TREX

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Chapter 1

TREX

Command line tool for provisioning via xCat in compliance with the batch scheduler

1.1 Dependencies

- libcurl
- rapidjson

1.2 Compilation

```
./cmakeHelper.sh
cd cbuild
make -j $(nproc)
```

1.3 Doxygen

```
cd doc && doxygen Doxyfile
```

1.3.1 for HTML documentation:

doc/build/html/index.html

1.3.2 for PDF documentation:

```
make -C build/latex
```

generates doc/build/latex/refman.pdf

1.4 Usage

```
USAGE:
        ./TREX deploy <nodes> [--group] [--image <image>] [--prescripts <prescripts>]
               [--postbootscripts <postbootscripts>] [--postscripts <postscripts>] [--provmethod
               <provmethod>] [-h] [--json] [-b (slurm|pbs)] [-l <path>]
        ./TREX nodes [<nodes>] [-h] [--json] [-b (slurm|pbs)] [-l <path>]
        ./TREX state [<nodes>] [--state <state>] [--reason <reason>] [-h] [--json] [-b (slurm|pbs)]
               [-l <path>]
        ./TREX jobs [<jobIDs>] [-h] [--json] [-b (slurm|pbs)] [-l <path>]
        ./TREX queues [<queues>] [-h] [--json] [-b (slurm|pbs)] [-l <path>]
        ./TREX images [<images>] [-h] [--json] [-b (slurm|pbs)] [-l <path>]
        ./TREX bootstate [<nodes>] [-h] [--json] [-b (slurm|pbs)] [-l <path>]
        ./TREX reboot <nodes> [-h] [--json] [-b (slurm|pbs)] [-l <path>]
PARAMETERS:
        COMMANDS
            deploy <nodes> --group [--image <image>] [--prescripts <prescripts>] [--postbootscripts
            <postbootscripts>] [--postscripts <postscripts>] [--provmethod <provmethod>]
                    Deploy <image> on <nodes/groups>
            nodes <nodes>
                    Get node information [of <nodes>]
            state <nodes> [--state <state>] [--reason <reason>]
                    Get/Set state [of <nodes>]
            jobs <jobIDs>
                    Get job info [of <jobIDs>]
            queues <queues>
                    Get queue information [of <queues>]
            images <images>
                    Get information for available images [<images>]
            bootstate <nodes>
                    Get bootstate [of <nodes>]
            reboot <nodes>
                    Reboot <nodes>
        OPTIONS
            -h, --help
                    Shows this help message
            --json  Output as json
            -b, --batch (slurm|pbs)
                    Batch System
            -l, --loginFile <path>
                    Path for login data
```

Chapter 2

Third Party Dependencies

2.1 clipp - command line interfaces for modern C++

https://github.com/muellan/clipp; Copyright (c) 2017 André Müller; foss@andremueller-online.de

License: MIT

2.2 Licenses

2.2.1 MIT

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Chapter 3

Hierarchical Index

3.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 4

Class Index

4.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 5

File Index

5.1 File List

Here is a list of all documented files with brief descriptions:

Chapter 6

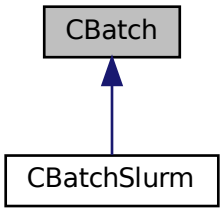
Class Documentation

6.1 CBatch Class Reference

Interface.

`#include <CBatch.h>`

Inheritance diagram for CBatch:



Protected Member Functions

- virtual int **get_jobs** (const std::vector< std::string > &, std::string &)=0
- virtual int **get_nodes** (const std::vector< std::string > &, std::string &)=0
- virtual int **get_queues** (const std::vector< std::string > &, std::string &)=0
- virtual int **get_node_states** (const std::vector< std::string > &, std::string &)=0
- virtual int **set_node_state** (const std::vector< std::string > &, std::string, std::string)=0

6.1.1 Detailed Description

Interface.

The documentation for this class was generated from the following files:

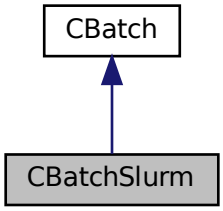
- /home/ntippman/projects/trex/src/batchExchange/CBatch.h
- /home/ntippman/projects/trex/src/batchExchange/CBatch.cpp

6.2 CBatchSlurm Class Reference

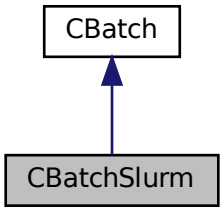
Slurm Class.

`#include <CBatchSlurm.h>`

Inheritance diagram for CBatchSlurm:



Collaboration diagram for CBatchSlurm:



Public Member Functions

- CBatchSlurm (std::string, std::string, std::string, std::string, bool)
  Constructor.
- virtual ~CBatchSlurm ()
  Destructor.
- int login ()
  Login session.
- int logout ()
  Logout session.
- int get_jobs (const std::vector< std::string > &, std::string &)
  Get job information.
- int get_nodes (const std::vector< std::string > &, std::string &)

Get node information.

- int get_queues (const std::vector< std::string > &, std::string &)

  Get queue information.
- int get_node_states (const std::vector< std::string > &, std::string &)

  Get node states.
- int set_node_state (const std::vector< std::string > &, std::string, std::string)

  Set node information.
- int **drain_nodes** (std::vector< std::string > &, const std::string &)
- int **drained** (std::vector< std::string > &, unsigned int &)

Additional Inherited Members

6.2.1 Detailed Description

Slurm Class.

