Appendix: TSTool Installation and Configuration for Windows and Linux Systems

Riverside Version, 10.00.02, 2011-05-23

1. Overview

This appendix describes how to install TSTool on Windows and Linux.

2. File Locations

Standard locations of TSTool software files are as follows. Files are normally installed on Windows on the *C:* drive but can be installed in a shared location on a server.

Windows: C: \Program Files\RTi\TSTool-Version *Linux: /opt/RTi/TSTool-Version*	Top-level install directory.
bin	Software program files directory.
batik.jar*	Scalable Vector Graphics (SVG) output packages.
Blowfish.jar*	Used for encryption/security.
cdss.domain.jar*	CDSS components.
h2.jar*	H2 embedded database.
HydroBaseDMI.jar*	State of Colorado HydroBase database interface package.
jcommon.jar, jfreechart.jar	Plotting package.
jsr173_1.0_api.jar, libXMLJava.jar	XML support.
jython.jar	Jython support.
msbase.jar *mssqlserver.jar* *msutil.jar*	Microsoft SQL Server packages.
NWSRFS_DMI.jar*	National Weather Service River Forecast System (NWSRFS) package.
RiversideDB_DMI.jar*	Riverside Technology, inc., RiversideDB database package.
RTi_Common.jar*	Riverside Technology, inc. supporting packages.
SatmonSysDMI.jar*	State of Colorado Satellite Monitoring System package.
StateMod.jar*	State of Colorado's StateMod and StateCU model packages.
TSCommandProcessor.jar*	Time series command processor package.
tstool	Shell script to run TSTool on Linux.
TSTool.bat	Batch file to run TSTool using the JRE software. This may need to be edited if the installation is not standard.

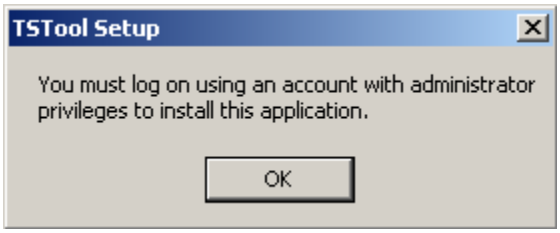
TSTool.exe	Executable program to run TSTool using the JRE software, recommended over batch file.
TSTool.l4j.ini	Configuration file for *TSTool.exe* launcher.
TSTool.jar*	TSTool program components.
doc\TSTool\UserManual	Main documentation directory for TSTool.
TSTool.pdf	TSTool documentation as PDF.
examples	Example data and command files.
logs	Directory for TSTool log files (should be writable).
system	Directory for system files.
CDSS.cfg	CDSS configuration file for HydroBase database configuration.
DATAUNIT	Data units file.
TSTool.cfg	Configuration file to modify TSTool defaults.
*jre**	Java Runtime Environment used by TSTool

3. Installing TSTool

3.1 Installing TSTool – Windows

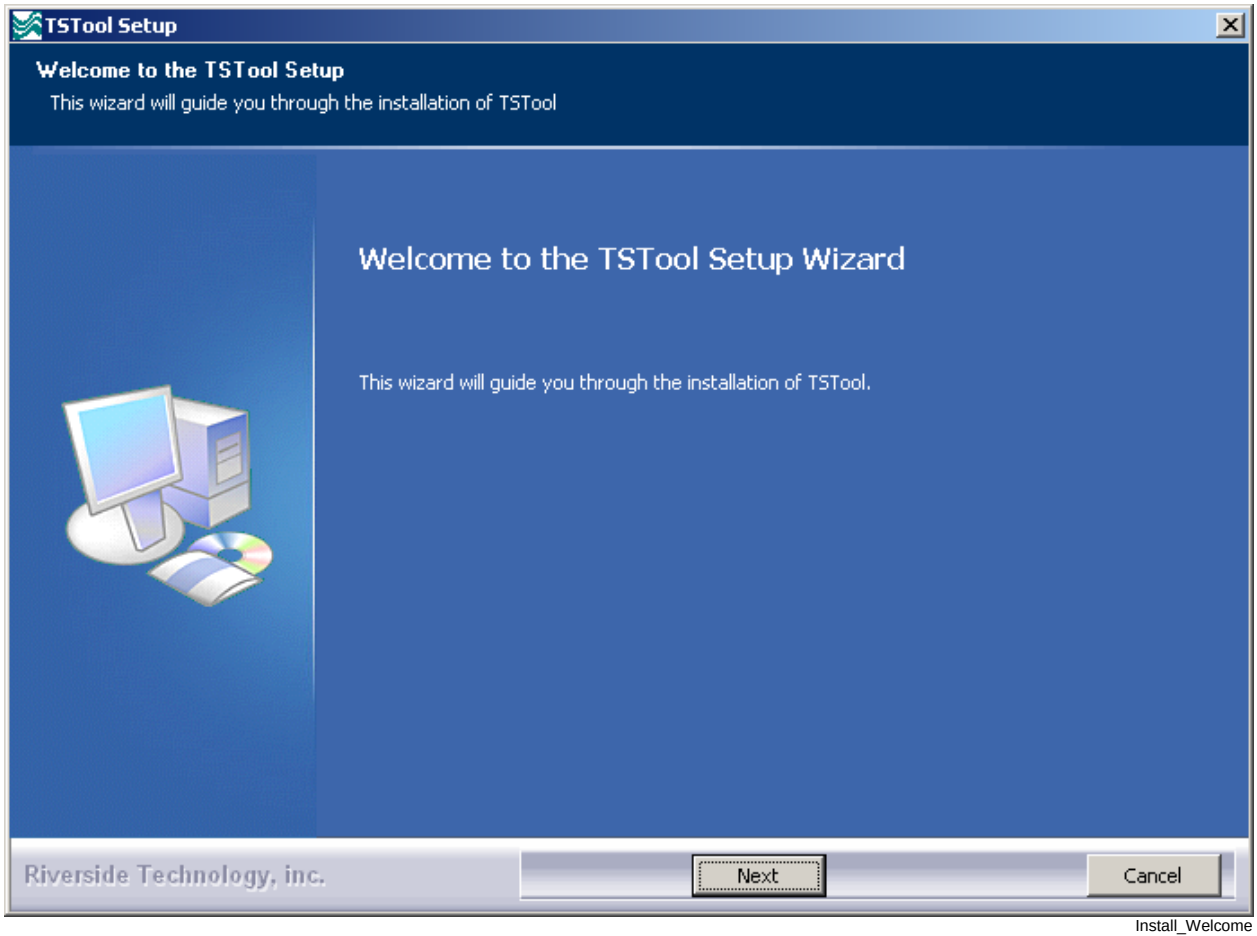
Use the following instructions to install TSTool using the *TSTool_*Version.Setup.exe* installer program.

