Bulk API Manual - Automated reporting to the TNS

Updated: Dec 2020 (adapted to AWS env.)

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1. General

AT reports (AT reps) and Classification reports (Class reps) can be submitted to the TNS by either using the interactive forms on the TNS website, or via the "Bulk" API method - submission of JSON-formatted data or TSV (Tab-Separated-Values) lists in an automated way from defined machines ("Bots") of e.g. the various contributing surveys.

The Bulk reports are being processed as promptly as possible in an asynchronous mode, dependent on the actual incoming queue of reports and the server's available resources. (Usually the processing of the reports is immediate.)

- Each report, sent to the TNS by the Bulk API (JSON/TSV), receives a sequential report-id that is provided to the sender of the report (serving as a "receipt").
- The sending machine should query the API (every second or a few) for the reply of the corresponding report-id.
- The report is processed in its turn, and once a reply is obtained for the given report-id, the sending machine can relate to it and parse the resulting feedbacks (e.g. if a new event was created or if it already exists on the system for the reported coordinates, the newly designated or existing name, etc…).

We have set up on our "sandbox" site an API TEST webpage where it is possible to experiment with submission of reports using a dedicated form. This is described in *Section 3*.

Important – Please do not commence sending real Bulk reports to the production site before verifying on the sandbox environment that all your codes and scripts work flawlessly and that the JSON/TSV are submitted and processed in a correct manner!

PHP & Python sample codes are provided for assisting with the development of the relevant scripts, explained in *Section* 8.

The JSON format for preparation of the AT and Class Reps are described in *Section 4*.

Do not hesitate to contact us for any assistance and/or clarifications.

2. Bots

1.1. General

Registered users can define Bots that are required for sending automated reports using the Bulk API. This is done by clicking the "+Add bot" button on the BOTS page: https://www.wis-tns.org/bots

A Bot, e.g. "PESSTO_Bot0", is associated with a survey/group and includes a definition of an *api_key*, which serves for authentication of any data submitted to the TNS from the given Bot. It is possible to define multiple Bots per given survey/affiliation.

For associating a Bot with specific group/s, click to edit the Bot on the BOTS page and then select the required group/s, for the group owner/s to approve. (The users and bots associated with each group are displayed on the GROUPS page.)

1.2. Obtaining an API Key

Upon creation of a Bot, an api_key is provided to the relevant person/s handling the automatic reports from the survey/group. This api_key should be kept and used for the submission of any data entry.

If there's a need for a new api_key, an owner of the Bot may click to edit the Bot (on the BOTS page) and there check the "Create new API Key" checkbox and save. The newly created api_key will be displayed.

3. The *SANDBOX* Environment and the *"Bulk report"* API test page

3.1. General

For experimentation and development of the sending of reports via the bulk API (and the additional available API's) we've set up the following sandbox site:

https://sandbox.wis-tns.org

This site is a replica of the production site but such that the data can be freely experimented with. Once a week, on Sunday UT 04, the data on the sandbox site is reset with data from the real site, so note that any data you have submitted for experimentation will be gone after the reset.

In this respect, note that also the Bots that have been defined in the sandbox env. will be overridden by the Bots as they are defined on the production site. Therefore, best to have your Bots defined on the production site also during the experimentation period so that their definitions hold and remain on the sandbox.

3.2. The "Bulk report" API test page

The API TEST FORM page is active only on the sandbox site, and its aim is to serve for experimentation with the various APIs, including the sending of JSON/TSV reports. The form on the *Bulk report* tab mimics the stages that should be implemented by the scripts for the automated submissions to the TNS.

