



T-Cubed DSA

(Data Synchronization Agent)

Version 2.00

User's Manual

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What is the DSA?

The T-Cubed DSA, or Data Synchronization Agent, is a companion application for the T-Cubed trouble ticket manager. The DSA is the key component for allowing up to 25 T-Cubed users to have shared access to a common trouble ticket database.

The T-Cubed application communicates with the DSA via TCP/IP protocol, making the DSA accessible for any computer with access to the Internet.

The DSA is in charge of accepting data changes from T-Cubed users and re-distributing those changes to other T-Cubed users. With the DSA, multiple T-Cubed users can stay up to date with each other.

How T-Cubed Data Synchronization Works

The DSA holds a central copy of the entire T-Cubed trouble ticket database, including ticket and property location. It also keeps track of the last time each T-Cubed user connected to it to download data changes. When a user sends data changes to the DSA, the DSA places a timestamp on each data change it receives. Then, when another user connects to the DSA to retrieve new data changes, the DSA checks the timestamps of the data changes it received and sends any that were received since the last time that particular user connected to the DSA.

When a user connects to the DSA with T-Cubed, the following logic is executed:

- 1. T-Cubed connects to DSA.**
- 2. DSA responds with connect confirmation.**
- 3. T-Cubed sends data changes it has to the DSA.**

The client will send all data changes entered by the user having a timestamp greater than the timestamp of the last time the

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user uploaded data changes. As the DSA receives the data changes, it will place its own timestamp on them, indicating when it received them. If it receives a data change record for an existing record, the existing record's data is replaced.

4. **T-Cubed requests data changes from DSA.**

The DSA will send all data changes it has received since the last time the user connected up to the time the user connected this session. If T-Cubed receives a data change record for an existing record, the existing record's data is replaced. Upon sending all data changes the DSA updates its timestamp of when the user last received data changes.

5. **T-Cubed disconnects.**

Data synchronization sessions are keyed off of the T-Cubed user's **Ticket Identifier**. This is why each installation of T-Cubed should be assigned a unique user name and ticket identifier. If two T-Cubed installations have the same ticket identifier, one of them is going to miss out on data updates and lose synchronization.

No data synchronization method is perfect, and cases of data conflict and update loss can occur with the DSA, but only in specific cases where multiple users work on the same ticket and fail to communicate with the DSA regularly. For example: John and Fred are working on the same ticket. John connects with the DSA frequently while he works on the ticket, but Fred neglects to contact the DSA to synchronize his database until a week later, and *after* he makes an entry. When he finally connects to the DSA, Fred's changes, though they may be chronologically older, will overwrite John's data changes. This is because the DSA only knows to send those data changes to a client that it has received since the client connected last, according to *its* timestamp. The DSA has no idea what chronological order the data changes were made, and cannot use the date and time of the data changes because they are based upon the client's computer clock. And, clients can be all over the world and their clocks set to different time zones.

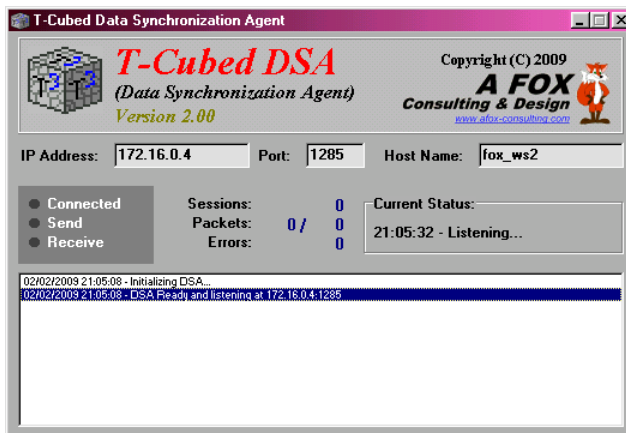
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One might think that reversing the protocol method to have the DSA send data changes first, and the client send its changes second would solve the problem but it only switches the problem around. This would cause Fred's changes, which may be more recent than John's, to be over-written rather than John's. No matter how you plan it, someone's changes are going to be lost. Therefore, to avoid this unhappy outcome, the general rule of thumb is: **The first thing you should do when opening T-Cubed is click 'Send / Receive' to get the most current data changes before beginning your work. And, always click 'Send / Receive' after completing your work.**

Remember: the DSA is your friend.

Running the DSA

The T-Cubed DSA is designed to be installed onto one computer that will act as a data "hub" for computers running the T-Cubed application. The DSA computer must support TCP/IP protocol and be accessible by computers running the T-Cubed application. By default, the DSA is configured to operate on TCP/IP port **1285**.



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The DSA will initialize and begin listening on its assigned IP port for T-Cubed clients. Once running the DSA requires no interaction.

Communication Model

The communications protocol and structure that is involved with data synchronization is intentionally loose and stateless. There is no formal "Hello" or "Goodbye" handshaking, as it is unnecessary. The DSA is a passive communicator in that it does not make any requests, it merely listens and responds to requests from clients. The only formal handshaking that occurs is during data packet transmission, where either a "okay" or "error" packet is returned for each data changes packet.

At the present time, the DSA can communicate with only one T-Cubed user at a time. If a second T-Cubed user tries to connect to the DSA while the DSA is busy with a first T-Cubed user, it will send a busy indicator to the second T-Cubed client, suggesting they try again shortly. As data synchronization sessions tend to last only a few seconds, this should not be a major issue.

Configuration

The DSA's configuration settings can be accessed via main window's system menu:

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Selecting “Configure...” will let you edit the TCP/IP port that the DSA uses for communication.

Selecting “Users...” will bring up a data grid displaying the DSA’s user tracking information, listing all the users who have connected to the DSA and their last data synchronization timestamp. From here you can delete individual user entries should a user need to re-install T-Cubed on their system. Deleting a user’s entry will cause their next connection to the DSA to be as if it were their first, and they will receive a full download of every piece of trouble ticket data that the DSA has. Note that this does NOT reset the user’s own T-Cubed timestamp on their end, and they will still only send any data that they entered since they last connected to the DSA.

Final Thoughts

We are always looking for ways to improve our software to meet the needs of users. If you have a suggestion for a future improvement to our software, or if you wish to report a bug, please feel free to contact us.

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