1. Run the *TSTool_*Version.Setup.exe* file by selecting from Windows Explorer, the ***Start… Run…*** menu, or from a command shell. You must be logged into the computer using an account with administrator privileges. Otherwise, the following warning will be displayed:



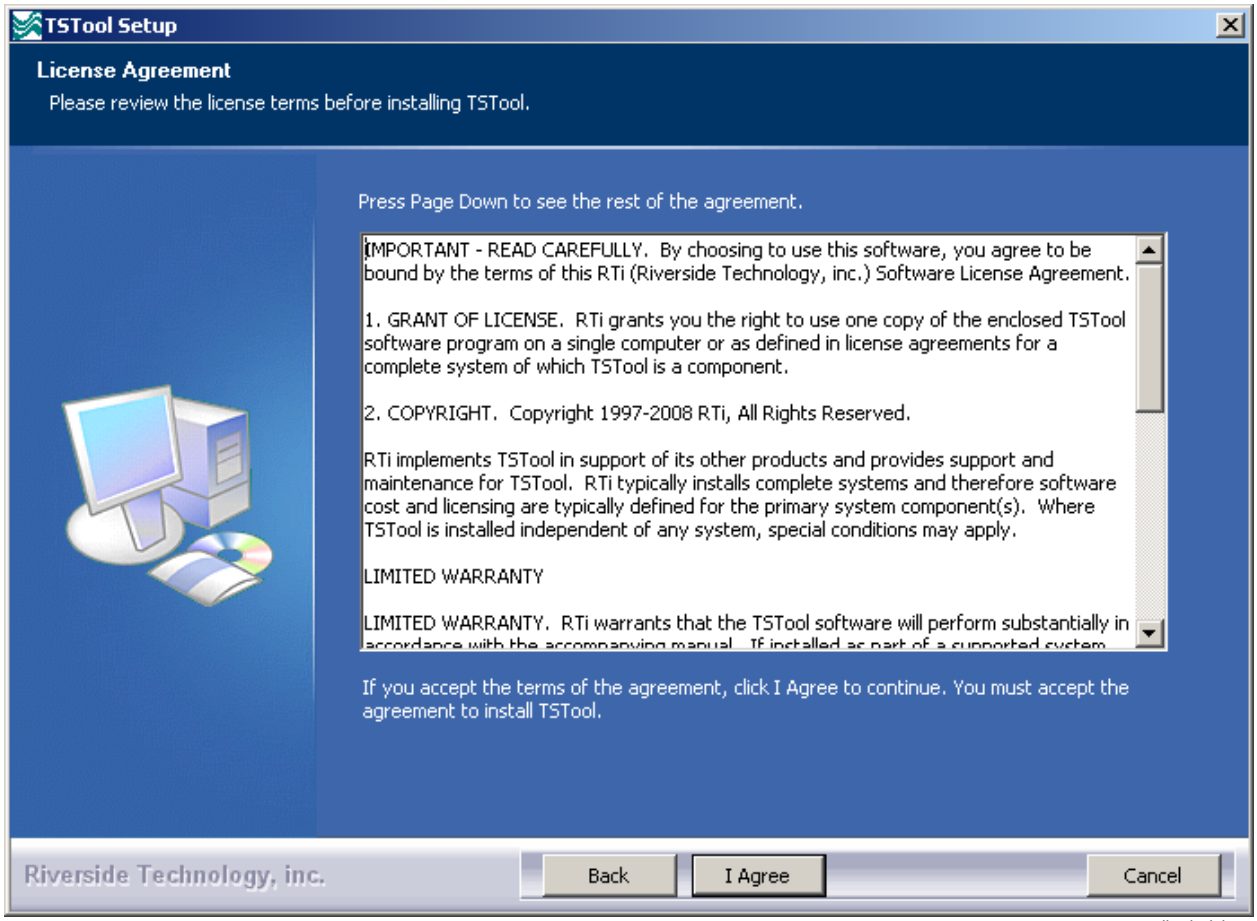
Install_AdministratorWarning

If you have administrative privileges, the following welcome will be displayed, and the installation can continue:



Install_Welcome

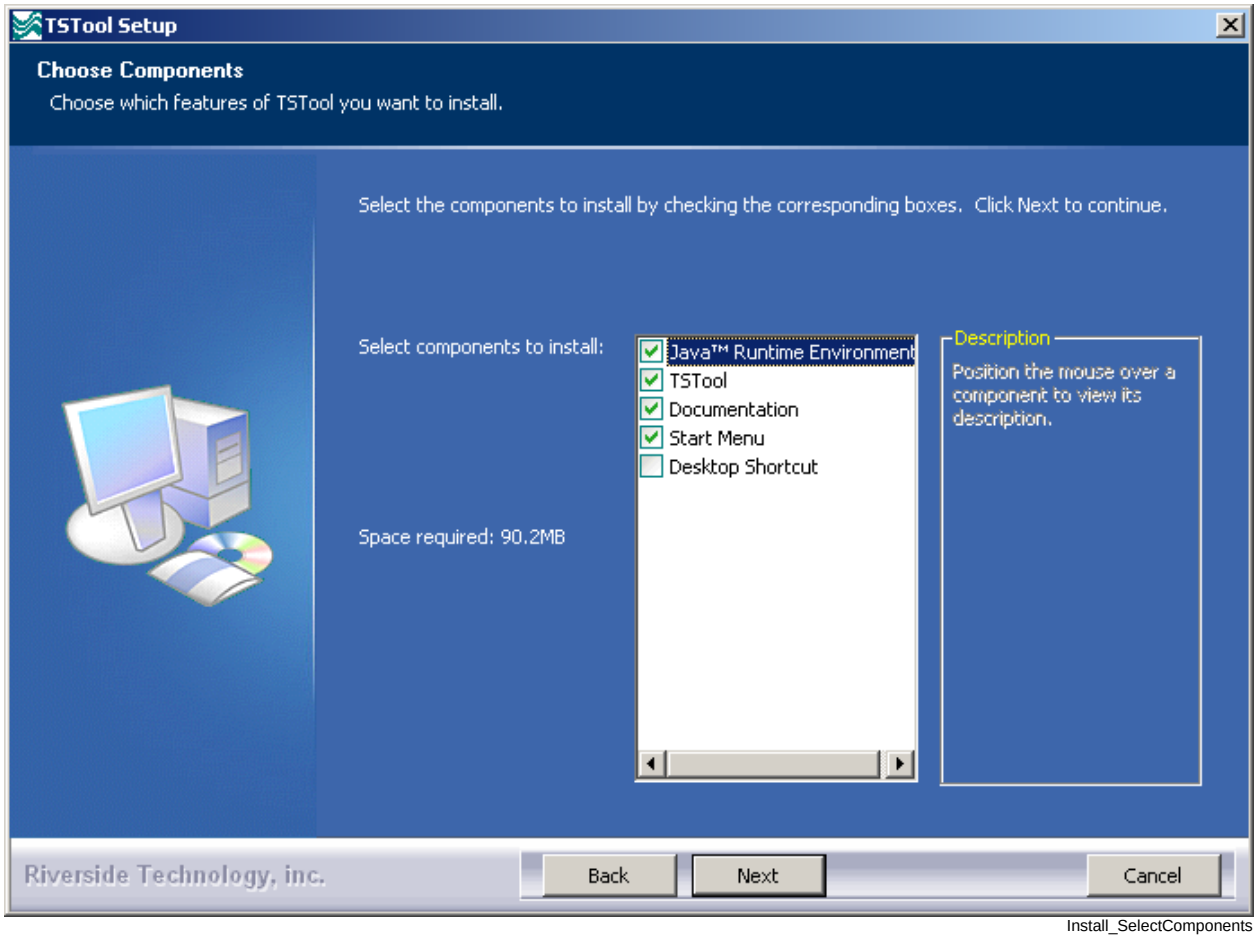
Press ***Next*** to continue with the installation.



Install_Disclaimer

Press ***I Agree*** to continue with the installation.

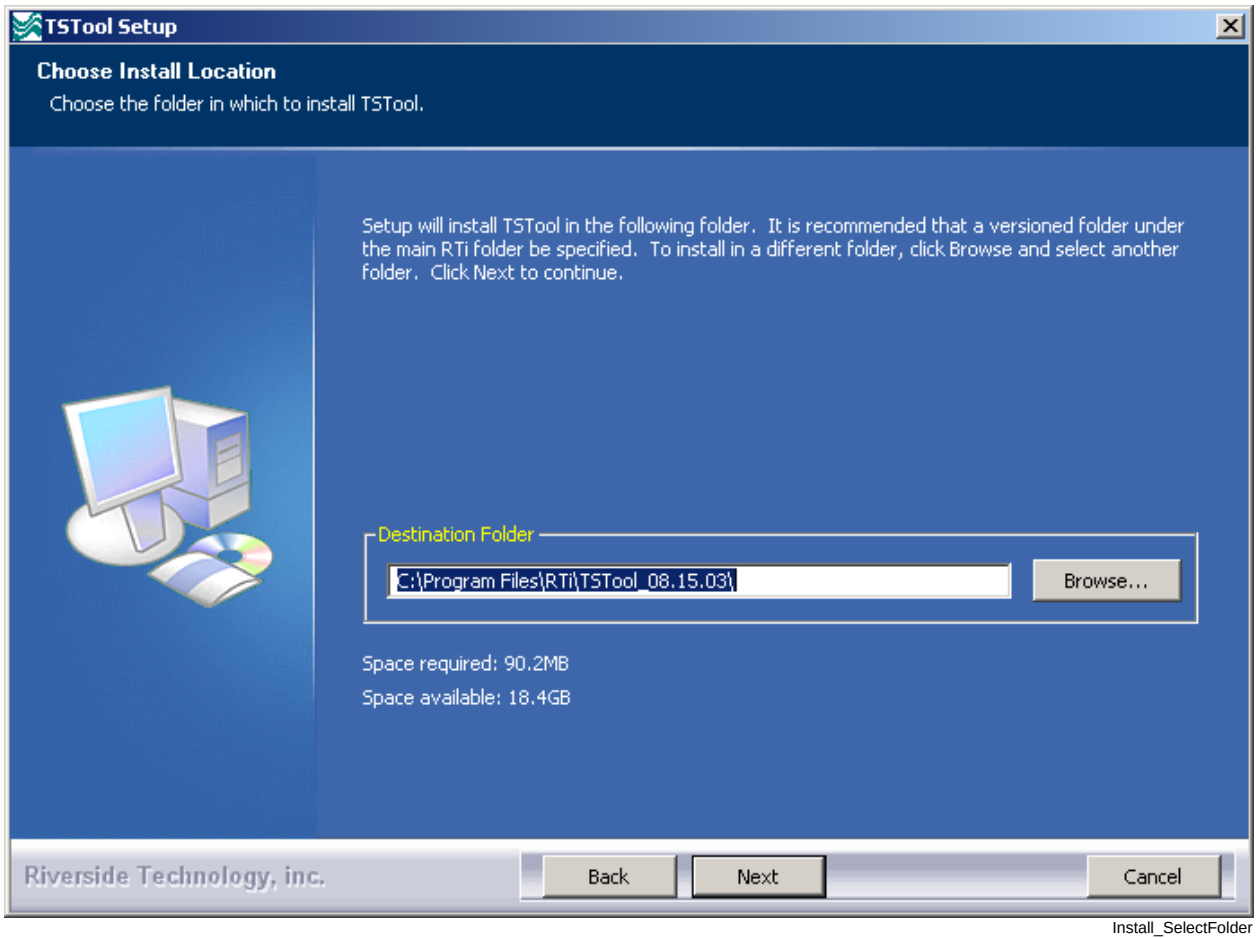
2. Several components can be selected for the install as shown in the following dialog. Position the mouse over a component to see its description.



