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IonReporterUploader Command-line Utility User Guide

For use with Torrent Suite™ Software 5.10 on Linux™, Macintosh™, or Windows™ Operating Systems

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For Research Use Only. Not for use in diagnostic procedures.

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B.0	September 11, 2018	Correction to typos in "Custom attributes in sample definitions" topic.
A.0	June 19, 2018	Changes from IonReporterUploader User Guide dated September 2015.

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IonReporterUploader command-line utility

You can use the IonReporterUploader command-line utility to transfer results files to Ion Reporter™ Software and to define samples, based on the transferred files. The IonReporterUploader command-line utility uses your login ID to transfer run data from Torrent Suite™ Software to Ion Reporter™ Software. The utility supports these transfer scenarios:

- Transfer a single BAM or VCF file
- Transfer all results files for a Torrent Suite™ Software analysis
- Transfer results files that are in a single flat folder
- Transfer multiple files that are not restricted to a single folder

You can later analyze the samples with Ion Reporter™ Software. The IonReporterUploader command-line utility can be run on your Torrent Server, or can be run on any standard (and current) computer that runs Linux™, Mac OS™, or Windows™ Operating System. You can enter IonReporterUploader command-line utility options through command line arguments, or through a properties file.

Note: IonReporterUploader command-line utility should not be used for uploading samples from references other than hg19 and GRCh38. Although E-coli and animal reference genomes can be used in Torrent Suite™ Software, they are not supported in Ion Reporter™ Software.

The Ion Reporter™ Software can be run on any of these systems:

- Your Torrent Server
- A standard Linux™ machine
- A standard Windows™ (XP or later) machine
- A standard Macintosh™ machine

Note: IonReporterUploader command-line utility supports the upload of combined Ion Reporter™ Software analysis results that are output by the **Combine Alignments** option in the Torrent Suite™ Software Projects tab. The IonReporterUploader plugin does not support uploading these files.

The IonReporterUploader command-line utility is an alternative to the IonReporterUploader plugin that is included with Torrent Suite™ Software. For information on IonReporterUploader plugin, see the Torrent Suite™ Software Help, or the *Torrent Suite™ Software 5.10 User Guide*.

Get started with the IonReporterUploader command-line utility

Sign into Ion Reporter™ Software to download the IonReporterUploader command-line utility files. After your IonReporterUploader command-line utility is installed and configured, you can run the IonReporterUploader command-line utility from the command-line interface that is installed on either your local machine, or on the Torrent Server.

A summary of the entire installation process is as follows:

- Download the IonReporterUploader command-line utility files from Ion Reporter™ Software and install the IonReporterUploader command-line utility on the computer that has the files that will be transferred.
- To transfer files to Ion Reporter™ Software 4.*x* and later, use your Ion Reporter™ Software login id and password, instead of an authentication token.
- If you are transferring multiple samples, create a CSV file of the sample metadata. Ensure that the files contains at least sample name, path to the data file, and gender.
- Optionally, create properties files for information to connect to Ion Reporter™ Software, and for additional sample metadata (such as chip type).
- Run the IonReporterUploader command-line utility.
- Check the IonReporterUploader command-line utility log.
- Log into Ion Reporter™ Software to analyze the samples.

IonReporterUploader command-line utility and IonReporterUploader plugin comparison

The following summarizes the differences in behavior and functionality for the IonReporterUploader command-line utility and the IonReporterUploader plugin in Torrent Suite™ Software:

Feature	IonReporterUploader plugin in Torrent Suite™ Software	IonReporterUploader command-line utility
Supports these following operating systems and computer	Available only in IonReporterUploader command-line utility	The Torrent Server or any standard Linux™ operating system, Mac OS™, or Windows™ operating system
Provides access to file uploads	Limited to results files that are listed in the **Completed Runs and Reports** in Torrent Suite™ Software	Any BAM or VCF file that is compatible with Ion Reporter software
Includes a Graphical User Interface (GUI)	Yes	No
Automatically launches analyses	Yes	Yes
Sends email notifictions of transfer status	Yes	No

Feature	IonReporterUploader plugin in Torrent Suite™ Software	IonReporterUploader command-line utility
Allows uploads of samples of with the same name	Uploads the file and defines the sample with a `_vn` string appended to the sample name (where `n` is the version number)	Does not upload the file or define the sample
Uses a default chip type	No	Ion 318 chip

Ion Reporter Software versions

The IonReporterUploader command-line utility supports Ion Reporter™ Software 4.0, 4.2, 4.4, 4.6 and 5.0, 5.2, 5.4, 5.6 and 5.10.

