Automating Production of Cross Media Content for Multi-channel Distribution

www.AXMEDIS.org

DE3.1.2.2.10
Specification of AXEPTool and AXMEDIA Tools

Version: 1.5
Date: 31-07-2006
Responsible: DSI (revised and approved by coordinator)

Project Number: IST-2-511299
Project Title: AXMEDIS
Deliverable Type: report
Visible to User Groups: yes
Visible to Affiliated: yes
Visible to the Public: yes

Deliverable Number: DE3.1.2.2.10
Contractual Date of Delivery: M18 (in delay)
Actual Date of Delivery: 31/07/2006
Title of Deliverable: Document
Work-Package contributing to the Deliverable: WP3.1
Task contributing to the Deliverable: WP3, WP2
Nature of the Deliverable: report
Author(s): DSI, EXITECH

Abstract: this part includes the specification of components, formats, databases and protocol related to the AXMEDIS Framework area of P2P including AXMEDIS P2P tools, AXEPTool, AXMEDIA, AXMEDIS P2P Query Service Servers, etc.

Keyword List: AXMEDIS P2P network, AXEPTool, AXMEDIA, bittorrent

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1 Executive Summary and Report Scope

The full AXMEDIS specification document has been decomposed in the following parts:

DE number	Deliverable title	responsible
DE3.1.2.2.1	Specification of General Aspects of AXMEDIS framework, first update of DE3.1.2 part A AXMEDIS-DE3-1-2-2-1-Spec-of-AX-Gen-Asp-of-AXMEDIS-framework-upA-v1-0.doc	DSI
DE3.1.2.2.2	Specification of AXMEDIS Command Manager, first update of DE3.1.2 part B AXMEDIS- DE3-1-2-2-2-Spec-of-AX-Cmd-Man-upB-v1-0.doc	DSI
DE3.1.2.2.3	Specification of AXMEDIS Object Manager and Protection Processor, first update of DE3.1.2 part B AXMEDIS-DE3-1-2-2-3-Spec-of-AXOM-and-ProtProc-upB-v1-0.doc	DSI
DE3.1.2.2.4	Specification of AXMEDIS Editors and Viewers, first update of DE3.1.2 part B AXMEDIS-DE3-1-2-2-4-Spec-of-AX-Editors-and-Viewers-upB-v1-0.doc	DSI
DE3.1.2.2.5	Specification of External AXMEDIS Editors/Viewers and Players, first update of DE3.1.2 part B AXMEDIS-DE3-1-2-2-5-Spec-of-External-Editors-Viewers-Players-upB-v1-0.doc	EPFL
DE3.1.2.2.6	Specification of AXMEDIS Content Processing, first update of DE3.1.2 part C AXMEDIS-DE3-1-2-2-6-Spec-of-AX-Content-Processing-upC-v1-0.doc	DSI
DE3.1.2.2.7	Specification of AXMEDIS External Processing Algorithms AXMEDIS-DE3-1-2-2-7-Spec-of-AX-External-Processing-Algorithms-v1-0.doc	FHGIGD
DE3.1.2.2.8	Specification of AXMEDIS CMS Crawling Capabilities, first update of part of DE3.1.2 AXMEDIS-DE3-1-2-2-8-Spec-of-AX-CMS-Crawling-Capab-v1-0.doc	DSI
DE3.1.2.2.9	Specification of AXMEDIS database and query support, first update of part of DE3.1.2 AXMEDIS-DE3-1-2-2-9-Spec-of-AX-database-and-query-support-v1-0.doc	EXITECH
DE3.1.2.2.10	Specification of AXMEDIS P2P tools, AXEPTool and AXMEDIS, first update of part of DE3.1.2 AXMEDIS-DE3-1-2-2-10-Spec-of-AXEPTool-and-AXMEDIA-tools-v1-0.doc	DSI and its subcontractor
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DE3.1.2.2.12	Specification of AXMEDIS Workflow Tools, first update of part of DE3.1.2 AXMEDIS-DE3-1-2-2-12-Spec-of-AX-Workflow-Tools-v1-0.doc	IRC
DE3.1.2.2.13	Specification of AXMEDIS Certifier and Supervisor and networks of AXCS, first update of part of DE3.1.2 AXMEDIS-DE3-1-2-2-13-Spec-of-AXCS-and-networks-v1-0.doc	DSI
DE3.1.2.2.14	Specification of AXMEDIS Protection Support, first update of part of DE3.1.2 AXMEDIS-DE3-1-2-2-14-Spec-of-AX-Protection-Support-v1-0.doc	FUPF
DE3.1.2.2.15	Specification of AXMEDIS accounting and reporting, first update of part of DE3.1.2 AXMEDIS-DE3-1-2-2-15-Spec-of-AX-Accounting-and-Reporting-v1-0.doc	EXITECH

1.1 This document concerns

In AXMEDIS, the P2P technology is used for sharing AXMEDIS Content among:

- B2B partners such as content: producers, integrators, distributors, publishers, archives, etc.; realized with AXEPTool;
- final users of a content distributor, realized with a Peer tool called AXMEDIA tool.

1.2 List of Modules or Executable Tools Specified in this document

A module is a component that can be or it is reused in other cases or points of the AXMEDIS framework or of other AXMEDIS based solutions.
The modules/tools have to include effective components and/or tools and also testing components and tools.

Module/tool Name	Module/Tool Description and purpose, state also in which other AXMEDIS area is used	Standards exploited if any
AXMEDIS P2P Query Service	A system server with a set of features to provide suppot for quering into the the P2P network	SQL, WSDL
AXMEDIS Query Service WEB Portal	An interface for business and final users to make queries on the P2P network	SQL
AXMEDIS Query Service Web Service	A WEB Service to receive queries from remote other tools to pose them on the P2P network.	SQL, WSDL
Publishing Objects Interface	A Web Service interface of the AXEPTool to allow publishing AXMEDIS objects into the P2P network	
Monitoring Web Service	A Web Service interface of the AXEPTool to allow downaloding and monitoring AXMEDIS objects from the P2P network	
query (results) interface on P2P tools	Query interface integrated into the AXEPTool and AXMEDIA tools to make queries to the AXMEDIS P2P Query Service via the AXMEDIS Query Service Web Service	
AXEPTool	P2P client peer for B2B file Sharing	BitTorrent protocol, AXMEDIS
AXMEDIA	P2P client peer for C2C file sharing	BitTorrent protocol, AXMEDIS

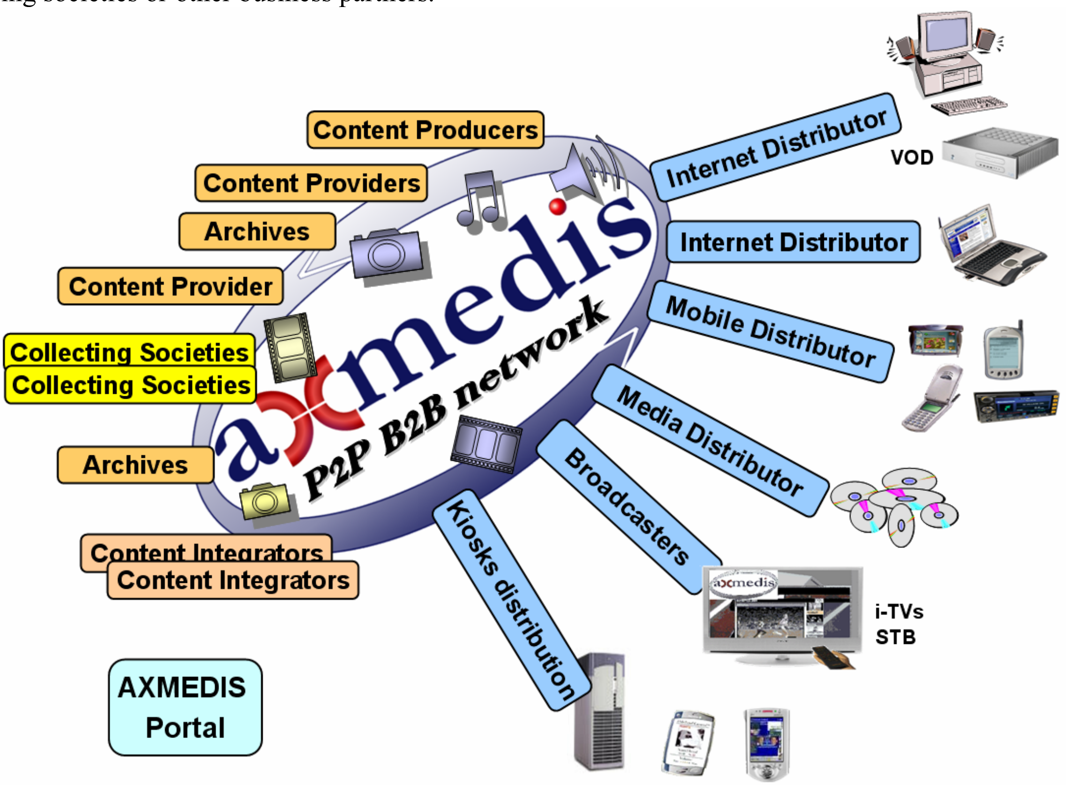
1.3 List of Protocols Specified in this document

A protocol is a communication modality among distinct processes that can be located or not on different computers.

Protocol Name	protocol Description and purpose, state also in which other modules is used	Who is the master and who is the slave	Standards exploited if any
Publication of Objects	A way to publish AXMEDIS objects on the B2B P2P network automatically	Master : AXCP Client AXEPTool	WSDL
Download of Objects	A way to download AXMEDIS objects from the B2B P2P network automatically, and monitoring the download	Master : AXCP Client : AXEPTool	WSDL

2 Aims of P2P in AXMEDIS

AXMEDIS framework and general solution supports DRM and Reporting about the usage of the content features, e.g., play, print, extract, etc., which are the rights These tools gather the information related to the exploitation of rights along the value chain and by the final user and reports it back to the concerned actors. These utilities are very useful to provide the evidence of the exploited rights in a transparent manner to collecting societies or other business partners.



AXMEDIS Business to Business area with some distributors

In order to ease the collaboration among the business area, AXMEDIS is providing a wide set of tools. Among these tools some of them are based on P2P concepts for content distribution, and are:

- AXEPTool for B2B content distribution
- AXMEDIA for C2C content distribution at support of B2C content distribution.

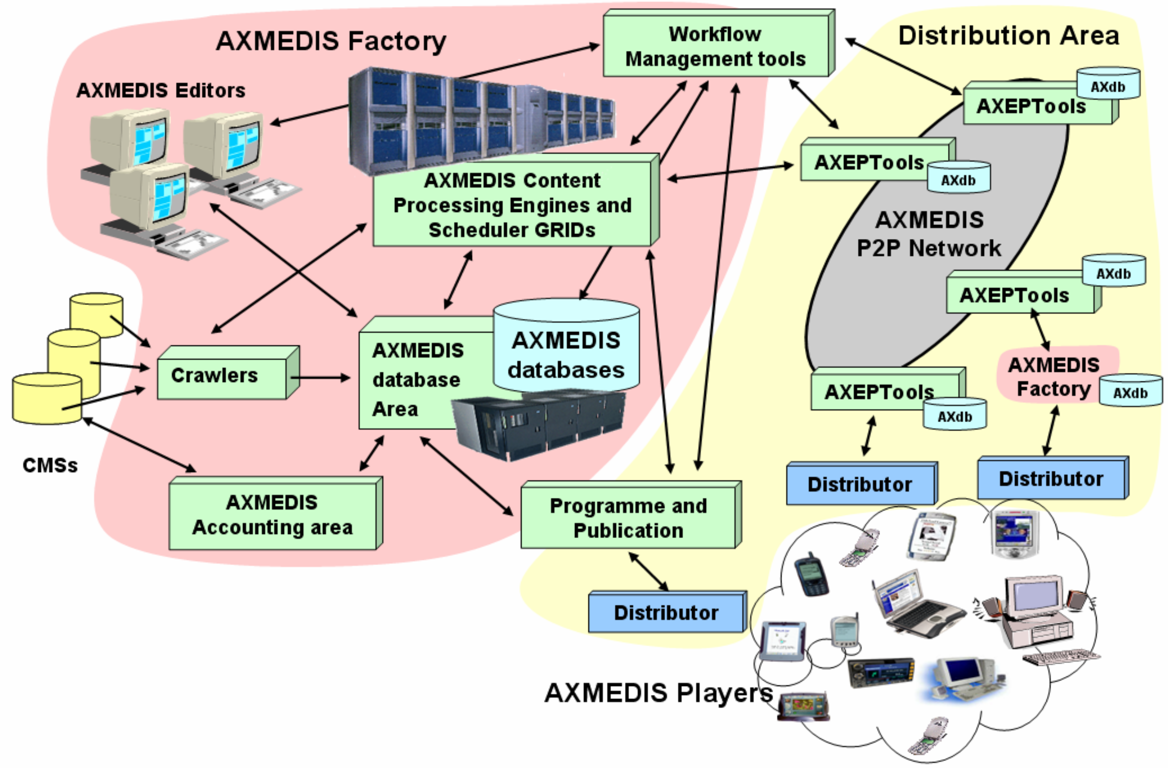
The B2B P2P Network depicted in the figure is used for sharing content among actors of the value chain by using the AXEPTool. One of more rings or area of P2P B2B may would be created to share different kind of objects or for geographical purpose.

The distribution side may present one or more single distribution paths for each type of content. In AXMEDIS, the content distributors can continue their preferred mechanisms for reaching the final users. The possible Channel Distributors have a large variety of capabilities, they are both of pull and push, and may include off-line and on-line connection from the client to the distributor.

Some Distributors may be interested in exploiting AXMEDIS technology to set up a legal P2P service for content distribution. This solution can be realized by using the so called **AXMEDIA** tools. It is a P2P tool for distributing and sharing AXMEDIS content among end users, the distributor may insert AXMEDIS content in the network of peers and this may freely navigate among them but with the supervision and control of AXMEDIS protection and monitoring models.

2.1 AXMEDIS Content Production

The Content Production area of AXMEDIS is mainly focused on what it is called AXMEDIS Factory automating: (i) the packaging containing the digital resources (the real content), (ii) adapting and Transcoding, (iii) protecting content and producing corresponding Prot-Info, (iv) publishing and distributing the produced package, (v) producing licenses for the users, etc.



Content Object Production

- Existing contents (e.g., resources and metadata located in databases, CMSs, file systems) are crawled and collected using automated processes and rules (e.g., Crawler, rule editing);
- Crawled contents or new contents can be inserted into the AXMEDIS Database;
- Content can be automatically packaged in AXMEDIS model (which is MPEG-21 compliant);
- Content production and elements (metadata, resources, protection information and licenses) can be processed manually with authoring tools and editor or automatically with AXMEDIS Content Processing tools based on executable rules that can be hosted on single or massive GRID of computers;
- Authoring tools can be used to insert/revise metadata, define protection information, define DRM licenses models, to modify content or simply to view the objects;
- Various processing are offered (adaptation, transcoding, protection, etc.), either automatically or manually (using GUI editor);
- The various components and digital resources can be glued together by means of SMIL based templates and style that may be used to define the usage interface (format) of the whole object: karaoke, collection, menus, sliding presentation, buttons, live, animations, etc.;
- Results can be sorted in a database or on file systems or published in towards distributors or on the B2B P2P AXMEDIS network;
- They are now available on the AXMEDIS network, for further aggregation, distribution, etc., to be searched, modified, or shared;
- Queries and P2P allow retrieving content located in all the connected AXMEDIS Factories;
- The queries can be activated to automatically react at eventual changes in the sources, and thus to perform an automatic production/update;
- Queries can be performed on the basis of classification and identification metadata, but also on technical features, descriptors, licensing information (PAR), etc.;

- Once identified the objects or queries, they can be used as input parameter of processing rules for the GRID AXMEDIS Content Processing;
- All these activities can be governed by Workflow Management Tools for defining process production flow and information of the content factory and among different factories.