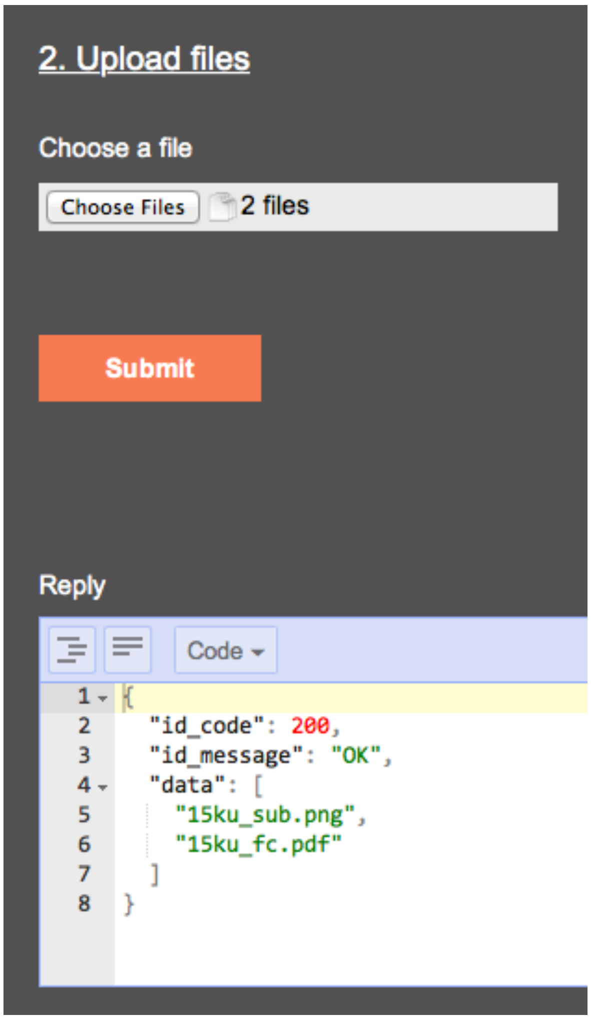
https://sandbox.wis-tns.org/api/bulk-report-form

The Bulk report form consists of the following **4 stages**:

❖ Insertion of the api_key (must be specified for authentication).

❖ Uploading of the relevant files (e.g. related files, the spectrum files of a classification report etc…).

After clicking the Submit button, a reply is displayed in the JSON editor below to approve that the files were uploaded successfully (or not), with the exact temporary names as they should be specified in the report itself. E.g.:



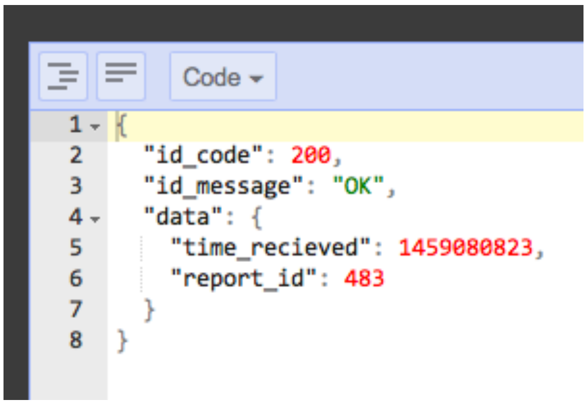
```
{
  "id_code": 200,
  "id_message": "OK",
  "data": [
    "15ku_sub.png",
    "15ku_fc.pdf"
  ]
}
```

❖ Submission of the report itself by either uploading a TSV file or by specifying the JSON-formatted data in the JSON editor window.

Clicking the “Get AT report example” or “Get Classification report example” (below the “Send data” button of the JSON editor) loads to the JSON editor an example template of the given report.

Also for the TSV submission there are example files that can be downloaded by clicking the “AT report example file” or “Classification report example file” (below the “Send data” button of the TSV section).

After submission of a JSON or TSV report (by clicking the “Send data” button), a confirmation for the submitted report appears in the JSON editor, with specification of the obtained report-id. E.g.:

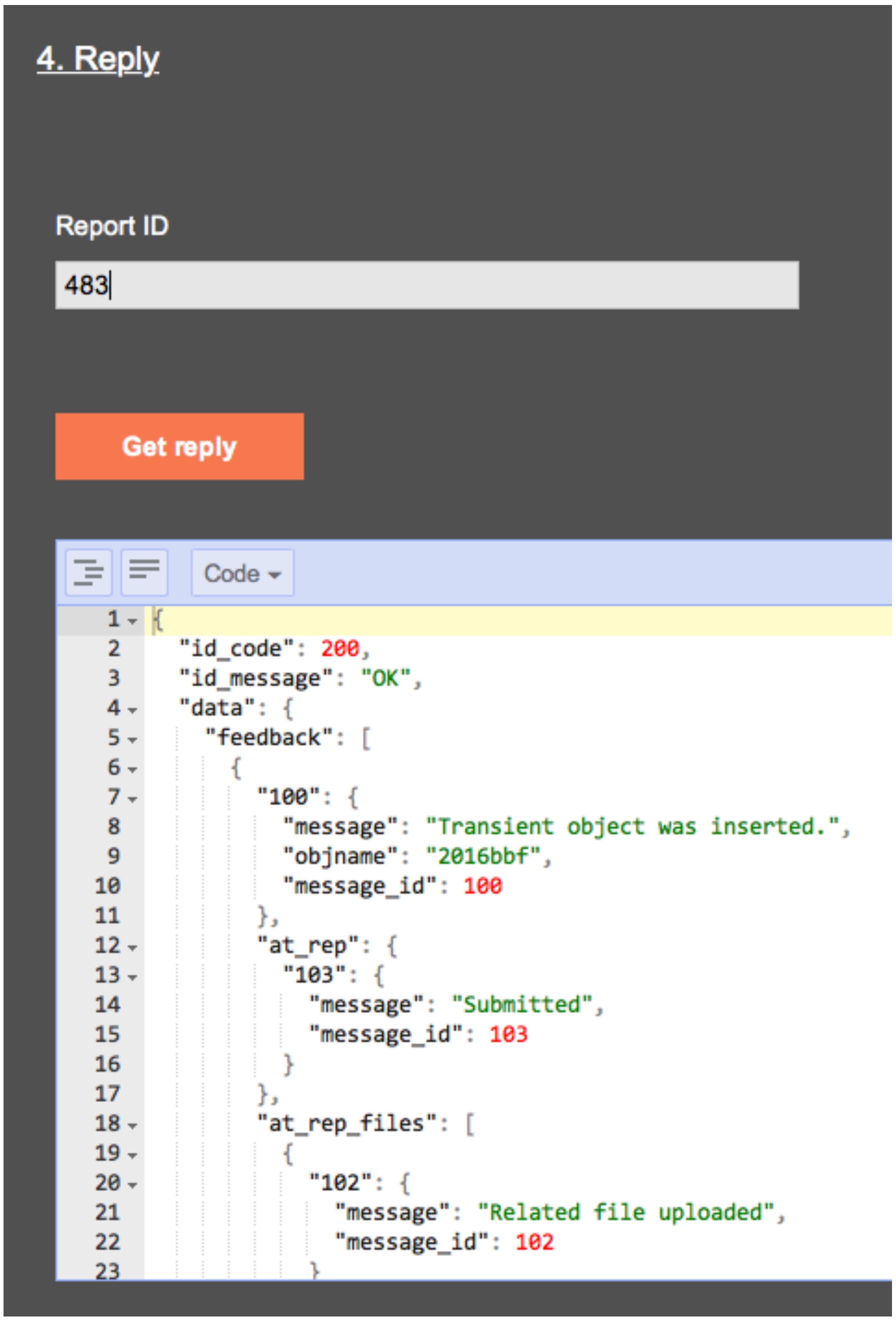


```
{
  "id_code": 200,
  "id_message": "OK",
  "data": {
    "time_recieved": 1459080823,
    "report_id": 483
  }
}
```

The report is then automatically processed.

❖ Checking for the reply of the processed report.

Upon inserting the given report-id and clicking on the “Get reply” button, the reply JSON of the report is displayed in the JSON editor, with the relevant feedback indications and messages. E.g.:



4. Reply

Report ID

483

Get reply

Code

```
{
  "id_code": 200,
  "id_message": "OK",
  "data": {
    "feedback": [
      {
        "100": {
          "message": "Transient object was inserted.",
          "objname": "2016bbf",
          "message_id": 100
        },
        "at_rep": {
          "103": {
            "message": "Submitted",
            "message_id": 103
          }
        },
        "at_rep_files": [
          {
            "102": {
              "message": "Related file uploaded",
              "message_id": 102
            }
```

Note that in the JSON editor windows, the JSON data can be displayed in both “Code” and “Tree” modes. (For copy/pasting lines use the “Code” mode, clearly.)

