



**Web API Specifications for the  
TRACE Treasury Securities  
File Downloads**

Version 4.0  
April 29, 2024

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## Revision History

Version	Date	Changes Made
Version 1.0	October 17, 2016	<ul style="list-style-type: none"><li>• Original version of specification</li></ul>
Version 2.0	April 26, 2017	<ul style="list-style-type: none"><li>• Eliminated 144A Indicator from Security Master File; the field is now a Reserved field.</li></ul>
Version 3.0	June 13, 2017	<ul style="list-style-type: none"><li>• Modified Participant List query string, Participant Daily List query string, and Participant Daily List Delta query string so that only TRACE for Treasury participants are returned in each query and not TRACE participants as a whole.</li></ul>
Version 3.1	May 15, 2023	<ul style="list-style-type: none"><li>• Updated BSYM_ID definition</li></ul>
<u>Version 4.0</u>	<u>April 29, 2024</u>	<ul style="list-style-type: none"><li>• <u>Removed certificate references and added new M2M API information</u></li><li>• <u>New string URL – starts with apidownload</u></li></ul>

## Introduction

The FINRA TRACE Reporting and Quotation Service is a system developed which consolidates the various fixed income and equity reporting facilities FINRA currently maintains (e.g., TRACE, ADF, OTC Equity Reporting, etc...) into a single platform. The secure web interface offers member firms enhanced reporting and data retrieval functionality.

The Download site for Treasury securities supports clients via a Web Application Programming Interface (API) to download security master files, and daily lists.

This document pertains specifically to Treasury securities reference data. This document outlines the parameters and values for each available Treasury securities file. The data in each of these files is current as of the time of download.

## Access to the Download API

Clients who wish to programmatically access the API must request a Refresh Token via the TRAQS Website with their OKTA profile login. This Refresh Token will be used to obtain an Access Token. This Access Token will use a "Bearer Token," which will allow clients to request the API files without having to collect credentials.

The Refresh Token is valid for 6 months. The Access Token expires every hour (3600 seconds). It is the client's responsibility to programmatically request a new Access Token when it expires using the Refresh Token.

To access TRAQS, a username, password, and NASDAQ Multi-Factor Authentication (MFA) is required. To establish a TRAQS username, please consult your Super Account Administrator (SAA) and use the Participant Data Management (PDM) system.

The data contained in the API files are maintained by FINRA Operations. For questions concerning the data, PDM, or to access the files, please contact FINRA Operations at (866) 776-0800 option 2 or [FINRAOperations@finra.org](mailto:FINRAOperations@finra.org). For technical questions or issues accessing the files, please contact FINRA Client and System Management at [FINRA-TSCSM@finra.org](mailto:FINRA-TSCSM@finra.org).

*Data is compiled from multiple sources, including but not limited to Refinitiv, S&P, Moody's, and Black Knight Technologies.*

## ~~Access to the File Domain~~

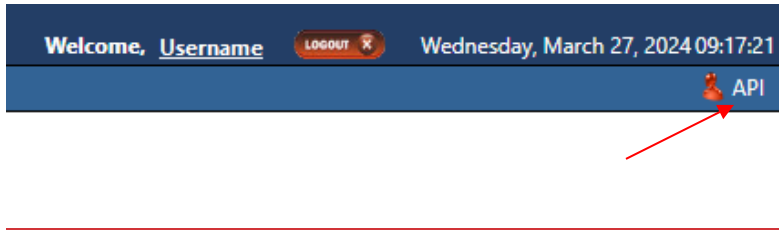
~~Treasury securities file downloads use the NASDAQ Web Security Framework (NWSF) for authentication (proper client authorization for access to particular files must be in place). In order to access the site and download files, a user needs to present a valid NWSF account/password and client certificate with access to the application.~~

~~The data contained in these files are maintained by FINRA Operations. For questions concerning the data, or to subscribe to receive these files, please contact FINRA Operations at (866) 776-0800 or [FINRAOperations@finra.org](mailto:FINRAOperations@finra.org). For technical questions or issues accessing the files, please contact FINRA Product Management at (866) 899-2107 or [FINRAProductManagement@finra.org](mailto:FINRAProductManagement@finra.org).~~