Install_SelectComponents

Select the components to install and press ***Next***.

3. The following dialog is then shown and is used to select the installation location for TSTool. To be consistent with other RTi software and allow different versions of TSTool to be installed at the same time, select a folder similar to that shown below.

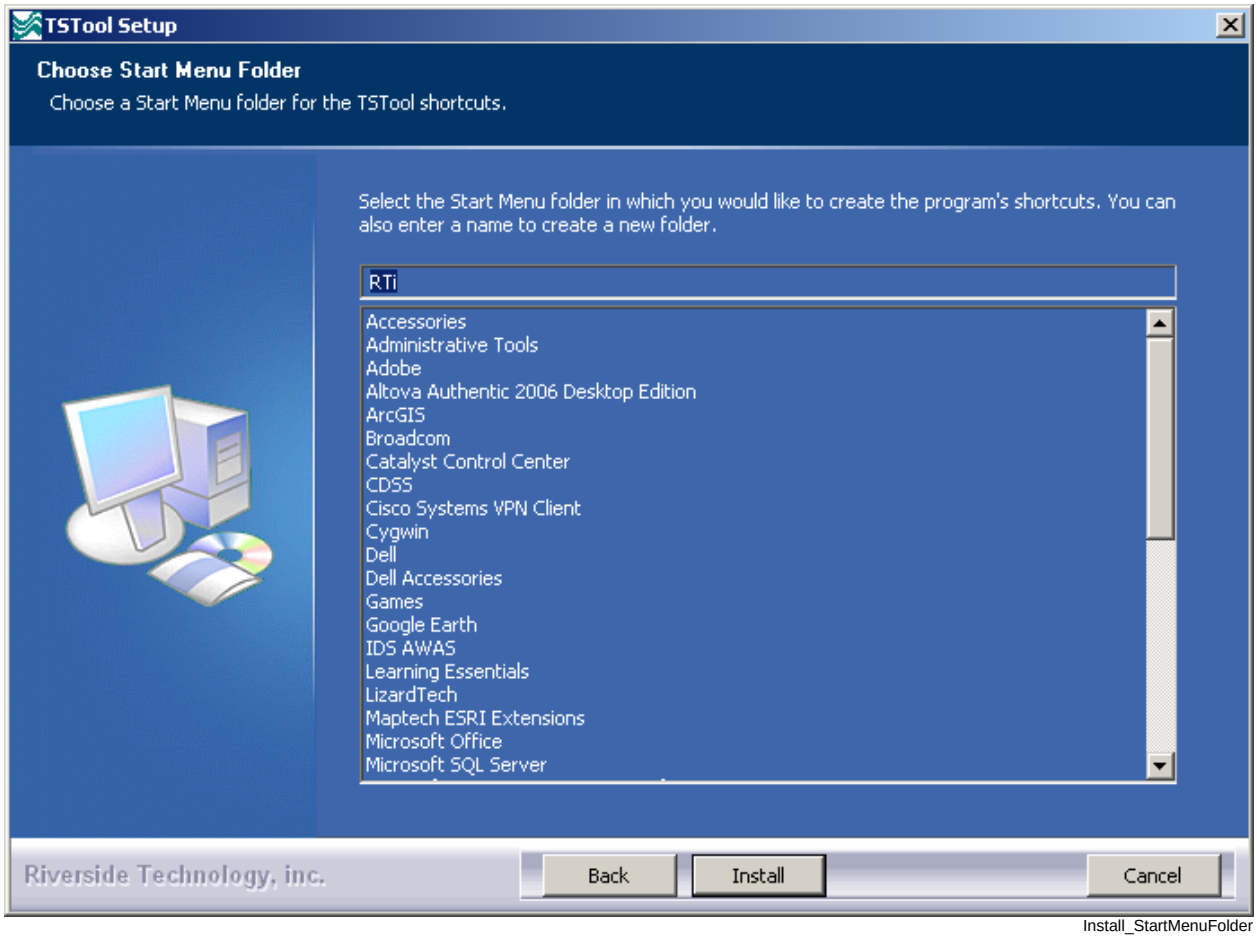


Install_SelectFolder

After selecting the install location, press ***Next***.

Note that this location will be saved as a Windows registry setting (*HKEY_LOCAL_MACHINE\Software\RTi\TSTool-Version\…*) to allow future updates to check for and default to the same install location, and to allow the standard software uninstall procedure to work correctly.