4. File Uploads

4.1. General

Any files accompanying a report, e.g. a related file, spectrum etc…, should be uploaded to the system BEFORE the submission of the report itself. The report should include the file name exactly as it was given by the feedback to the upload, see 5.4, otherwise the system will not be able to locate it.

4.2. URL: https://www.wis-tns.org/api/file-upload

Sandbox URL: https://sandbox.wis-tns.org/api/file-upload

4.3. Data description

- Type: POST
- Mandatory parameters:
  - api_key – the bot's API Key
  - files[i] – array of files to upload; i=0…N (number of uploaded files)

4.4. Upon a successful upload, the system will reply back with a name for each of the uploaded files (the names of the files may be changed by the system).

5. AT and Classification Reports

5.1. General

Submission of reports by JSON-formatted data allows for the maximal flexibility. A single or multiple entries (of an AT or Classification report/s) can be specified, and for specific items within a report (e.g. photometry entries in the AT report or spectra entries in a classification report) up to 10 entries can be specified, exactly like in the interactive dedicated forms ("AT/Classification Report Form").

The amount of entries to be listed within a single AT or Classification submission is limited to 100. So, for instance, if your survey's mode of operation is defined to send discovery reports in a summarized way (at the end of the night or every several hours) rather than for each discovered candidate transient separately, and the list surpasses 100 entries, it should be split to several reports.

Sections 4.2 and *4.3* below list the complete possible key-value pairs for the AT and Class Reps. Note that these values, as well as the allowed formats and mandatory vs. non-mandatory parameters are in complete agreement with the interactive forms webpages.

For obtaining the necessary id's of the groups, instruments, filters, units, object-types, spectrum-types etc…, check on the Bulk report page the "Get all options' values" in the JSON submit section (below the JSON editor).

5.2. URL: https://www.wis-tns.org/api/bulk-report
Sandbox URL: https://sandbox.wis-tns.org/api/bulk-report

5.3. Data description

- Type: POST
- Mandatory parameters:
    - api_key – the bot's API Key
    - data – holds the JSON report

5.4. Upon a successful submission, a reply JSON is sent back with the "report_id" identifying the report that was just submitted. Use this report in order to request back the submission reply (see section 8) Note: we expect the reply to be ready immediately, however, this depends on the server's load and may take a little longer. Therefore, we suggest to have a mechanism in place quering the server for a reply every several seconds, until a reply appears. In case there is a problem and no reply is obtained, please contact us by email and provide the report-id.

5.5. **AT Report** JSON key-value list

- Specified in red are mandatory keys; in green example values, and remarks (not part of the JSON) in blue.
- Internal name: It is possible to either provide the exact internal name of the object as it exists in the reporting survey, or instead, if the internal name is synced with the name provided by the TNS, to provide instructions for the construction of the internal name by specifying the *internal_name_format* values. E.g. if specifying the following *internal_name_format* values:
```
"internal_name_format": {
      "prefix": "iPTF",
      "year_format": "YY",
      "postfix": ""
    },
```
  the internal name created for a TNS name 2016xyz will be iPTF16xyz.