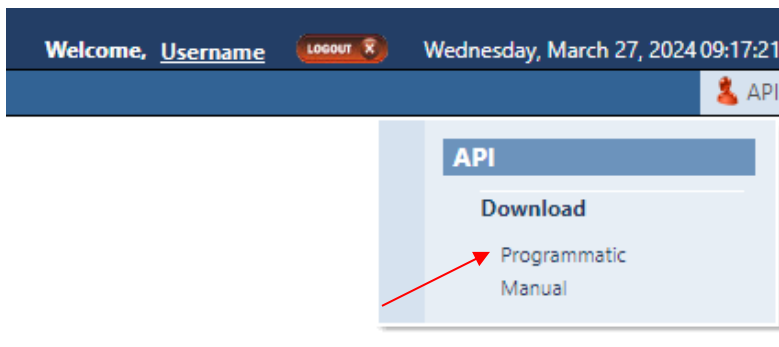
*Data is compiled from multiple sources, including but not limited to Refinitiv, S&P, Moody's, and Black Knight Technologies.*

# Acquiring the Refresh Token in TRAQs

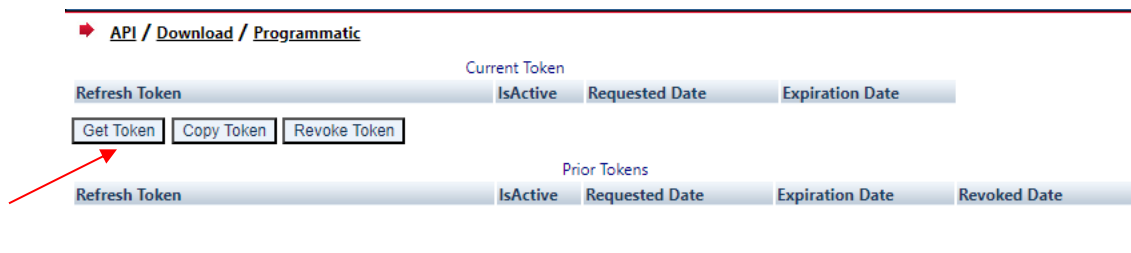
1. Log into TRAQs and authenticate using MFA.
2. Click API from the Main Menu.



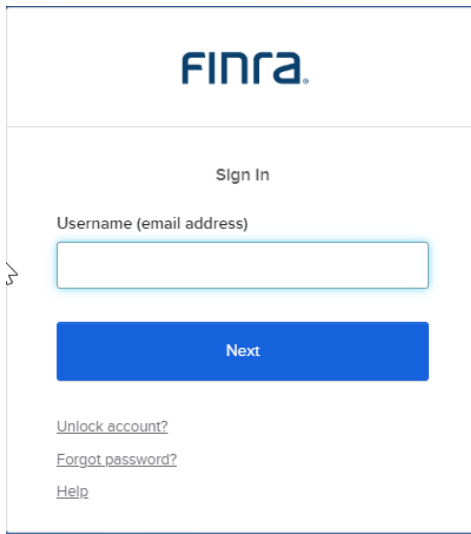
3. Click Programmatic from the Download Menu (this is where the Refresh Token is obtained).



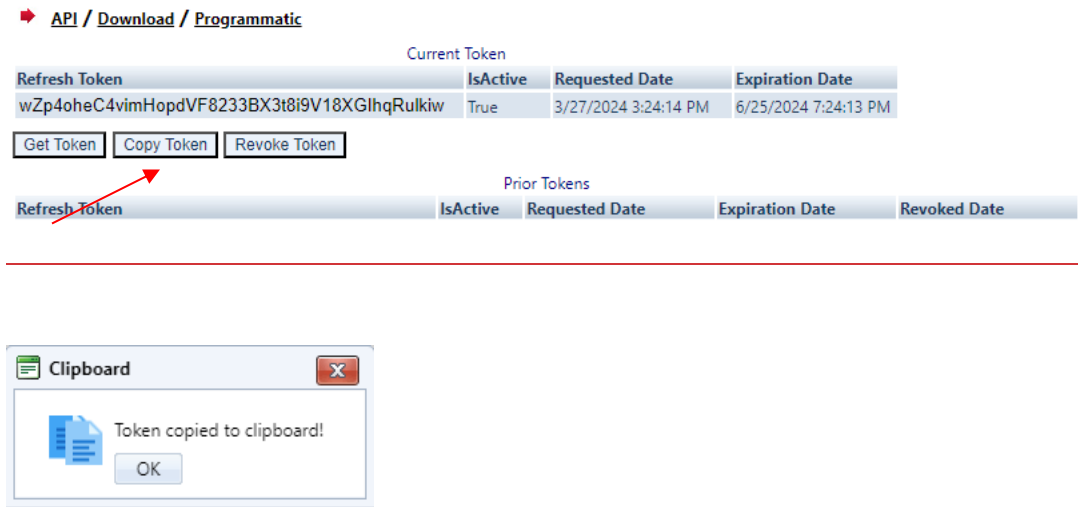
4. Click Get Token from the API Download Programmatic screen.