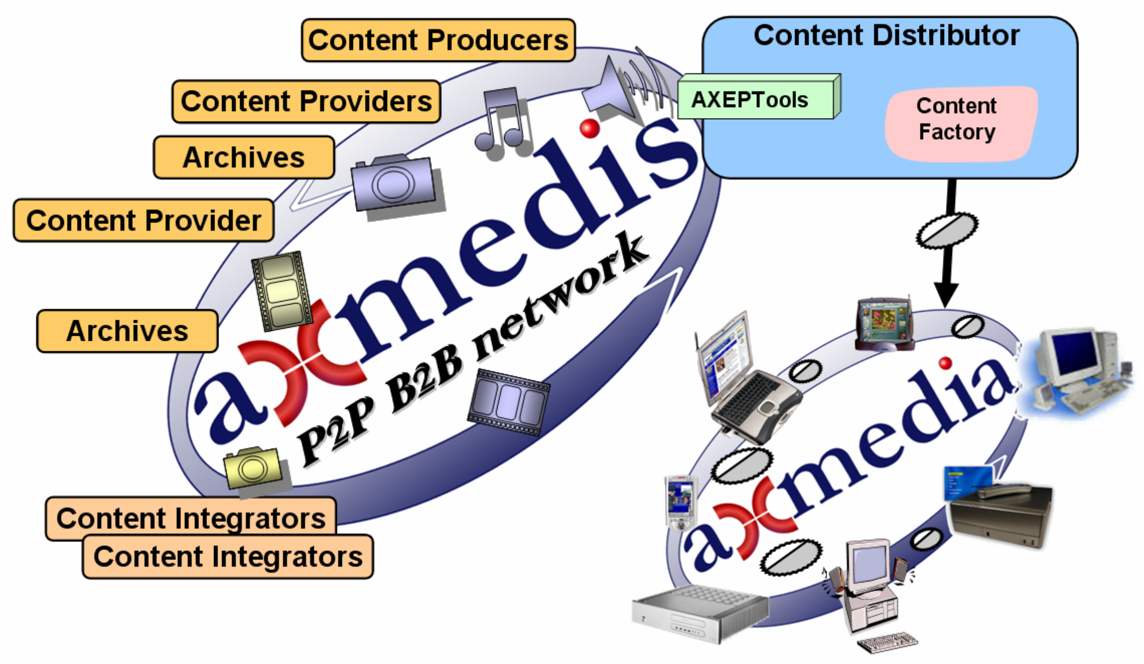
2.2 AXMEDIS P2P Tools: AXEPTool and AXMEDIA tool

In AXMEDIS, the P2P technology is used for sharing AXMEDIS Content among:

- B2B partners such as content: producers, integrators, distributors, publishers, archives, etc.; realized with AXEPTool;
- final users of a content distributor, realized with a Peer tool called AXMEDIA tool.

The **general features of any AXMEDIS P2P tools (AXEPTool and AXMEDIA)** are:

- legal usage of P2P content distribution;
- guarantee of consistency between the exposed metadata and the downloaded content;
- verification and certification of content distribution and sharing;
- monitoring of downloads and uploads in the P2P network;
- efficiency of downloading, even for large files.



AXMEDIA usage and relationships with AXEPTool

From the point of view of B2B, the major features are:

- integration of P2P channel with the Content Factory;
  - automating the download and publishing of content;
  - separation of content to be shared from that maintained in the AXMEDIS database of the content factory;
- monitoring the content downloads and usages of published content;
- reduction of costs for content distribution and sharing:
  - automatic update of published content in the P2P network;
  - automatic download of updated content in other peers of the P2P network;
  - eventual usage of the C2C network for distributing content even among B2B users
- reduction of costs for content promotion;
  - allowing the sharing of promotional content

- reduction of costs for content search and acquisition:
    - possibility of making queries on the all connected content factories and these queries also include: classification, identification, technical descriptors of content and licensing information;
    - access to content coming from all the other connected business partners endowed by an AXEPTools.

Some Distributors are interested in exploiting AXMEDIS technology to set up a legal P2P service for content distribution among their users. This solution has to be realized by using the **AXMEDIA** tool as a Peer tool of a P2P network. It is a P2P tool for distributing and sharing AXMEDIS content among end users, the distributor may insert AXMEDIS content in the network of peers and that content may freely navigate among the peers with the supervision and control of AXMEDIS protection and monitoring model.

From the point of view of C2C, the major features are:

- easy to use
- easy to install

3 Requirements for P2P tools in AXMEDIS

The AXEPTool is the application that allows business users to share a common environment in which AXMEDIS Objects can be published and loaded without the need of a centralized infrastructure which would be costly to maintain and a potential bottleneck in the whole production chain.

In the following, only the most relevant and mandatory requirements have been reported. Please note that some of them area satisfied by means of the AXMEDIS Content Processing tools that actively and periodically can send queries to the P2P network and tools. These issues will be clearer observing the architecture of the AXEPTool into the AXMEDIS framework.

The AXEPTool for P2P on B2B must meet requirements divided into the following categories: system and IPR, general requirements, discovery and connection to the AXMEDIS community, query to search AXMEDIS objects, loading remote AXMEDIS objects, publishing local AXMEDIS objects.

Requirements that are not mandatory are commented in a specific manner.

3.1 System and IPR requirements for P2P tools of AXMEDIS

AXMEDIS consortium major system and IPR requirements about the P2P support and tools in AXMEDIS:

3.1.1) to have of the P2P tools source code accessible and stored into the AXMEDIS Framework, located into the CVS of AXMEDIS;

3.1.2) to have the possibility of manipulating the source code for the future without any restriction, and without the need to have any specific authorization;

3.1.3) to have the possibility of improving the source code for integrating DRM aspects;

3.1.4) to have the source code in open source license, so as to allow the usage of tools without extra costs (NOT MANDATORY).

The Consortium Agreement of AXMEDIS may clarify other aspects of IPR.

3.2 General P2P Requirements valid for both AXMEDIA and AXEPTool P2Ps

The P2P infrastructure of AXMEDIS:

3.2.1) Must accept at least AXMEDIS objects in protected and non protected forms.

3.2.2) May accept in addition to AXMEDIS objects any files (NOT MANDATORY): not only AXMEDIS objects can be ”shared” and queried but files of any type or content.

3.2.3) Must allow performing some verification of consistency of the AXMEDIS object certification, to guarantee consistency of the objects with its metadata and its integrity, signature. Specific technology is present in the AXMEDIS that can be enforced into the P2P tools to cover this requirement.

3.2.4) Must allow performing the estimation of some fingerprint on the AXMEDIS objects and/or on eventual single audio and video tracks. Specific technology is present in the AXMEDIS that can be enforced into the P2P tools to cover this requirement (NOT MANDATORY if the solution already have some hash estimation to solve this)..

3.2.5) Must provide an efficient monitoring tool to present in the user interface the status of the download. The P2P tools must provide a real-time monitor for downloads of files in order to give to the consumer the status of all operations under run. The related GUI should present the monitored traffic as more as possible in an intuitively view.

3.2.6) Must provide support for queries in according to the AXMEDIS Query interface

3.2.7) Must support multiple sources download in an efficient manner such as .bitTorrent or other solutions

3.2.8) Must support the creation of multiple sources downloads where the peers are both those signed to B2B and C2C P2P networks, dependently on the content they have only.

3.2.9) The IDs used into the systems should be the AXOID defined in the AXMEDIS Framework with UUID model, if not possible an additional identification/descriptor has to be added into the AXMEDIS model.

3.3 Specific AXEPTool for P2P on B2B

The AXEPTool and solution has the above mentioned system and general requirements plus the following.

3.3.1) Must provide user registration and certification of clients

3.3.2) Must allow to establish some SSL connection with the tracker

3.3.3) Must provide integration for automatic loading and publishing of AXMEDIS content and content in general. These features have to be exported as WEB Services

3.3.4) Must provide support for sophisticated queries in according to the AXMEDIS Query interface *already developed and that can be reused into it.*

3.3.5) Music provide fully complete results exposing AXMEDIS AXOID and metadata, PAR, etc. as in the spirit of AXMEDIS.

3.4 Specific AXMEDIA Tool for P2P on B2C

The AXMEDIA Tool is the P2P application used in B2C via P2P. More requirements about Client/Server Distribution via PC are available in the specification of WP4 related to "**AXMEDIS for Distribution via Internet**". The AXMEDIA tool and solution has the above mentioned system and general requirements plus the following.

3.4.1) Must provide a simples query support that allows simple search queries composition through a simplified GUI, providing results in a simplified format, easy to understand for the final users.

3.4.2) Music provide complete results exposing AXMEDIS AXOID and metadata.

3.4.3) Must be easily installable on a wide range of computers and possibly on different platforms such as Windows and MAC.

4 General Information on BitTorrent Technology and related state of the art

Largely extracted from WEB pages and from Wikipedia: www.wikipedia.org. On the other hand, even if the following information could be accessible on the WIKIPEDIA, due to the instability/evolution of that WEB site we preferred to include and instance of that information in the document.

BitTorrent is the name of a peer-to-peer (P2P) file distribution client application and also of its related file sharing protocol, both of which were created by programmer Bram Cohen. BitTorrent is designed to distribute large amounts of data widely without incurring the corresponding consumption in costly server and bandwidth resources. CacheLogic suggests that BitTorrent traffic accounts for ~35% of all traffic on the Internet while other sources are skeptical.
The original BitTorrent application was written in Python. Its source code, as of version 4.0, has been released under the BitTorrent Open Source License, which is a modified version of the Jabber Open Source License. There are numerous compatible clients, written in a variety of programming languages, and running on a variety of computing platforms.
BitTorrent clients are programs which implement the BitTorrent protocol. Each BitTorrent client is capable of preparing, requesting, and transmitting any type of computer file over a network using the BitTorrent protocol. This includes text, audio, video, encrypted content, and other types of digital information.

Creating and publishing torrents
To share a file or group of files through BitTorrent, clients first create a “.torrent” information file. This is a small file which contains meta information about the files to be shared, and about the host computer that coordinates the file distribution (http://www.bittorrent.com). The exact information contained in the tracker file depends on the version of the BitTorrent protocol. However, a torrent file always has the extension .torrent. Torrent files contain an “announce” section, which specifies the URL of the tracker, and an “info” section which contains (suggested) names for the files, their lengths, the piece length used, and a SHA-1 hash code for each piece, which clients should use to verify the integrity of the data they receive.

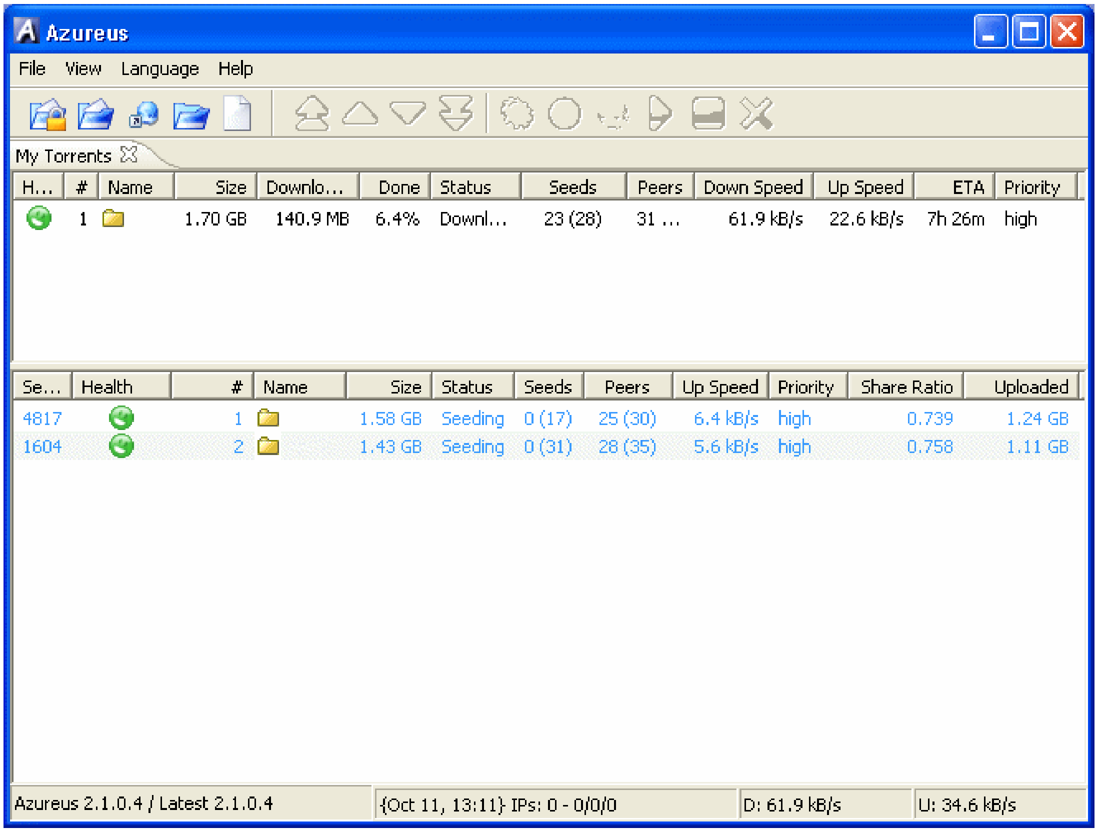
Clients who have finished downloading the file may also choose to act as seeders, providing a complete copy of the file. After the torrent file is created, a link to it is placed on a website or elsewhere, and it is registered with a tracker. BitTorrent trackers maintain lists of the clients currently participating in the torrent. The computer with the initial copy of the file is referred to as the initial seeder.

Downloading torrents and sharing files
Using a web browser, users navigate to the site listing the torrent, download it, and open it in a BitTorrent client. After opening the torrent, the BitTorrent client connects to the tracker, which provides it with a list of clients currently downloading the file or files. A group of peers on a BitTorrent or P2P connected with each other to share a particular torrent is generally referred to as a swarm.

Initially, there may be no other peers in the swarm, in which case the client connects directly to the initial seeder and begins to request pieces. The BitTorrent protocol breaks down files into a number of much smaller pieces, typically a quarter of a megabyte (256 KB) in size. Larger file sizes typically have larger pieces. For example, a 4.37 GB file may have a piece size of 4 MB (4096 KB). Pieces are checked as they are received using a hash algorithm to ensure that they are error free.

As peers enter the swarm, they begin sharing pieces with one another, instead of downloading directly from the seeder. Clients incorporate mechanisms to optimize their download and upload rates, for example using a tit for tat scheme. Peers download pieces in a random order, to increase the opportunity to exchange data, which is only possible if two peers have a different subset of the file.

The effectiveness of the peer-to-peer data exchange depends largely on the policies used by clients to determine whom to send data to. Clients will prefer to send data to peers that send data back to them, which encourages fair sharing, but strict policies often result in suboptimal situations, where newly joined peers are unable to receive any data (because they don't have any pieces yet to share themselves) and two peers with a good connection between them do not exchange data simply because neither of them wants to take the initiative. To counter these effects, the official BitTorrent client uses a mechanism called “optimistic unchoking”, where the client will reserve a portion of its available bandwidth for sending pieces to random peers (not necessarily known-good partners, so called preferred peers), in hopes of discovering even better partners and to ensure newcomers get a chance to join the swarm.