- All fields containing preset values (e.g. groupid, at_type, instrument_value…) must include the appropriate value id. A list (in JSON format) of possible values can be viewd on the Bulk page or downloaded at: https://www.wis-tns.org/api/values

```
{
  "at_report": {
    "0": {                                   // "0" is always the first entry; if multiple entries
      "ra": {                                //  add "1", "2" etc…
        "value": "10:20:30.04",
        "error": "0.5",
        "units": "arcsec"
      },
      "dec": {
        "value": "+20:30:40.05",
        "error": "0.5",
        "units": "arcsec"
      },
```
~~"groupid": "1",~~ // The groupid was replaced by the two

```
                                              // group_id's in the following two lines:
"reporting_group_id": "1",
"discovery_data_source_id": "1",
"reporter": "J. Smith, on behalf of SurveyName...",
"discovery_datetime": "2016-03-01.234",
"at_type": "1",
"host_name": "NGC 1234",
"host_redshift": "",
"transient_redshift": "",
"internal_name": "",
"internal_name_format": {                     // Possible to specify this if not specifying a
  "prefix": "prefixStr",                      // specific internal_name.
  "year_format": "YY",                        // Valid values: 'YY' / 'YYYY'
  "postfix": "postfixStr"
},

"remarks": "",
"proprietary_period_groups": [                // Associated groups are relevant mainly
  "1",                                        // when specifying a proprietary period.
  "2"
],
"proprietary_period": {
  "proprietary_period_value": "0",            // "0" if no proprietary period requested.
  "proprietary_period_units": "days"
},
"non_detection": {                            // Like in the form – if there is no last
  "obsdate": "2016-02-28.123",                // non-detection photometry measurement in
  "limiting_flux": "21.5",                    // hand, archival info should be specified.
  "flux_units": "1",
  "filter_value": "50",
  "instrument_value": "103",
  "exptime": "60",
  "observer": "Robot",
  "comments": "",
  "archiveid": "",
  "archival_remarks": ""
},
"photometry": {
  "photometry_group": {
    "0": {
      "obsdate": "2016-03-01.234",
      "flux": "19.5",
      "flux_error": "0.2",
      "limiting_flux": "",
      "flux_units": "1",
      "filter_value": "50",
      "instrument_value": "103",
      "exptime": "60",
      "observer": "Robot",
      "comments": ""
    },
    "1": {                                    //  If multiple photometry entries, add "1","2" etc
      " obsdate ": "",
      " flux ": "",
      "flux_error": "",
      "limiting_flux": "",
      " flux_units ": "",
      " filter_value ": "",
      " instrument_value ": "",
          "exptime": "",
          "observer": "",
          "comments": ""
        }
      }
    },
    "related_files": {
      "0": {
        "related_file_name": "FC.png",
        "related_file_comments": "Finding Chart..."
      },
      "1": {
        "related_file_name": "DiscImage.jpg",
        "related_file_comments": "Discovery image..."
      }
    }
  }
 }
}
```

5.6. **Classification Report** JSON key-value list

```
{
 "classification_report": {
  "0": {
    "name": "2016abc",
    "classifier": "K. Smith, on behalf of SurveyName",
    "objtypeid": "3",
    "redshift": "0.123",
    "groupid": "1",
    "class_proprietary_period_groups": [          // Associated groups are relevant mainly
      "1",                                        // when specifying a proprietary period.
      "2"
    ],
    "remarks": "Another Ia",
    "class_proprietary_period": {                 // Proprietary period for the classification itself.
      "class_proprietary_period_value": "0",
      "class_proprietary_period_units": "days"
    },
    "spectra": {
      "spectra-group": {
        "0": {
          "obsdate": "2016-03-07.89",
          "instrumentid": "1",
          "exptime": "600",
          "observer": "J. Smith",
          "reducer": "K. Smith",
          "spectypeid": "1",
          "ascii_file": "FileName.ascii",
          "fits_file": "FileName.fits",
          "remarks": "",
          "spec_proprietary_period": {            // Proprietary period for the provided spectrum.
            "spec_proprietary_period_value": "1",
            "spec_proprietary_period_units": "months"
          }
        },
        "1": {                                         //  If multiple photometry entries, add “1”,“2” etc
          "obsdate": "",
          "instrumentid": "",
          "exptime": "",
          "observer": "",
          "reducer": "",
          "spectypeid": "",
          "ascii_file": "",
          "fits_file": "",
          "remarks": "",
          "spec_proprietary_period": {
            "spec_proprietary_period_value": "",
            "spec_proprietary_period_units": "days"
          }
        }
      }
    },
    "related_files": {
      "0": {
        "related_file_name": "Classification_plot.png",
        "related_file_comments": "SNID Classification plot..."
      },
      "1": {
        "related_file_name": "",
        "related_file_comments": ""
      }
    }
  }
 }
}
```

6. TSV submission

6.1. General

Submission of reports by constructing of TSV (Tab-Separated-Values) files is less recommended than the JSON-formatted data and serves as a kind of a “shortcut”, if willing to submit multiple entries (up to the 100 limit) of an AT or Classification report in a less flexible way.
Why less flexible? Because in a TSV list, each entry spans only a single row, so e.g. only one photometry point, that of the discovery, can be specified for an AT report, or only a single spectrum for a classification report.
Also note that a TSV report can hold an AT report OR classification report, but not both.