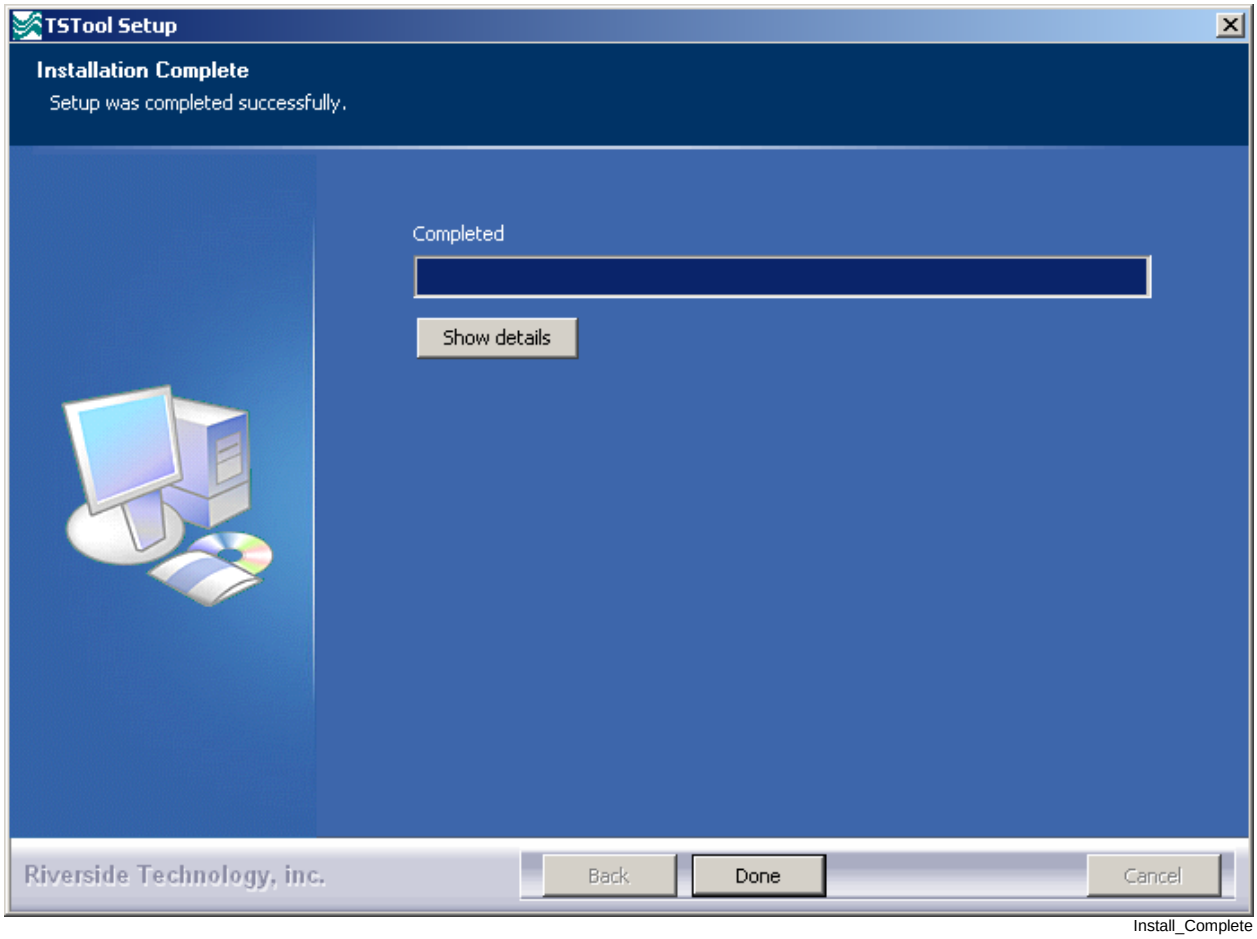
4. The following dialog will be shown to select the menu for the software:



Install_StartMenuFolder

After selecting the folder, press ***Install***.

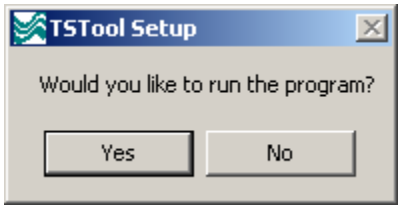
5. The following dialog will show the progress of the installation:



Install_Complete

Press ***Show details*** to see the files that were installed or press ***Next*** to continue.

6. The following dialog will then be shown asking whether the TSTool software should be run:



Install_RunTSToolQuestion

Press ***Yes*** to run the software or ***No*** to exit the installation procedure.

7. TSTool may be distributed with a demonstration license. You may be provided instructions for how to upgrade the license. Typically the ***Help…Import Configuration…*** menu is used to import old settings after an installation or to import new license properties that are provided for the new release.

3.1.1 Installing TSTool on a File Server

TSTool can be installed on a file server, which allows software updates to be made in one location, thereby eliminating the need to install software on individual machines. For this type of installation, all computers that access the software should typically have similar configuration, including network configuration. The standard installer described in this documentation focuses on individual installs on user computers. To make TSTool software installed on a server available to other computers, perform the following (this is typically performed by system administrators):

1. Run the *TSTool_*Setup.exe* installer as described above. During installation specify the TSTool installation home using a drive letter and path for the server or specify a Universal Naming Convention (UNC) path (e.g., *\\ServerName\Program Files\RTi\TSTool-Version*).
2. Or….Copy the files from a local installation to a network location. The TSTool software will detect the file location when run using the *TSTool.exe* file. If the *TSTool.bat* file is used to run the software (discouraged), it may need to be modified to specify the location of files on the server.

The menus and shortcuts will only be configured for the computer from which the installation was run. Therefore, menus and shortcuts for other computers will need to be manually configured.

