

pandas-td Compatibility

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pytd.pandas_td.connect

```
pytd.pandas_td.connect(apikey=None, endpoint=None, **kwargs)[source]
```

Create a connection to Treasure Data

Parameters

- **apikey** (*str, optional*) – Treasure Data API key. If not given, a value of environment variable `TD_API_KEY` is used by default.
- **endpoint** (*str, optional*) – Treasure Data API server. If not given, `https://api.treasuredata.com` is used by default. List of available endpoints is: [Sites and Endpoints](#)
- **kwargs** (*dict, optional*) – Optional arguments

Returns

Return type

`pytd.Client`

pytd.pandas_td.create_engine

```
pytd.pandas_td.create_engine(url, con=None, header=True, show_progress=5.0, clear_progress=True)[source]
```

Create a handler for query engine based on a URL.

The following environment variables are used for default connection:

```
TD_API_KEY API key TD_API_SERVER API server (default: https://api.treasuredata.com)
```

Parameters

- **url** (*str*) – Engine descriptor in the form “type://apikey@host/database?params...” Use shorthand notation “type:database?params...” for the default connection. `pytd: “params”` will be ignored since `pytd.QueryEngine` does not have any extra parameters.
- **con** (`pytd.Client`, optional) – Handler returned by `pytd.pandas_td.connect()`. If not given, default client is used.
- **header** (*str or bool, default: True*) – Prepend comment strings, in the form “– comment”, as a header of queries. Set `False` to disable header.
- **show_progress** (*double or bool, default: 5.0*) – Number of seconds to wait before printing progress. Set `False` to disable progress entirely. `pytd:` This argument will be ignored.
- **clear_progress** (*bool, default: True*) – If `True`, clear progress when query completed. `pytd:` This argument will be ignored.

Returns

Return type

`pytd.query_engine.QueryEngine`

Examples

```
>>> import pytd.pandas_td as td
>>> con = td.connect(apikey=apikey, endpoint="https://api.treasuredata.com")
>>> engine = td.create_engine("presto:sample_datasets")
```

pytd.pandas_td.read_td_query

`pytd.pandas_td.read_td_query(query, engine, index_col=None, parse_dates=None, distributed_join=False, params=None)`[\[source\]](#)

Read Treasure Data query into a DataFrame.

Returns a DataFrame corresponding to the result set of the query string. Optionally provide an `index_col` parameter to use one of the columns as the index, otherwise default integer index will be used.

While Presto in pytd has two options to issue a query, by either `tdclient` or `prestodb`, `pytd.pandas_td.read_td_query` always uses the former to be compatible with the original pandas-td. Use `pytd.Client` to take advantage of the latter option.

Parameters

- **query** (*str*) – Query string to be executed.
- **engine** (`pytd.query_engine.QueryEngine`) – Handler returned by `create_engine`.
- **index_col** (*str, optional*) – Column name to use as index for the returned DataFrame object.
- **parse_dates** (*list or dict, optional*) –
 - List of column names to parse as dates
 - Dict of {column_name: format string} where format string is strftime compatible in case of parsing string times or is one of (D, s, ns, ms, us) in case of parsing integer timestamps
- **distributed_join** (bool, default: False) – (Presto only) If True, distributed join is enabled. If False, broadcast join is used. See <https://prestodb.io/docs/current/release/release-0.77.html>
- **params** (*dict, optional*) –

Parameters to pass to execute method. pytd does not support parameter `type` ('hive', 'presto'), and query type needs to be defined by `engine`.

Available parameters:

- **db** (*str*): use the database
- **result_url** (*str*): result output URL
- **priority** (*int or str*): priority
 - -2: "VERY LOW"
 - -1: "LOW"
 - 0: "NORMAL"
 - 1: "HIGH"
 - 2: "VERY HIGH"
- **retry_limit** (*int*): max number of automatic retries
- **wait_interval** (*int*): sleep interval until job finish
- **wait_callback** (*function*): called every interval against job itself
- **engine_version** (*str*): run query with Hive 2 if this parameter is set to "experimental" in `HiveQueryEngine`.
[Using Hive 2 to Create Queries](#)

Returns

Query result in a DataFrame

Return type

`pandas.DataFrame`

pytd.pandas_td.read_td_job

`pytd.pandas_td.read_td_job(job_id, engine, index_col=None, parse_dates=None)`[\[source\]](#)

Read Treasure Data job result into a DataFrame.