Sections 5.2 and *5.3* below show the columns of the TSV lists; example files are available for download on the Bulk report page as mentioned in *Section 3.2* (stage 3 of the bulk page).

6.2. URL: https://www.wis-tns.org/api/csv-report

Sandbox URL: https://sandbox.wis-tns.org/api/csv-report

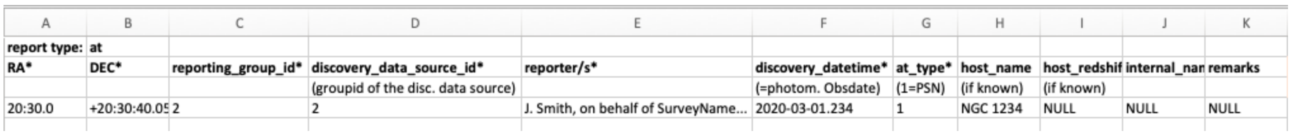
6.3. Data description

- Type: POST
- Mandatory parameters:
    - api_key – the bot’s API Key
    - data – holds the TSV report

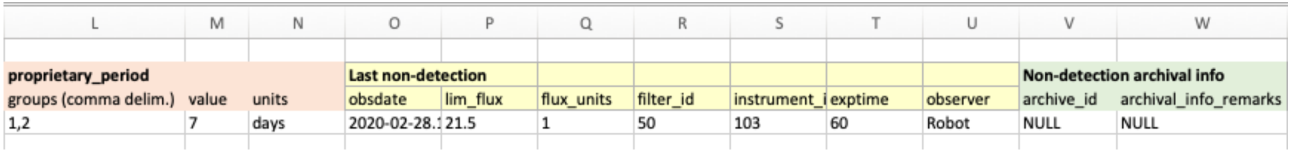
6.4. Upon a successful submission, a reply JSON is sent back with the "report_id" identifying the report that was just submitted. All details described in section 6.4 hold here as well.

6.5. AT Report TSV format

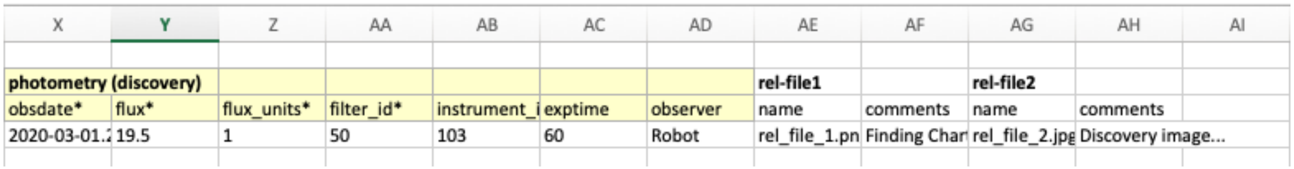
- Columns for which specifying a value is mandatory are marked with ‘*’.
- All fields containing preset values (e.g. groupid, at_type, instrument_id…) must include the appropriate value id. See section 6.5 for details.