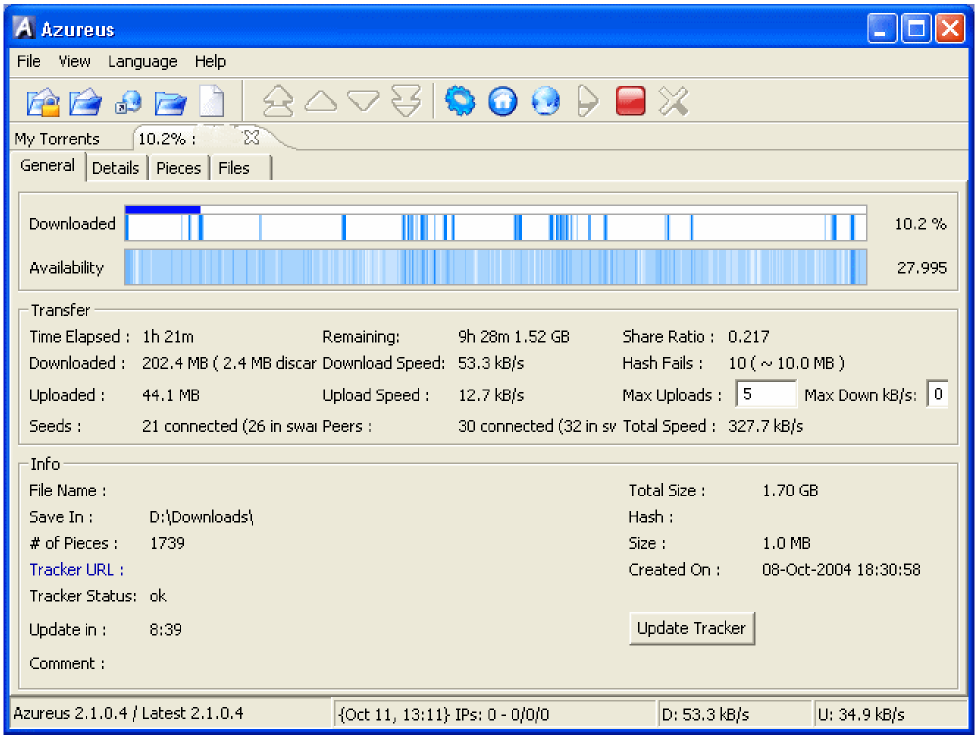


H...	#	Name	Size	Downlo...	Done	Status	Seeds	Peers	Down Speed	Up Speed	ETA	Priority
●	1		1.70 GB	140.9 MB	6.4%	Downl...	23 (28)	31 ...	61.9 kB/s	22.6 kB/s	7h 26m	high

Se...	Health	#	Name	Size	Status	Seeds	Peers	Up Speed	Priority	Share Ratio	Uploaded
4817	●	1		1.58 GB	Seeding	0 (17)	25 (30)	6.4 kB/s	high	0.739	1.24 GB
1604	●	2		1.43 GB	Seeding	0 (31)	28 (35)	5.6 kB/s	high	0.758	1.11 GB

Azureus 2.1.0.4 / Latest 2.1.0.4 | {Oct 11, 13:11} IPs: 0 - 0/0/0 | D: 61.9 kB/s | U: 34.6 kB/s

In Azureus bittorrent client, while a file is downloading, right click and click **Show Details**. As you can see I've blocked out some information on mine as I don't want to go requesting permission from the tracker I was using before I post this guide. Therefore I have removed the **filename, Tracker URL, Hash** and the file **Comment**. On your screen you will see these details. Certain areas are important here like **Share Ratio**. As you can see my Share Ratio for this file is just 0.217. This is a bad ratio but expected while the file is still downloading. When the file finishes downloading, users are expected to keep the seeding going until the ratio goes over **1.000**. You will notice the **Update Tracker** button. Clients have to update the tracker on the parts of files they have and other such things, this button is just here in case you wish to update immediately, however if you look across the way, you will that there is already a countdown to next update. When you are seeding, there is a slightly different detail as you will see now.



Transfer

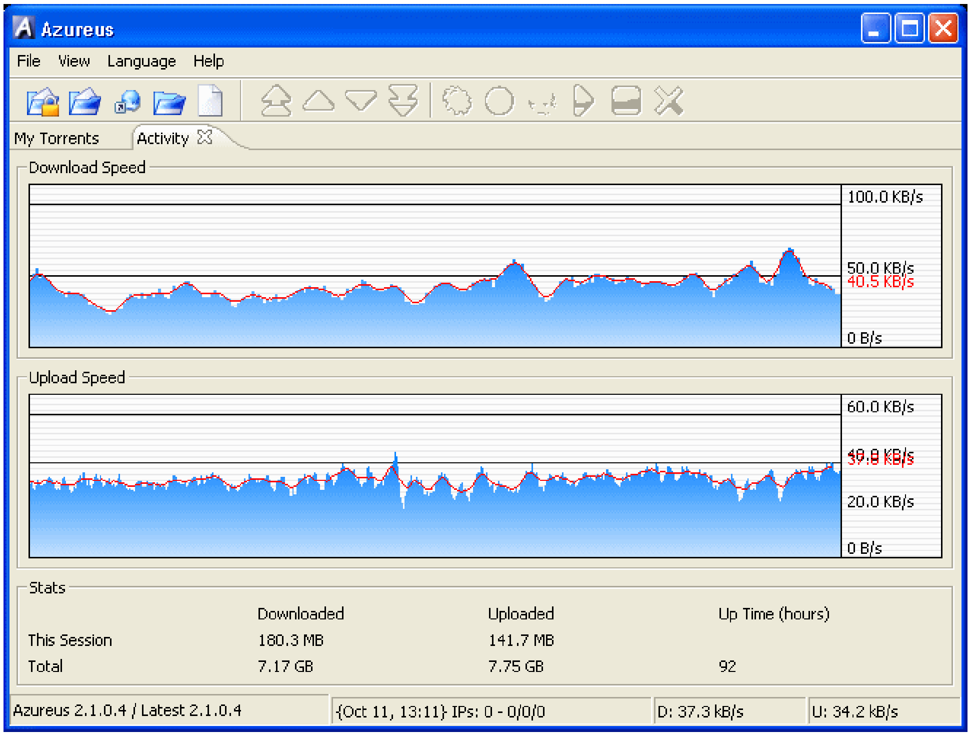
Time Elapsed : 1h 21m   Remaining: 9h 28m 1.52 GB   Share Ratio : 0.217
Downloaded : 202.4 MB (2.4 MB discar   Download Speed: 53.3 kB/s   Hash Fails : 10 (~ 10.0 MB)
Uploaded : 44.1 MB   Upload Speed : 12.7 kB/s   Max Uploads : 5   Max Down kB/s: 0
Seeds : 21 connected (26 in swa   Peers : 30 connected (32 in sv   Total Speed : 327.7 kB/s

Info

File Name :
Save In : D:\Downloads\
# of Pieces : 1739
Tracker URL :
Tracker Status: ok
Update in : 8:39
Comment :
Total Size : 1.70 GB
Hash :
Size : 1.0 MB
Created On : 08-Oct-2004 18:30:58

Azureus 2.1.0.4 / Latest 2.1.0.4   {Oct 11, 13:11} IPs: 0 - 0/0/0   D: 53.3 kB/s   U: 34.9 kB/s

In Azureus bittorrent client, if you click **View --> Statistics**, you get some nice information on your upload and download bandwidth and how stable it has been. As you can see it also shows you your overall downloaded data since you began using Azureus, your uptime and the bandwidth transfers for this session.

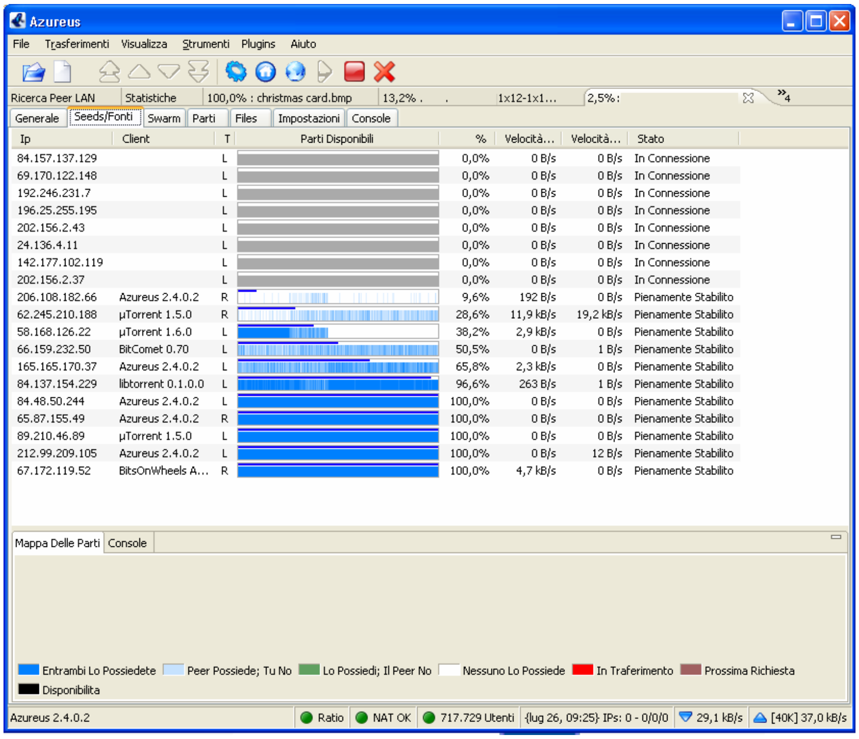


Stats

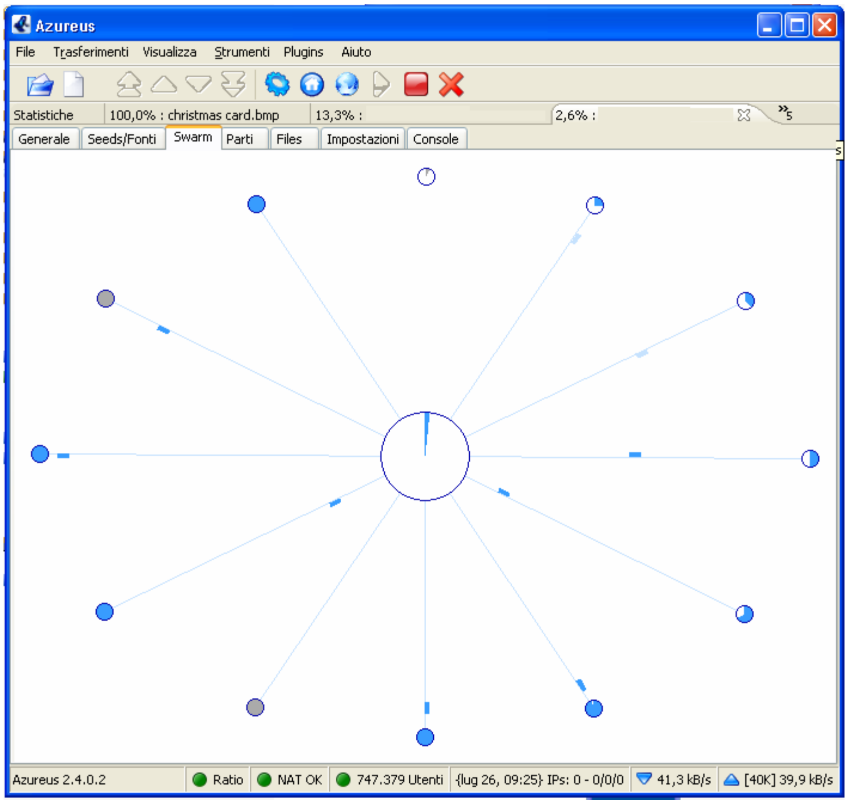
	Downloaded	Uploaded	Up Time (hours)
This Session	180.3 MB	141.7 MB	
Total	7.17 GB	7.75 GB	92

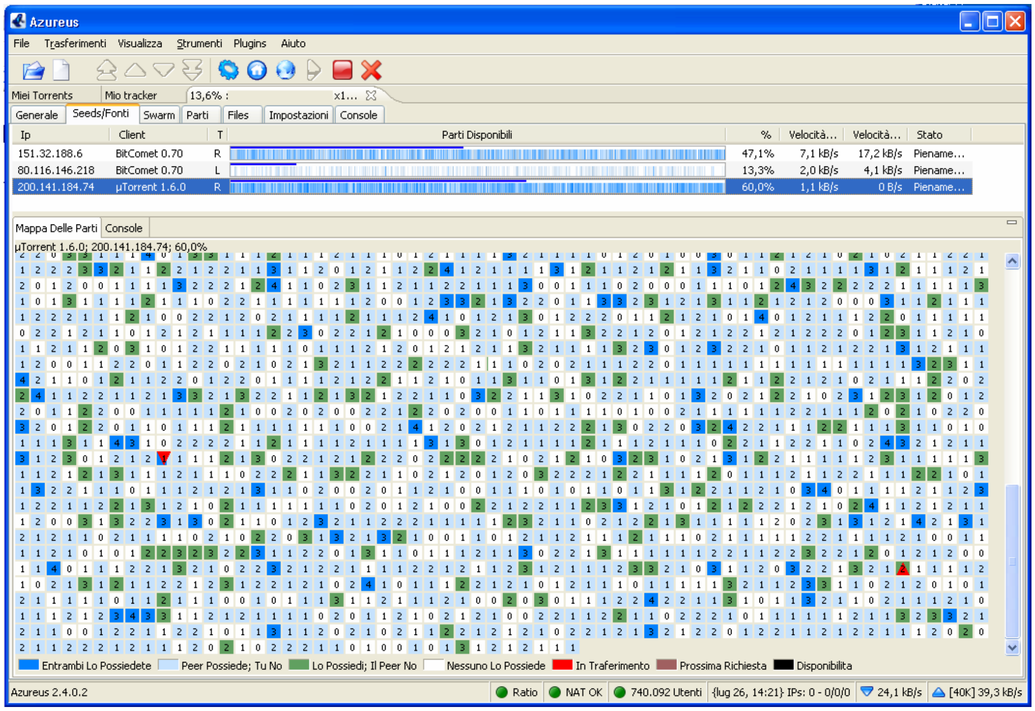
Azureus 2.1.0.4 / Latest 2.1.0.4   {Oct 11, 13:11} IPs: 0 - 0/0/0   D: 37.3 kB/s   U: 34.2 kB/s

In the following, different representations of the status of the download are reported. The first one report the fonts with the rate of transfer for each of them. The second (the swarm) is a picture of the fonts with a simpler and immediate status of their capability. The latter is the status of the transfer for a given file in which the status of each segment of the file is marked with a different color depending if the file segment is accessible, present, under download, etc.



Ip	Client	T	Parti Disponibili	%	Velocità…	Velocità…	Stato
84.157.137.129		L		0,0%	0 B/s	0 B/s	In Connessione
69.170.122.148		L		0,0%	0 B/s	0 B/s	In Connessione
192.246.231.7		L		0,0%	0 B/s	0 B/s	In Connessione
196.25.255.195		L		0,0%	0 B/s	0 B/s	In Connessione
202.156.2.43		L		0,0%	0 B/s	0 B/s	In Connessione
24.136.4.11		L		0,0%	0 B/s	0 B/s	In Connessione
142.177.102.119		L		0,0%	0 B/s	0 B/s	In Connessione
202.156.2.37		L		0,0%	0 B/s	0 B/s	In Connessione
206.108.182.66	Azureus 2.4.0.2	R		9,6%	192 B/s	0 B/s	Pienamente Stabilito
62.245.210.188	µTorrent 1.5.0	R		28,6%	11,9 kB/s	19,2 kB/s	Pienamente Stabilito
58.168.126.22	µTorrent 1.6.0	L		38,2%	2,9 kB/s	0 B/s	Pienamente Stabilito
66.159.232.50	BitComet 0.70	L		50,5%	0 B/s	1 B/s	Pienamente Stabilito
165.165.170.37	Azureus 2.4.0.2	L		65,8%	2,3 kB/s	0 B/s	Pienamente Stabilito
84.137.154.229	libtorrent 0.1.0.0	L		96,6%	263 B/s	1 B/s	Pienamente Stabilito
84.48.50.244	Azureus 2.4.0.2	L		100,0%	0 B/s	0 B/s	Pienamente Stabilito
65.87.155.49	Azureus 2.4.0.2	R		100,0%	0 B/s	0 B/s	Pienamente Stabilito
89.210.46.89	µTorrent 1.5.0	L		100,0%	0 B/s	0 B/s	Pienamente Stabilito
212.99.209.105	Azureus 2.4.0.2	L		100,0%	0 B/s	12 B/s	Pienamente Stabilito
67.172.119.52	BitsOnWheels A…	R		100,0%	4,7 kB/s	0 B/s	Pienamente Stabilito





Ip	Client	T	Parti Disponibili	%	Velocità...	Velocità...	Stato
151.32.188.6	BitComet 0.70	R		47,1%	7,1 kB/s	17,2 kB/s	Piename...
80.116.146.218	BitComet 0.70	L		13,3%	2,0 kB/s	4,1 kB/s	Piename...
200.141.184.74	µTorrent 1.6.0	R		60,0%	1,1 kB/s	0 B/s	Piename...