Returns a DataFrame corresponding to the result set of the job. This method waits for job completion if the specified job is still running. Optionally provide an `index_col` parameter to use one of the columns as the index, otherwise default integer index will be used.

Parameters

- **job_id** (*int*) – Job ID.
- **engine** (`pytd.query_engine.QueryEngine`) – Handler returned by `create_engine`.
- **index_col** (*str, optional*) – Column name to use as index for the returned DataFrame object.
- **parse_dates** (*list or dict, optional*) –
 - List of column names to parse as dates

- Dict of {column_name: format string} where format string is strftime compatible in case of parsing string times or is one of (D, s, ns, ms, us) in case of parsing integer timestamps

Returns

Job result in a dataframe

Return type

`pandas.DataFrame`

pytd.pandas_td.read_td_table

`pytd.pandas_td.read_td_table(table_name, engine, index_col=None, parse_dates=None, columns=None, time_range=None, limit=10000)`[\[source\]](#)

Read Treasure Data table into a DataFrame.

The number of returned rows is limited by "limit" (default 10,000). Setting limit=None means all rows. Be careful when you set limit=None because your table might be very large and the result does not fit into memory.

Parameters

- **table_name** (*str*) – Name of Treasure Data table in database.
- **engine** (`pytd.query_engine.QueryEngine`) – Handler returned by `create_engine`.
- **index_col** (*str, optional*) – Column name to use as index for the returned DataFrame object.
- **parse_dates** (*list or dict, optional*) –
 - List of column names to parse as dates
 - Dict of {column_name: format string} where format string is strftime compatible in case of parsing string times or is one of (D, s, ns, ms, us) in case of parsing integer timestamps
- **columns** (*list, optional*) – List of column names to select from table.
- **time_range** (*tuple (start, end), optional*) – Limit time range to select. "start" and "end" are one of None, integers, strings or datetime objects. "end" is exclusive, not included in the result.
- **limit** (*int, default: 10,000*) – Maximum number of rows to select.

Returns

Return type

`pandas.DataFrame`

pytd.pandas_td.read_td

`pytd.pandas_td.read_td(query, engine, index_col=None, parse_dates=None, distributed_join=False, params=None)`[\[source\]](#)

Read Treasure Data query into a DataFrame.

Returns a DataFrame corresponding to the result set of the query string. Optionally provide an `index_col` parameter to use one of the columns as the index, otherwise default integer index will be used.

While Presto in pytd has two options to issue a query, by either `tdclient` or `prestodb`, `pytd.pandas_td#read_td_query` always uses the former to be compatible with the original `pandas-td`. Use `pytd.Client` to take advantage of the latter option.

Parameters

- **query** (*str*) – Query string to be executed.
- **engine** (`pytd.query_engine.QueryEngine`) – Handler returned by `create_engine`.
- **index_col** (*str, optional*) – Column name to use as index for the returned DataFrame object.
- **parse_dates** (*list or dict, optional*) –
 - List of column names to parse as dates
 - Dict of {column_name: format string} where format string is strftime compatible in case of parsing string times or is one of (D, s, ns, ms, us) in case of parsing integer timestamps
- **distributed_join** (*bool, default: False*) – (Presto only) If True, distributed join is enabled. If False, broadcast join is used. See <https://prestodb.io/docs/current/release/release-0.77.html>
- **params** (*dict, optional*) –

Parameters to pass to execute method. pytd does not support parameter `type` ('hive', 'presto'), and query type needs to be defined by `engine`.