5. After requesting the Refresh Token, the system will ask you to **Authenticate** again. If successful, the user will be brought back to the API Download Programmatic screen and the Refresh Token information will be populated under the “Current Token” portion of the screen.



6. Click **Copy Token** and paste the **Refresh Token** into your script.



7. Add code to your script to request an **Access Token**.

8. Upon logging into the API domain from your application, your application will request a new Access Token from the TRAQs download server.

9. Your application will apply the new Access Token to the download API request call.

10. On success, the requested data will be returned to your application.

11. The user has the ability to Revoke the current Refresh Token at any time, by clicking **Revoke Token**. This will inactivate the current Refresh Token and it will move to the Prior Token portion of the screen.

➤ [API / Download / Programmatic](#)

Current Token				
Refresh Token	IsActive	Requested Date	Expiration Date	
wZp4oheC4vimHopdVF8233BX3t8i9V18XGhqRulkiw	True	3/27/2024 3:24:14 PM	6/25/2024 7:24:13 PM	

Prior Tokens				
Refresh Token	IsActive	Requested Date	Expiration Date	Revoked Date

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➤ [API / Download / Programmatic](#)

Current Token			
Refresh Token	IsActive	Requested Date	Expiration Date
wZp4oheC4vimHopdVF8233BX3t8i9V18XGhqRulkiw	False	3/27/2024 3:24:14 PM	6/25/2024 7:24:13 PM

Prior Tokens				
Refresh Token	IsActive	Requested Date	Expiration Date	Revoked Date
wZp4oheC4vimHopdVF8233BX3t8i9V18XGhqRulkiw	False	3/27/2024 3:24:14 PM	6/25/2024 7:24:13 PM	3/27/2024 3:41:17 PM

---

12. If the current Refresh Token is expired, click **Get Token** which will generate a new Refresh token and the expired Refresh Token will move to the Prior Token portion of the screen.

➤ [API / Download / Programmatic](#)

Current Token			
Refresh Token	IsActive	Requested Date	Expiration Date
r7W5gnX_FLzliq-HPAm06dcJvIBhXUWNzKFhJH31Rts	True	3/27/2024 3:51:26 PM	6/25/2024 7:51:26 PM

Prior Tokens				
Refresh Token	IsActive	Requested Date	Expiration Date	Revoked Date
wZp4oheC4vimHopdVF8233BX3t8i9V18XGhqRulkiw	False	3/27/2024 3:24:14 PM	6/25/2024 7:24:13 PM	3/27/2024 3:41:17 PM

---

**Note:** Users will be notified via email 15 days prior to **Refresh Token** expiration. You cannot download the API files if the **Refresh Token** or **Access Token** are expired. Refresh Tokens that expire will need to be requested manually following step 3 above and updated in your script.





## Protocol

FINRA's API download site provides access to files using standard HTTP Secure (https) protocol. It is a combination of the Hypertext Transfer protocol and the TLS protocol to provide encrypted communications and secure identification. The URL <https://apidownload.finratraqs.org> is the domain where the files reside. In order to access file reference data users should refer to the query strings detailed in this specification. Examples of actual download query strings are available in later sections of this specification.

## File Availability – All Times are Approximate

File	When Available
Treasury Securities Security Master	Real time starting at 7:00 a.m. ET and throughout the day until 8:00 p.m. ET
Treasury Security Daily List	Real time starting at 7:00 a.m. ET and throughout the day until 8:00 p.m. ET
Treasury Security Daily List Delta	Real time starting at 7:00 a.m. ET and throughout the day until 8:00 p.m. ET
Participant	Real time starting at 7:00 a.m. ET and throughout the day until 8:00 p.m. ET
Participant Daily List	Real time starting at 7:00 a.m. ET and throughout the day until 8:00 p.m. ET
Participant Daily List Delta	Real time starting at 7:00 a.m. ET and throughout the day until 8:00 p.m. ET
US Agreements	Real time starting at 7:00 a.m. ET and throughout the day until 8:00 p.m. ET

**NOTE:** Users may attempt to access the files on non-business days; however, due to server maintenance which occurs on weekends and other non-business days it is possible the user will not have immediate success in access the data during these days.