µTorrent 1.6.0; 200.141.184.74; 60,0%

🟦 Entrambi Lo Possiedete ▢ Peer Possiede; Tu No 🟩 Lo Possiedi; Il Peer No ▢ Nessuno Lo Possiede 🟥 In Traferimento 🟫 Prossima Richiesta ■ Disponibilita

Azureus 2.4.0.2 | ● Ratio | ● NAT OK | ● 740.092 Utenti | {lug 26, 14:21} IPs: 0 - 0/0/0 | ▽ 24,1 kB/s | △ [40K] 39,3 kB/s

The importance of Uploading

I had to write a small bit about uploading. Uploading on BitTorrent is vital. If you connect to a torrent that has just 3 seeds and 800 peers, then most of the sharing will be done between peers. If you download the whole file and have uploaded just 10% of that file and then leave, you are hurting the performance of that torrent. This kind of usage is very bad because if a lot of people begun doing it, then there would be very little seeds and eventually the seeds could disappear and there may be nobody left with 100% of the file. The full file still may be available as files are traded in small pieces, but if all users stopped uploading as much as they downloaded, torrents life wouldn't last long and when it was fully working, it would be very slow. Always make sure you upload as much as you download if not more. Someone who download 700MB and uploads 700MB still in the eyes of BitTorrent is not sharing properly. For the life of a torrent to go on for a long time at high speeds, all users should make sure they upload at least 150% of what they downloaded. When your torrents are done downloading keep them active until you reach this amount, or if you need to use the files, you can stop the torrent activity, use them (but do not alter them) and then click the same torrent again and you would be added to the tracker as a seed and would continue uploading again. Trackers has begun banning leechers, or keeping records of leechers as a way to deter their behavior, if you like BitTorrent, don't try and cheat it.

Limitations

BitTorrent does not offer its users anonymity. It is possible to obtain the IP addresses of all current, and possibly previous, participants in a swarm from the tracker. This may expose users with insecure systems to attacks to discover their identity. This is not a problem in a legal service for content sharing.

Another drawback is that BitTorrent file sharers compared to users of client/server technology often have little incentive to become seeders after they finish downloading. The result of this is that torrent swarms gradually die out, meaning a lower possibility of obtaining older torrents. Some BitTorrent websites have attempted to address this by recording each user's download and upload ratio for all or just the user to see, as well as the provision of access to older torrent files to people with better ratios.

BitTorrent is typically best suited in continuously connected broadband environments. Dial-up users find it less efficient due to frequent disconnects and slow download rates.

4.1 BitTorrent Terminology

- **Availability**: (also distributed copies) The number of full copies of the file available to the client. Each seed adds 1.0 to this number, as they have one complete copy of the file. A connected peer with a fraction of the file available adds that fraction to the availability, if no other peer has this part of the file. (ie. a peer with 65.3% of the file downloaded increases the availability by 0.653. However, if two peers both have the same portion of the file downloaded - say 50% - and there is only one seeder, the availability is 1.5).
- **Choked**: Describes a peer to whom the client refuses to send file pieces. A client chokes another client in several situations: The second client is a seed, in which case it does not want any pieces (ie. it is completely uninterested) The client is already uploading at its full capacity (ie. the value for max_uploads has been reached)
- **interested** Describes a downloader who wishes to obtain pieces of a file the client has. For example, the uploading client would flag a downloading client as 'interested' if that client did not possess a piece that it did, and wished to obtain it.
- **leech** A leech is usually a peer who has a negative effect on the swarm by having a very poor share ratio - in other words, downloading much more than they upload. Most leeches are users on asymmetric internet connections and do not leave their BitTorrent client open to seed the file after their download has completed. However, some leeches intentionally avoid uploading by using modified clients or excessively limiting their upload speed. The term leech, however, can be used simply to describe a peer - or any client that does not have 100% of the data.
- **peer** A peer is one instance of a BitTorrent client running on a computer on the Internet to which other clients connect and transfer data. Usually a peer does not have the complete file, but only parts of it. However, in the colloquial definition, "peer" can be used to refer to any participant in the swarm (in this case, it's synonymous with "client").
- **scrape** This is when a client sends a request to the tracking server for information about the statistics of the torrent, such as with whom to share the file and how well those other users are sharing.
- **seeder** A seeder is a peer that has a complete copy of the torrent and still offers it for upload. The more seeders there are, the better the chances are for completion of the file.
- **snubbed** An uploading client is flagged as snubbed if the downloading client has not received any data from it in over 60 seconds.
- **superseed** When a file is new, much time can be wasted because the seeding client might send the same file piece to many different peers, while other pieces have not yet been downloaded at all. Some clients, like ABC, Azureus, BitTornado, TorrentStorm, and µTorrent have a "superseed" mode, where they try to only send out pieces that have never been sent out before, making the initial propagation of the file much faster. This is generally used only for a new torrent, or one which must be re-seeded because no other seeds are available.
- **swarm** Together, all peers (including seeders) sharing a torrent are called a swarm. For example, six ordinary peers and two seeders make a swarm of eight.
- **torrent** A torrent can mean either a .torrent metadata file or all files described by it, depending on context. The torrent file contains metadata about all the files it makes downloadable, including their names and sizes and checksums of all pieces in the torrent. It also contains the address of a tracker that coordinates communication between the peers in the swarm.
- **tracker** A tracker is a server that keeps track of which seeds and peers are in the swarm. Clients report information to the tracker periodically and in exchange receive information about other clients to which they can connect. The tracker is not directly involved in the data transfer and does not have a copy of the file.

4.2 General Information on BitTorrent Tracker

A BitTorrent tracker is a server which assists in the communication between peers using the BitTorrent protocol. It is also, in the absence of extensions to the original protocol, the only major critical point, as clients are required to communicate with the tracker to initiate downloads. (Clients that have already begun downloading also communicate with the tracker periodically to negotiate with newer peers and provide statistics, however, after the initial reception of peer data, peer communication can continue without a tracker.)

A tracker should be differentiated from a BitTorrent index by the fact that it does not necessarily list files that are being tracked. A BitTorrent index is a list of .torrent files (usually including descriptions and other information). Trackers merely coordinate communication between peers attempting to download the payload of the torrents.

Many BitTorrent websites act as both tracker and index. Sites such as these publicize the tracker's URL and allow users to upload torrents to the index with the tracker's URL embedded in them, providing all the features necessary to initiate a download.

Trackers are the primary reason for a damaged BitTorrent 'swarm'. (Other reasons are mostly related to damaged or hacked clients uploading corrupt data.) The reliability of trackers has been improved through two main innovations in the BitTorrent protocol:

Multi-tracker torrents feature multiple trackers in the one torrent. This way, should one tracker fail, the others can continue supporting file transfer.

There are two incompatible 'trackerless' BitTorrent transfer (aka. decentralized tracking) methods: DHT-based implementations, and Azureus's 'Distributed Database'.

The term 'trackerless' is something of a misnomer, as decentralized or distributed tracking essentially treats every peer in the swarm as a tracker. Original BitTorrent was the first client to offer decentralized tracking through its DHT method. Later, Azureus, µTorrent and BitComet adopted this feature, although Azureus's method of implementation is incompatible with the DHT offered by all other supporting clients.

4.2.1 Lists of Trackers

C/C++ Trackers

- BitCometTracker - C++(?), Windows Only
- Extended BitTorrent client and Tracker (XBTT) - Windows/Linux

BNBT Based

- BNBT - Port of the original Python BT tracker with many additional features
- BNBT Trinity Edition - A modified version of BNBT with a windows installer
- CBTT - Another tracker written in C++, based on BNBT
- =Xotic= Edition of BNBT - Based on BNBT with extra features; focused on Linux users
- BNBT - This is a C++ implementation of a BitTorrent tracker. It should compile under most any Unix with GCC available, as well as MS Windows with MSVC (binaries included.) It includes all of the functionality of the reference Python tracker, but it also includes many enhancements: user accounts, improved web interface, statistics, etc. See also the TrackPak for a bundled BNBT and installer that's easy to use.

PHP Trackers

- Blog Torrent - Supports webseed, does not require MySQL(?). ABANDONED
- Broadcast Machine - Successor to Blog Torrent, Focuses on Torrentcasts
- BT phpTracker Plus - Coded from scratch; lightweight
- Btittracker - A frontend for phpBTTracker
- ByteStats Tracker - External scrape support, installation script. ABANDONED
- PHP Nuke BitTorrent Module - BitTorrent tracker module for the popular PHPNuke CMS
- phpMyBitTorrent - Successor to the PHPNuke Tracker Module, this is a standalone tracker with many features

- BTChange 0.94a - For modifying tracker info in an existing .torrent file. Use this if the tracker changes, so that you don't have to recreate the file. See also: Sourceforge page.

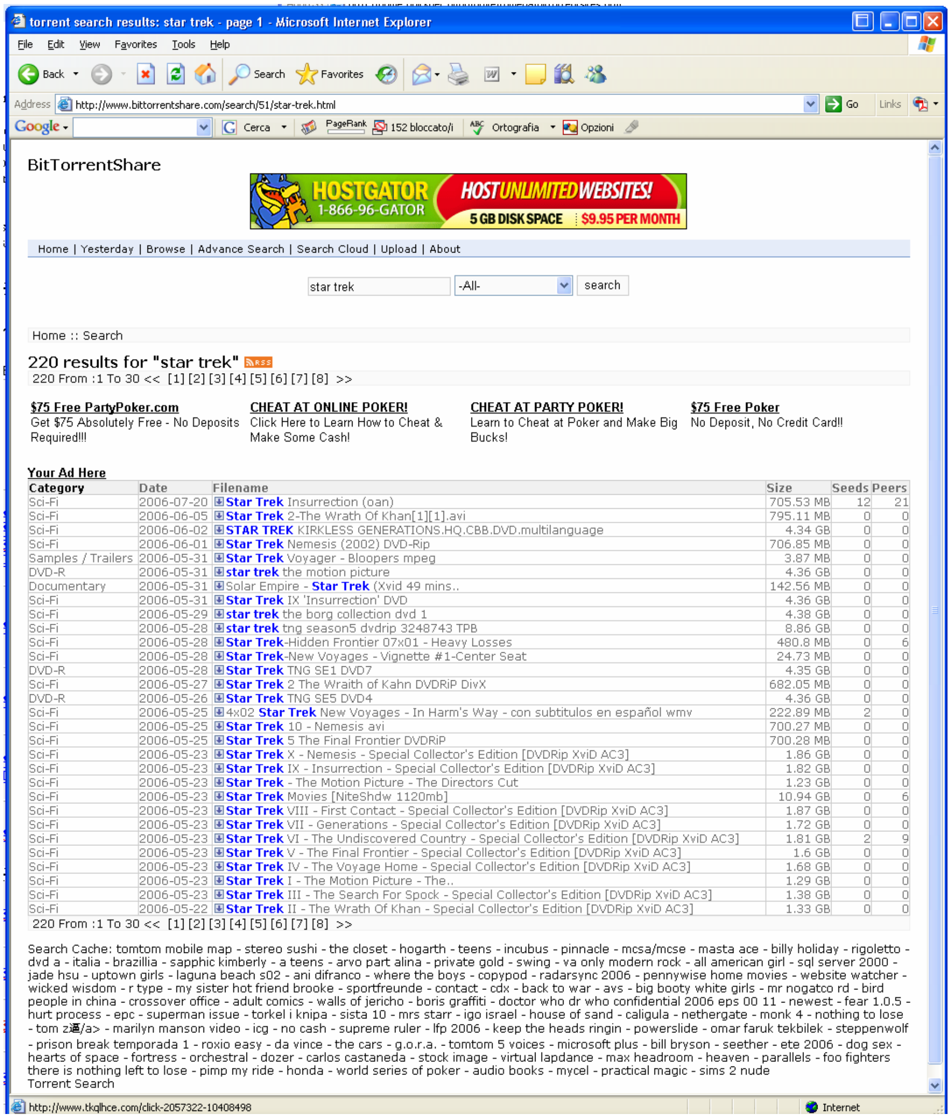
PHPBTTRACKER - Installer, MySQL. ABANDONED

- PHPBTTRACKER+ - Tracker based on PHPBTTRACKER. Many extra features
- PHPBTTracker-Admin - Another tracker based on PHPBTTRACKER, also with many additional features.
- PHPBTTracker - a free (GPL) tracker implementation in PHP with a MySQL back-end, includes built-in statistics collection and reporting.

4.3 Servers for listing and searching Torrent Files

They are servers that allow you to make some query. There are many sites that list torrent files. To use these sites, all you would have to do is click on a file listed, and it should download automatically and your client should immediately connect to the tracker and start the downloading. Some known sites that list torrent files are. Sites that list torrent files (like suprnova.org) have their trackers to handle the downloading and sharing that the users are doing. A torrent file would have the details on the tracker so you can only use a torrent file on the tracker it was made for. Software exists for anybody to setup their own trackers and build their own torrent files.

- http://home.quicknet.nl/qn/prive/romeria/bittorrentsites.htm list of BitTorrent trackers, servers with list of files, server in which it is possible to search for BitTorrent file.
- Suprnova.org - (Only works with original BT client)
- Torrentbits.org
- TorrentReactor.com
- FileList.org - (Requires registration and read FAQ)


torrent search results: star trek - page 1 - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back
Search
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Address http://www.bittorrentshare.com/search/51/star-trek.html
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Opzioni
HOSTGATOR 1-866-96-GATOR
HOST UNLIMITED WEBSITES!
5 GB DISK SPACE
$9.95 PER MONTH
http://www.tkqlhce.com/click-2057322-10408498
Internet

BitTorrentShare

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star trek -All- search

Home :: Search

220 results for "star trek" RSS

220 From :1 To 30 << [1] [2] [3] [4] [5] [6] [7] [8] >>

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Category	Date	Filename	Size	Seeds	Peers
Sci-Fi	2006-07-20	**Star Trek** Insurrection (oan)	705.53 MB	12	21
Sci-Fi	2006-06-05	**Star Trek** 2-The Wrath Of Khan[1][1].avi	795.11 MB	0	0
Sci-Fi	2006-06-02	**STAR TREK** KIRKLESS GENERATIONS.HQ.CBB.DVD.multilanguage	4.34 GB	0	0
Sci-Fi	2006-06-01	**Star Trek** Nemesis (2002) DVD-Rip	706.85 MB	0	0
Samples / Trailers	2006-05-31	**Star Trek** Voyager - Bloopers mpeg	3.87 MB	0	0
DVD-R	2006-05-31	**star trek** the motion picture	4.36 GB	0	0
Documentary	2006-05-31	Solar Empire - **Star Trek** (Xvid 49 mins..	142.56 MB	0	0
Sci-Fi	2006-05-31	**Star Trek** IX 'Insurrection' DVD	4.36 GB	0	0
Sci-Fi	2006-05-29	**star trek** the borg collection dvd 1	4.38 GB	0	0
Sci-Fi	2006-05-28	**star trek** tng season5 dvdrip 3248743 TPB	8.86 GB	0	0
Sci-Fi	2006-05-28	**Star Trek**-Hidden Frontier 07x01 - Heavy Losses	480.8 MB	0	6
Sci-Fi	2006-05-28	**Star Trek**-New Voyages - Vignette #1-Center Seat	24.73 MB	0	0
DVD-R	2006-05-28	**Star Trek** TNG SE1 DVD7	4.35 GB	0	0
Sci-Fi	2006-05-27	**Star Trek** 2 The Wraith of Kahn DVDRiP DivX	682.05 MB	0	0
DVD-R	2006-05-26	**Star Trek** TNG SE5 DVD4	4.36 GB	0	0
Sci-Fi	2006-05-25	4x02 **Star Trek** New Voyages - In Harm's Way - con subtitulos en español wmv	222.89 MB	2	0
Sci-Fi	2006-05-25	**Star Trek** 10 - Nemesis avi	700.27 MB	0	0
Sci-Fi	2006-05-25	**Star Trek** 5 The Final Frontier DVDRiP	700.28 MB	0	0
Sci-Fi	2006-05-23	**Star Trek** X - Nemesis - Special Collector's Edition [DVDRip XviD AC3]	1.86 GB	0	0
Sci-Fi	2006-05-23	**Star Trek** IX - Insurrection - Special Collector's Edition [DVDRip XviD AC3]	1.82 GB	0	0
Sci-Fi	2006-05-23	**Star Trek** - The Motion Picture - The Directors Cut	1.23 GB	0	0
Sci-Fi	2006-05-23	**Star Trek** Movies [NiteShdw 1120mb]	10.94 GB	0	6
Sci-Fi	2006-05-23	**Star Trek** VIII - First Contact - Special Collector's Edition [DVDRip XviD AC3]	1.87 GB	0	0
Sci-Fi	2006-05-23	**Star Trek** VII - Generations - Special Collector's Edition [DVDRip XviD AC3]	1.72 GB	0	0
Sci-Fi	2006-05-23	**Star Trek** VI - The Undiscovered Country - Special Collector's Edition [DVDRip XviD AC3]	1.81 GB	2	9
Sci-Fi	2006-05-23	**Star Trek** V - The Final Frontier - Special Collector's Edition [DVDRip XviD AC3]	1.6 GB	0	0
Sci-Fi	2006-05-23	**Star Trek** IV - The Voyage Home - Special Collector's Edition [DVDRip XviD AC3]	1.68 GB	0	0
Sci-Fi	2006-05-23	**Star Trek** I - The Motion Picture - The..	1.29 GB	0	0
Sci-Fi	2006-05-23	**Star Trek** III - The Search For Spock - Special Collector's Edition [DVDRip XviD AC3]	1.38 GB	0	0
Sci-Fi	2006-05-22	**Star Trek** II - The Wrath Of Khan - Special Collector's Edition [DVDRip XviD AC3]	1.33 GB	0	0