Available parameters:

- `db` (*str*): use the database
- `result_url` (*str*): result output URL
- `priority` (*int or str*): priority

- -2: "VERY LOW"
- -1: "LOW"
- 0: "NORMAL"
- 1: "HIGH"
- 2: "VERY HIGH"
- `retry_limit` (int): max number of automatic retries
- `wait_interval` (int): sleep interval until job finish
- `wait_callback` (function): called every interval against job itself
- `engine_version` (str): run query with Hive 2 if this parameter is set to "experimental" in HiveQueryEngine. [Using Hive 2 to Create Queries](#)

Returns

Query result in a DataFrame

Return type

`pandas.DataFrame`

pytd.pandas_td.to_td

`pytd.pandas_td.to_td(frame, name, con, if_exists='fail', time_col=None, time_index=None, index=True, index_label=None, chunksize=10000, date_format=None, writer='bulk_import', **kwargs)`[\[source\]](#)

Write a DataFrame to a Treasure Data table.

This method converts the dataframe into a series of key-value pairs and sends them using the Treasure Data streaming API. The data is divided into chunks of rows (default 10,000) and uploaded separately. If upload failed, the client retries the process for a certain amount of time (max_cumul_retry_delay; default 600 secs). This method may fail and raise an exception when retries did not success, in which case the data may be partially inserted. Use the bulk import utility if you cannot accept partial inserts.

Parameters

- **frame** (`pandas.DataFrame`) – DataFrame to be written.
- **name** (*str*) – Name of table to be written, in the form 'database.table'.
- **con** (`pytd.Client`) – A client for a Treasure Data account returned by `pytd.pandas_td.connect()`.
- **if_exists** (*str*, {'error' ('fail'), 'overwrite' ('replace'), 'append', 'ignore'}, *default*: 'error') –

What happens when a target table already exists. For pandas-td compatibility, 'error', 'overwrite', 'append', 'ignore' can respectively be:

- fail: If table exists, raise an exception.
- replace: If table exists, drop it, recreate it, and insert data.
- append: If table exists, insert data. Create if does not exist.
- ignore: If table exists, do nothing.
- **time_col** (*str, optional*) – Column name to use as "time" column for the table. Column type must be integer (unixtime), datetime, or string. If None is given (default), then the current time is used as time values.
- **time_index** (*int, optional*) – Level of index to use as "time" column for the table. Set 0 for a single index. This parameter implies `index=False`.
- **index** (*bool, default: True*) – Write DataFrame index as a column.
- **index_label** (*str or sequence, default: None*) – Column label for index column(s). If None is given (default) and index is True, then the index names are used. A sequence should be given if the DataFrame uses MultiIndex.
- **chunksize** (*int, default: 10,000*) – Number of rows to be inserted in each chunk from the dataframe. pytd: This argument will be ignored.
- **date_format** (*str, default: None*) – Format string for datetime objects
- **writer** (*str*, {'bulk_import', 'insert_into', 'spark'}, or `pytd.writer.Writer`, *default*: 'bulk_import') – A Writer to choose writing method to Treasure Data. If not given or string value, a temporal Writer instance will be created.
- **fmt** (*str*, {'csv', 'msgpack'}, *default*: 'csv') –

Format for `bulk_import`.

- **csv**

Convert dataframe to temporary CSV file. Stable option but slower than msgpack option because pytd saves dataframe as temporary CSV file, then td-client converts it to msgpack. Types of columns are guessed by `pandas.read_csv` and it causes unintended type conversion e.g., 0-padded string "00012" into integer 12.

- **msgpack**

Convert to temporary msgpack.gz file. Fast option but there is a slight difference on type conversion compared to csv.

IPython Magics

Use IPython magics to access to Treasure Data. Start by loading the magics.

```
In [1]: %load_ext pytd.pandas_td.ipython
```

pytd.pandas_td.ipython.MagicContext

class pytd.pandas_td.ipython.MagicContext[\[source\]](#)

`__init__()`[\[source\]](#)

Initialize self. See help(type(self)) for accurate signature.

`connect()`[\[source\]](#)

pytd.pandas_td.ipython.MagicTable

class pytd.pandas_td.ipython.MagicTable(*table*)[\[source\]](#)

`__init__(table)`[\[source\]](#)

Initialize self. See help(type(self)) for accurate signature.

pytd.pandas_td.ipython.get_td_magic_context()

pytd.pandas_td.ipython.TDMagics

class pytd.pandas_td.ipython.TDMagics(*shell*)[\[source\]](#)

`__init__(shell)`[\[source\]](#)

Create a configurable given a config config.