However, IonReporterUploader command-line utility 5.0 and later requires a Java version of 1.7 or higher to function, therefore IonReporterUploader command-line utility installed on an older Torrent Server running Java 1.6 will not work anymore unless an additional step to set up the path is performed.

If you have Torrent Suite™ Software 4.6 or earlier running on Ubuntu 10.04 and want to use the IonReporterUploader command-line utility on that computer, you need to first update your IonReporterUploader command-line utility to 5.0 or later, then execute your `irucli.sh` with this command:

```
$ export PATH=/results/plugins/IonReporterUploader/java/
_jre_location_/bin:$PATH
```

Next, enter the usual `irucli.sh` command:

```
$ ./ irucli.sh -c myconnectionfile.txt -s a.csv
```

This path setup step only needs to be done once per Linux™ terminal session.

Note: The `_jre_location_` in the above path, may change depending on what version of java was embedded in the IonReporterUploader command-line utility that was installed, which in turn depends on the version of the IRU plugin. For example, a typical path for jre on a Torrent Server installed with IonReporterUploader command-line utility 5.0.0.21 might be as follows:

```
/results/plugins/IonReporterUploader/java/jre/openjdk-7-jre-
headless/usr/lib/jvm/java-7-openjdk-amd64/jre/bin/
```

For Torrent Suite™ Software that is installed with IonReporterUploader command-line utility 5.0.0.25-jre8 might be as follows:

```
/results/plugins/IonReporterUploader/java/jre/jre1.8.0_45/bin/
```

Download IonReporterUploader command-line utility

This procedure explains how to download and install the IonReporterUploader command-line utility from Ion Reporter™ Software. The procedure may vary, based on the operating system of the target computer. In general, decompress the downloaded directory on your target machine, then copy the directory `IonReporterUploader-cli` to a convenient location.

Ideally, you should download the IonReporterUploader command-line utility onto the computer where it will be run. At a minimum, you must use a computer with the same operating system.

IMPORTANT! Use only the decompression utility available on your local computer. Do not decompress files on a different operating system and copy those files to a computer that uses a different operating system.

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1. Sign in to Ion Reporter™ Software, then click **Settings (⚙) ▸ Download Ion Reporter Uploader**.
2. Click the filename `IonReporterUploader-cli.zip`, then download the file to the target computer.
3. Extract the downloaded `IonReporterUploader-cli.zip` file, then copy the `IonReporterUploader-cli` directory to a convenient location on the target computer.

Run Ion Reporter Uploader command-line utility

The IonReporterUploader command-line utility `irucli` is ready to run after you extract it. Run the IonReporterUploader command-line utility from the `IonReporterUploader-cli` bin directory (with the `irucli.bat` or `irucli.sh` script). Instructions to use the IonReporterUploader command-line utility are downloaded with the utility.

Install IRU command-line utility on Linux™ OS

Follow these instructions to install the IonReporterUploader command-line utility on your Linux™ computer:

Note: This example is for the bash shell. For help to set your search path in other shells, contact your IonReporterUploader command-line utility system administrator.

1. Decompress the IonReporterUploader command-line utility directory with this command (or a similar one): `unzip IonReporterUploader-cli.zip`
2. (Optional) To set the search path to the bin folder, add the following line to your `.bashrc` file: `export PATH=/absolute/path/to/IonReporterUploader-cli/bin:$PATH .`
3. Run the IonReporterUploader command-line utility. The following command displays online help for IonReporterUploader command-line utility and verifies your installation: `irucli.sh -h`

   Note: If you did not add the bin directory for the IonReporterUploader command-line utility to your search path, you can use this to run the plugin: `/absolute/path/to/IonReporterUploader-cli/bin/irucli.sh -h ../../relative/path/to/IonReporterUploader-cli/bin/irucli.sh -h`

The installation is complete. Next, set up your properties files with the connection information and samples information, and use command-line options as required. See “Properties files“ on page 8 and “Configuration options“ on page 9 for more information.