220 From :1 To 30 << [1] [2] [3] [4] [5] [6] [7] [8] >>

Search Cache: tomtom mobile map - stereo sushi - the closet - hogarth - teens - incubus - pinnacle - mcsa/mcse - masta ace - billy holiday - rigoletto - dvd a - italia - brazillia - sapphic kimberly - a teens - arvo part alina - private gold - swing - va only modern rock - all american girl - sql server 2000 - jade hsu - uptown girls - laguna beach s02 - ani difranco - where the boys - copypod - radarsync 2006 - pennywise home movies - website watcher - wicked wisdom - r type - my sister hot friend brooke - sportfreunde - contact - cdx - back to war - avs - big booty white girls - mr nogatco rd - bird people in china - crossover office - adult comics - walls of jericho - boris graffiti - doctor who dr who confidential 2006 eps 00 11 - newest - fear 1.0.5 - hurt process - epc - superman issue - torkel i knipa - sista 10 - mrs starr - igo israel - house of sand - caligula - nethergate - monk 4 - nothing to lose - tom z逼/a> - marilyn manson video - icg - no cash - supreme ruler - lfp 2006 - keep the heads ringin - powerslide - omar faruk tekbilek - steppenwolf - prison break temporada 1 - roxio easy - da vince - the cars - g.o.r.a. - tomtom 5 voices - microsoft plus - bill bryson - seether - ete 2006 - dog sex - hearts of space - fortress - orchestral - dozer - carlos castaneda - stock image - virtual lapdance - max headroom - heaven - parallels - foo fighters there is nothing left to lose - pimp my ride - honda - world series of poker - audio books - mycel - practical magic - sims 2 nude
Torrent Search

4.4 Some additional issues of BitTorrent

4.4.1 Alternative approaches

The BitTorrent protocol provides no way to index torrent files. As a result, a comparatively small number of websites have hosted the large majority of torrents linking to copyright material, rendering those sites especially vulnerable to lawsuits. In response, some developers have sought ways to make publishing of files more anonymous while still retaining BitTorrent's speed advantage. The Shareaza client, for example, provides three alternatives to BitTorrent: eDonkey2000, Gnutella, and Shareaza's native network, Gnutella2. If the tracker is down, it can finish the file over the other protocols, and/or find new (Shareaza) peers over G2. The use of distributed trackers is also one of the goals for Azureus 2.3.0.2 and BitTorrent 4.1.2. Another interesting idea that has surfaced recently in Azureus is virtual torrent. This idea is based on the distributed tracker approach and is used to describe some web resource. Right now, it is used for instant messaging. It is implemented using a special messaging protocol and requires an appropriate plugin. Anatomic P2P is another approach, which uses a decentralized network of nodes that route traffic to dynamic trackers.

4.4.2 Legal defenses

There are two major differences between BitTorrent and many other peer-to-peer file-trading systems, which advocates suggest make it less useful to those sharing copyrighted material without authorization. First, BitTorrent itself does not offer a search facility to find files by name. A user must find the initial torrent file by other means, such as a web search. Second, BitTorrent makes no attempt to conceal the host ultimately responsible for facilitating the sharing: a person who wishes to make a file available must run a tracker on a specific host or hosts and distribute the tracker address(es) in the .torrent file. While it is possible to simply operate a tracker on a server that is located where the copyright holder cannot take legal action, this feature of the protocol does imply some degree of vulnerability that other protocols lack. It is far easier to request that the server's ISP shut the site down than it is to find and identify every user sharing a file on a traditional peer-to-peer network. However, with the use of a distributed hash table (DHT), a tracker is no longer required, although they are often still used so that clients that do not support DHT can still connect to the swarm.

4.5 Other features of BitTorrent

4.5.1 Utilities

- TorrentSpy - An MS Windows tool which allows you to query a tracker about a specific torrent, view metadata info, check a file's hashes, etc. A new feature is the "create" tab for making torrent files to upload.
- maketorrent - A utility for creating torrent files, by the author of the burst! client. Version 1.x of MakeTorrent was a modified version of the Python 'completedir' program with extra features. Version 2.x is a complete rewrite in Delphi.
- completedir 1.0.1 - A utility for creating new .torrent files, part of the official BitTorrent client package. This is packaged as a Windows installer, get the source code for use with other platforms.
- Java BitTorrent Tools - A metafile viewer/editor, availability checker, and a basic tracker.
- DumpTorrentCGI - Use this handy web page to parse and output the contents of a .torrent file (from either your local system or a link URL.) Use this to quickly determine a torrent's hash ID or which tracker is hosting it.
- trackerlyze.pl 1.11 - A free (GPL) Perl script that analyzes the logfile of a tracker and creates graphs and reports of the bandwidth used and number of peers/seeds. See also: Home page.
- libbt - A library implementation of the BitTorrent protocol in C. This project is still under development, and is not suitable to end-users at this point.

4.5.2 Broadcatching

Another proposed feature combines RSS and BitTorrent to create a content delivery system dubbed broadcatching. Since a Steve Gillmor column for Ziff-Davis in December 2003, the discussion has spread quickly among many bloggers (Techdirt, Ernest Miller, and former TechTV host Chris Pirillo, for example). As Scott Raymond explained:

"I want RSS feeds of BitTorrent files. A script would periodically check the feed for new items, and use them to start the download. Then, I could find a trusted publisher of an Alias RSS feed, and 'subscribe' to all new episodes of the show, which would then start downloading automatically — like the 'season pass' feature of the TiVo."
While potential illegal uses abound as is the case with any new distribution method, this idea lends itself to a great number of ideas that could turn traditional distribution models on their heads, giving smaller operations a new opportunity for content distribution. The system leans on the cost-saving benefit of BitTorrent, where expenses are virtually non-existent; each downloader of a file participates in a portion of the distribution. One early adoption of this concept is IPTV show mariposaHD, which uses BitTorrent to distribute large (1-2 GB) WMVHD files of high-definition video.

RSS feeds layered on top keep track of the content, and because BitTorrent does cryptographic hashing of all data, subscribers to the feed can be sure they're getting what they think they're getting, whether that winds up being the latest Sopranos episode, or the latest Sveasoft firmware upgrade. (Naturally, however, ensuring that the same data reaches all nodes neglects the possibility that the original, source file may be corrupted or incorrectly labeled.)

One of the first open source attempts to create a client specifically for this was Democracy Player. The idea is already gaining momentum however, with other Free Software clients such as PenguinTV and KatchTV also now supporting broadcatching.

4.5.3 APIs

The BitTorrent web-service Prodigem has made available a feature to any web application capable of parsing XML through its standard Representational State Transfer (REST) based interface. Additionally, Torrenthut is developing a similar torrent API which will provide the same features, as well as further intuition to help bring the torrent community to Web 2.0 standards. Alongside this release is a first PHP application built using the API called PEP which will parse any Really Simple Syndication (RSS 2.0) feed and automatically create and seed a torrent for each enclosure found in that feed.

4.5.4 Multitracker

Another unofficial feature is an extension to the BitTorrent metadata format proposed by John Hoffman. It allows the use of multiple trackers per file, so if one tracker fails, others can continue supporting file transfer. It is implemented in several clients, such as BitTornado and µTorrent. Trackers are placed in groups, or tiers, with a tracker randomly chosen from the top tier and tried, moving to the next tier if all the trackers in the top tier fail.

4.6 BitTorrent Software Comparison

From: http://en.wikipedia.org/wiki/Comparison_of_BitTorrent_software

client	FLOSS	Runs on Linux/ Unix	Runs on Windows	Runs on Mac OS X	IPv6 Support	Max active torrents	Supports Super-seeding	Tracker	Malware-free	Supports UPnP Port Mapping [1]	Supports NAT Port Mapping Protocol	Supports NAT traversal	Supports DHT [2]	Supports Peer exchange	Supports BitTorrent protocol encryption
ABC [Yet Another BitTorrent Clirent]	Yes	Old version	Yes	No	?	∞	Yes	No	Yes	Yes	?	No	No	No	No
Acquisition	No	No	No	Yes	?	3, ∞ when registered	No	No	Yes	No	Yes	No	No	?	No
Anatomic P2P	Yes	Yes	Yes	Yes	?	∞	Yes	Separate download	Yes	Yes	?	?	?	?	No
Arctic Torrent	Yes	No	Yes	No	No	∞	No	No	Yes	No	?	No	No	?	No
Azureus	Yes	Yes	Yes	Yes	Yes	∞	Yes	Yes	Yes	Yes	?	DHT only	Yes [3]	Yes	Yes

BitComet	No	No	Yes	No	?	∞	No[4]	Separate download	Yes	Yes	?	Yes	Yes	Yes	Yes
BitLord	No	No	Yes	No	?	∞	No[4]	No	Adware	Yes	?	Yes	No	Yes	No
BitPump	?	?	Yes	?	?	?	?	?	?	?	?	?	?	?	?
BitTornado	Yes	Yes	Yes	Yes	Yes	∞	Yes	Yes [5]	Yes	Yes	?	No	No	Yes	No
BitTorrent / Mainline	Yes[6]	Yes	Yes	Yes	?	∞	No	Yes [5]	Yes	Yes	?	No	Yes	?	Yes
BitSpirit	No	No	Yes	No	?	∞	Yes	No	Yes	Yes	?	Yes	Yes	?	No
Bits on Wheels	No	No	No	Yes	?	∞	No	No	Yes	No	?	?	No	?	No
Blizzard Downloader	No	No	Yes	Yes	?	1	No	No	Yes	No	?	No	No	?	No
Blog Torrent	?	No	Yes	Yes	?	3	?	Yes	?	?	?	?	?	?	?
BtManager	Yes	Yes	Yes	Yes	?	?	?	?	?	?	?	?	?	?	No

burst!	Yes	No	Yes	No	?	20	Yes	No	Yes	?	?	?	?	?	No
ctorrent	Yes	Yes	No	No	No	∞	?	?	?	?	?	?	?	?	No
eDonkey2000	No	Yes	Yes	Yes	?	?	?	?	Adware [7]	?	?	?	?	?	No
freeloader	Yes	Yes	No	No	?	∞	?	No	Yes	?	?	?	?	?	No
G3 Torrent	Yes	No	Yes	No	?	∞	No	No	Yes	No	?	No	No	?	No
Gnome BitTorrent	Yes	Yes	No	No	?	∞	?	No	Yes	?	?	?	No	No	No
KTorrent	Yes	Yes	No	No	?	∞	No	No	Yes	Yes	?	No	Alpha	No	Alpha
Localhost	Yes	Yes	Yes	No	?	∞	Yes	Yes	Yes	Yes	?	Yes	Yes, required.	?	No
MLNet	Yes	Yes	Yes	Yes	No	∞	No	Yes	Yes	No	?	No	No	?	No
MooPolice	No	No	Yes	No	No	∞	No	No	Yes	Yes	?	No	Yes	Yes	No

Opera 9 browser	No	Yes	Yes	Yes	?	∞	?	No	Yes	No	?	?	No	No	No
QTorrent	Yes	Yes	No	No	?	∞	No	No	Yes	No	?	No	No	No	No
Qbittorrent	Yes	Yes	No	No	Yes	∞	No	No	Yes	Yes	?	No	No	Yes	No
rtorrent	Yes	Yes	No	Yes	No	∞	No	No	Yes	No	?	No	No	?	No
Rufus	Yes	Yes	Yes	No	No	∞	No	No	Yes	?	?	No	No	?	No
Shareaza	Yes	No	Yes	No	No	10	No	No	Yes	Yes	?	No	Yes [8]	?	No
Tomato Torrent	Yes	No	No	Yes	?	?	?	?	Yes	?	?	?	?	?	No
TorrentFlux	Yes	Yes	Yes	Yes	?	∞	Yes	No	Yes	Yes	?	No	No	No	No
Transmission	Yes	Yes	No	Yes	No	∞	No	No	Yes	No	?	No	No	?	No
Turbo Torrent	No	No	Yes	No	?	∞	Yes	Yes	No	Yes	?	No	No	?	No

TorrentSpy Rufus	Yes	No	Yes	No	?	∞	No	No	Adware [9]	?	?	?	No	?	No
µTorrent	No	No [10]	Yes	No	No	∞	Yes	Yes	Yes	Yes	?	No	Yes	Yes [11]	Yes
WizBit	Yes	No	No	No	?	?	No	No	Yes	No	?	No	No	No	No
XBT Client	Yes	No [12]	Yes	No	?	∞	Yes	Yes	Yes	Yes	?	?	No	?	No
ZipTorrent	No	No	Yes	No	?	?	?	?	Yes	Yes	?	No	?	?	No
BitTorrent client	**FLOSS**	**Runs on Linux/ Unix**	**Runs on Windows**	**Runs on Mac OS X**	**IPv6 Support**	**Max active torrents**	**Supports Super-seeding**	**Tracker**	**Malware-free**	**Supports UPnP Port Mapping [1]**	**Supports NAT Port Mapping Protocol**	**Supports NAT traversal**	**Supports DHT [2]**	**Supports Peer exchange**	**Supports BitTorrent protocol encryption**

BitTorrent client	Programming Language	Basis	Interface	Built-in disk cache[13]	Supports Web Seeding [14]	Supports Broadcatching (RSS)	Supports Prioritization	Supports Selective Downloading	Supports SOCKS for outgoing connections	Web Remote Control	Torrent Search Engine
ABC [Yet Another BitTorrent Client]	Python	BitTornado	GUI and web	?	Yes	No	Yes	Yes	?	Yes	Separate download

Acquisition	Objective-C and Cocoa	Limewire	GUI	?	No	No	No	No	No	No	No
Anatomic P2P	Python	BitTornado	GUI and old CLI	?	Yes	?	?	?	?	?	?
Arctic Torrent	C++	libtorrent	GUI	?	No	No	No	No	No	No	No
Azureus	Java and SWT	-	GUI, CLI, Telnet, Web, XMLoverHTTP remote control API	Yes	Yes[15]	Plugin	Yes	Yes	Yes	Plugin[16]	3rd party plugins
BitComet	C++	?	GUI	Yes	No	No	Yes	Yes	Yes	No	Built-in Web browser
BitLord	C++	BitComet	GUI	Yes	No	No	Yes	Yes	Yes	No	Built-in Web browser
BitPump	?	?	GUI	?	?	?	?	?	?	?	?
BitTornado	Python	BitTorrent	GUI and CLI	?	Yes	No	Yes	Yes	No	No	No

BitTorrent / Mainline	Python	-	GUI and CLI	?	No	No	No	No	No	No	Yes
BitSpirit	C++	BitComet	GUI	Yes	No	No	Yes	Yes	Yes	No	No
Bits on Wheels	Objective-C and Cocoa	-	GUI	?	?	?	?	No	?	No	?
Blizzard Downloader	?	BitTorrent client for early version	GUI	?	No	No	No	No	?	No	No
Blog Torrent	?	BitTorrent client for early version	GUI	?	No	No	No	No	?	No	No
BtManager	Python	?	GUI	?	?	?	?	?	?	?	?
burst!	Python	?	GUI	?	?	?	?	No	?	?	?
ctorrent	C++	?	CLI	?	?	?	?	Yes	?	?	?
eDonkey2000	C++	?	GUI	?	?	?	?	?	?	?	?

freeloader	Python	?	GUI	?	?	No	?	?	?	No	No
G3 Torrent	Python	BitTorrent	GUI and web	?	No	Yes	Yes	Yes	No	Yes	No
Gnome BitTorrent	Python	?	GUI	?	No	No	?	?	?	No	No
KTorrent	C++	-	GUI and CLI (Alpha)	?	No	No	Alpha	Yes	?	No	Built-in Web browser
Localhost	Java and SWT	Azureus	Web	Yes	No	Plugin	Yes	Yes	Yes	Plugin[16]	Yes
MLNet	Ocaml	-	CLI, Telnet, Web, Network GUI	Yes	No	No	Yes	No	No[17]	Yes	Yes[18]
MooPolice	C++	libtorrent	GUI	No	Yes	No	Yes	Yes	?	No	No
Opera 9 browser	C++	?	GUI	?	No	?	?	?	?	No	Built-into Web browser
QTorrent	C++	TheSHAD0W	GUI	?	?	?	?	?	?	?	?