6.2.2 Member Function Documentation

6.2.2.1 get_jobs()

```
int CBatchSlurm::get_jobs (
            const std::vector< std::string > & filter,
            std::string & output )  [virtual]
```

Get job information.

Parameters

jobs	Job Id(s)
output	output

Returns

0 Success

1 Error

Implements CBatch.

6.2.2.2 get_node_states()

```
int CBatchSlurm::get_node_states (
            const std::vector< std::string > & filter,
            std::string & output )  [virtual]
```

Get node states.

Parameters

filter	Nodes(s)
output	output

Returns

0 Success

1 Error

Implements CBatch.

6.2.2.3 get_nodes()

```
int CBatchSlurm::get_nodes (
            const std::vector< std::string > & filter,
            std::string & output )  [virtual]
```

Get node information.

Parameters

filter	Nodes(s)
output	output

Returns

0 Success

1 Error

Implements CBatch.

6.2.2.4 get_queues()

```
int CBatchSlurm::get_queues (
            const std::vector< std::string > & filter,
            std::string & output )  [virtual]
```

Get queue information.

Parameters

filter	Queue(s)
output	output

Returns

0 Success

1 Error

Implements CBatch.

6.2.2.5 login()

```
int CBatchSlurm::login ( )
```

Login session.

Returns

0 Success

1 Error

6.2.2.6 logout()

```
int CBatchSlurm::logout ( )
```

Logout session.

Returns

0 Success

1 Error

6.2.2.7 set_node_state()

```
int CBatchSlurm::set_node_state (
            const std::vector< std::string > & nodes,
            std::string state,
            std::string reason )  [virtual]
```

Set node information.

Parameters

queues	nodes list of nodes
state	State to be set
reason	Reason for state change

Returns

0 Success

1 Error

Implements CBatch.

The documentation for this class was generated from the following files:

- /home/ntippman/projects/trex/src/batchExchange/CBatchSlurm.h
- /home/ntippman/projects/trex/src/batchExchange/CBatchSlurm.cpp

6.3 CXCat Class Reference

Public Member Functions

- CXCat (std::string, std::string, std::string, std::string, bool)
  Constructor.
- ~CXCat ()
  Destructor.
- int login ()
  Login session.
- int logout ()
  Logout session.
- int get_os_images (const std::vector< std::string > &, std::string &)
  Get os images.
- int get_os_image_names (std::vector< std::string > &)
  Get names of os images.
- int get_bootstate (const std::vector< std::string > &, std::string &)
  Get os images.
- int get_nodes (std::string &)
  Get information of all available nodes.
- int set_os_image (const std::vector< std::string > &, std::string)
  Set os image.
- int reboot_nodes (const std::vector< std::string > &)
  Reboot nodes.
- int set_group_attributes (std::string, const std::string &)
  Set attributes of group.
- int set_node_attributes (const std::vector< std::string > &, const std::string &)
  Set attributes of nodes.
- int get_group_members (std::string group, std::vector< std::string > &output)
  Get all members of group.
- int get_group_names (std::vector< std::string > &)
  Get names of all groups.
- int get_group (std::string, std::string &)
  Get attributes of group.

6.3.1 Member Function Documentation

6.3.1.1 get_bootstate()

```
int CXCat::get_bootstate (
            const std::vector< std::string > & filter,
            std::string & output )
```

Get os images.

Parameters

filter	filter
output	output

Returns

0 Success

1 Error

6.3.1.2 get_group()

```
int CXCat::get_group (
            std::string group,
            std::string & output )
```

Get attributes of group.

Parameters

group	group
output	output

Returns

0 Success

1 Error

6.3.1.3 get_group_members()

```
int CXCat::get_group_members (
            std::string group,
            std::vector< std::string > & output )
```

Get all members of group.

Parameters

group	group
output	output

Returns

0 Success

1 Error

6.3.1.4 get_group_names()

```
int CXCat::get_group_names (
            std::vector< std::string > & output )
```

Get names of all groups.

Parameters

output	output

Returns

0 Success

1 Error

6.3.1.5 get_nodes()

```
int CXCat::get_nodes (
            std::string & output )
```

Get information of all available nodes.

Parameters

output	output

Returns

0 Success

1 Error

6.3.1.6 get_os_image_names()

```
int CXCat::get_os_image_names (
            std::vector< std::string > & output )
```

Get names of os images.

Parameters

output	output

Returns

0 Success

1 Error

6.3.1.7 get_os_images()

```
int CXCat::get_os_images (
            const std::vector< std::string > & filter,
            std::string & output )
```

Get os images.

Parameters

filter	filter
output	output

Returns

0 Success

1 Error

6.3.1.8 login()

```
int CXCat::login ( )
```

Login session.

Returns

0 Success

1 Error

6.3.1.9 logout()

```
int CXCat::logout ( )
```

Logout session.

Returns

0 Success

1 Error

6.3.1.10 reboot_nodes()

```
int CXCat::reboot_nodes (
            const std::vector< std::string > & filter )
```

Reboot nodes.

Parameters

filter	filter

Returns

0 Success

1 Error

6.3.1.11 set_group_attributes()

```
int CXCat::set_group_attributes (
            std::string group,
            const std::string & attributes )
```

Set attributes of group.

Parameters

group	name of group
attributes	json attributes

Returns

0 Success

1 Error

6.3.1.12 set_node_attributes()

```
int CXCat::set_node_attributes (
            const std::vector< std::string > & nodes,
            const std::string & attributes )
```

Set attributes of nodes.