Properties files

The IonReporterUploader command-line utility optionally uses two properties files, one for configuration information to connect to Ion Reporter™ Software and one for sample metadata. Command-line options override the values specified in a properties file, if both are used.

Configuration properties file

The configuration properties file contains the information required for the IonReporterUploader command-line utility to connect to the Ion Reporter™ Server. This information is the same as what is used to configure the IonReporterUploader plugin that is included with Torrent Suite™ Software. :

```
protocol=https
serverAddress=Your local server IP
port=443
IRVersion=4.4
userName=me@domain.com
```

Specify the configuration properties file on the command line with the -c option:

```
-c config.properties
```

The `config.properties` value for the `-c` option can be either an absolute or relative path to the properties file. See also: Ways to specify configuration options.

An example configuration properties file is installed as `example.cfg`:

```
IonReporterUploader-cli/bin/example.cfg
```

IMPORTANT! When you transfer to Ion Reporter™ Software 4.*x* or later, the IonReporterUploader command-line utility always prompts you to enter your Ion Reporter™ Server password. You cannot specify your password in a properties file.

Log file directory

By default on each run, the IonReporterUploader command-line utility creates its log file in the current directory. To specify a different location for the log file, use the following `-l`option:

```
-l /absolute/path/to/other/log/directory
```

The log file name is always `log.txt`. The log file is overwritten if it already exists (and previous contents are lost). You must have write permission to the log file directory.

If the IonReporterUploader command-line utility cannot create the directory given with the `-l` option, the IonReporterUploader command-line utility exits and does not transfer files.

Exit codes

IonReporterUploader command-line utility generates only two status codes: `0` for success and `1` for failure, as typical Linux™ commands do. Error code `137` is an exit code generated by Linux™ for any application that fails due to lack of memory.

Configuration options

The information to connect to Ion Reporter™ Software can be specified through the following:

- A configuration properties file — See "Configuration properties file" on page 8.

  Note: In the configuration properties file, the value pairs use an equals sign. In the command-line options, a space is used.

- Individual options on the command-line — Command-line options override the values specified in a properties file, if both are used.

  The following are examples of command-line configuration options:

  ```
  --protocol https --userName=me@domain.com --serverPort 443
  --serverAddress 40. dataloader.ionreporter.thermofisher.com
  ```

  A URL of combined options on the command-line — The `protocol`, `serverAddress`, and `serverPort` options can be combined to a single `--url` option. If the `--url` is used in combination with the individual configuration options, then the value of `--url` is used.

  Here is an example of the `--url` option:

  ```
  --url https://40.dataloader.ionreporter.thermofisher.com:443
  ```

Command-line options

Options for the transfer scenarios, using IonReporterUploader command-line utility, are as follows:

To transfer a single file — Use the `--sn`, `--sp`, and `--sg` options.

To transfer results files from a Torrent Suite™ Software analysis — Use the `--generateCSVFromTSAnalysisDir` and `--generateCSVFile` options to create a CSV file, edit the CSV file to add sample gender manually, then run IonReporterUploader command-line utility with the `-s` option pointing to your edited CSV file. See "Generate a CSV file from a Torrent Suite™ Software analysis directory" on page 17 for more information.

To transfer files in a single flat folder — Use the `--fn`, `--fp`, and `--fg` options. `--fg`, `--fn`, `--fp` are very similar to the `--sg`, `--sn`, `--sp` options. While these `--s*` options are used to define a sample with only one BAM or VCF, the `--f*` options are used to define a sample with multiple BAM (or VCF) files. In this case, `--fp` will be a folder path, where all files pertaining to that sample, are held.

To transfer multiple files that are not restricted to one folder — Prepare a CSV file that defines your samples and use the `-s` option to point to your CSV file. See The samples CSV file.