Qbittorrent	C++	libtorrent	GUI	No	Yes	No	No	Yes	?	No	Yes[19]
rtorrent	C++	libTorrent	CLI	?	No	No	Yes	Yes	?	No	No
Rufus	Python	G3 Torrent	GUI and web	?	No	Yes	Yes	Yes	?	Yes	No
Shareaza	C++	Shareaza core	GUI and web	Yes	No	No	Yes	No	No	Yes	Yes
Tomato Torrent	Cocoa	BitTorrent?	GUI	?	?	?	?	?	?	?	?
TorrentFlux	PHP	BitTornado	Web	Yes	Yes	No	No	Yes	No	Yes	Yes
Transmission	C	-	GUI and CLI	?	No	No	No	No	No	No	No
Turbo Torrent	Python	G3 Torrent	GUI and web	?	No	No	Yes	Yes	?	Yes	Built-in Web browser
TorrentSpy Rufus	Python	Rufus	GUI	?	No	Yes	Yes	Yes	?	?	?
µTorrent	C++	-	GUI and Web (alpha)	Yes	No	Yes	Yes	Yes	Yes	Alpha	Yes

WizBit	Python	-	Mobile phone GUI (alpha)	No	No	No	No	?	No	No	Yes
XBT Client	C++	-	GUI and Web (alpha)	?	?	?	Yes	Yes	?	Yes	?
ZipTorrent	C++	libtorrent	GUI	?	?	Yes	?	?	?	?	?
BitTorrent client	**Programming Language**	**Basis**	**Interface**	**Built-in disk cache**[13]	**Supports Web Seeding**[14]	**Supports Broadcatching (RSS)**	**Supports Prioritisation**	**Supports Selective Downloading**	**Supports SOCKS for outgoing connections**	**Web Remote Control**	**Torrent Search Engine**

1. ^ a b Automatically configure port forwarding (requires Router with UPnP support)
2. ^ a b It allows you to use trackerless torrents or (with some clients) to resume normal torrents when their tracker is down
3. ^ Not compatible with Official BitTorrent client DHT.
4. ^ a b BitComet and BitLord clients interfere with Super-Seeding by other BitTorrent software as they do not acknowledge pieces sent by the Seeder. (**NOTE:** This has been fixed in version 0.70)
5. ^ a b Tracker included with Linux binaries and with source, but not with Windows binary
6. ^ BitTorrent Open Source License is not considered free by Debian Free Software Guidelines, see [1]
7. ^ Used to contain both Adware and Spyware, non-"Pro" version continues to contain Adware. *New note* Latest versions (1.4.3+) of eDonkey all contain adware, which can not be opted out of, even with a "Pro" install.
8. ^ It's not a DHT network, but Shareaza uses gnutella2 to find other Shareaza clients when the tracker is down. This option is disabled by default.
9. ^ Unofficial version of Rufus created by TorrentSpy with WhenU SaveNow adware bundled in it; reportedly possible to opt-out during installation.

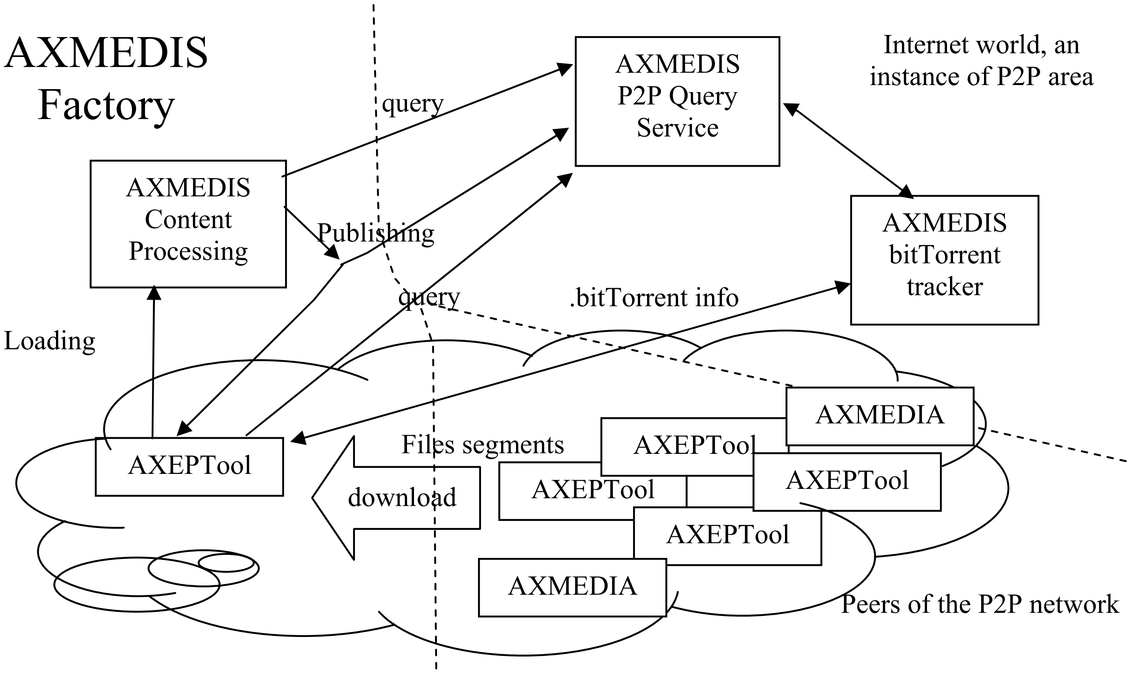
10. ^ Runs perfectly under Wine.
11. ^ Only exchanging with other µTorrent clients
12. ^ Client backend can be run on linux or windows, client requires windows.
13. ^ a b Reduces disk usage, file fragmentation (in case it is not preallocated) and latencies due to larger written blocks and cached data for hash checking finished pieces.
14. ^ a b Recently implemented (unofficial) web seeding feature, see HTTP-Based Seeding Specification
15. ^ Supports the Getright Webseeding spec in addition to the Bittornado spec[2]
16. ^ a b Provides a Java-based and a simple HTML/JS based WebUI
17. ^ See task #4401 Socks Proxy; however, http proxy is supported.
18. ^ GUIs exist with built-in web browser
19. ^ Integrated

Relevant Features and solutions matching the interests and requirements of AXMEDIS:

client	FLOSS	Runs on Linux/ Unix	Runs on Windows	Runs on Mac OS X	Max active torrents	Supports Super-seeding	Tracker	Malware-free	Supports UPnP Port Mapping [1]	Supports NAT Port Mapping Protocol	Supports NAT traversal	Supports DHT [2]	Supports BitTorrent protocol encryption	Programming Language	Basis	Interface	Supports Web Seeding [14]	Supports Broadcatching (RSS)	Supports Prioritization	Supports Selective Downloading	Supports SOCKS for outgoing connections	Web Remote Control	Torrent Search Engine
Arctic Torrent	Yes	No	Yes	No	∞	No	No	Yes	No	?	No	No	No	C++	libtorrent	GUI	No	No	No	No	No	No	No
Azureus	Yes	Yes	Yes	Yes	∞	Yes	Yes	Yes	Yes	?	DHT only	Yes [3]	Yes	Java and SWT	-	GUI, CLI, Telnet, Web, XML over HTTP remote control API	Yes[15]	Plugin	Yes	Yes	Yes	Plugin[16]	3rd party plugins
Localhost	Yes	Yes	Yes	No	∞	Yes	Yes	Yes	Yes	?	Yes	Yes, required.	No	Java and SWT	Azureus	Web	No	Plugin	Yes	Yes	Yes	Plugin[16]	Yes
Shareaza	Yes	No	Yes	No	10	No	No	Yes	Yes	?	No	Yes [8]	No	C++	Shareaza core	GUI and web	No	No	Yes	No	No	Yes	Yes
XBT Client	Yes	No [12]	Yes	No	∞	Yes	Yes	Yes	Yes	?	?	No	No	C++	-	GUI and Web (alpha)	?	?	Yes	Yes	?	Yes	?

5 General B2B scenarios

The general solution and architecture of AXMEDIS framework tools integrated with P2P tools is reported in the previous section. Technically it can be depicted as follows.



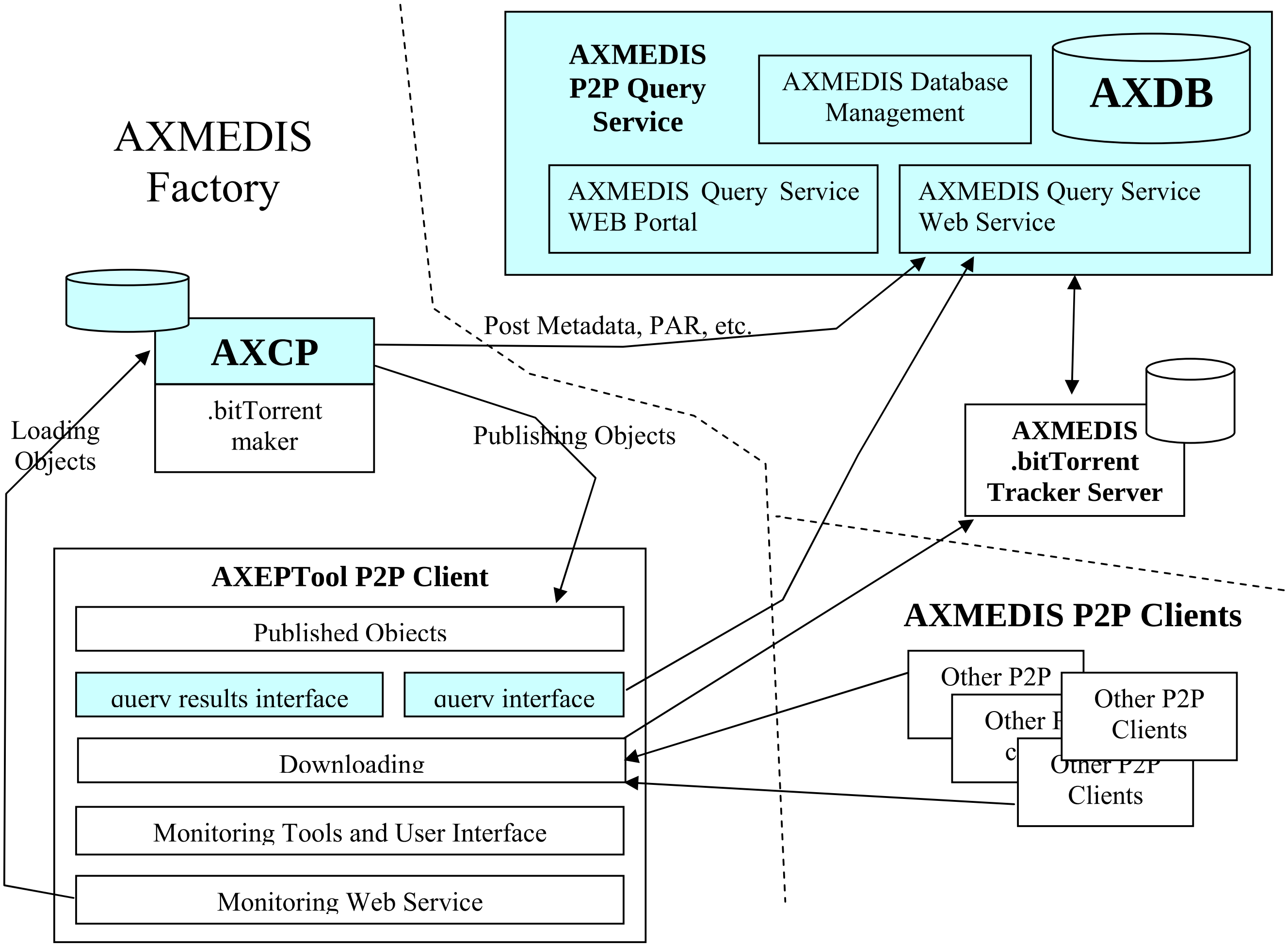
The P2P Clients can be both: AXEPTool and/or AXMEDIA P2P tools.

In this architecture for the B2B level we have:

- **AXMEDIS factory** (under responsibility of DSI), a place in which the AXMEDIS objects are created and/or are used to create other more complex objects, or are distributed towards other distribution channels, for example, broadcast,
- **AXMEDIS P2P Query Service** (under responsibility of EXITECH): a server located to cover a P2P community in which the database of metadata are located and that collect also the .bitTorrent information for the related AXMEDIS objects. AXMEDIS P2P Query Service may be connected with other AXMEDIS P2P Query Services to create a higher level of P2P sharing of content.
- **AXMEDIS BitTorrent Tracker**: a server derived from BitTorrent Tracker technology and solution to host BitTorrent information, update them, and provide them to AXMEDIS P2P clients according to the BitTorrent protocol. In a global geographic system, many AXMEDIS BitTorrent Trackers may survive to provide services.
- **.bitTorrent info:** BitTorrent information file containing the information created by a bitTorrent Maker processing the file to be shared into the P2P area.
- **AXEPTool**: a P2P client tool derived from a BitTorrent Client for B2B P2P sharing of AXMEDIS objects.
- **AXMEDIA**: a P2P client tool derived from a BitTorrent Client for C2C AXMEDIS object sharing.

In sharing files, the AXEPTool may use the files contained into the local repositories of the AXMEDIA tools and vice versa. So that the P2P network is practically defined by the “AXMEDIS P2P Query Service” and by clients that get connection to the AXMEDIS BitTorrent Tracker to get the specific BitTorrent information associated to a download.

6 Integration of P2P in AXMEDIS for B2B



In the above figure the parts in Cyan are already present and available in the AXMEDIS Framework even if not fully used for this kind of context.

The P2P Clients can be both: AXEPTool and/or AXMEDIA P2P tools.