Parameters

nodes	list of nodes
attributes	json attributes

Returns

0 Success

1 Error

6.3.1.13 set_os_image()

```
int CXCat::set_os_image (
            const std::vector< std::string > & filter,
            std::string osImage )
```

Set os image.

Parameters

filter	filter
output	output

Returns

0 Success

1 Error

The documentation for this class was generated from the following files:

- /home/ntippman/projects/trex/src/batchExchange/CXCat.h
- /home/ntippman/projects/trex/src/batchExchange/CXCat.cpp

6.4 HttpSession Class Reference

Public Member Functions

- HttpSession (const std::string &usernameIn, const std::string &passwordIn, const std::string &server↩ AddressIn, const std::string &serverPortIn)

  Constructor.
- ~HttpSession ()

  Destructor.
- void ssl_verify (bool verfiy)

  Simple setter if ssl certificate should be checked or not.
- int set_token_type (int tokenTypeIn, const SessionTokenTypes *sessionTokenTypes=nullptr)

  Sets keys to extract session token more easyly.
- void set_date_parse_descr (const std::string formatDesc)

  Setter for data format.
- void set_login_path (const std::string loginPathIn)

  Defines the URL path for login.
- void set_logout_path (const std::string logoutPathIn)

  Defines the URL path for logout.
- std::string get_access_token ()

  Get access token.
- int login ()

  Gets authentification token.
- int logout ()

  Frees authentification token.

6.4.1 Constructor & Destructor Documentation

6.4.1.1 HttpSession()

```
HttpSession::HttpSession (
            const std::string & usernameIn,
            const std::string & passwordIn,
            const std::string & serverAddressIn,
            const std::string & serverPortIn )
```

Constructor.

Constructor with necessary parameters for function. Initililizes libcurl handle too.

Parameters

usernameIn	login name of user
passwordIn	login password of user
server↩ AddressIn	url of server
serverPortIn	port of server

6.4.1.2 ∼HttpSession()

```
HttpSession::∼HttpSession ( )
```

Destructor.

Frees session if not done yet and libcurl ressources.

6.4.2 Member Function Documentation

6.4.2.1 get_access_token()

```
std::string HttpSession::get_access_token ( )
```

Get access token.

Returns

the access token itself

6.4.2.2 login()

```
int HttpSession::login ( )
```

Gets authentification token.

Returns

0-100 error codes from libcurl >100 http error codes -1 no libcurl handle -2 no username or password -3 no host address or port -4 could not receive access token -5 already logged in -10 could'n extract token -100 unknown session type

Parameters

loginPathIn	REST path to login endpoint (leading / is needed e.g. "/token")

6.4.2.3 logout()

```
int HttpSession::logout ( )
```

Frees authentification token.

Returns

0-100 error codes from libcurl >100 http error codes

6.4.2.4 set_date_parse_descr()

```
void HttpSession::set_date_parse_descr (
            const std::string formatDesc )
```

Setter for data format.

Must have a format like it is described in strtime. https://www.cplusplus.com/reference/ctime/strftime/

Parameters

formatDesc	strtime like date description

6.4.2.5 set_login_path()

```
void HttpSession::set_login_path (
            const std::string loginPathIn )
```

Defines the URL path for login.

Parameters

login↩ PathIn	URL path (leading / is needed)

6.4.2.6 set_logout_path()

```
void HttpSession::set_logout_path (
            const std::string logoutPathIn )
```

Defines the URL path for logout.

Parameters

logout↩ PathIn	URL path (leading / is needed)

6.4.2.7 set_token_type()

```
int HttpSession::set_token_type (
            int tokenTypeIn,
            const SessionTokenTypes * sessionTokenTypes = nullptr )
```

Sets keys to extract session token more easyly.

Parameters

tokenTypeIn	defines which type of token should be used
sessionTokenTypes	struct with json keys for token attributes

6.4.2.8 ssl_verify()

```
void HttpSession::ssl_verify (
            bool verfiy )
```

Simple setter if ssl certificate should be checked or not.

Parameters

verfiy	true if ssl certificate should be checked

The documentation for this class was generated from the following files:

- /home/ntippman/projects/trex/src/batchExchange/httpSession.h
- /home/ntippman/projects/trex/src/batchExchange/httpSession.cpp

6.5 utils::loginData Struct Reference

Public Attributes

- std::string **username**
- std::string **password**
- std::string **host**
- std::string **port**

The documentation for this struct was generated from the following file:

- /home/ntippman/projects/trex/src/batchExchange/utils.h

6.6 RestClient Class Reference

Public Member Functions

- RestClient (const int)
  Constructor.
- ~RestClient ()
  Destructor.
- int login ()
  Loggs in if needed.
- int logout ()
  Removes login tokens and frees sessions.
- void set_user_credentials (const std::string &, const std::string &)
  Simple setter for username an password.
- void set_host_config (const std::string &, const std::string &)
  Simple setter for server settings.
- void ssl_verify (bool)
  Simple setter if ssl certificate should be checked or not.
- void useragent (const std::string &)
  Simple setter user agent.
- int get (const std::string &, std::string &, std::string &)
  Represents http get request.
- int post (const std::string &, const std::string &, std::string &, std::string &)
  Represents http post request.
- int del (const std::string &, std::string &, std::string &)
  Represents http delete request.
- int patch (const std::string &, const std::string &, std::string &, std::string &)
  Represents http patch request.
- int put (const std::string &, const std::string &, std::string &, std::string &)
  Represents http put request.
- int **call** (std::string, const std::string &, std::string &, const std::string &="")
- long get_last_http_code ()
  Getter for http return code of last request.
- double get_last_request_time ()
  Getter for execution time of last request.
- std::string get_last_url ()
  Getter for url of last request.