## URL Parameters

Parameter	Parameter Options
action	<b>DOWNLOAD</b> - provide the complete file. <b>DELTA</b> – provide the changes since the last time the user downloaded the file.  Delta files are supported for Security Daily List and Participant Daily List. <b>NOT</b> for the Security Master, Participant List, and US Agreements files.
facility	<b>TRACE</b>
file	<b>TSMMASTER</b> – Security Master File for Treasury securities <b>DAILYLISTTS</b> – Security Daily List for Treasury Securities <b>PARTICIPANTTS</b> – Participant List (current TRACE for Treasury participants with active authorizations) <b>PDAILYLISTTS</b> – Participant Daily List (additions/deletions/changes to the Participant List for TRACE for Treasury) <b>TSUSA</b> –US Agreements Treasury Securities
day	A date, for example: 1/2/2017. Date is used for Daily List requests.

File	Query Parameters
Treasury Master	action= DOWNLOAD&file=TSMMASTER&facility=TRACE
Treasury Security Daily List	action=DOWNLOAD&file=DAILYLISTTS&facility=TRACE
Treasury Security Daily List delta (See note 1)	action=DELTA&file=DAILYLISTTS&facility=TRACE
Treasury Security Daily List for a specific day	action=DOWNLOAD&file=DAILYLISTTS&facility=TRACE&day=7/10/2017
TRACE Participant List	action=DOWNLOAD&file=PARTICIPANTTS&facility=TRACE
TRACE Participant Daily List	action=DOWNLOAD&file=PDAILYLISTTS&facility=TRACE
TRACE Participant Daily List delta (see note 1)	action=DELTA&file=PDAILYLISTTS&facility=TRACE
TRACE Participant Daily List for a specific day	action=DOWNLOAD&file=PDAILYLISTTS&facility=TRACE&day=07/10/2017
TRACE Treasury Security US Agreements	action=DOWNLOAD&file=TSUSA&facility=TRACE

**NOTE 1:** All requests are categorized and recorded. When a DELTA request is made, the time of the previous request is used to determine the items that appear in the DELTA results. The time used for the previous request is the time of request minus two minutes. This ensures that no updates are missed but it can mean items from a previous request may appear in the next DELTA request. Systems should be coded with this in mind.

## File Definitions - All Files are Pipe Delimited

### TRACE for Treasury Securities Security Master Files

Field Name (Header)	Description	Comments	Maximum Length
SYM_CD	FINRA assigned Symbol		14
CUSIP_ID	CUSIP	This field will be blank for firms that do not have a CUSIP license in place.	9
BSYM_ID	FIGI/Financial Instrument Global Identifier		12
SUB_PRDCT_TYPE	Sub-Product Type Code	Valid values are: BILL – <i>Treasury Bill</i> NOTE – <i>Bonds and Notes</i> STRP – <i>Strips</i> TIPS - <i>TIPS</i>	5
ISSUER_NM	Issuer Name		80
SCRTY_DS	Security Description		80
CPN_RT	Coupon Rate	Decimal format	27 (19 after decimal)
CPN_TYPE_CD	Coupon Type Code	<i>Please see Appendix 1 for a list of Coupon Type Code / Descriptions</i>	10
MTRTY_DT	Maturity Date	YYYYMMDD format.	
GRADE	Grade	H – High Yield; I – Investment Grade	1
RESERVED2	Filler	Blank field - reserved for future use.	
RESERVED3	Filler	Blank field - reserved for future use.	
RESERVED4	Filler	Blank field – reserved for future use.	1
DISSEM	Trade Report Disseminator Indicator	Y = Indicates trade reports will be disseminated N= Indicates trade reports will not be disseminated	1
Benchmark Start Date		YYYYMMDD format.	
Benchmark End Date		YYYYMMDD format.	