Parameters

- **config** (*Config*) – If this is empty, default values are used. If config is a `Config` instance, it will be used to configure the instance.
- **parent** (*Configurable instance, optional*) – The parent `Configurable` instance of this object.

Notes

Subclasses of `Configurable` must call the `__init__()` method of `Configurable` *before* doing anything else and using `super()`:

```
class MyConfigurable(Configurable):
    def __init__(self, config=None):
        super(MyConfigurable, self).__init__(config=config)
        # Then any other code you need to finish initialization.
```

This ensures that instances will be configured properly.

pytd.pandas_td.ipython.DatabasesMagics

class pytd.pandas_td.ipython.DatabasesMagics(*shell*)[\[source\]](#)

`td_databases(pattern)`

List databases in the form of `pandas.DataFrame`.

```
%td_databases [<database_name_pattern>]
```

Parameters

<database_name_pattern> (*string, optional*) – List databases matched to a given pattern. If not given, all existing databases will be listed.

Returns

Return type

`pandas.DataFrame`

Examples

```
In [1]: %load_ext pytd.pandas_td.ipython

In [2]: %td_databases sample
Out[2]:
```

	name	count	permission	created_at	updated_at
0	xx	348124	administrator	2019-01-23 05:48:11+00:00	2019-01-23 05:48:11+00:00
1	yyyyyyyyyy	0	administrator	2017-12-14 07:52:34+00:00	2017-12-14 07:52:34+00:00
2	zzzzzzzzzzzz	0	administrator	2016-05-25 23:12:06+00:00	2016-05-25 23:12:06+00:00
...					

```
In [3]: %td_databases sample
Out[3]:
```

	name	count	permission	created_at	updated_at
0	sampledb	2	administrator	2014-04-11 22:29:38+00:00	2014-04-11 22:29:38+00:00
1	sample_xxxxxxxx	2	administrator	2017-06-02 23:37:41+00:00	2017-06-02 23:37:41+00:00
2	sample_datasets	8812278	query_only	2014-10-04 01:13:11+00:00	2018-03-16 04:59:06+00:00
...					

```
magics= {'cell': {}, 'line': {'td_databases': 'td_databases'}}
registered= True
```

pytd.pandas_td.ipython.TableMagics

class pytd.pandas_td.ipython.TablesMagics(*shell*)[[source](#)]

td_tables(*pattern*)

List tables in databases.

```
%td_tables [<table_identifier_pattern>]
```

Parameters

<table_identifier_pattern> (*string, optional*) – List tables matched to a given pattern. Table identifier is represented as database_name.table_name. If not given, all existing tables will be listed.

Returns

Return type

pandas.DataFrame

Examples

```
In [1]: %load_ext pytd.pandas_td.ipython

In [2]: %td_tables
Out[2]:
```

	db_name	name	count	estimated_storage_size
last_log_timestamp		created_at		
0	xxxxx_demo_aa	customer_test	70	1047 2018-02-05 06:20:32+00:00
2018-02-05 06:20:24+00:00				
1	xxxxx_demo_aa	email_log	0	0 1970-01-01 00:00:00+00:00
2018-02-05 07:19:57+00:00				
2	yy_wf	topk_similar_items	10598	134208 2018-04-16 09:23:57+00:00
2018-04-16 09:59:48+00:00				
...				

```
In [3]: %td_tables sample
Out[3]:
```

	db_name	name	count	estimated_storage_size
last_log_timestamp		created_at		
0	xx_test	aaaaaaaa_sample	0	0 1970-01-01 00:
00:00+00:00 2015-10-20 17:37:40+00:00				
1	sampledb	sampletbl	2	843 1970-01-01 00:
00:00+00:00 2014-04-11 22:30:08+00:00				
2	zzzz_test_db	sample_output_tab	4	889 2018-06-06 08:
26:20+00:00 2018-06-06 08:27:12+00:00				
...				

```
magics= {'cell': {}, 'line': {'td_tables': 'td_tables'}}
```

```
registered= True
```

pytd.pandas_td.ipython.JobMagics

```
class pytd.pandas_td.ipython.JobsMagics(shell)[source]
```

```
td_jobs(line)
```

