
Appendix: Data Store Overview

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Overview

Data stores are used to configure a “connection” to allow data access, and can be of the following type:

- Database Data Store – used when making connections to relational databases such as Microsoft SQL Server and Oracle. This type of data store is used when a software API (application programmer interface) library is available for direct database communication, typically in an enterprise computing environment. In this case the data store requires a database server name and database name. Database data stores typically are faster but have the disadvantage of requiring that a database be available.
- Web Service Data Store – used when making connections to web services. This type of data store is used when a web service API is available, such as using SOAP or REST web service technologies. Requests and data retrievals occur by making HTTP requests rather than direct connections to a database. Web service data stores typically are slower than database data stores but have the advantage of not requiring the database to be installed locally. One issue with web services is that it is more difficult to provide data browsing features because lists of stations, etc., must be retrieved with a performance penalty. TSTool compensates for this by caching data locally in memory or on disk; however, this can require more complex code. Internet access is required to use web service data stores and performance is impacted by other internet users. When using web service data stores it may be appropriate to retrieve data to a local format and then use the local data to perform additional processing.

Additional data store types may be added in the future. However, requiring a configuration file is cumbersome for simple file access and consequently data stores will be implemented only in cases where the data store configuration can easily be reused between TSTool sessions.

When opened by TSTool, the data store name is used on the end of time series identifiers (TSID) to indicate the storage location for data. For example, the end of the TSID is as follows:

```
Main.Part.Of.TSID~DataStoreName
```

It is envisioned that some of the legacy “input types” supported by TSTool will be converted to data stores to take advantage of data store design features, including greater configuration ability.

Data Store Configuration Files

A data store is configured by enabling the data store type in the main *TSTool.cfg* configuration file, and creating a data store configuration file for each connection. Configurations are processed at software startup to enable data stores. An example of the TSTool configuration file for the UsgsNwisDaily data store is shown below. Multiple data stores can be defined using the [DataStore:DataStoreName] syntax.

```
# Configuration file for TSTool

[TSTool]

UsgsNwisDailyEnabled = true

# Startup data stores (note that data store name in config file takes precedence)

[DataStore:UsgsNwisDaily]

ConfigFile = "UsgsNwisDaily.cfg"
```

TSTool Configuration File with USGS NWIS Daily Data Store Properties

The following illustrates a data store configuration file format, which in this example is located in the same folder as the TSTool configuration file and configures the “UsgsNwisDaily” data store. Several standard properties are required and additional properties may be used for specific data stores.

```
# Configuration information for "UsgsNwisDaily" data store.
# Properties are:
#
# The user will see the following when interacting with the data store:
#
# Type - UsgsNwisDailyDataStore (required with no changes)
# Name - data store identifier used in applications, for example as the
#       input type information for time series identifiers (usually a short string)
# Description - data store description for reports and user interfaces (short phrase)
# Enabled - whether the data store is enabled (default=True)
#
# The following are specific to the USGS NWIS daily data store:
#
# ServiceRootURI - web service root URI, including the server name and root path
# ServiceAPIDocumentationURI - web service API documentation URI, describing
#       the syntax, input, and output
# ServiceOnlineURI - web service interactive page to query data, typically
#       "drill down" or form based

Type = "UsgsNwisDailyDataStore"
Name = "UsgsNwisDaily"
Description = "USGS NWIS Daily Value Web Service"
Enabled = True
ServiceRootURI = "http://waterservices.usgs.gov/nwis/dv"
ServiceAPIDocumentationURI = "http://waterservices.usgs.gov/rest/DV-Service.html"
ServiceOnlineURI = "http://waterservices.usgs.gov/rest/DV-Test-Tool.html"
```

Separate appendices are provided to describe each data store type that is supported by TSTool.