### TRACE for Treasury Securities Daily List (for Securities)

Field Name (Header)	Description	Comments	Maximum Length
DAILY_LIST_DT	Daily List Date	YYYYMMDD format.	
DAILY_LIST_TIME	Daily List Time	HH:MM:SS	
DAILY_LIST_EVENT_CD	Daily List Event Type	Valid values are: SA <i>Security Add</i> SD <i>Security Delete</i> SC <i>Security Change</i>	2
DAILY_LIST_RSN_CD	Daily List Reason	Reason for the addition, deletion, or change. This field may be blank.  <i>Please see Appendix 2 for a list of Daily List Reason Codes / Descriptions</i>	5
CMMNT_TX	Event Comment	Free form text field entered by FINRA Operations. May be blank.	30
EFCTV_DT	Effective Date	Reflects effective date for the event affected in the record.	
PROD_TYPE	Product Type	Constant "TS".	
SYM_CD	FINRA Symbol		14
CUSIP		This field will be blank for firms that do not have a CUSIP license in place.	9
BSYM_ID	FIGI/Financial Instrument Global Identifier		12
SCRTY_DS	Security Description		250
ISSUER_NM	Issuer Name		255
CPN_RT	Coupon Rate	Decimal format	27 (19 after decimal)
MTRTY_DT	Maturity Date	YYYYMMDD format.	
SUBPROD_TYPE	Sub-Product Type	Valid values are: BILL – <i>Treasury Bill</i> NOTE – <i>Bonds and Notes</i> STRP – <i>Strips</i> TIPS - <i>TIPS</i>  Note: Changes to Sub- Product values will be administered by a Delete then Add Daily List event.	5
NEW_SYM_CD	New Symbol	Applicable to Change Event Types only. Will be blank on Add and Delete Events.	14

Field Name (Header)	Description	Comments	Maximum Length
NEW_CUSIP	New CUSIP	Applicable to Change Event Types only. Will be blank on Add and Delete Events.	9
NEW_BSYM_ID	New FIGI/Financial Instrument Global Identifier	Applicable to Change Event Types only. Will be blank on Add and Delete Events.	12
NEW_SCRTY_DS	New Security Description	Applicable to Change Event Types only. Will be blank on Add and Delete Events.	250
NEW_ISSUER_NM	New Issuer	Applicable to Change Event Types only. Will be blank on Add and Delete Events.	255
NEW_CPN_RT	New Coupon Rate	Applicable to Change Event Types only. Will be blank on Add and Delete Events.	27 (19 after decimal)
NEW_MTRTY_DT	New Maturity Date	Applicable to Change Event Types only. Will be blank on Add and Delete Events.	
NEW_SUBPROD_TYPE	New Sub Product Type	Applicable to Change Event Types only. Will be blank on Add and Delete Events.	5

#### TRACE for Treasury Participant List

Field Name (Header)	Description	Comments	Maximum Length
mpid	Market Participant Identifier	FINRA identifier assigned to the Treasury participant	6
dba_nm	Firm Name		64

#### TRACE for Treasury Participant Daily List

Field Name (Header)	Description	Comments	Maximum Length
list_dt	Daily List Date	MMDDYYYY format	
effective_dt	Effective Date	MMDDYYYY format	
cd_description	Event Type	Valid values are: Participant Addition Participant Deletion Participant Change	
old_mpid	Market Participant Identifier		6
old_dba	Firm Name		64
new_mpid	New Market Participant Identifier		6
new_dba	New Firm Name		64
rf_cd	Reporting Facility	Value will always be TRACE	

### TRACE for Treasury Securities US Agreements File

Field Name (Header)	Description	Comments	Maximum Length
MPID	MPID of the Client	FINRA identifier assigned to the participant.	6
AGRMT_EFCTV_DT	Effective Date for the agreement with the client	Format is YYYYMMDDHHMMSS	14
AGRMT_XPRTN_DT	End date for agreement with the client	Format is YYMMDDHHMMSS	12
UNFRM_SRVC_AGRMT_MP_ID	MPID of client with who agreement is based	FINRA identifier assigned to the participant.	6
US_GIVEUP_DROP_FL	Give Up firm receives drop copies of transaction messages	Y or N.	

## Example Requests

### Example 1 - Get the current TRACE for Treasury Participant List

This request retrieves the current list of TRACE for Treasury authorized Participants:

<https://apidownload.finratraqs.org/DownloadHandler.ashx?action=DOWNLOAD&file=PARTICIPANTTS&facility=TRACE>

### Example 2 - Get the TRACE for Treasury Participant Daily List for 7/10/2017

This request retrieves the list of changes to TRACE for Treasury authorized Participants published on 5/1/2017 (note 7/10/2017 is used as an example. Any specific date may be used):

<https://apidownload.finratraqs.org/DownloadHandler.ashx?action=DOWNLOAD&file=PDAILYLISTTS&facility=TRACE&day=7/10/2017>