A	B	C	D	E	F	G	H	I	J	K
report type:	**at**									
RA*	**DEC***	**reporting_group_id***	**discovery_data_source_id***	**reporter/s***	**discovery_datetime***	**at_type***	**host_name**	**host_redshif**	**internal_nan**	**remarks**
			(groupid of the disc. data source)		(=photom. Obsdate)	(1=PSN)	(if known)	(if known)		
20:30.0	+20:30:40.05	2	2	J. Smith, on behalf of SurveyName...	2020-03-01.234	1	NGC 1234	NULL	NULL	NULL

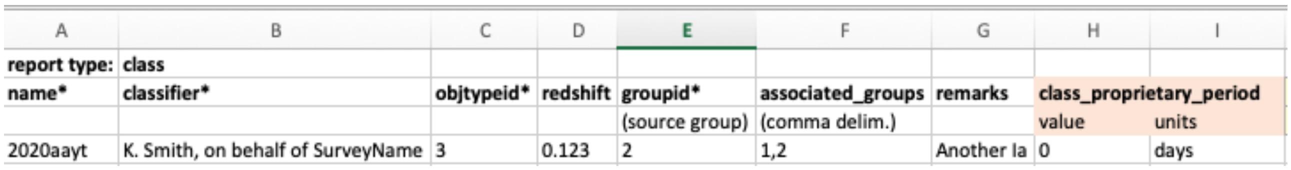


L	M	N	O	P	Q	R	S	T	U	V	W
proprietary_period			**Last non-detection**							**Non-detection archival info**	
groups (comma delim.)	value	units	obsdate	lim_flux	flux_units	filter_id	instrument_i	exptime	observer	archive_id	archival_info_remarks
1,2	7	days	2020-02-28.1	21.5	1	50	103	60	Robot	NULL	NULL

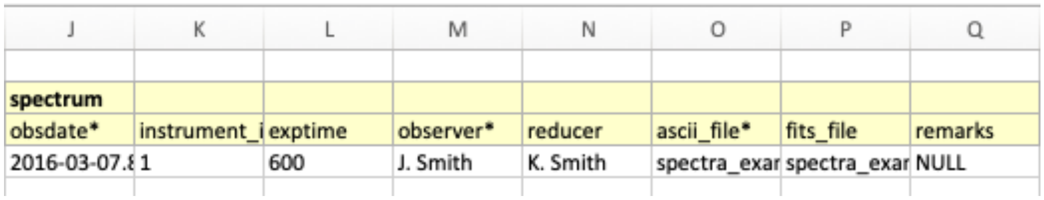


X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
photometry (discovery)							**rel-file1**		**rel-file2**		
obsdate*	flux*	flux_units*	filter_id*	instrument_i	exptime	observer	name	comments	name	comments	
2020-03-01.2	19.5	1	50	103	60	Robot	rel_file_1.pn	Finding Chan	rel_file_2.jpg	Discovery image...	

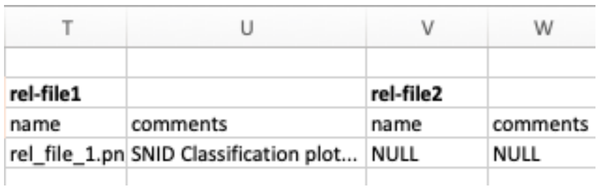
6.6. Classification Report TSV format



A	B	C	D	E	F	G	H	I
report type:	**class**							
name*	**classifier***	**objtypeid***	**redshift**	**groupid***	**associated_groups**	**remarks**	**class_proprietary_period**	
				(source group)	(comma delim.)		value	units
2020aayt	K. Smith, on behalf of SurveyName	3	0.123	2	1,2	Another la	0	days



J	K	L	M	N	O	P	Q
spectrum							
obsdate*	instrument_i	exptime	observer*	reducer	ascii_file*	fits_file	remarks
2016-03-07.8	1	600	J. Smith	K. Smith	spectra_exar	spectra_exar	NULL



T	U	V	W
rel-file1		**rel-file2**	
name	comments	name	comments
rel_file_1.pn	SNID Classification plot...	NULL	NULL

7. Feedback messages

7.1. General

The feedback messages obtained from the Bulk API are similar to those obtained on the interactive AT and Classification report forms. The messages can be easily identified by their message id's, allowing for efficient parsing of the resulting feedbacks. We list here the mapping between the message id's and their corresponding texts.

7.2. URL: https://www.wis-tns.org/api/bulk-report-reply
Sandbox URL: https://sandbox.wis-tns.org/api/bulk-report-reply

7.3. Data description

- Type: POST
- Mandatory parameters:
    - api_key – the bot's API Key
    - report_id – holds the report-id provided from the report submission interface.