6.6.1 Constructor & Destructor Documentation

6.6.1.1 RestClient()

```
RestClient::RestClient (
            const int authTypeIn )
```

Constructor.

Constructor with necessary parameters for function. Initililizes libcurl handle too.

Parameters

auth↩ TypeIn	type of http connection (e.g. no login, token based, ...)

6.6.1.2 ~RestClient()

```
RestClient::~RestClient ( )
```

Destructor.

Frees session if not done yet and libcurl ressources.

6.6.2 Member Function Documentation

6.6.2.1 del()

```
int RestClient::del (
            const std::string & restPath,
            std::string & response,
            std::string & header )
```

Represents http delete request.

Returns

0-100 error codes from libcurl >100 http error codes -1 no libcurl handle

6.6.2.2 get()

```
int RestClient::get (
            const std::string & restPath,
            std::string & response,
            std::string & header )
```

Represents http get request.

Returns

0-100 error codes from libcurl >100 http error codes -1 no libcurl handle

6.6.2.3 get_last_http_code()

```
long RestClient::get_last_http_code ( )
```

Getter for http return code of last request.

Returns

code of last request

6.6.2.4 get_last_request_time()

```
double RestClient::get_last_request_time ( )
```

Getter for execution time of last request.

Returns

execution time of last request

6.6.2.5 get_last_url()

```
std::string RestClient::get_last_url ( )
```

Getter for url of last request.

Returns

url of last request

6.6.2.6 login()

```
int RestClient::login ( )
```

Loggs in if needed.

Returns

0-100 error codes from libcurl >100 http error codes -1 no libcurl handle -2 no username or password -3 no host address or port -4 could not receive access token -5 already logged in -100 unknown authentication method

6.6.2.7 patch()

```
int RestClient::patch (
            const std::string & restPath,
            const std::string & postData,
            std::string & response,
            std::string & header )
```

Represents http patch request.

Returns

0-100 error codes from libcurl >100 http error codes -1 no libcurl handle

6.6.2.8 post()

```
int RestClient::post (
            const std::string & restPath,
            const std::string & postData,
            std::string & response,
            std::string & header )
```

Represents http post request.

Returns

0-100 error codes from libcurl >100 http error codes -1 no libcurl handle

6.6.2.9 put()

```
int RestClient::put (
            const std::string & restPath,
            const std::string & postData,
            std::string & response,
            std::string & header )
```

Represents http put request.

Returns

0-100 error codes from libcurl >100 http error codes -1 no libcurl handle

6.6.2.10 set_host_config()

```
void RestClient::set_host_config (
            const std::string & serverAddressIn,
            const std::string & serverPortIn )
```

Simple setter for server settings.

Parameters

serverAddressIn	server address or dns name
serverPortIn	port to communicate with (e.g. 80 for http, 443 for https)

6.6.2.11 set_user_credentials()

```
void RestClient::set_user_credentials (
            const std::string & usernameIn,
            const std::string & passwordIn )
```

Simple setter for username an password.

Parameters

usernameIn	username for login
passwordIn	password for login

6.6.2.12 ssl_verify()

```
void RestClient::ssl_verify (
            bool sslVerifyIn )
```

Simple setter if ssl certificate should be checked or not.

Parameters

sslVerifyIn	true if ssl certificate should be checked

6.6.2.13 useragent()

```
void RestClient::useragent (
            const std::string & useragent )
```

Simple setter user agent.

Sets the name how libcurl authenticated against the server.

Parameters

useragent	authentication name

The documentation for this class was generated from the following files:

- /home/ntippman/projects/trex/src/batchExchange/restClient.h
- /home/ntippman/projects/trex/src/batchExchange/restClient.cpp

6.7 SessionToken Class Reference

Public Member Functions

- SessionToken ()
  Constructor.
- ~SessionToken ()
  Destructor.
- void set_keys_token_type (const std::vector< std::string > &keysTokenTypeIn)
  Set token type.
- void set_keys_access_token (const std::vector< std::string > &keysAccessTokenIn)
  Set access token.
- void set_keys_refresh_token (const std::vector< std::string > &keysRefreshTokenIn)
  Set refresh token.
- void set_keys_expire_time (const std::vector< std::string > &keysExpireTimeIn)
  Set expire time.
- void set_keys_expire_date (const std::vector< std::string > &keysExpireDateIn)
  Set expire date.
- void set_keys_by_token_type (const SessionTokenTypes token)
  Sets keys to extract session token more easyly.
- void set_date_parse_descr (std::string formatDesc)
  Setter for data format.
- int read_token (const std::string &token)
  Wrapper for reading token data from json object.
- bool token_expired ()
  Resturns if token is expired.
- int token_time_to_expire ()
  Delivers time in seconds when how long the token is valid.
- std::string get_token_type ()
  Get token type.
- std::string get_access_token ()
  Get access token.
- std::string get_refresh_token ()
  Get refresh token.
- int get_expire_time ()
  Get expire time of token.
- time_t get_expire_date ()
  Get expire date.

6.7.1 Member Function Documentation

6.7.1.1 get_access_token()

```
std::string SessionToken::get_access_token ( )
```

Get access token.

Returns

access token

6.7.1.2 get_expire_date()

```
time_t SessionToken::get_expire_date ( )
```

Get expire date.

Returns

expire date of the access token as unix timestamp

6.7.1.3 get_expire_time()

```
int SessionToken::get_expire_time ( )
```

Get expire time of token.

