Standard Streams

Standard streams are preconnected input and output communication channels between a computer program and its environment when it begins execution.

The three input/output connections are called stdin (standard input), stdout (standard output) and stderr (standard error).

When a command is executed via an interactive shell, the streams are typically connected to the text terminal on which the shell is running, but can be changed with redirection or a pipeline.

Stdin

Standard input is a stream from which a program reads its input data. The program requests data transfers by use of the read operation.

Unless redirected, standard input is inherited from the parent process. In the case of an interactive shell, that is usually associated with the keyboard.

For processes that use a file as input, that file data may be passed (or piped) in through the stdin channel.

Input via Stdin

Piping an input file myVolumes.csv via stdin to TMSS10Sync.

```
TMSS10Sync -S user:-password@serveraddress < myVolumes.csv
```

Stdout

Standard output is a stream to which a program writes its output data.

Unless redirected, standard output is inherited from the parent process.

Output Via Stdout

Redirecting stdout from TMSS10Sync to file sync_stdout.txt. If the file sync_stdout.txt already exists, it will be overwritten.

```
TMSS10Sync -S user:-password@serveraddress < myVolumes.csv > sync_stdout.txt
```

Redirecting stdout from TMSS10Sync to file sync_stdout.txt. Using the double » symbol instead of a single >, the file sync_stdout.txt will be appended to rather than overwritten.

```
TMSS10Sync -S user:-password@serveraddress < myVolumes.csv >>
sync_stdout.txt
```

Stderr

Standard error is another output stream typically used by programs to output error messages or diagnostics. It is a stream independent of standard output and can be redirected separately.

Output Via Stderr

Redirecting stderr from TMSS10Sync to file sync_stderr.txt. If the file sync_stderr.txt already exists, it will be overwritten.

```
TMSS10Sync -S user:-password@serveraddress < myVolumes.csv > sync_stdout.txt
2> sync_stderr.txt
```

Redirecting stdout from TMSS10Sync to file sync_stderr.txt. Using the double » symbol instead of a single >, the file sync_stderr.txt will be appended to rather than overwritten.

```
TMSS10Sync -S user:-password@serveraddress < myVolumes.csv >>
sync_stdout.txt 2>> sync_stderr.txt
```

Concatenating Stdout and Stderr

Depending on the purpose of the output from stdout and stderr it is possible to combine both streams to the one output file.

```
TMSS10Sync -S user:-password@serveraddress < myVolumes.csv > 2>&1
sync_stdout_stderr.txt
```