7.4. Mapping of the messages

Message id	Message	Provided values
General		
200	OK	
201	Created	
400	Bad request	
401	Unauthorized	
403	Forbidden	
404	Not Found	
Blocking errors		
0	Invalid	
1	Last non-detection should precede the Discovery Datetime	
2	At least one Photometry point - that of the discovery - should be filled	
3	Required field	
4	Proprietary period cannot extend more than 100 years	
5	An identical AT report (sender, RA/DEC, discovery date) already exists	
6	Last non-detection or archival info must be filled	
7	Proprietary period cannot be backdated	
10	Unauthorized	
20	ASCII file or FITS file must be uploaded	
21	At least one Spectra should be filled	
22	An ASCII file must be uploaded	
Feedbacks		
100	Transient object was inserted	objname (eg ‘2016abc’)
101	Transient object exists	objname (eg ‘2016abc’), prefix (eg ‘AT’), type, RA, DEC, separation
102	Related file uploaded	
103	Submitted	
110	No results found	
120	New object type set	new_object_type
121	Object name prefix has changed	new_object_name
122	Object redshift was set	new_redshift
123	Object redshift changed	new_redshift

8. Sample code

8.1. General

A set of functions written in ***PHP*** is provided to serve as an example for developing the necessary code for the automated Bulk submission to the TNS of the AT or Classification reports. The sample code file can be downloaded from the provided link on the help page.

A ***Python*** sample code, kindly provided by Ken Smith from QUB, is also available for download from the provided link on the help page. (The python code receives as arguments the api_key and a filename containing the JSON-formatted report.)

A reminder - **All the development and experimentations should be performed against the sandbox environment**. Only when fully debugged and verified should real reports be sent to the production site.

8.2. Structure of the *PHP* sample code

The sample code consists of various definitions and functions, including a helper function that constructs an example AT-Rep JSON. (Similar procedures can be implemented for Classification reports.)

The sample code directs to the sandbox site for experimentation:

```
class TNSClient {

    /// TNS's API URL
    protected static $baseAPIUrl = 'http://sandbox-tns.weizmann.ac.il/api/';
```

The section that submits the report and receives the appropriate report-id is given as follows:

```
define('API_KEY', '1234567890123456789012345678901234567890');

define('SLEEP_SEC','1');
define('LOOP_COUNTER','60');

///*
// Send AT report and get reply ID.
$feed_handler = new TNSClient(array('api_key' => API_KEY));
$json = at_rep_example();
$json_reply = $feed_handler->sendBulkReport($json);
$report_id = $json_reply['data']['report_id'];
print_r('Report ID: ' . $report_id);
```

Next, looping until the report is processed and a reply is created (limiting the looping for ~1 min – 60 times – is just an example of a possible implementation):

```
// Get processed reply.
$feed_handler = new TNSClient(array('api_key' => API_KEY));
$counter = 0;
do{
    sleep(SLEEP_SEC); // Sleep for SLEEP_SEC seconds.
    $reply = $feed_handler->bulkReportReply(array('report_id' => $report_id));
    $counter++;
}
while(isset($reply['id_code']) && $reply['id_code'] == '404' && $counter < LOOP_COUNTER);
var_dump($reply);
```

Finally, parsing the results may be performed as follows:

```
// Check if key is present.
$find = findKey($reply, 'id_code');
$find = intval($find);

if($find > 400) {
    print_r('General error: ' . $reply['id_message']);
}
else if($find == 400) {
    print_r('Bad request. Please check feedback for more information');
}
else {

    // Check if new object created.
    $find = findKey($reply, 100);
    if($find !== FALSE) {
        print_r('New object created; name = ' . $find['objname']);
    }

    // Check if object exists.
    $find = findKey($reply, 101);
    if($find !== FALSE) {
        print_r('Transient object already exists; name = ' . $find['objname'] .
                ', Separation = ' . $find['separation']);
    }

}
```

The sample code can be executed from the command line as is (after arrangement of the api_key, of course, and whichever additional details) by e.g.:

php tns_bulk_sample_code.php