Returns

expire time of the access token in seconds

6.7.1.4 get_refresh_token()

```
std::string SessionToken::get_refresh_token ( )
```

Get refresh token.

Returns

a refresh token to request a new access token

6.7.1.5 get_token_type()

```
std::string SessionToken::get_token_type ( )
```

Get token type.

Returns

Type of the token

6.7.1.6 read_token()

```
int SessionToken::read_token (
            const std::string & token )
```

Wrapper for reading token data from json object.

Parameters

token	the token data as json containted in a string

Returns

error code

6.7.1.7 set_date_parse_descr()

```
void SessionToken::set_date_parse_descr (
            std::string formatDesc )
```

Setter for data format.

Must have a format like it is described in strtime. https://www.cplusplus.com/reference/ctime/strftime/

Parameters

formatDesc	strtime like date description

6.7.1.8 set_keys_access_token()

```
void SessionToken::set_keys_access_token (
            const std::vector< std::string > & keysAccessTokenIn )
```

Set access token.

Parameters

keysAccess↩ TokenIn	contains keys of json file where to find the access token ["token", "accessToken"]

6.7.1.9 set_keys_by_token_type()

```
void SessionToken::set_keys_by_token_type (
            const SessionTokenTypes token )
```

Sets keys to extract session token more easyly.

Parameters

token	struct with json keys for token attributes

6.7.1.10 set_keys_expire_date()

```
void SessionToken::set_keys_expire_date (
            const std::vector< std::string > & keysExpireDateIn )
```

Set expire date.

Parameters

keysExpire↩ DateIn	contains keys of json file where to find the expire date ["token", "date"]

6.7.1.11 set_keys_expire_time()

```
void SessionToken::set_keys_expire_time (
            const std::vector< std::string > & keysExpireTimeIn )
```

Set expire time.

Parameters

keysExpire↩ TimeIn	contains keys of json file where to find the expire time ["token", "time"]

6.7.1.12 set_keys_refresh_token()

```
void SessionToken::set_keys_refresh_token (
            const std::vector< std::string > & keysRefreshTokenIn )
```

Set refresh token.

Parameters

keysRefresh↩ TokenIn	contains keys of json file where to find the refresh token ["token", "refreshToken"]

6.7.1.13 set_keys_token_type()

```
void SessionToken::set_keys_token_type (
            const std::vector< std::string > & keysTokenTypeIn )
```

Set token type.

Parameters

keysToken↩ TypeIn	contains keys of json file where to find the token type ["token", "tokenType"]

6.7.1.14 token_expired()

```
bool SessionToken::token_expired ( )
```

Resturns if token is expired.

Returns

simple bool true == expired

6.7.1.15 token_time_to_expire()

```
int SessionToken::token_time_to_expire ( )
```

Delivers time in seconds when how long the token is valid.

Returns

time in seconds

The documentation for this class was generated from the following files:

- /home/ntippman/projects/trex/src/batchExchange/httpSession.h
- /home/ntippman/projects/trex/src/batchExchange/httpSession.cpp

6.8 SessionTokenTypes Struct Reference

Public Attributes

- std::vector< std::string > **keysTokenType**
- std::vector< std::string > **keysAccessToken**
- std::vector< std::string > **keysRefreshToken**
- std::vector< std::string > **keysExpireTime**
- std::vector< std::string > **keysExpireDate**

The documentation for this struct was generated from the following file:

- /home/ntippman/projects/trex/src/batchExchange/sessionTokenTypes.h

Chapter 7

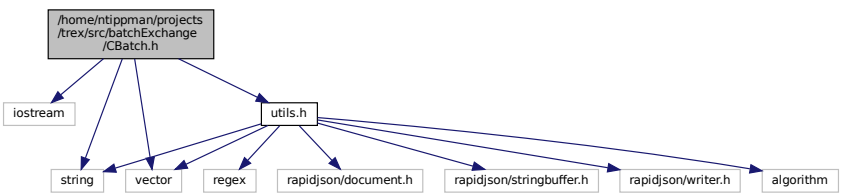
File Documentation

7.1 /home/ntippman/projects/trex/src/batchExchange/CBatch.h File Reference

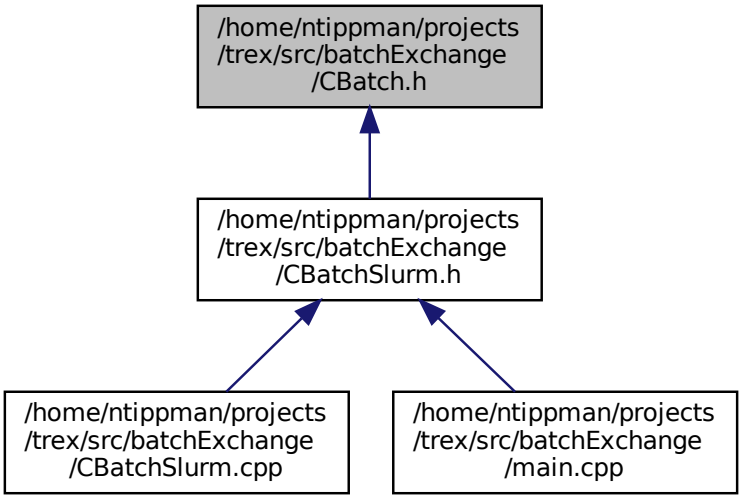
Definitions for CBatch.h.

```
#include <iostream>
#include <string>
#include <vector>
#include "utils.h"
```

Include dependency graph for CBatch.h:



This graph shows which files directly or indirectly include this file:



Classes

- class CBatch

  Interface.