### Example 3 - Get today's TRACE for Treasury Participant Daily List (no day provided)

This request retrieves the current day's cumulative list of changes to TRACE for Treasury authorized Participants:

<https://apidownload.finratraqs.org/DownloadHandler.ashx?action=DOWNLOAD&file=PDAILYLISTTS&facility=TRACE>

### Example 4 - Get changes to the TRACE for Treasury Participant Daily List since the last download (no day provided)

This request retrieves the latest list of changes to TRACE for Treasury authorized Participants since the last user download of the Participant List:

<https://apidownload.finratraqs.org/DownloadHandler.ashx?action=DELTA&file=PDAILYLISTTS&facility=TRACE>

### Example 5 - Get the current Treasury Security Master file

This request retrieves the current list of all Treasury securities eligible for trade reporting:

<https://apidownload.finratraqs.org/DownloadHandler.ashx?action=DOWNLOAD&file=TSMaster&facility=TRACE>

### Example 6 - Get today's TS Daily List (no day provided)

This request retrieves the current day's cumulative list of changes to all the Treasury Security Master data.

<https://apidownload.finratraqs.org/DownloadHandler.ashx?action=DOWNLOAD&file=DAILYLISTTS&facility=TRACE>



## Sample Results

### TRACE for Treasury Securities Security Master File Illustrating the Header and Footer

```
SYM_CD|CUSIP_ID|BSYM_ID|SUB_PRDCT_TYPE|ISSUER_NM|SCRTY_DS|CPN_RT|CPN_TYPE_CD|MTRTY_DT|GRADE|RESERVED2|RESERVED3|RESERVED4|DISSEM|Benchmark Start Date|Benchmark End Date
TSRYS4493660|912796JE0|BBG00CBVNNC3|BILL|UNITED STATES TREASURY|United States Treasury Bill|0.00000000000000000000|DSC|20170302|I||||N|20160830|20160906
TSRYS4493662|912796JP5|BBG00CS9FQW4|BILL|UNITED STATES TREASURY|United States Treasury Bill|0.00000000000000000000|DSC|20170427|I||||N|20170329|20170404
TSRYS4493663|912796JT7|BBG00CXJXJ52|BILL|UNITED STATES TREASURY|United States Treasury Bill|0.00000000000000000000|DSC|20170525|I||||N|20170426|20170502
TSRYS4493664|912796JX8|BBG00D3CKKX8|BILL|UNITED STATES TREASURY|United States Treasury Bill|0.00000000000000000000|DSC|20170622|I||||N|20170524|20170530
TSRYS4493667|912796KG3|BBG00DK4LV71|BILL|UNITED STATES TREASURY|United States Treasury Bill|0.00000000000000000000|DSC|20170209|I||||N|20160809|20160815
...
[snip]
...
TSRYS5587029|912803GT4||STRP|UNITED STATES TREASURY|United States Treasury Security Stripped Principal Payment|0.00000000000000000000|STR|20430515|I||||N||
Footer - Count: 00002466, Facility: TRACE, File Created: 20230512151551
```

### TRACE for Treasury Securities Daily List File Illustrating the Header and Footer

```
DAILY_LIST_DT|DAILY_LIST_TIME|DAILY_LIST_EVENT_CD|DAILY_LIST_RSN_CD|CMMNT_TX|E FCTV_DT|PROD_TYPE|SYM_CD|CUSIP|BSYM_ID|SCRTY_DS|ISSUER_NM|CPN_RT|MTRTY_DT|SUBPRD_TYPE|NEW_SYM_CD|NEW_CUSIP|NEW_BSYM_ID|NEW_SCRTY_DS|NEW_ISSUER_NM|NEW_CPN_RT|NEW_MTRTY_DT|NEW_SUBPRD_TYPE
20230505|16:27:42|SA||New Security
TS|20230505|TS|TSRYS5584396|912797GS0||United States Treasury Bill|UNITED STATES TREASURY|0.00000000000000000000|20230914|BILL|||||||
...
[snip]
...
20230505|16:27:42|SA||New Security
TS|20230505|TS|TSRYS5584399|912797FH5||United States Treasury Bill|UNITED STATES TREASURY|0.00000000000000000000|20240516|BILL|||||||
Footer - Count: 00000004, Facility: TRACE, File Created: 20230512154347
```

