**Minor Project 2015-2016**

**BITTORRENT**

PHASE I EVALUATION



JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY (NOIDA)

(Declared Deemed to be University U/S 3 of UGC Act)

A-10, SECTOR-62, NOIDA, INDIA (12)

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##### **SUBMITTED TO-SUBMITTED BY(BatchB7) -**

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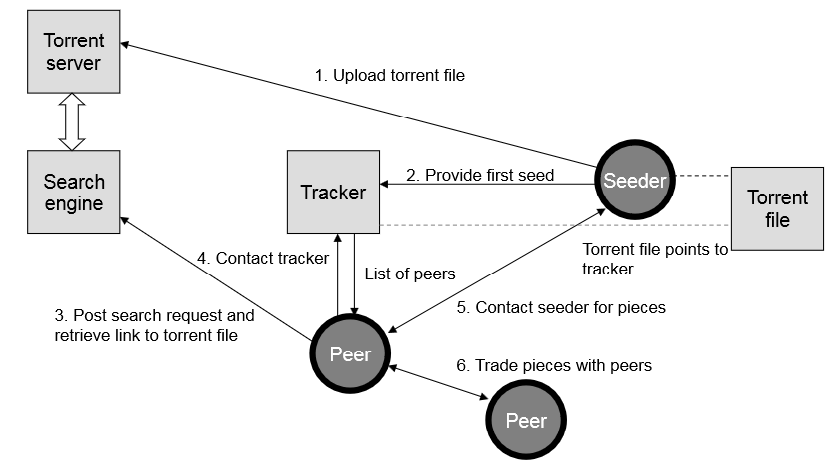
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**Introduction**

BitTorrent is a communications protocol for the practice of peer-to-peer file sharing that is used to distribute large amounts of data over the Internet.

BitTorrent is one of the most common protocols for transferring large files. To send or receive files the user must have a BitTorrent client; a computer program that implements the BitTorrent protocol.

**How Does BitTorrent Work?**



A user who wants to upload a file first creates a small torrent descriptor file that they distribute by conventional means (web, email, etc.). They then make the file itself available through a BitTorrent node acting as a seed. Those with the torrent descriptor file can give it to their own BitTorrent nodes, which—acting as peers or leechers—download it by connecting to the seed and/or other peers.

A BitTorrent client is any program that implements the BitTorrent protocol. Each client is capable of preparing, requesting, and transmitting any type of computer file over a network, using the protocol. A peer is any computer running an instance of a client.

To share a file or group of files, a peer first creates a small file called a "torrent" (e.g. MyFile.torrent). This file contains metadata about the files to be shared and about the tracker, the computer that coordinates the file distribution. Peers that want to download the file must first obtain a torrent file for it and connect to the specified tracker, which tells them from which other peers to download the pieces of the file. It is based on segmented file transfer.

**Objectives: Phase I**

* Learn about Bit torrent protocol and the various steps involved while using a Bit torrent client.
* Learn about Different Types Trackers and their Implementation.
* Using the client to upload the .torrent file.
* Bencode the torrent file.
* Extract the parameters from the Bencoded file.
* Send a request to the tracker using the parameters from the Bencoded torrent file.
* Use various kind of trackers i.e. Public, Private, Online login.
* Implement a Private Tracker on the local host and Later on the server
* Add Trackers to the .torrent file.
* Upload the .torrent file to the private tracker system implemented using an open source tutorial.
* Receive the ip dictionary from the tracker i.e Various Seeds and Peers.
* Bencode the dictionary received and store the ips.
* Connect to various ips first establish hand shaking and then wait for a response.
* Convert the response from the peer from hex -> asci -> dec -> binary.
* Read the response and display the message.
* Further read about the various Bit torrent messages and their further meanings.