Option	Description
`-c config_properties_file`	The path to the configuration properties file, which contains the port, protocol, URL, and authentication token required to connect to Ion Reporter™ Software. See "Configuration properties file" on page 8 for more information.
`-d data_root`	The absolute path to the data root folder. the default path is the current directory `./`. Relative paths in the samples CSV are interpreted relative to the data root folder.
`--fg sample_gender`	The gender for a single sample uploaded from a flat folder of multiple files. **Note:** When you use this option, you must also include values for the sample name (`--fn`) and sample folder path (`--fp`) parameters, and values for these parameters.
`--fn sample_name`	The sample name for a single sample uploaded from a flat folder of multiple files. When you use this option, you must also include values for the sample gender (`--fg`) and the sample folder path (`--fp`) parameters, and values for these parameters.
`--fp sample_folder_path`	The path to a flat folder containing BAM files for a single sample. When you use this option, you must also include values for the sample gender (`--fg`) and the sample name (`--fn`) parameters and values for these parameters.
`--generateCSVFile`	The path and file name to the CSV file to be created. Must be used with `generateCSVFromTSAnalysisDir`.
`generateCSVFromTSAnalysisDir`	Absolute path to a Torrent Suite™ Software analysis directory.

Option	Description
`-h --help`	Display of description and usage of IonReporterUploader command-line utility.
`--IRVersion`	The Ion Reporter™ Software version to which data will be transferred.
`-l log_file_dir`	Directory location of the IonReporterUploader command-line utility log file. The plugin creates this directory if it does not already exist. If this option is not specified, the current directory (`./`) is used. The file name for the log is always `log.txt`. **Note:** The IonReporterUploader command-line utility also uses this directory for temporary files, then deletes the temporary files after each run.
`-m metadata_properties_file`	Path to the samples metadata properties file, which contains metadata in key value oairs. See "Upload a single sample with a configuration file" on page 16 for more details.
`-s samples_properties_file`	Path to the samples properties file which contains the following information for each sample: sample name, path on local computer, and gender. See "Samples CSV file" on page 13 for more information.
`--sg sample_gender`	The gender of the sample. Allowed values are case-sensitive: • Male • Female • Unknown **Note:** When you use this option, you must also include the sample name (`-sn`) and sample path (`-sp`) parameters, and values for these parameters.
`--sn sample_name`	The sample name. This value is used as the sample name in Ion Reporter™ Software. **Note:** When you use this option, you must also include the sample gender (`-sg`) and sample path (`-sp`) parameters, and values for these parameters.

Option	Description
`--sp sample_path`	Path to the sample file to be transferred. The path can be absolute or relative. Relative paths are interpreted relative to the data root folder, which by default is the current directory. You can change the data root folder with the `-d` option. **Note:** When you use this option, you must also include the sample name (`-sn`) and the sample gender (`-sg`) parameters, and values for these parameters.
Various connection connection options	Configuration parameters can be entered as individual options on the command line: • `--protocol https` • `--port 443` **Note:** See "Configuration options" on page 9.
Various sample metadata options	Sample metadata can be entered as individual options on the command line: • `--chipType 318R` • `--chipID AD129980` The default for `--chipType` is `318`. **Note:** These options do not use an equals sign on the command line.

Sample metadata properties file

Sample metadata can be entered using a metadata properties file, instead of use command-line options in IonReporterUploader command-line utility. For example:

```
chipType=510
chipId=FD33442
```

Specify the metadata properties file on the command-line with the `-m` option:

```
-m metadata.properties
```

With the exception of sample name, gender, and file path, the IonReporterUploader command-line utility adds this metadata to every sample defined in the IonReporterUploader command-line utility run command. See "Apply metadata to multiple samples" on page 17 for more information.

Samples CSV file

When you have multiple files to transfer, you specify them in a Comma-Separated Value (CSV) file. The CSV file is also required to define a sample made of multiple data files that are not all in the same folder.

The format of the samples CSV file is described in the following table:

Location	Description
First field	The sample name
Second field	The path (on your local computer) to the data file for this sample
Third field	The gender for this sample. Allowed values are as follows: • Male • Female • Unknown

The following is an example CSV file:

```
# comment line (ignored)
# Sample Name, Sample Path, Gender (this line is not required)
MySample1, /share/apps/data/MySample1, Unknown
MySample2, /share/apps/data/MySample2a, Male
MySample2, /share/apps/data/MySample2b, Male
MySample2, /share/apps/data/MySample2c, Male
MySample3, data/MySample3, Unknown
```

This example CSV file specifies the following samples:

MySample1 — Defined from one data file

MySample2 — Defined from three data files.