If TSTool has been installed on a local computer and it is also available on the network, the network version can be run by running the software in the *ServerName\RTi\Program Files\TSTool-Version\bin* folder. The software will expect that file locations use the same drives as when the software was installed.

3.2. Installing TSTool – Linux

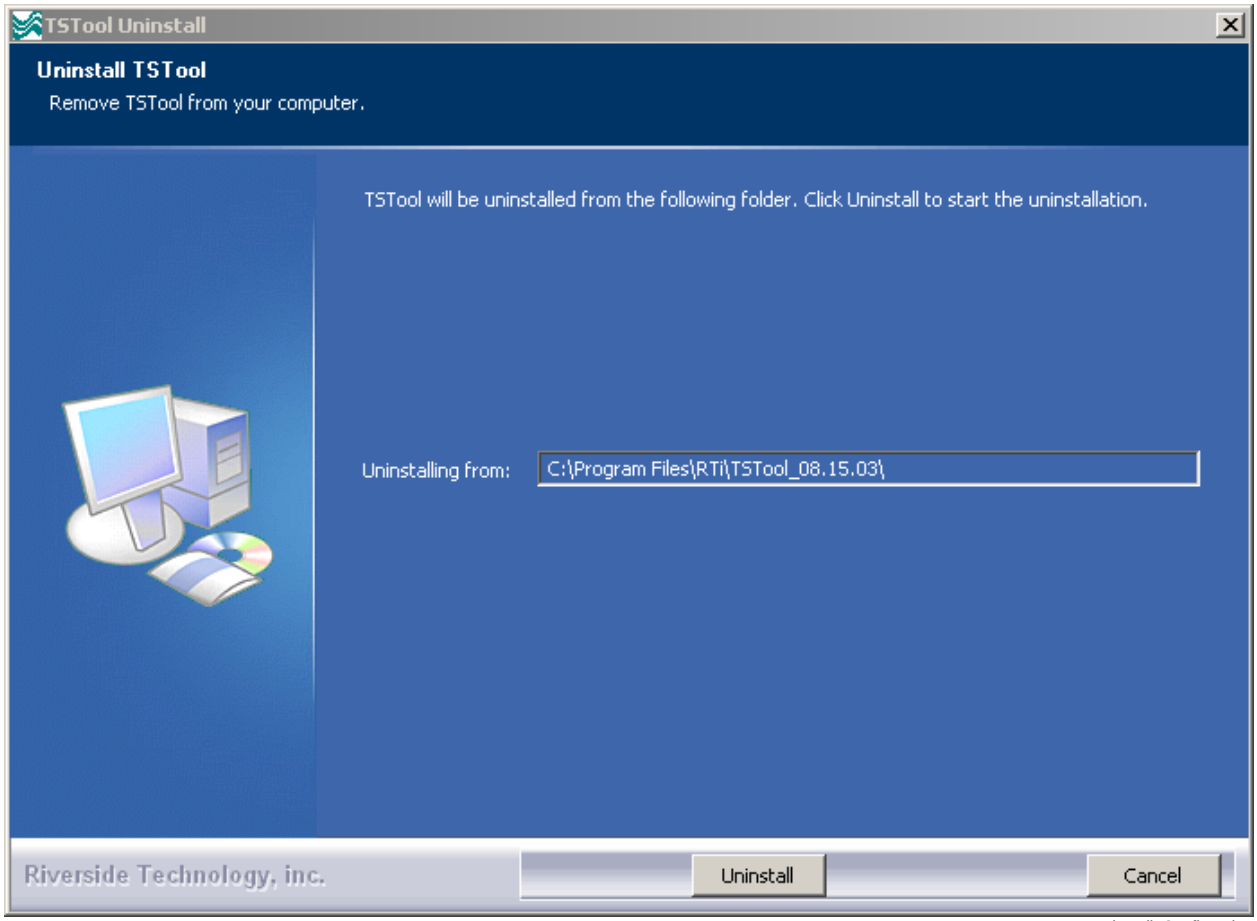
TSTool for Linux is typically provided as a *tar.gz* file that will unzip assuming that the software is installed in */opt*. The software can also be made available for UNIX versions where a Java Runtime Environment is available. The following steps summarize installation on Linux:

1. Login as root or other user with privileges to write to the */opt* folder.
2. Copy the provided *TSTool-Version.tar.gz* file to */tmp* or another convenient location.
3. Change to the /opt folder: **`cd /opt`**
4. Extract the TSTool software: **`tar xzvf /tmp/TSTool-Version.tar.gz`**
   If desired, list the files first using: **`tar tzvf /tmp/TSTool-Version.tar.gz`**
5. Change to the /opt/bin folder: **`cd /opt/bin`**
6. If the software is to be run with a version, create a symbolic link as follows (an abbreviated form of the version can be used to minimize typing):
   `ln –s /opt/RTi/TSTool-Version/bin/tstool tstool0815`
7. Normally, the latest software is made available as the default, as follows:
   `ln –s /opt/RTi/TSTool-Version/bin/tstool tstool`
8. If desired, modify the TSTool configuration files described at the end of this documentation. In particular, disable/enable input types appropriate for the system.
9. To run TSTool, confirm that */opt/bin* is in the `PATH` environment variable and run the *tstool* script (or other name that was created as a symbolic link).

4. Uninstalling TSTool Software

4.1 Uninstalling TSTool Software - Windows

To uninstall TSTool software on Windows, select ***Start…All Programs...RTi…TSTool…Uninstall…TSTool-Version*** and confirm the uninstall.



Uninstall_Confirmation

Press ***Uninstall*** to uninstall the software.

4.2 Uninstalling TSTool Software - Linux

To uninstall TSTool software on Linux, remove the */opt/RTi/TSTool-Version* directory and its contents and any symbolic links in */opt/bin* that point to the software.

