverName=<SSAS server name>, dbName=<SSAS db name>,
→cubes=[], dims=[], fullProcess=True)
    dd.msg.addState("DONOE MICROSOFT SSAS")

    dd.msg.sendSMTPmsg (msgName="JOB SAMPLE LOADING FINSISHED", onlyOnErr=False,
→withErr=True, )
```

1.9.1 Ding Work-flow

EXTRACT Load from oracle query into sql server table **STG_Services** using truncate insert method

EXECUTE Executing SQL file named ** update_Target_STG_Services.sql **

EXTRACT Merge data from table ** STG_Services ** (target) to ** DWH_Services **

TRANFORM function fDCast(). Columns ValidEndDate,ValidBgDate convert string values to small-datetime More on function can be found at *Extract functions*

TRANSFORM execution function. Column LongDesc Concatinate 3 columns into long string: COL6+COL7+COL8

TRANSFORM function fDCurr(). Update Column ETL_Date with system datetime value.

EXTRACT Merge data from **STG_Services** into **DWH_Services**

- merge key columns: "COL1","COL2"

- merge using connection functionality and can be done only if source and target are located at the same connection

1.9.2 Dong Work-Flow

DATA-TYPES All oracle query columns COL1, COL2, ... will be in **STG_Services** and **DWH_Services** using

SQL datatype align to oracle data-types :DATA-TYPES: ValidEndDate,ValidBgDate will have smalldatetime :DATA-TYPES: LongDesc will have nvarchar(500) :DATA-TYPES: ETL_Date will have smalldatetime :INDEX: Tables **STG_Services** and **DWH_Services** will have non unique ("iu":false), clustered index ("ic":true) on COL1 and COl2

1.10 execDbSql

- Executing SQL files and PLSQL queries.

- Support dynamic variable

- Support extracting queries from '.sql' files

- Support multithreading query processing

```python
# Main imports for dingDong
import logging
from dingDong import DingDong
from dingDong import Config

# Configuration
Config.LOGS_DEBUG = logging.DEBUG          # logging level
Config.SQL_FOLDER_DIR = "C:\dingDong"      # SQL folder for using sql files to
→execute

# list of all queris to execute. basic tuple: ([priority], executing query, [paramam])
queriesToExecute = [
    (1,"Update product set entryDate=getdate() where createDate>@startDate and
→createDate<@startDate"),
    (1,"Update productCategory set category='unKnow' where category in (@categories)",
→ {'@categories':'5,6,7'}),
    (2, "updateTableProducts.sql"),
    (2, "PROC_UPDATE_PRODUCTS")
    ....
    ]

dd = DingDong()

# list or string for all queries to process
Config.QUERY_PARAMS = {'@startDate':'20100801', '@endDate':'20100801'}
```

1.11 microsoft OLAP

Executing Microsoft OLAP cubes and dimensions, using Microsoft.AnalysisServices.DLL.

:: import logging from dingDong import DingDong from dingDong import Config

Config.LOGS_DEBUG = logging.DEBUG

dd = DingDong() dd.execMicrosoftOLAP(serverName, dbName, cubes=[], dims=[], fullProcess=True)

serverNsme Microsoft analysis services instance name

dbName Analysis services database name

cubes processing cubes * cubes = []: processing all existing cubes * cubes = ['cube1', 'cube2',...]: process cube1, cube2 ..

dims processing dimensions * dims = []: processing all shared dimensions * dims = ['dimension_1', 'dimension_2', 'dimension_3', ...]: process only dimension_1, dimension_2, dimension_3

fullProcess analysis process type - FULL or PARTIAL

1.12 Mailing logging massaging

msg method using to add masages for monitoring overall work-flow process

addState method to add massage into HTML e-mail

sendSMTPmsg send email massage with errors (if exists), warnings (if exists)

```python
""" import modules -> logging used fr setting log level"""
from dingDong import DingDong
from dingDong import Config

Config.SMTP_RECEIVERS  = [<email1>, <email2>...]   # SEND EMAIL: TO
Config.SMTP_SERVER     = "<SMTP server>"
Config.SMTP_SERVER_USER = "email@address.com"
Config.SMTP_SERVER_PASS = "<email password>"
Config.SMTP_SENDER     = "<email from>"            # SEND EMAIL: FROM



PROJECT_FOLDER      = <folder path>\JSON    # main folder to store all JSON work-flow
→files
LOGS_FOLDER         = <folder path>\LOGS    # logs folder
SQL_FOLDER          = <folder path>\SQL     # SQL files to execute


FILES_NOT_INCLUDE   = ['<jsonFile.json>', '<jsonFile1>']    # JSON files to ignore
→while using JSON folder
FILES_INCLUDE       = ['<jsonFile5.json>','<jsonFile8>']    # Load only this JSON
→files

CONN_DICT = {
        'dwh' : {"conn":"sql" , "url":<URL string>,"file":"sample.sql"},
        'sap' : {"conn":"oracle", 'dsn':<dnn> , 'user':<user>,'pass':<pass>,'nls':
→<local nls language>},
        'crm' : {"conn":"sql" , "url":<URL string>},
        'file': {'delimiter':'~','header':True, 'folder':<folder path>,'replace':r
→'\"|\t'}
        }

Config.QUERY_PARAMS = {
    "$start" : "1/1/2018"
    "$end"   : "/31/12/2019"
}

ddSQLExecution = [
        (1, SQL_FOLDER+"\\updateDWH.sql", {}),
        (2, "exec Procedure_1_SQL", {}),
        (3, "exec Procedure_2_SQL", {}),
        (3, "exec Procedure_3_SQL" , {}),
        (4, "exec Procedure_4_SQL", {}),
        (5, "exec Procedure_5_SQL @last_etl_date='$start'" ,{'$start':config.QUERY_
→PARAMS['$start']}),
```

(continues on next page)

```
        (5, "exec Procedure_6_SQL", {})
    ]

if __name__ == '__main__':
    parser = argparse.ArgumentParser(description='Loading data from json files, cant
→get: source list files or destination list files or append mode () ')
    dd = dingDong(  dicObj=None, filePath=None, dirData=PROJECT_FOLDER,
                    includeFiles=FILES_INCLUDE, notIncludeFiles=FILES_NOT_INCLUDE,
                    dirLogs=LOGS_FOLDER, connDict=CONN_DICT, processes=4)

    dd.setLoggingLevel(val=logging.DEBUG)

    dd.ding()
    dd.msg.addState("DING FINISHED !")

    dd.dong()
    dd.msg.addState("DONG FINISHED !")

    dd.execDbSql(queries=qs, connName='sql')
    dd.msg.addState("FINISH BUSINESS LOGIC  !")

    dd.execMicrosoftOLAP(serverName='<OLAP_SERVER>', dbName='<OLAP_DB>', cubes=[],
→dims=[], fullProcess=True)
    dd.msg.addState("FINISH EXECUTING OLAP !")

    dd.msg.sendSMTPmsg (msgName="FINISHED WORK_FLOW", onlyOnErr=False, withErr=True, )
```

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1.14 Contact

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