MySample3 — Defined from one data file, using a relative path. The relative path is by default the current directory (`./`) and can be changed with the `-d` option.

Guidelines for the samples CSV file:

- The IonReporterUploader command-line utility uses the sample path information to find the data files that are to be transferred.
- The IonReporterUploader command-line utility uses the sample name and gender information to define the sample in Ion Reporter™ Software. Specify the CSV file on the command line with the `-s` option.
- The path to sample files can be either absolute or relative. Relative paths can be relative to either the current directory, `./`, or to a data root folder that you specify on the command-line with the `-d` option.
- Lines that begin with a `#` character are treated as comments and are ignored.

Note: To transfer a single file, you use either a CSV file or these command-line options (as a group): `-sn <sample_name> -sp <sample_file_path> -sg <sample_gender>`

Custom attributes in sample definitions

Note: Custom attributes are not supported by Field Service Engineers (FSEs) and Field Bioinformatics Engineers (FSBs). These definitions are intended for advanced users of Torrent Suite™ Software.

If you use Ion Reporter™ Software 4.4 or later, custom properties can be specified on the Ion Reporter™ Software by using the following file:

```
--customParametersFile /absolute/path/to/parametersFile.txt
```

The general syntax of the line in the custom parameters file is:

```
Samplename=key1:value1,key2:value2,key3:value3
```

The parameters are applied to the sample defined by `Samplename`. As many custom key value pairs can be added as are needed.

You can use a reserved key `_all_samples_` in place of `Samplename` to specify the default custom keys that are to appear on all samples. For example:

The `_all_samples_` line can be placed at multiple locations in the custom parameter file. The custom parameter file is read from top to bottom and the samples following the `_all_samples_` lines inherit all the keys specified in all the `_all_samples` lined up to that point in the file. Usually, one _all_samples_ line provided at the top of the file works for most requirements. However, if you intend to create some of the samples with some default custom parameters and a few other samples with additional custom parameters, then it can be achieved by having multiple `_all_samples_ lines` and appropriate sample lines inserted after the corresponding `_all_samples_ lines`. For example:

```
all_samples_=key1:value1,key2:value2, S1 = key3:value3 S2 =
key4:value4 _all_samples_=key2:value2 S3 = key2:value2
```

Note: If there are any reserved keys, such as gender, workflow, relation, relationrole, cellularity pct, nucleotideType, cancerType, sampleExternalId, sampledescription used in the custom parameters list, then they are treated as the regular parameters for that sample and appear on the sample metadata properties file on the destination Ion Reporter sample folder. All the remaining keys become the custom parameters and are listed with the same syntax on the metadata properties file, as follows:

```
customParameters=key1:value1,key2:value2,key3:value3
```

For example, if the given parameters file contains:

```
_all_samples_=cellularityPct:100,x:y
sample_A=p:q,cancerType:nasal carcinoma
sample_B=sampleNickName:jamesbond
```

Then for all the samples used in the .csv file, the following keys can be found in the `s.metadata.properties`:

```
cellularityPct = 100
customParameters=x:y
```

For sample_A, the following keys can be found in the `s.metadata.properties`:

```
cellularityPct = 100 cancerType = nasal carcinoma
customParameters=x:y,p:q
```

For sample_B, the following keys can be found in the `s.metadata.properties`:

```
cellulartyPct = 100
customParameters=x:y,sampleNicName:jamesbond
```

Parameter file keys

The IonReporterUploader command-line utility recognizes the following keys in the custom parameters file and can automatically launch Ion Reporter™ Software workflows for imported samples.

setid - An `id`, usually an integer number, representing the analysis set separation among a given set of samples. Each Ion Reporter™ Software analysis must be uniquely represented by this `setid`. If the workflow requires multiple samples, then multiple samples may be mapped to the same `setid`. For example, if you plan to start 10 workflows in this given set of `irucli` uploads, then you can distinguish each group of samples with numbers from `1` to `10`, in this field.