7.1.1 Detailed Description

Definitions for CBatch.h.

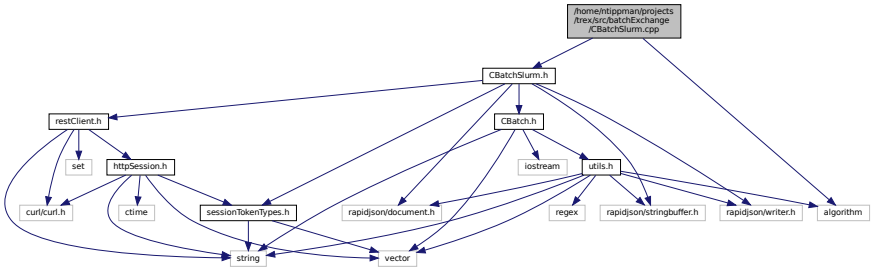
Interface definition for inheriting batch classes.

7.2 /home/ntippman/projects/trex/src/batchExchange/CBatchSlurm.cpp File Reference

CBatch Slurm implementation.

```
#include "CBatchSlurm.h"
#include <algorithm>
```

Include dependency graph for CBatchSlurm.cpp:



7.2.1 Detailed Description

CBatch Slurm implementation.

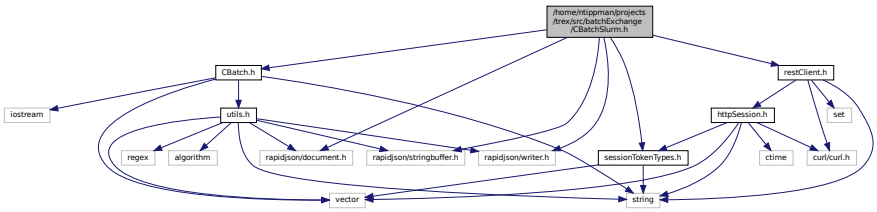
Slurm currently does not provide a way to query multiple specified resources with a single call. Therefore the whole collection is queried and then filtered.

7.3 /home/ntippman/projects/trex/src/batchExchange/CBatchSlurm.h File Reference

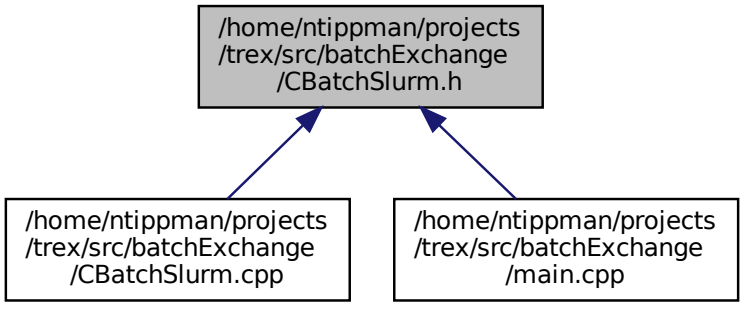
Header for CBatchSlurm.cpp.

```
#include "CBatch.h"
#include "rapidjson/document.h"
#include "rapidjson/stringbuffer.h"
#include "rapidjson/writer.h"
#include "restClient.h"
#include "sessionTokenTypes.h"
```

Include dependency graph for CBatchSlurm.h:



This graph shows which files directly or indirectly include this file:



Classes

- class CBatchSlurm

  Slurm Class.

7.3.1 Detailed Description

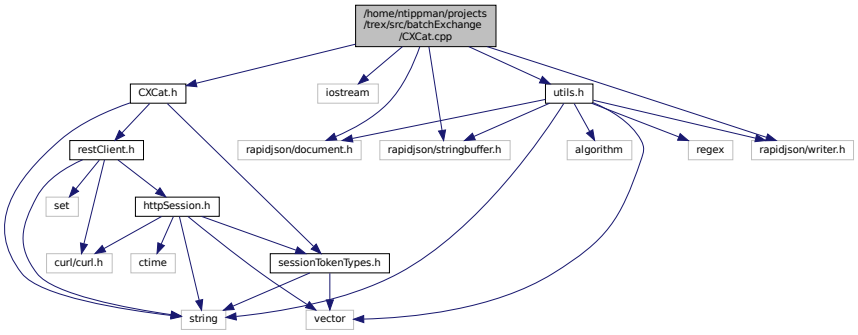
Header for CBatchSlurm.cpp.

7.4 /home/ntippman/projects/trex/src/batchExchange/CXCat.cpp File Reference

CXCat implementation.

```
#include "CXCat.h"
#include <iostream>
#include "rapidjson/document.h"
#include "rapidjson/stringbuffer.h"
#include "rapidjson/writer.h"
#include "utils.h"
```

Include dependency graph for CXCat.cpp:



7.4.1 Detailed Description

CXCat implementation.