List job activities in an account.

```
%td_jobs
```

Returns

Return type

```
pandas.DataFrame
```

Examples

```
In [1]: %load_ext pytd.pandas_td.ipython

In [2]: %td_jobs
Out[2]:
```

	status	job_id	type	start_at	query
0	error	448650806	hive	2019-04-12 05:33:36+00:00	with null_samples as (\n select\n id,\n ...
1	success	448646994	presto	2019-04-12 05:23:29+00:00	-- read_td_query\n-- set session distributed_j...
2	success	448646986	presto	2019-04-12 05:23:27+00:00	-- read_td_query\n-- set session distributed_j...
...					

```
magics= {'cell': {}, 'line': {'td_jobs': 'td_jobs'}}
```

```
registered= True
```

pytd.pandas_td.ipython.UseMagics

class `pytd.pandas_td.ipython.UseMagics`(*shell*)[[source](#)]

`td_use`(*line*)

Use a specific database.

This magic pushes all table names in a specified database into the current namespace.

```
%td_use [<database_name>]
```

Parameters

<database_name> (*string*) – Database name.

Examples

```
In [1]: %load_ext pytd.pandas_td.ipython

In [2]: %td_use sample_datasets
INFO: import nasdaq
INFO: import www_access

In [3]: nasdaq # describe table columns in the form of DataFrame
Out[3]: <pytd.pandas_td.ipython.MagicTable at 0x117651908>
```

```
magics={ 'cell': {}, 'line': { 'td_use': 'td_use' } }
```

```
registered= True
```

pytd.pandas_td.ipython.QueryMagics

class `pytd.pandas_td.ipython.QueryMagics`(*shell*)[[source](#)]

`create_job_parser`() [[source](#)]

`parse_job_args`(*line*)[[source](#)]

`create_query_parser`(*engine_type*)[[source](#)]

`parse_query_args`(*engine_type*, *line*)[[source](#)]

`push_code`(*code*, *end*='\\n')[[source](#)]

`display_code_block`() [[source](#)]

`build_query`(*cell*)[[source](#)]

`build_engine`(*engine_type*, *database*, *args*)[[source](#)]

`convert_time`(*d*)[[source](#)]

`set_index`(*d*, *index*, *args*)[[source](#)]

`pivot`(*d*, *args*)[[source](#)]

`post_process`(*d*, *args*)[[source](#)]

`run_job`(*line*)[[source](#)]

`run_query`(*engine_type*, *line*, *cell*)[[source](#)]

`td_job`(*line*)

Get job result.

```
%td_job [--pivot] [--plot] [--dry-run] [--verbose]
        [--connection <connection>] [--dropna] [--out <out>]
        [--out-file <out_file>] [--quiet] [--timezone <timezone>]
        job_id
```


Parameters

- **<job_id>** (*integer*) – Job ID.
- **--pivot** (*optional*) – Run `pivot_table` against dimensions.
- **--plot** (*optional*) – Plot the query result.
- **-n** (*--dry_run,*) – Output translated code without running query.
- **-v** (*--verbose,*) – Verbose output.
- **<connection>, -c <connection>** (*--connection*) – Use specified connection.
- **d** (*--dropna,*) – Drop columns if all values are NA.
- **<out>, -o <out>** (*--out*) – Store the result to variable.
- **<out_file>, -O <out_file>** (*--out-file*) – Store the result to file.
- **q** (*--quiet,*) – Disable progress output.
- **<timezone>, -T <timezone>** (*--timezone*) – Set timezone to time index.