## TRACE for Treasury Participant Daily List File Illustrating the Header and Footer

```
list_dt|effective_dt|cd_description|old_mpid|old_dba|new_mpid|new_dba|rf_cd
09/09/2010|09/09/2010|Participant Addition|||HRBC|hurleyf test HRBC
mppweb|OTCE
09/09/2010|09/09/2010|Participant Addition|ABNE|ABNE TEST|||TRACE
09/09/2010|09/09/2010|Participant Addition|ABNF|ABNF TEST|||TRACE
09/09/2010|09/09/2010|Participant Addition|ABNB|ABN AMRO CLEARING CHICAGO
LLC|||TRACE
09/09/2010|09/09/2010|Participant Addition|ABNC|ABNC TEST|||TRACE
...
[snip]
...
09/09/2010|09/09/2010|Participant Deletion|AALC|THRIVENT INVESTMENT
MANAGEMENT CO2|||TRACE
Footer - Count: 00000014, Facility:TRACE, File Created: 20100910120732
```

## TRACE for Treasury Participant List File Illustrating the Header and Footer

```
mpid|dba_nm
AAAA|TEST
ABLE|NATIXIS BLEICHROEDER INC.
ABNA|ABN AMRO SECURITIES (USA) LLC
ABNB|ABN AMRO CLEARING CHICAGO LLC
ABNC|ABNC TEST
ABND|ABND TEST
ABNE|ABNE TEST
ABNG|ABNG TEST
ABPI|PAVEK INVESTMENTS INC.
...
[snip]
...
QUAL|QUAYLE & CO. SECURITIES
ROCK|ROCKWELL GLOBAL CAPITAL LLC
SCHO|SCHOFF & BAXTER, INC.
TMBR|TIMBER HILL LLC
UBSS|UBS SECURITIES LLC
WONG|A B WONG CAPITAL LLC
WTCO|WILLIAMS TRADING LLC
Footer - Count: 00000089, Facility: TRACE, File Created: 20100910121322
```

## Appendices

**Note:** all codes/descriptions in the following appendices are subject to updates, as necessary.

### Appendix 1 – Treasury Securities Coupon Type Codes and Descriptions

Coupon Type Code	Coupon Type Description
DSC	Discount/Zero Coupon
FIX	Fixed Coupon
FLT	Floating Coupon
RNG	Range Coupon
STR	Stripped Coupon
TBP	To Be Priced Coupon
UNK	Unknown
VAR	Variable Coupon

### Appendix 2 - Daily List Update Reason Codes and Descriptions

Update Reason Code	Update Reason Description
<i>blank</i>	<i>No reason given</i>
MOT	Moved from OTCE
DNY	Delisted from NYSE
DAX	Delisted from AMEX
DAR	Delisted from ARCA
DNQ	Delisted from NASDAQ
DEX	Delisted from Exchange
ISV	Ineligible – Sovereign
ICD	Ineligible – CD
ICR	Ineligible – Currency
IMM	Ineligible – Money Market
ITR	Ineligible – Treasury
IAI	Ineligible – Accredited Investor
IRS	Ineligible – Other
BR	Bankruptcy
LIQ	Liquidation
CAL	Called
RED	Redeemed
EXC	Exchanged
CAN	Cancelled
A/M	Acquisition/Merger
MAT	Matured
LNY	Listed on the NYSE
LAR	Listed on the NYSE ARCA
LAX	Listed on AMEX
LNQ	Listed on NASDAQ

<b>Update Reason Code</b>	<b>Update Reason Description</b>
LCB	Listed on CBOE
ROB	Reportable to the OTCBB
RON	Reportable on the OTC NBB
RMS	Reportable to the MSRB
12J	12(j) Registration Revoked by the SEC
RNC	Regulatory Non Compliance
OTH	Other *

\*where OTH is used, please refer to the Event Comments field in the file (CMMNT\_TX) for additional information.

## **Programmatic Access Example(curl)**

The following is a code excerpt to illustrate how to use the MPP Download site programmatically.