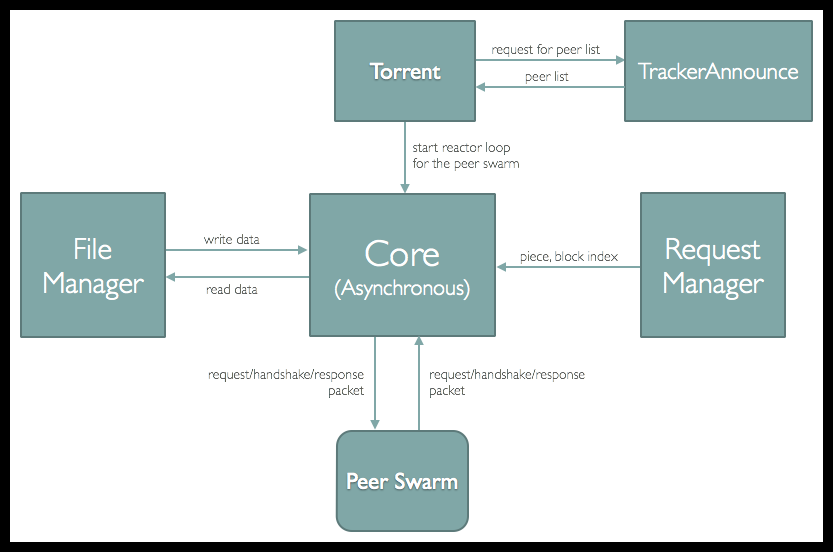
**Work Division**

* Avantika Verma: Minor Project.
* Siddharth Uppal: N/a
* Kriti Aggarwal: N/a

**Background Study and Findings**

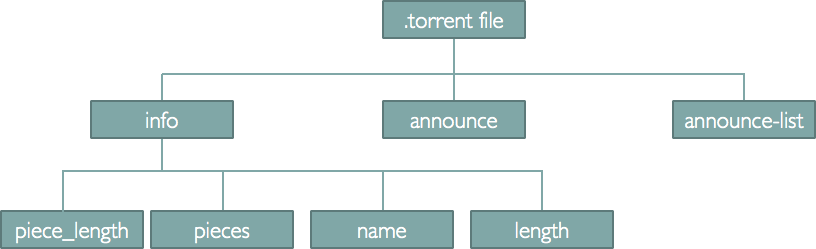
**What is BitTorrent**

The BitTorrent protocol can be used to reduce the server and network impact of distributing large files. Rather than downloading a file from a single source server, the BitTorrent protocol allows users to join a "swarm" of hosts to upload to/download from each other simultaneously. Using the BitTorrent protocol, several basic computers, such as home computers, can replace large servers while efficiently distributing files to many recipients. This lower bandwidth usage also helps prevent large spikes in internet traffic in a given area, keeping internet speeds higher for all users in general, regardless of whether or not they use the BitTorrent protocol



**How bittorrent works?**

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Segmented file transfer implementation: the file being distributed is divided into segments called pieces. As each peer receives a new piece of the file it becomes a source (of that piece) for other peers, relieving the original seed from having to send that piece to every computer or user wishing a copy. With BitTorrent, the task of distributing the file is shared by those who want it; it is entirely possible for the seed to send only a single copy of the file itself and eventually distribute to an unlimited number of peers.

**PROTOCOLS USED:**

**BitTorrent tracker protocol**

The BitTorrent tracker protocol is used by clients to request the IP addresses of other peers associated with a torrent, and to exchange the client's transfer statistics. Clients contact a centralized server, known as a \*tracker\*, which stores their addresses and responds with the addresses of other clients (also known as \*peers\*). The tracker does not know which nodes have which pieces; its job is to tell its clients where to find each other.

Query parameters must be encoded according to the rules for HTML form submissions through HTTP GET: 'reserved character' bytes are encoded in hexadecimal as %HH, and space is encoded as "+"; names and values are joined with "=" and the pairs joined with "&".

The tracker's announce URL is obtained from the announce entry of the root dictionary of the torrent metadata file.

Clients announce themselves by sending a GET request to the tracker's announce URL with "?" and the following parameters appended.

**IMPLEMENTING:**

## .torrent File

The first step in streaming (download) the torrent is to extract the information about it. This can be found in the .torrent file.This file contains the minimum information needed to join the swarm of peers that have pieces of the data that we are looking for. The .torrent file is a bencoded file containing a dictionary. The most essential fields in this dictionary are :

* **info**: a dictionary that describes the file(s) of the torrent. There are two possible forms: one for the case of a 'single-file' torrent with no directory structure, and one for the case of a 'multi-file' torrent (see below for details)
* **announce**: The announce URL of the tracker (string). The announce URL is the URL to get yourself registered. The tracker is an HTTP GET request service that stores the list of peers and their IP that are downloading the given torrent. We can retrieve this list from the tracker by sending a GET request. Other peers can locate us by using the trackers as well.
* **announce-list**: (optional) this is an extention to the official specification, offering backwards-compatibility. (list of lists of strings).

### Info Dictionary

This section contains the field which are common to both mode, "single file" and "multiple file".

* **piece length**: number of bytes in each piece (integer)
* **pieces**: string consisting of the concatenation of all 20-byte SHA1 hash values, one per piece (byte string, i.e. not urlencoded.

**Designing**

**Partial Implementation**

**Testing**

**References**