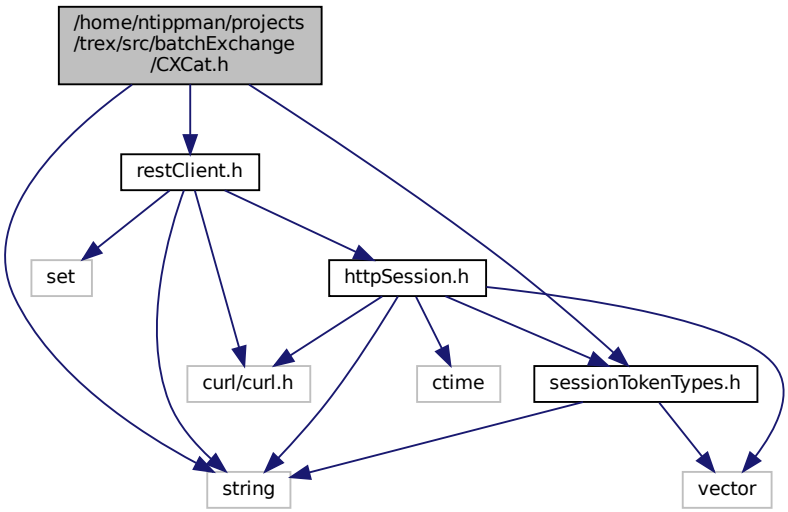
7.5 /home/ntippman/projects/trex/src/batchExchange/CXCat.h File Reference

Header for CXCat.

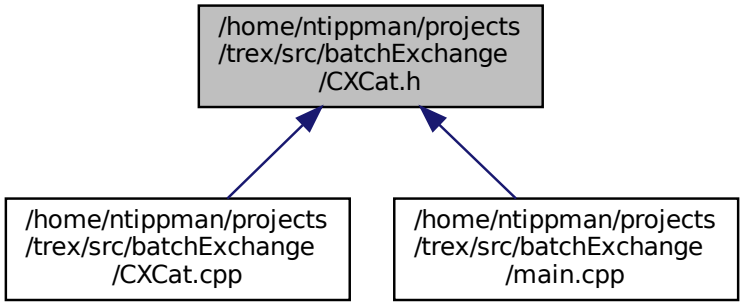
```
#include <string>
#include "restClient.h"
```

```
#include "sessionTokenTypes.h"
```

Include dependency graph for CXCat.h:



This graph shows which files directly or indirectly include this file:



Classes

- class CXCat

7.5.1 Detailed Description

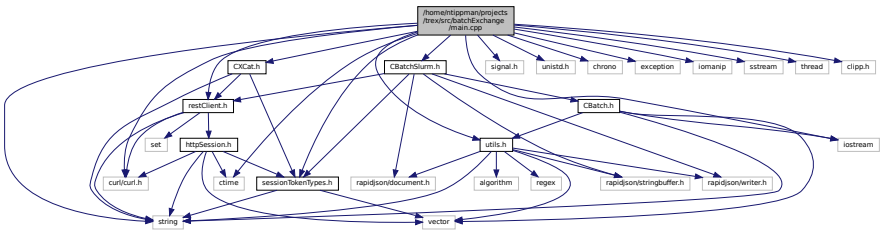
Header for CXCat.

7.6 /home/ntippman/projects/trex/src/batchExchange/main.cpp File Reference

CLI.

```
#include <curl/curl.h>
#include <signal.h>
#include <unistd.h>
#include <chrono>
#include <ctime>
#include <exception>
#include <iomanip>
#include <iostream>
#include <sstream>
#include <string>
#include <thread>
#include "CBatchSlurm.h"
#include "CXCat.h"
#include "clipp.h"
#include "restClient.h"
#include "sessionTokenTypes.h"
#include "utils.h"
```

Include dependency graph for main.cpp:



Macros

- #define **DRAIN_SLEEP** 3000

Functions

- bool **canceled** (false)
- void sigHandler (int signal)

  Handle caught signal.
- int **main** (int argc, char **argv)

7.6.1 Detailed Description

CLI.

7.6.2 Function Documentation

7.6.2.1 sigHandler()

```
void sigHandler (
            int signal )
```

Handle caught signal.

This function is called when SIGINT is caught.

Parameters

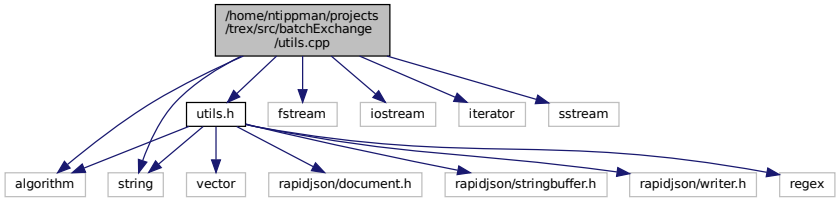
signal	Number of signal

7.7 /home/ntippman/projects/trex/src/batchExchange/utils.cpp File Reference

Collection of helper functions.

```
#include "utils.h"
#include <algorithm>
#include <fstream>
#include <iostream>
#include <iterator>
#include <sstream>
#include <string>
```

Include dependency graph for utils.cpp:



7.7.1 Detailed Description

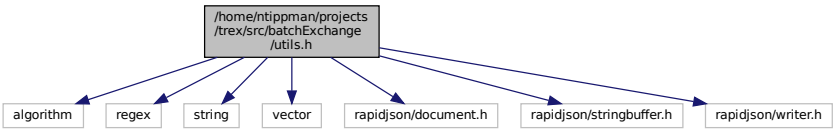
Collection of helper functions.