6.1 AXCP (AXMEDIS content processing) and relationships with the other tools

AXCP (AXMEDIS Content Processing) it is a set of AXMEDIS tools described in the introduction of this document. The AXCP Editor and Executor allow to write scripts and execute them. Thus, the AXCP tools allow scripting a large set of content processing activities including accessing at web services, producing objects (MPEG-21 and AXMEDIS and OMA formats), manipulating XML, and thus in connection of the P2P tools the AXCP has to permit the control of upload and download of files from the P2P area.
See the following document for details about the AXCP tools:
http://www.axmedis.org/documenti/view_documenti.php?doc_id=1728

In the AXMEDIS architecture for the content sharing at B2B level with the usage of the P2P AXEPTools the AXCP (AXMEDIS content processing) tool (engine processing scripts) has to be capable of:

- publishing the AXMEDIS objects having AXOID=ABCDX by:
    i. Processing the AXMEDIS object with the “AXMEDIS .bitTorrent Maker” to produce the “AXMEDIS .bitTorrent Information” for file AXMEDIS object ABCDX
    ii. Sending metadata (an simple AXMEDIS object without digital resources) to the AXMEDIS P2P Query service, including the “AXMEDIS .bitTorrent Information”
    iii. Posting the AXMEDIS object processed by the “AXMEDIS .bitTorrent Maker” into the AXEPTool database for published objects.
- performing queries on the AXMEDIS P2P Query Service to have as a results a list of AXMEDIS objects with their metadata and their “AXMEDIS .bitTorrent Information”.
- interacting with the AXEPTool via a WEB Service called “Monitoring Web Service” to:
    - ask for the downloads of some AXMEDIS objects passing to the AXEPTool the “AXMEDIS .bitTorrent Information” and AXOIDs
    - ask for the status of the objects under downloads/publishing, receiving back:
        - listing of objects published
        - list of objects under download including those already at the 100%
        - for each object the percentage of download performed with respect to their completion, and an estimated time to complete the download, for example: in 34 Minutes.
    - stop the download for some AXMEDIS object identified by its AXOID

6.2 AXMEDIS .bitTorrent Maker tool

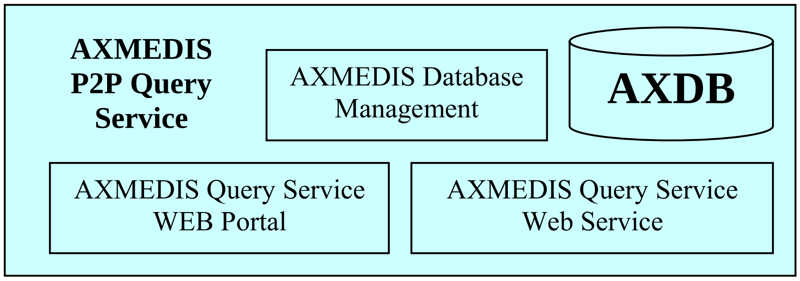
BitTorrent Maker is a tool that allows packaging objects and producing AXMEDIS .bitTorrent information files.
The **AXMEDIS .bitTorrent Maker** has to be usable as a simple executable file tool with its parameters from:

- the AXCP
- the AXEPTools
- the AXMEDIS tools and
- any other tools.

The .torrent file is produced as a result of a process that is typically performed by P2P BitTorrent Clients and can be passed to other tools as mentioned above to reach at the end the AXMEDIS BitTorrent Tracker Server.
The AXMEDIS .bitTorrent Maker is produced by customizing (if needed) a classical .bitTorrent maker, in many cases that functionality is directly present into the BitTorrent Client. .

6.3 AXMEDIS P2P Query Service Server

AXMEDIS P2P Query Service is a server that provides information about the objects indexed into the AXDB and at disposal of a community. Several Communities can be created, for example one for each distributor, by using and installing a different AXMEDIS P2P Query Service SERVER.
A query service that could be a simple redirection of the AXMEDIS database query on other AXMEDIS factories (see http://www.axmedis.org/documenti/view_documenti.php?doc_id=1728)
For more details on the structure of the AXMEDIS query support see:
http://www.axmedis.org/documenti/view_documenti.php?doc_id=1932


AXMEDIS P2P Query Service
AXMEDIS Database Management
AXDB
AXMEDIS Query Service WEB Portal
AXMEDIS Query Service Web Service

AXMEDIS P2P Query Service Server includes

1. **AXDB: AXMEDIS Database** which is practically an AXMEDIS database without the objects but only with the metadata. Plus a table that associates the AXOID with .bitTorrent initial files mentioned before as: “AXMEDIS .bitTorrent Information”. This information is passed in a field of the AXMEDIS metadata.
2. **AXMEDIS Query Service Web Service** allows to establish a protected channel for:
    a. publishing/loading a new AXMEDIS object metadata and additional information (.torrent)
    b. receiving a query and providing a result in terms of AXOID, metadata and .torrent file
    c. deleting/un-publishing of an AXMEDIS object.
3. **AXMEDIS Query Service WEB Portal** allows to common users to make queries on the portal directly, the results are those described above. This is a simple and direct interface to make queries, probably used only by final users.

Please note that the **AXMEDIS Query Service Web Service** can be used by:

- the AXCP for automating the Publishing of objects, SSL connection or not: this can be implemented by posting the AXOID of objects to be indexed. In other cases, the posting could be performed only by sending the AXOID while the metadata can be recovered form the AXCS.
- the AXCP for automating the search for new objects in the P2P network, SSL connection or not
- the AXMEDIS query support for making a query on the Virtual Network of P2P tools of the several factories.

6.4 AXMEDIS BitTorrent Tracker Server

The AXMEDIS BitTorrent Tracker Server contains a table that contains for each AXOID all the AXMEDIS BitTorrent information about who has the file segments, etc. This server works with the P2P client according to the standard BitTorrent protocol with trackers. The communication from the P2PClient and the Tracker can be protected with SSL.

When and user on a P2P Client has received the query result has in the hands the references to the BitTorrent Tracker Server and from it can get the information about the peers that have the file segments and thus can start the download according to the BitTorrent policies.
Please note that the communication from the AXMEDIS Query Service Server and the BitTorrent Tracker could be used to communicate to the Tracker the list of objects (list of AXOID) permitted for that Tracker. Another way to enforce this can be to authenticate the P2P Clients, thus nobody that is authenticated would have interest in putting a wrong .torrent file in the Tracker.

The AXMEDIS BitTorrent Tracker Server:

- Can be realized from one of the server accessible, see the list in the previous section
- Some P2P BitTorrent Clients, such as Azureus, include their own integrated Tracker Server. This means that potentially each peer may have its tracker server. A more specific tracker server capable to support higher performances is needed. So that it is preferred to install one of the solutions listed in the previous sections.
- Probably starting from a standard Tracker Server none or marginal changes are needed
- Eventual change and/or modification could be needed in the protocol in order to host only AXMEDIS BitTorrent information files. This has to be decided yet, and probably can be performed in other manners.
- It could be useful to have statistical information about (some of the tracker server are capable to provide statistical information):
    - How many downloads of the BitTorrent File
    - How many updates of the BitTorrent File
    - Any other information that could be collected by the Tracker Server
    - Etc.

It should be avoided to provide many trackers as the number of Peers. It could be better to have few centralized trackers for all. May be one for each AXMEDIS P2P Query Service Server.

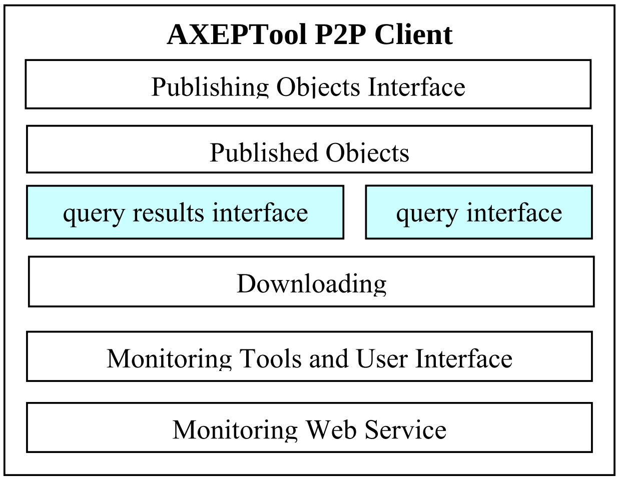
The tracker can be easily integrated into the AXMEDIS P2P Query Service Server or in alternative it is possible to use any active BitTorrent tracker if the protocol for AXMEDIS is not going to be changed.
If we maintain the same protocol we lose the feature of controlling the objects that are using the tracker and thus we can take the risk that some piracy objects can be indexed by our tracker server and that biTorrent files of our AXMEDIS objects are hosted in many and unknown Tracker Servers (this may always happen).
The best solution is to control the tracker to allow the insertion and update of BitTorrent files and information only from AXMEDIS P2P tools.

One possibility to create a restricted community is to:

- encrypt BitTorrent Files with some specific keys and protocols depending on the AXMEDIS certification model.
- Use the same BitTorrent protocol and Tracker Servers capable to open those files.
- Use specific P2P Client Tools.

6.5 AXMEDIS AXEPTool P2P Client

AXEPTool is a P2P client tool derived from bitTorrent Client for B2B P2P sharing and thus also for interacting with the AXMEDIS Factory and specifically with the AXCP tool.



The AXMEDIS AXEPTool P2P Client Can be realized with .bitTorrent Azureus client (see the list in the previous section), which has as major features those presented in the previous table that for the our purpose can be summarized as:

- o Developed in Java
- o Includes a tracker
- o Support protected communication with the Tracker
- o Presents a monitor interface

It seems that the present Plugin technology of Azureus does not allow to do much and for sure not to control the downloads and other facts that we need to enforce. So that the work is in effect to the modification of the P2P client.

The AXMEDIS AXEPTool P2P Client:

- Provides a **Query Interface** *that can be realized by what is already present on some other AXMEDIS tools, see Query Support in the Specification of database*
- Provides a **Query Results Interface** in a sophisticated manner allowing presenting:
  - o Metadata of the AXMEDIS objects in response of the query, the so called AXInfo
  - o A point/button for selecting the objects to be downloaded, for which the download has to start
- Provide a **Publishing Objects Interface** for receiving objects from another tool (for example from the AXMEDIS AXCP Egine) to be published on the P2P network and thus for posting the BitTorrent information file and/or making accessible the full version of the file for other peers.
  - o It provides a functionality via an FTP or WEB service or Plug-in to:
    - ▪ **publicationObject(URI);** publication of an object, its metadata have been already posted on the AXMEDIS P2P Query Service Server:
      - post/save the AXMEDIS object passed into the **Published Object area of the P2**P environment of the P2P client tool.
    - ▪ **BitTorrentInfo URI createPublicationObject(URI)**, publication of an object, its metadata have been already posted on the AXMEDIS P2P Query Service Server. This function service has three functionalities:
      - create the BitTorrent Information file and return it to the AXCP
      - post/save the AXMEDIS object passed into the **Published Object area of the P2**P environment of the P2P client tool.

        - Post the BitTorrent Information file into the Tracker Server of reference identified by the P2P Client Tool.
    - the P2P client tool uses a repository or a directory with the **Published Objects** which is the Published Object area of the P2P Client
    - The objects can also be published manually from the user interface of the AXEPTool. Probably in the P2P Client there is no distinct areas for the Downloaded objects and the objects published. In this case we have a simplification.
- Provide a **Monitoring Tools User Interface** for:
    - Observing the status of the plan to Downloaded files, % of completion, who is involved, download rate, etc.
    - Estimation of the time to completion
    - All the examples related to the Azureus Client have been depicted in the previous sections.
- Provides a **Monitoring Web Service** with the following functionalities:
    - **PubStatus monitorPublication()**, provides the current status of the objects which are in the **Published Object area of the P2**P environment. It returns a list if IDs, with the number of downloads for each segment, the so called PubStatus:
        - AXOID=45, 1(34), 2(345), ….. that means segment 1 has been downloaded 34 times.
        - AXOID=45225,
    - **AXOIDList getPublicationObjectsList()**, returns the ID of objects which are present in the directory of Published objects
    - **removePublicationObject(AXOID)**, deletes the object specified by the ID from the database/directory of Published objects. This is something that should not to be done in P2P systems, but when they are used for B2B the directory could reach the limit of their size and housekeeping is needed.
    - **DwnStatus monitorDownload()**, provides the current status of the downloading objects in the P2P environment. It returns a list if IDs with the current percentage of download, the so called DwnStatus:
        - AXOID=45, status 56%, estimated time to completion (if possible)
        - AXOID=45225, status 100% estimated time to completion (if possible)
    - **AXOIDList getDownloadObjectsList(),** returns the ID of objects in the directory of Downloaded objects
    - **download(AXOID)**, starts the download of the object specified by the AXOID in the P2P environment;
    - **abortDownload(AXOID)**, aborts/stops the download of the object specified by the ID.
    - **removeDownloadObject(AXOID),** deletes the object specified by the ID from the database/directory of Downloaded objects. This is something that should not to be done in P2P systems, but when they are used for B2B the directory could reach the limit of their size and housekeeping is needed.
    - **URI getObject(AXOID),** retrieves the object URI from which the downloaded at 100% object can be copied into the AXMEDIS database by the AXCP. This action will be performed by the AXCP directly accessing to that directory/uri.

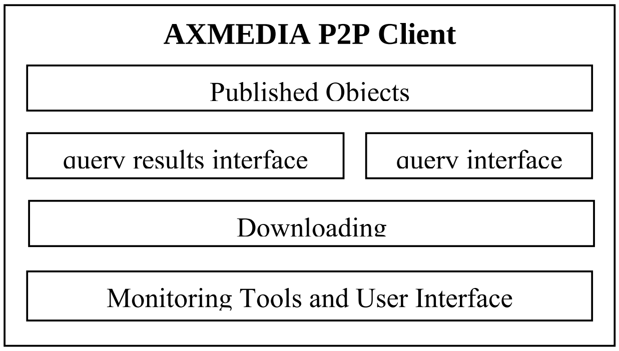
In the following sections the WSDL formalization of the above two web services are reported.

Integration into the AXMEDIS AXEPTool of:

- certification and authentication mechanisms of AXMEDIS to be sure that the AXEPTool is a certified and authorized tool and person.
- A module for estimating fingerprints of resources, connection to the AXCS to verify if the estimated FP correspond to the resource effectively contained in the digital object.

The P2P Clients can be both: AXEPTool and/or AXMEDIA P2P tools.

6.6 integration of P2P in AXMEDIA for C2C



The AXMEDIA tools presents:

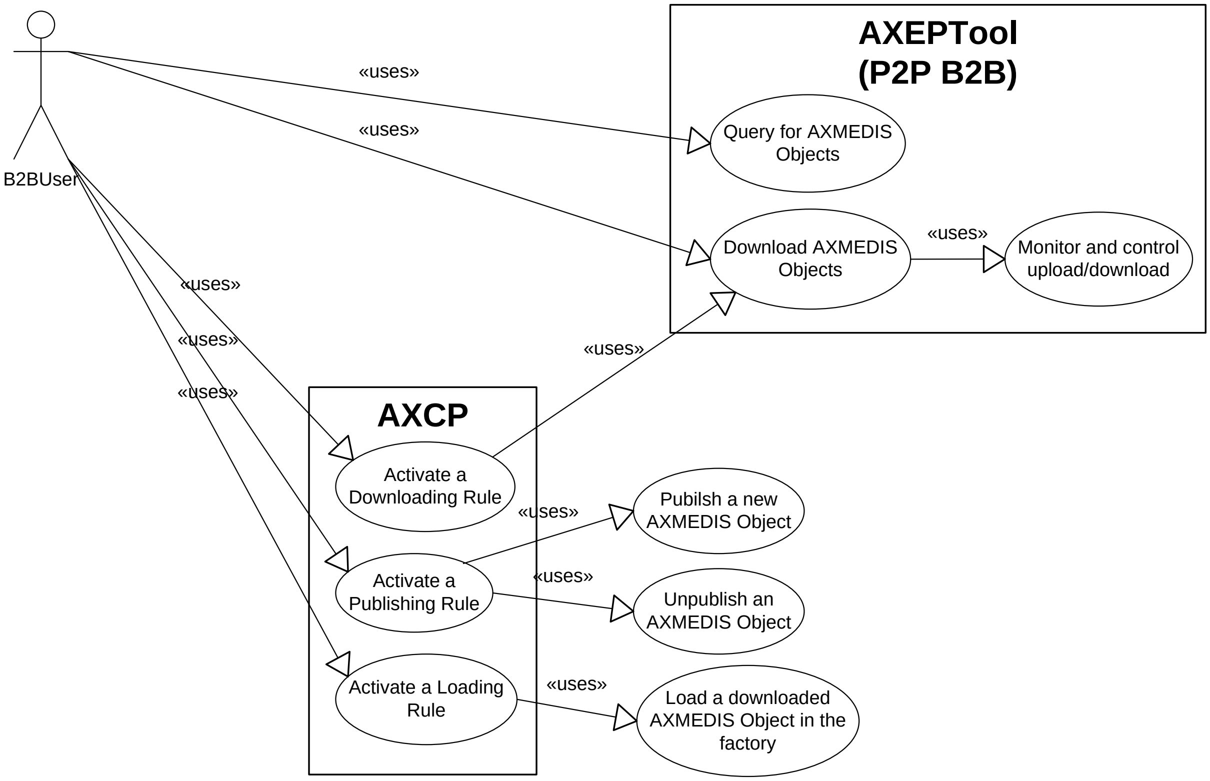
- a nicer user interface
- a simplified query user interface
- a simplified monitoring tool and user interface

7 Usage walk-through

In this section, the main use cases have been depicted in order to clarify functionalities to be exposed by AXEPTool (P2P B2B client).
In the following use-case diagram the main B2B user action have been included.