Returns

Return type

`pandas.DataFrame`

Examples

```
In [1]: %load_ext pytd.pandas_td.ipython

In [2]: %td_job 451709460 # select * from sample_datasets.nasdaq limit 5
Out[2]:
```

	symbol	open	volume	high	low	close
time						
1992-08-25 16:00:00	ATRO	0.0	3900	0.7076	0.7076	0.7076
1992-08-25 16:00:00	ALOG	0.0	11200	11.0000	10.6250	11.0000
1992-08-25 16:00:00	ATAX	0.0	11400	11.3750	11.0000	11.0000
1992-08-25 16:00:00	ATRI	0.0	5400	14.3405	14.0070	14.2571
1992-08-25 16:00:00	ABMD	0.0	38800	5.7500	5.2500	5.6875

td_hive

td_hive(line, cell)

Run a Hive query.

```
%%td_hive [<database>] [--pivot] [--plot] [--dry-run] [--verbose]
          [--connection <connection>] [--dropna] [--out <out>]
          [--out-file <out_file>] [--quiet] [--timezone <timezone>]

<query>
```

Parameters

- **<query>** (*string*) – Hive query.
- **<database>** (*string, optional*) – Database name.
- **--pivot** (*optional*) – Run `pivot_table` against dimensions.
- **--plot** (*optional*) – Plot the query result.
- **-n** (*--dry_run,*) – Output translated code without running query.
- **-v** (*--verbose,*) – Verbose output.
- **<connection>, -c <connection>** (*--connection*) – Use specified connection.
- **-d** (*--dropna,*) – Drop columns if all values are NA.
- **<out>, -o <out>** (*--out*) – Store the result to variable.
- **<out_file>, -O <out_file>** (*--out-file*) – Store the result to file.
- **-q** (*--quiet,*) – Disable progress output.
- **<timezone>, -T <timezone>** (*--timezone*) – Set timezone to time index.

Returns

Return type

`pandas.DataFrame`

Examples

```
In [1]: %load_ext pytd.pandas_td.ipython

In [2]: %%td_hive
...: select hivemall_version()
...:
Out[2]:
           _c0
0  0.6.0-SNAPSHOT-201901-r01
```

td_presto

td_presto(line,cell)

Run a Presto query.

```
%%td_presto [<database>] [--pivot] [--plot] [--dry-run] [--verbose]
            [--connection <connection>] [--dropna] [--out <out>]
            [--out-file <out_file>] [--quiet] [--timezone <timezone>]

<query>
```

Parameters

- **<query>** (*string*) – Presto query.
- **<database>** (*string, optional*) – Database name.
- **--pivot** (*optional*) – Run pivot_table against dimensions.
- **--plot** (*optional*) – Plot the query result.
- **-n** (*--dry_run,*) – Output translated code without running query.
- **-v** (*--verbose,*) – Verbose output.
- **<connection>**, **-c <connection>** (*--connection*) – Use specified connection.
- **-d** (*--dropna,*) – Drop columns if all values are NA.
- **<out>**, **-o <out>** (*--out*) – Store the result to variable.
- **<out_file>**, **-O <out_file>** (*--out-file*) – Store the result to file.
- **-q** (*--quiet,*) – Disable progress output.
- **<timezone>**, **-T <timezone>** (*--timezone*) – Set timezone to time index.

Returns

Return type

pandas.DataFrame

Examples

```
In [1]: %load_ext pytd.pandas_td.ipython

In [2]: %%td_presto
...: select * from sample_datasets.nasdaq limit 5
...:
Out[2]:
           time          symbol  open  volume    high    low    close
1989-01-26 16:00:00      SMTC    0.0    8000  0.4532  0.4532  0.4532
1989-01-26 16:00:00      SEIC    0.0  163200  0.7077  0.6921  0.7025
1989-01-26 16:00:00      SIGI    0.0    2800  3.9610  3.8750  3.9610
1989-01-26 16:00:00      NAVG    0.0    1800 14.6740 14.1738 14.6740
1989-01-26 16:00:00      MOCO    0.0   71101  3.6722  3.5609  3.5980
```

```
magics={'cell': {'td_hive': 'td_hive', 'td_presto': 'td_presto'}, 'line': {'td_job': 'td_job'}}
```

```
registered= True
```

pytd.pandas_td.ipython.load_ipython_extension

pytd.pandas_td.ipython.load_ipython_extension(*ipython*)[[source](#)]