7.8 /home/ntippman/projects/trex/src/batchExchange/utils.h File Reference

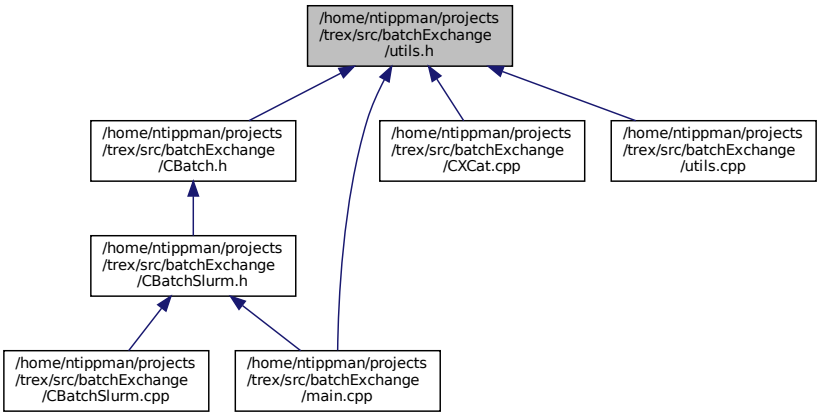
Header for utils.cpp.

```
#include <algorithm>
#include <regex>
#include <string>
#include <vector>
#include "rapidjson/document.h"
#include "rapidjson/stringbuffer.h"
#include "rapidjson/writer.h"
```

Include dependency graph for utils.h:



This graph shows which files directly or indirectly include this file:



Classes

- struct utils::loginData

Macros

- #define **INVALID_JSON_ERROR_MSG** "Error - Response is not valid JSON"

Functions

- void utils::str_split (const std::string &input, const std::string delimiter, std::vector< std::string > &ret)

  Split string at delimiter.
- int **utils::read_login_data** (const std::string &path, utils::loginData &megware, utils::loginData &xcat, utils::loginData &slurm, bool ignoreHeader=true)
- int **utils::read_file_to_string** (std::string, std::string &)
- int **utils::write_to_file** (std::string, const std::string &)
- void **utils::erase_lines_from_start** (std::string &, int)
- void **utils::to_lower** (std::string &)
- void **utils::to_upper** (std::string &)
- std::string **utils::join_vector_to_string** (const std::vector< std::string > &, const std::string)
- int **utils::check_errors** (const std::string &)
- void utils::str_extract_regex_occurances (std::string, const std::regex &, std::vector< std::string > &)

  Extract all regex matches from string.
- bool utils::is_number (const std::string &)

  Check if string contains only numbers (integer only)
- void utils::decode_brace (const std::string &, std::vector< std::string > &)

  Decode brace notation.
- bool utils::str_match_wildcard (const std::string &, const std::string &)

  Check if string matches wildcard-string.
- bool utils::ends_with (const std::string &, const std::string &)

  Check if string ends with <suffix>
- bool utils::starts_with (const std::string &, const std::string &)

  Check if string starts with <prefix>
- bool utils::str_match_any_wildcard (const std::vector< std::string > &, const std::string &)

  Check if string matches any wildcard-string of vector.
- void **utils::rapidjson_doc_to_str** (rapidjson::Document &, std::string &)
- template<typename T >
  bool utils::vector_contains (const std::vector< T > &v, const T &e)

  Template function to check whether a vector contains the specified element.

Variables

- const std::vector< std::string > **utils::slurmNodeStates**

7.8.1 Detailed Description

Header for utils.cpp.

7.8.2 Function Documentation

7.8.2.1 decode_brace()

```
void utils::decode_brace (
            const std::string & input,
            std::vector< std::string > & ret )
```

Decode brace notation.

Parameters

input	String to be decoded
ret	Vector of decoded strings

7.8.2.2 ends_with()

```
bool utils::ends_with (
            const std::string & s,
            const std::string & suffix )
```

Check if string ends with <suffix>

Parameters

s	Input string
suffix	Suffix

Returns

0 Suffix not present

1 Suffix present

7.8.2.3 is_number()

```
bool utils::is_number (
            const std::string & s )
```

Check if string contains only numbers (integer only)

Parameters

pattern	Wildcard pattern vector
target	Target to be checked

Returns

0 NaN

1 Is number

7.8.2.4 starts_with()

```
bool utils::starts_with (
            const std::string & s,
            const std::string & prefix )
```

Check if string starts with <prefix>

Parameters

s	Input string
prefix	Prefix

Returns

0 Prefix not present

1 Prefix present

7.8.2.5 str_extract_regex_occurances()

```
void utils::str_extract_regex_occurances (
            std::string input,
            const std::regex & regex,
            std::vector< std::string > & ret )
```

Extract all regex matches from string.

Parameters

input	Input string to be checked
regex	Regex
ret	Vector of matches

7.8.2.6 str_match_any_wildcard()

```
bool utils::str_match_any_wildcard (
            const std::vector< std::string > & wildcards,
            const std::string & target )
```

Check if string matches any wildcard-string of vector.

Parameters

pattern	Wildcard pattern vector
target	Target to be checked

Returns

0 No match

1 Match

7.8.2.7 str_match_wildcard()

```
bool utils::str_match_wildcard (
            const std::string & pattern,
            const std::string & target )
```

Check if string matches wildcard-string.

Parameters

pattern	Wildcard pattern
target	Target to be checked

Returns

0 No match

1 Match

7.8.2.8 str_split()

```
void utils::str_split (
            const std::string & input,
            const std::string delimiter,
            std::vector< std::string > & ret )
```

Split string at delimiter.

Parameters

input	Input string
delimiter	Delimiter
ret	Output vector

7.8.2.9 vector_contains()

```
template<typename T >
bool utils::vector_contains (
```

```
const std::vector< T > & v,
const T & e )
```

Template function to check whether a vector contains the specified element.

Parameters

v	Vector
e	Element

Returns

0 Element not in vector

1 Element in vector

Index