An Open-Source Alternative to BitTorrent Sync

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Purpose

The purpose is to develop a free alternative to the BitTorrent Sync utility. BitTorrent Sync offers users file replication across multiple computers in a way similar to the widely used Dropbox application, but is built on top of the BitTorrent Protocol (BTP), requires no centralized file server, and has no limits on the size of the data that can be stored in it. Our goal is to produce the desired software suite and support systems.

Requirements

1. Definitions (*Taken from http://jonas.nitro.dk/bittorrent/bittorrent-rfc.html*)

    1.1. Peer - A peer is a node in a network participating in file sharing. It can simultaneously act both as a server and a client to other nodes on the network.

    1.2. Neighboring peers - Peers to which a client has an active point to point TCP connection.

    1.3. Client - A client is a user agent (UA) that acts as a peer on behalf of a user.

    1.4. Torrent - A torrent is the term for the file (single-file torrent) or group of files (multi-file torrent) the client is downloading.

    1.5. Swarm - A network of peers that actively operate on a given torrent.

    1.6. Seeder - A peer that has a complete copy of a torrent.

    1.7. Tracker - A tracker is a centralized server that holds information about one or more torrents and associated swarms. It functions as a gateway for peers into a swarm.

    1.8. Metainfo file - A text file that holds information about the torrent, e.g. the URL of the tracker. It usually has the extension .torrent.

2. Utility

    2.1. Usage

2.1.1. The utility will run as a background process (daemon) on the local system.

2.1.2. The utility will monitor a number of specified directories on the local file system.

2.1.3. The utility will automatically create and modify a Metainfo file (.torrent) for each monitored directory.

2.1.4. The utility will periodically check monitored directories for file modifications by their timestamps.

2.1.5. The utility will inform peers when a modification occurs in one of its monitored directories by distributing an updated version of its Metainfo file.

2.1.6. The utility will listen for updates from peers, and will modify its monitored directories to reflect that update.

2.2. Configuration

2.2.1. The utility will have a number of configuration parameters which can be adjusted based on the users preference.

2.2.2. Configuration parameters will be specified within a text file stored on the local file system.

2.2.3. Networking settings will be defined within the configuration file.

2.2.4. Directories to be monitored by the utility will be defined within the configuration file.

2.2.5. Each directory defined in the configuration file may have a number of parameters defined (required parameters are indicated and optional parameters will be given some default value):

2.2.5.1. (Required) The directory's path on the file system

2.2.5.2. (Required) Name of the directory (different from the path, used for matching directories across different machines)

2.2.5.3. How often the utility should check the directory for updates

2.2.5.4. Download rate limits for transfers to the directory

2.2.5.5. Upload rate limits for transfers from the directory

2.3. File Manipulation

2.3.1. The utility will attempt to modify files in the monitored directories, as well as Metainfo files, automatically.

2.3.2. The utility will allow the user to add files within a monitored directory.

2.3.3. The utility will allow the user to remove files within a monitored directory.

2.3.4. The utility will allow the user to rename files within a monitored directory.

2.3.5. The utility will allow the user to modify files within a monitored

directory.

2.4. Network Communication

2.4.1. NAT and Gateway

2.4.1.1. The utility may automatically choose a port and use Universal Plug and Play (UPnP) to ensure that it is accessible behind a router.

2.4.1.2. User may manually define the networking settings if he/she chooses to do so.

2.4.2. Tracker

2.4.2.1. Users may communicate with any trackers they choose for coordinating their swarm of devices.

2.4.2.2. Security considerations are only guaranteed with any degree of certainty when communicating with Tracker services we provide.

2.4.2.2.1. No passwords will be stored in plaintext by a service we control.

2.4.2.2.2. Communication with the tracker will be encrypted using TLS/SSL.

2.4.2.3. Trackerless operation using Distributed Hash Tables will be supported.

2.4.3. Peers

2.4.3.1. Users will be required to authenticate a new peer to any given client.

2.4.3.2. Peers will communicate to trade up-to-date versions of the monitored directories Metainfo files.

2.4.3.3. File transfer between peers will utilize the BitTorrent Protocol.

3. Supporting Software and Services

3.1. Configuration Tool

3.1.1. The Configuration Tool can be issued commands to start and stop the utility.

3.1.2. The Configuration Tool will provide a command line interface.

3.1.3. The Configuration Tool will modify the text file the utility uses for configuration.

3.1.4. The Configuration Tool will allow the user to add to the list of monitored directories without modifying the contents of the monitored directories.

3.1.5. The Configuration Tool will allow the user to remove from the list of monitored directories without modifying the contents of the monitored directories.

3.1.6. The Configuration Tool will allow the user to modify the list of monitored directories without modifying the contents of the

monitored directories.

3.2. Application-Specific Private Tracker Service

3.2.1. We will provide users a Tracker for instances of the utility to connect to.

3.2.2. The service will provide a web interface for managing the Tracker.

3.2.3. The service will require user registration and authentication.

3.2.4. The service will allow users to add monitored directories.

3.2.5. The service will allow users to remove monitored directories.

4. Standards, Licensing, Supported Platforms

4.1. The software will be published using the BSD 3-Clause License.

4.2. The utility will comply with BitTorrent Protocol Version 1.0 (BTP/1.0).

4.3. All software components will support deployment on the GNU/Linux operating system.

4.3.1. The Debian Distribution and its derivatives will be specifically targeted for support.

A suite of software tools will be developed which will provide users with the ability to replicate files across multiple systems with minimal setup required and more flexibility than what is provided by cloud services like Dropbox. In addition to file synching utility itself, a configuration/control tool, and an optional Tracker web service will be developed.