5. Running TSTool

TSTool can be started in several ways as described below.

5.1 RTi Menu – Windows

The ***Start…All Programs…RTi…TSTool-Version*** (or ***Start… Programs… RTi… TSTool-Version***) menu can be used on Windows to start the software. This runs the *TSToolInstallHome\bin\TSTool.exe* software.

5.2 Command Line Executable

The installation process does NOT add the *TSToolInstallHome\bin* folder to the path; however, this addition can be made by the user, allowing the TSTool software to be started anywhere by running *TSTool* (*tstool* on Linux). Running TSTool from any location will result in the software being run in the installation location. Specifying a command file on the command line or interactively will reset the working directory to that of the command file.

5.3 TSTool Batch File – Windows

A batch file can be used to run the *TSTool.exe* program, for example using the `-commands` command line parameter to specify a command file. In this case it may be necessary to specify the absolute path to the command file to ensure that the software can locate related files.

6. TSTool Configuration Files

TSTool requires minimal configuration after installation. This section describes TSTool configuration files that can be customized for a system.

6.1 TSTool Configuration File

The *system/TSTool.cfg* file under the main installation directory contains top-level configuration information for TSTool. The format of the file is as follows:

```
# Configuration file for TSTool
[TSTool]

DateValueEnabled = true
HydroBaseEnabled = true
MexicoCSMNEnabled = true
NWSCardEnabled = true
NWSRFSFS5Files = true
NWSRFSESPTraceEnsembleEnabled = true
RiversideDBEnabled = true
RiverWareEnabled = true
StateCUEnabled = true
StateModEnabled = true

MapLayerLookupFile = "\cdss\gis\co\TimeSeriesMapLookup.csv"

LicenseOwner = "YourName"
LicenseType = Site
LicenseCount = 3
LicenseExpires = Never
LicenseKey = "your-key"
```

The example illustrates the format of the file. The `*Enabled` properties can be used to enable/disable input types. Common formats are enabled by default and more specialized formats are disabled by default, if not specified in the file. For example use `HydroBaseEnabled = false` to disable the automatic HydroBase login that occurs with the HydroBase input type (e.g., if HydroBase is unavailable or not needed). The license properties are assigned by RTi and should only be changed with input from support. Each input type can have additional properties, although only a few currently do, as described below. Use the ***Tools…Options*** menu to display a dialog that helps with editing the `*Enabled` properties.

The optional `MapLayerLookupFile` property indicates the name of the time series to map layer lookup file. See the **Map Configuration** section below.

Additional configuration information for various input types and data stores may be required and are described in the following sections.

6.2 Data Units File

The *system/DATAUNIT* file under the main installation directory contains data unit information that defines conversions and output precision. In most cases the default file can be used but additional units may need to be added for a user's needs (in this case please notify the developers so the units can be added to the default file distributed with installations). Currently the *DATAUNIT* file is the only source for units information – in the future units may be determined from the various input sources.

6.3 HydroBase Configuration

The following properties can be defined to control how TSTool interacts with HydroBase. See also the **CDSS Configuration File** section below.

TSTool HydroBase Configuration Properties

Property	Description	Default
`AutoConnect`	If `False`, a HydroBase login dialog will be shown at startup. If `True`, the default database information in the CDSS configuration file (see next section) will be used to automatically connect to the database, and the login dialog will not be shown.	`False`
`WDIDLength`	Indicates the length of water district identifiers (WDIDs) constructed from separate WD and ID data, when creating time series identifiers. Because time series identifier strings are compared literally, it is important that the WDIDs are consistent within a commands file.	`7`

6.4 CDSS Configuration File

By default, TSTool will automatically look for HydroBase databases on the current (local) machine and the State servers. State server databases are typically only accessible to State of Colorado computers. If SQL Server HydroBase versions have been installed on a different machine, the *\cdss\TSool-Version\system\CDSS.cfg* file can be used to indicate the database servers. An example of the configuration file is as follows:

```
[HydroBase]

ServerNames="ServerName,local"
DefaultServerName="ServerName"
DefaultDatabaseName="HydroBase_CO_20080730"

[ColoradoSMS]

ServerNames="ServerName,local"
DefaultServerName="ServerName"
DefaultDatabaseName="RealtimeStreamflow"
UserLogin="UserLogin"
```

The ColoradoSMS input type is being used to support annotation of real-time data graphs with alert information, within the State of Colorado's offices.

Properties can be specified on the TSTool command line using the notation `"Property=Value"` and will in some cases override the values in the configuration file. These features are under development as necessary.

The CDSS configuration properties are described in the following tables:

CDSS HydroBase Database Configuration Properties

Property	Description	Default
`ServerNames`	A comma-separated list of server names to list in the HydroBase login dialog.	The state server is listed.
`Default ServerName`	The default HydroBase server name to use. This allows the HydroBase login dialog to preselect a default that applies to most users in the system. If TSTool is run in batch mode and the HydroBase input type is enabled, use this property to make a default connection to HydroBase, for use with other commands in the batch run.	`greenmtn. state.co.us`
`Default DatabaseName`	The default HydroBase database name to use. This allows the HydroBase login dialog to preselect a default that applies to most users in the system. If TSTool is run in batch mode and the HydroBase input type is enabled, use this property to make a default connection to HydroBase, for use with other commands in the batch run.	
`Database Engine`	Reserved for internal use.	
`DatabaseName`	The database name to use for the initial connection. This overrides the default server.	
`Database Server`	The server name to use for the initial connection. This overrides the default server.	
`SystemLogin`	Reserved for internal use.	
`SystemPassword`	Reserved for internal use.	
`UserLogin`	Reserved for internal use.	