### **Example using the TS Security Master**

```
#!/bin/bash

URL_REFRESH=http://apidownload.finratraqs.org/refresh [apidownload.finratraqs.org]
URL_DOWNLOAD=http://apidownload.finratraqs.org/DownloadHandler.ashx?action=DOWNLOAD
&file=TSMaster&facility=TRACE [apidownload.finratraqs.org]
USER_NAME="Finrausr"
FAILEDSTATUS="HTTP/1.1 401 Token is inactive or expired."
FAILEDREFRESHSTATUS="Refresh Token is invalid or has expired."

update tokens(){
    # Get a new access token
    # install jq command - sudo apt-get install jq
    tmp="$(mktemp)"
    curl -s -X POST --url "${URL_REFRESH}" \
        --header "content-type: application/x-www-form-
urlencoded" \
        --data
"username=${USER_NAME}&refreshtoken=${refresh token}" > "${tmp}"

    read failedrefreshstatus <<(cat "${tmp}" | tr -d '\r')

    #check if refresh token is invalid
    if [ "${failedrefreshstatus}" = "${FAILEDREFRESHSTATUS}" ] ; then

        echo "${failedrefreshstatus}"
        echo ""
        exit 1
    fi

    read refresh token <<( cat "${tmp}" | jq .refresh token | tr -d
'' )
    read access token <<( cat "${tmp}" | jq .access token | tr -d '' )
    #echo "${refresh token}" > refresh token.txt

    echo "Requested new access token cached"
    echo ""

    echo "${access token}" > access token.txt
    rm -f "${tmp}"
}

# The Refresh Token
read refresh token < refresh token.txt

echo "Your refresh token is ${refresh token}"
echo ""

# The Access Token
access token=""

if [ -f "access token.txt" ]; then
```

```

        read access token < access token.txt
    fi

    echo "Your current access token: ${access token}"
    echo ""

    if [ -z "${access token}" ]; then
        echo "No cached access token; getting new access token!"
        echo ""

        update tokens
        read access token < access token.txt

        echo "Your new access token: ${access token}"
    echo ""
    fi

    tmp="$(mktemp)"

    echo "Validating access token..."
    echo ""

    #get curl header status for token validity
    httpstatus=$(curl -s -I --url "${URL_DOWNLOAD}" \
        --header "Authorization: Bearer ${access token}" \
        | awk 'NR==1{print $0} END {print $0}' | tr -d '\r')

    #echo "$httpstatus" > httpstatus.txt
    #echo "$FAILEDSTATUS" > failedstatus.txt

    #check if token is invalid
    if [ "${httpstatus}" = "${FAILEDSTATUS}" ] ; then

        echo "Invalid/expired access token, requesting new access token!"
        echo ""

        update tokens
        read access token < access token.txt

        echo "Your new access token: ${access token}"
        echo ""
    fi

    echo "Request download with access token!"
    echo ""

    #download file (this uses option -OJ, getting the file name from the content-
    disposition
    #                                     if file exists, this will fail.)
    curl -s -OJ -X POST --url "${URL_DOWNLOAD}" \
        --header "Authorization: Bearer ${access token}" \
        --data "username=${USER_NAME}"

    ls -lrt

    #cat "${tmp}"
    rm -f "${tmp}"

```

## Programmatic Access Example (C#, .NET)

The following is a code excerpt to illustrate how to use the MPP Download site programmatically. If you are going to access the site with an application the first step is to download the NWSF client certificate using your web browser. Install it in the browser then export the certificate from the browser, saving the certificate to a location on the machine as an X905 certificate (.cer).

Example using the TS Security Master:

```
string Action = "DOWNLOAD";
string file = "TSMMASTER";
string facility = "TRACE";

string site = "https://download.finratrags.org/DownloadHandler.ashx";
string query = string.Format("{0}?action={1}&file={2}&facility={3}", site,
                             Action, file, facility);

// Create request
HttpRequest webRequest = WebRequest.Create(query) as HttpRequest;

// Get cert and add to request
X509Certificate Cert =
    X509Certificate.CreateFromCertFile("C:\\MPP\\cert\\mpp_cert.cer");

webRequest.ClientCertificates.Add(Cert);
webRequest.Method = "GET";

// Add nwsf user/password to request

NetworkCredential nwCredentials = new NetworkCredential("user", "pwd");
webRequest.Credentials = nwCredentials;

// Make the request
HttpWebResponse Response = (HttpWebResponse)webRequest.GetResponse();

// Fiddle with the header in the response to get the file name
int pos = Response.Headers["Content-Disposition"].IndexOf("TRACE");

string Filename = Response.Headers["Content-Disposition"].Substring(pos);

// Create a file to save it in ..
StreamWriter sw = new StreamWriter("C:\\MPP\\files\\" + Filename, false);

StreamReader sr = new StreamReader(Response.GetResponseStream(),
                                   Encoding.Default);
int cnt;
char[] ReadBuf = new char[1024];

while ((cnt = sr.Read(ReadBuf, 0, 1024)) != 0)
{
    sw.Write(ReadBuf);
}
```