Workflow - The name of the workflow as is available in Ion Reporter™ Software. The workflow name can contain spaces.

Relation - Represents the relationship type among the samples meant for this workflow, such as Tumor Normal, Proband, and so on.

RelationRole - Role the sample played in the workflow. Examples are Father, Mother, Proband, and so on.

Below are permissible values that can be used, based on the Ion Reporter™ Software controlled vocabulary:

Key	Value
Relation	`SINGLE`, `PAIRED_TUMOR_NORMAL`, `PAIRED`, `TRIO`, `DNA_RNA`, `SINGLE_RNA_FUSION` Note: `PAIRED` is meant for use only with "sample_control" workflow
RelationRole	`PROBAND`, `TUMOR`, `NORMAL`, `SAMPLE`, `CONTROL`, `FATHER`, `MOTHER`, `DNA`, `RNA`
gender	`Male`, `Female`, `Unknown`
NucleotideType	`DNA`, `RNA`
setid	Usually an integer number; Optionally, a string is permissible. If this key is used, then its value cannot be empty, and cannot begin with an underscore.

Sample name limitations

The IonReporterUploader command-line utility transfers your files to Ion Reporter™ Software and defines Ion Reporter™ Software samples based on your transferred files.

Note: BAM files for use with IonReporterUploader command-line utility must not contain any spaces.

In most cases, the IonReporterUploader command-line utility defines your sample with the sample name that is specified, either with the `-sn` command-line option or the sample name column in the sample CSV file.

However, if a sample with the same name already exists in Ion Reporter™ Software, then the IonReporterUploader command-line utility skips that sample. There is no file transfer or sample definition for that sample. The IonReporterUploader command-line utility then proceeds with the transfer of any other data files that are in the run.

IonReporterUploader command-line utility utility examples

These examples demonstrate the use of the command-line options for IonReporterUploader command-line utility. On the Windows™ Operating System, replace the script name `irucli.sh` with `irucli.bat`.

Upload a single sample with a configuration file

This example demonstrates how to upload a single sample to Ion Reporter™ Software. Replace values in the brackets <> with values that are appropriate for your site.

Note: This example uses a configuration file and a specific log directory.

```
irucli.sh -c <config filepath> --sn <sample name> --sg <Gender
-
Male,Female,Unknown> --sp <filepath> -l <logdirectory>
```

You can enter additional samples metadata in the metadata properties file. For example:

```
chipType=318R
chipId=AD129980
```

Specify the metadata properties file on the command-line with the `-m` option:

```
-m metadata.properties
```

Except for sample name, gender, and file path, the IonReporterUploader command-line utility adds this metadata to every sample defined in Ion Reporter™ Software for the IonReporterUploader command-line utility run.

Apply metadata to multiple samples

Metadata that is defined in the `metadata.properties` file is applied to all samples that are defined in the `samples.csv` file. Replace values in the brackets <> with values that are appropriate for your site.

Use this command if you want the IonReporterUploader command-line utility to add the metadata to every sample that is defined in Ion Reporter™ Software on the subsequent sequencing run.

```
irucli.sh -c <config filepath> -m <metadata.properties
filepath> -s <samples.csv filepath>
```

Generate a CSV file from a Torrent Suite™ Software analysis directory

This example transfers the results files from a completed run in Torrent Suite™ Software, and defines a sample Ion Reporter™ Software from each BAM and VCF file.

1. Enter this command on a single line to generate a CSV file of information for all BAM files that are in the directory:

   ```
   irucli.sh --generateCSVFile path/to/the/output.csv--
   generateCSVFromTSAnalysisDir/absolute/path/to/TS/
   AnalysisDirectory
   ```

2. 2. Open the CSV file and add the gender of each sample. The file contains the string `REPLACE_GENDER_FOR_<samplename>` as a reminder. The gender values are case-sensitive. The allowed values are:
   - Male
   - Female
   - Unknown
3. Run the IonReporterUploader command-line utility again, with an `-s` option that points to the CSV file: `irucli.sh -c path/to/myConnection.cfg -s output.csv`.

Limited Product Warranty

Limited product warranty

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