CDSS Satellite Monitoring System (ColoradoSMS) Database Configuration Properties

Property	Description	Default
`ServerNames`	A comma-separated list of server names to list in the SMS login dialog.	The state server is listed.
`Default ServerName`	The default SMS database server name to use. This allows the SMS login dialog to preselect a default that applies to most users in the system. If TSTool is run in batch mode and the ColoradoSMS input type is enabled, use this property to make a default connection to the SMS database, for use with other commands in the batch run.	`greenmtn. state.co.us`
`Default DatabaseName`	The default SMS database name to use. This allows the SMS login dialog to preselect a default that applies to most users in the system. If TSTool is run in batch mode and the ColoradoSMS input type is enabled, use this property to make a default connection to the SMS database, for use with other commands in the batch run.	
`Database Engine`	Reserved for internal use.	
`DatabaseName`	The database name to use for the initial connection. This overrides the default server.	
`Database Server`	The server name to use for the initial connection. This overrides the default server.	
`SystemLogin`	Reserved for internal use.	
`SystemPassword`	Reserved for internal use.	
`UserLogin`	The user login, for use with TSTool batch runs. The `ColoradoSMS.UserLogin` parameter can be specified on the command line and will be used when making the initial SMS database connection.	

The SMS database cannot currently be opened with a login dialog. Therefore, correct information must be specified in the CDSS configuration file and/or the TSTool command line.

6.5 NWSRFS FS5Files Configuration

The following properties can be defined in the TSTool configuration file to control the start-up connection to NWSRFS FS5Files. The connection will be used unless reset interactively.

Property	Description	Default
`UseAppsDefaults`	Indicates whether Apps Defaults should be used to locate the FS5Files. If `True` is specified, then no `InputName` property is required and the input name will be omitted from time series identifiers. If `False` is specified, then it is expected that the `InputName` property will indicate a valid directory for FS5Files.	`False`
`InputName`	If `UseAppsDefaults` is `False`, then this property is expected to indicate a valid directory for FS5Files and time series identifiers will include the directory name.	No default.

For example, the following properties will cause TSTool to open the specified NWSRFS FS5Files at startup. Note that defaulting to a connection will cause TSTool to start slower. Currently there is no way to configure this information for individual users.

```
[NWSRFSFS5Files]

UseAppsDefaults = false
InputName = "J:\develop\apps\TSTool\test\Data_NWSRFS_FS5Files\NCRFC"
```

6.6 RiversideDB Configuration

See the **RiversideDB Data Store** appendix.

6.7 Map Configuration

TSTool can display maps configured as GeoView project files. See the **GeoView Mapping Tools Appendix** for more information about these files. To allow a link between time series and map layers, use the `TimeSeriesMapLayerLook` property in the *TSTool.cfg* file to specify a time series to map layer lookup file (see the **TSTool Configuration File** section above). The following example file illustrates the contents of the lookup file:

```
# This file allows time series in TSTool to be linked to stations in spatial
# data layers.  The columns are used as appropriate, depending on the direction
# of the select (from time series list or from the map).
#
# This file has been tested with the \CDSS\GIS\CO\co_TSTool.gvp file.  Not all
# possible combinations of time series and map layers have been defined - only
# enough to illustrate the configuration.
# Additional attributes need to be added to the point files to allow more
# extensive functionality.  For example, if attributes for data interval (time
# step) and data source are added to the attributes, then a definition query
# can be defined on the layer for displays to use the same data file.  The
# configuration below can then use the different names to configure the link
# to time series.
#
# TS_InputType - the time series input type, as used in TSTool
# TS_DataType - the data type shown in TSTool, specific to an input type
#              For example, TSTool uses "Streamflow" for HydroBase, whereas
#              for other input types a different data type string may be used.
# TS_Interval - time series interval of interest (e.g.,"Month", "Day", "1Hour"
#              "Irregular")
# Layer_Name - the layer name used in the map layer list
# Layer_Location - the attribute that is used to identify a location, to be
#              matched against the time series data location
# Layer_DataType - the attribute that is used to indicate the data type for a
#              station's time series (CURRENTLY NOT USED - UNDER EVALUATION)
# Layer_Interval - the attribute that is used to indicate the interval for a
#              station's time series
# Layer_DataSource - the attribute that is used to indicate the data source for
#              a station's time series.
#
# When matching time series in the TSTool time series query list with features
# on the map, the TS_* values are matched with the time series identifier
# values and the Layer_* attributes are matched against specific time series.
#
# Data layers are listed from largest interval to smallest.
"TS_InputType","TS_DataType","TS_Interval","Layer_Name","Layer_Location","Layer_DataSource"
HydroBase,DivTotal,Day,"Diversions",id_label_7,""
HydroBase,DivTotal,Month,"Diversions",id_label_7,""
HydroBase,EvapPan,Day,"Evaporation Stations",station_id,""
HydroBase,EvapPan,Month,"Evaporation Stations",station_id,""
HydroBase,Precip,Irregular,"Precipitation Stations",station_id,""
HydroBase,Precip,Day,"Precipitation Stations",station_id,""
HydroBase,Precip,Month,"Precipitation Stations",station_id,""
HydroBase,RelTotal,Day,"Reservoirs",id_label_7,""
HydroBase,RelTotal,Month,"Reservoirs",id_label_7,""
HydroBase,Streamflow-DISCHRG,Irregular,"Streamflow Gages - Real-time",station_id,""
HydroBase,Streamflow,Day,"Streamflow Gages - Historical",station_id,""
HydroBase,Streamflow,Month,"Streamflow Gages - Historical",station_id,""
```

Example Time Series Map Layer Lookup File

The columns in the lookup file indicate how information in the time series input/query list can be matched against time series in map layers. In particular, the `TS*` columns define values that are seen in the TSTool interface and the `Layer*` columns define the layer and attribute names for map layers. The `Layer_Interval` and `Layer_DataSource` are optional but if specified result in more specific links between time series and map layers.