The use cases of main interest are those considered for AXEPTool:

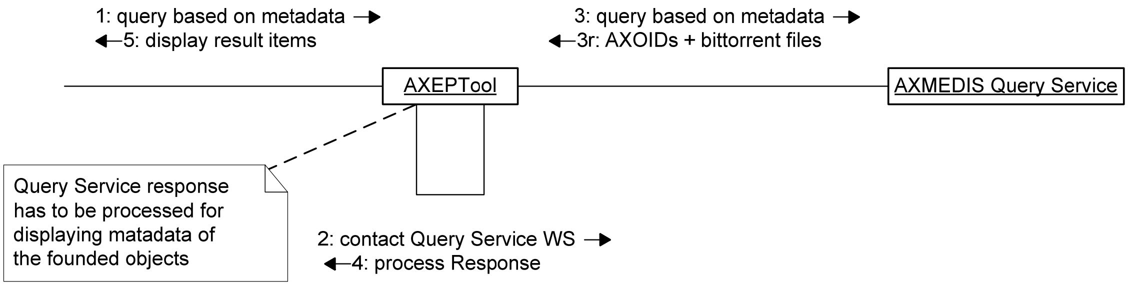
- The user can query for content directly on the client interface (even embedding a web-page rendering);
- The user can command to initiate the download process for a given query result; this use case include the typical action of monitoring and controlling the active downloading process.


AXEPTool
(P2P B2B)
B2BUser
«uses»
«uses»
Query for AXMEDIS Objects
Download AXMEDIS Objects
«uses»
Monitor and control upload/download
«uses»
«uses»
«uses»
«uses»
AXCP
Activate a Downloading Rule
Activate a Publishing Rule
Activate a Loading Rule
«uses»
Pubilsh a new AXMEDIS Object
«uses»
Unpublish an AXMEDIS Object
«uses»
Load a downloaded AXMEDIS Object in the factory

The other use cases are reported for two main reasons:

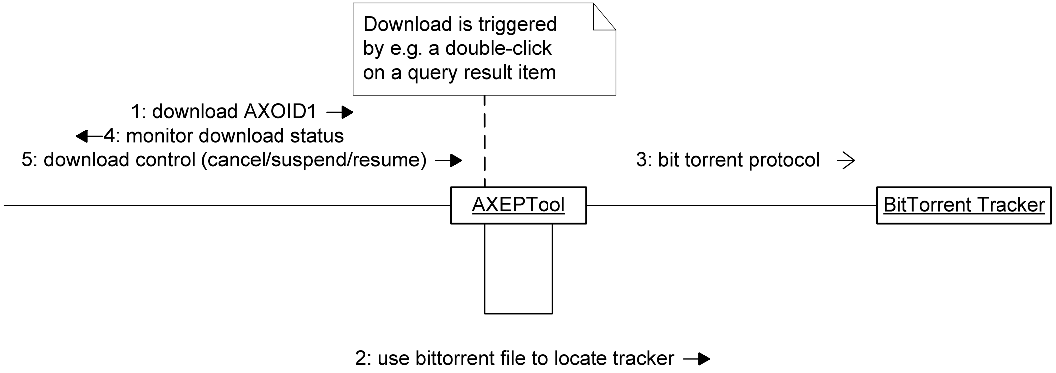
- The capability of controlling the AXEPTool (by a well-known WS interface) remotely. This action is particularly needed in B2B context since download processes can be managed in an automatic manner. This highlights that the downloading technology is reused, while it is accessed by a different way w.r.t. to the GUI.
- The role of the AXCP in completing the full P2P distribution life-cycle. A B2B user can actually create procedures for publish/unpublishing AXMEDIS objects by using scripting language. It can also "script" (i.e. program) what to import from the downloaded objects in the factory database for further usage.

In the following basic collaboration diagram are reported in order to show AXEPTool P2P client functionalities for query and download.


1: query based on metadata
5: display result items
3: query based on metadata
3r: AXOIDs + bittorrent files
AXEPTool
AXMEDIS Query Service
Query Service response has to be processed for displaying matadata of the founded objects
2: contact Query Service WS
4: process Response

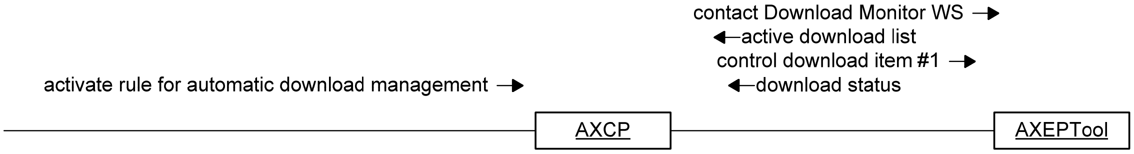
The first diagram shows the interaction between AXEPTool and AXMEDIS Query Service. The action is simply to redirect the user query to the Query Service collecting in the response information regarding the matching objects. The WS response is processed, since all the present metadata have to be attached to the query result items.

Please note that in the response also bittorrent metainfo files are returned.


Download is triggered by e.g. a double-click on a query result item
1: download AXOID1
4: monitor download status
5: download control (cancel/suspend/resume)
3: bit torrent protocol
AXEPTool
BitTorrent Tracker
2: use bittorrent file to locate tracker

In the second diagram the typical action, being consequent to a query, has been presented.

In fact the user can decide of starting the download of an object. In this case the interaction is based on bittorrent protocol established among AXEPTool and the interested BitTorrent Tracker.


contact Download Monitor WS
active download list
control download item #1
download status
activate rule for automatic download management
AXCP
AXEPTool

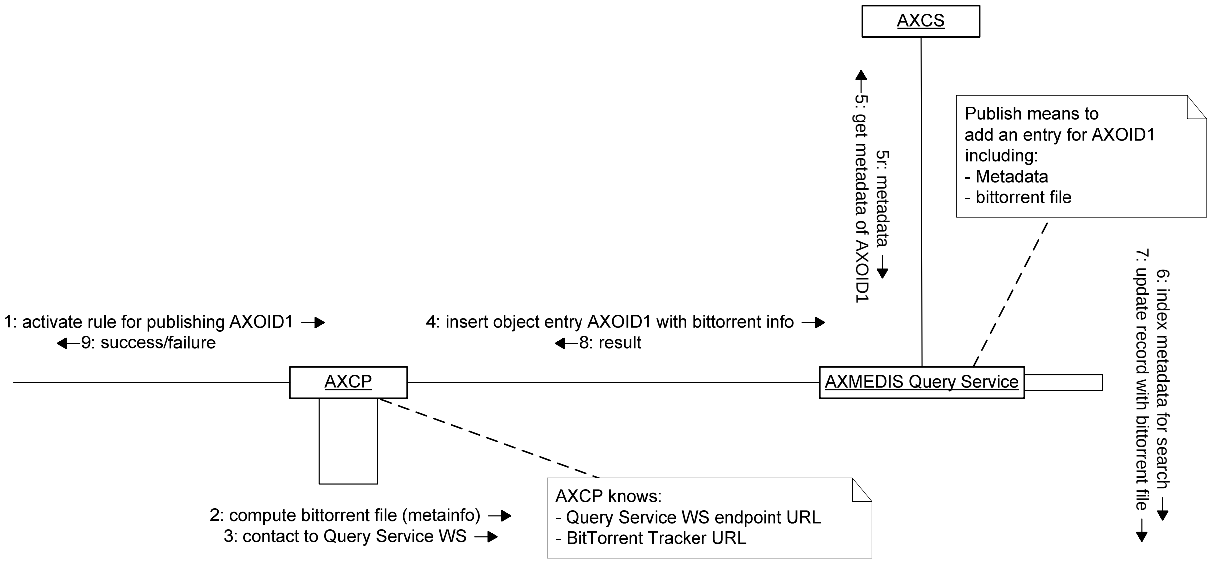
In the last diagram the AXCP is put as an intermediate in the AXEPTool control. In this case it allows the script function to operate as the user on the GUI (i.e. looking what is downloading and controlling those processes).

7.1.1 Usage walk-through for AXMEDIS Query Service and AXCP (EXITECH)

In this diagram a possible solution for avoiding posting of metadata by the B2B user is presented.

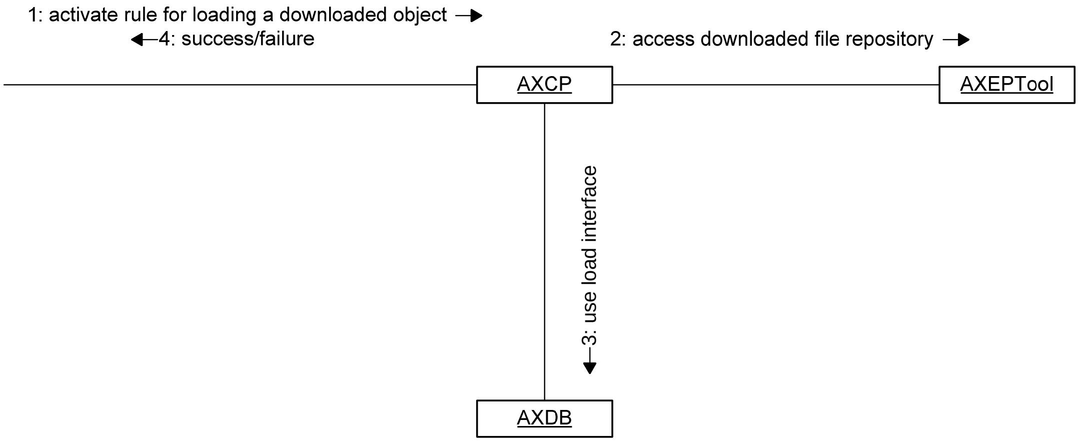
This solution can reuse the knowledge of the AXMEDIS infrastructure regarding an object metadata, since any object that can be distributed/published have been registered to AXCS (with metadata).

The solution of using the information located into the AXCS can be useful especially if the AXCS and the AXMEDIS P2P Query Service are located and maintained by the same organization. That can be AXMEDIS.ORG or by the channel distributor.


AXCS
5: get metadata of AXOID1
5r: metadata
Publish means to
add an entry for AXOID1
including:
- Metadata
- bittorrent file
6: index metadata for search
7: update record with bittorrent file
1: activate rule for publishing AXOID1
9: success/failure
4: insert object entry AXOID1 with bittorrent info
8: result
AXCP
AXMEDIS Query Service
2: compute bittorrent file (metainfo)
3: contact to Query Service WS
AXCP knows:
- Query Service WS endpoint URL
- BitTorrent Tracker URL

Please note that publishing task is totally carried out by AXCP and its functionalities of accessing WS. AXCP has also to compute bittorrent file.

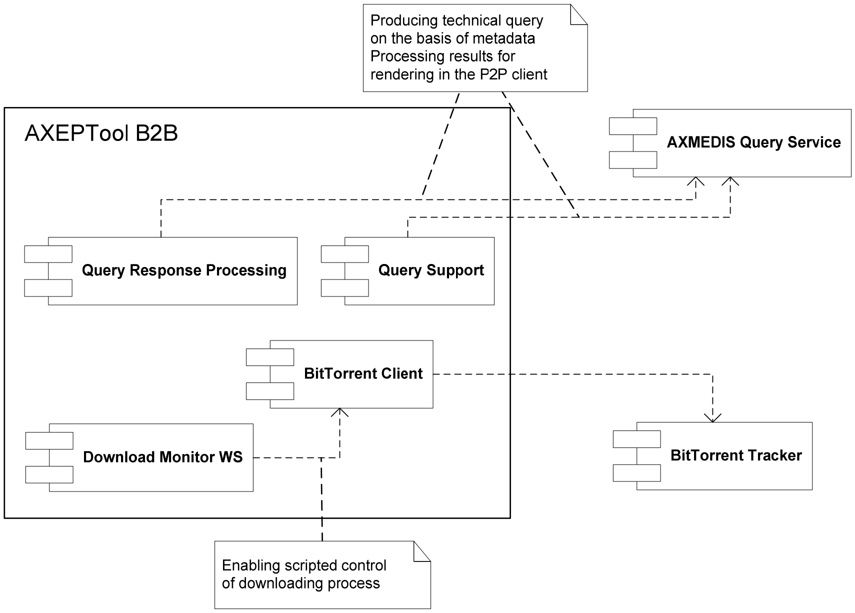
Another diagram has been produced to explain how import of newly downloaded object can be realized by only using AXCP functionality.
The latter has to access downloaded file repository of AXEPTool, and to use AXDB loading service.


1: activate rule for loading a downloaded object
4: success/failure
2: access downloaded file repository
AXCP
AXEPTool
3: use load interface
AXDB

7.2 Note on the AXEPTool implementation

The following diagram put in evidence the main parts of the P2P B2B client solution. The relationships have been depicted for indicating major dependencies.

Please note the separation among query and download functionalities and the capability of remotely control (via WS) the P2P client. Additional technology is needed to integrate query/response mechanism in the AXEPTool.



-

8 WSDL description of the Publishing Objects Interface

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2006 rel. 3 sp1 (http://www.altova.com) by Fabrizio Fioravanti (EXITECH) -->
<WSDL:definitions xmlns="http://schemas.xmlsoap.org/wsdl/"
xmlns:tns="http://www.axmedis.org/axeptool" xmlns:SOAP-
ENV="http://schemas.xmlsoap.org/soap/envelope/" xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:SOAP="http://schemas.xmlsoap.org/wsdl/soap/"
xmlns:MIME="http://schemas.xmlsoap.org/wsdl/mime/"
xmlns:DIME="http://schemas.xmlsoap.org/ws/2002/04/dime/wsdl/"
xmlns:WSDL="http://schemas.xmlsoap.org/wsdl/" targetNamespace="http://www.axmedis.org/axeptool"
name="axeptool">
    <WSDL:types>
        <schema xmlns="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://www.axmedis.org/axeptool" elementFormDefault="qualified"
attributeFormDefault="unqualified">
            <import namespace="http://schemas.xmlsoap.org/soap/encoding/"/>
            <element name="resultURI">
                <complexType>
                    <xsd:annotation>
                        <xsd:documentation>result URI with errorCode</xsd:documentation>
                    </xsd:annotation>
                    <sequence>
                        <element name="result" type="xsd:int" minOccurs="1" maxOccurs="1"/>
                        <element name="uri" type="xsd:anyURI" minOccurs="0" maxOccurs="1"/>
                    </sequence>
                </complexType>
            </element>
            <element name="int" type="xsd:int"/>
            <element name="uri" type="xsd:anyURI"/>
        </schema>
    </WSDL:types>
    <WSDL:message name="publicationObjectRequest">
        <part name="sourceURI" element="tns:uri"/>
    </WSDL:message>
    <WSDL:message name="publicationObjectResponse">
        <part name="result" element="tns:int"/>
    </WSDL:message>
    <WSDL:message name="createPublicationObjectResponse">
        <part name="resultUri" element="tns:resultURI"/>
    </WSDL:message>
    <WSDL:message name="createPublicationObjectRequest">
        <WSDL:part name="sourceURI" element="tns:uri"/>
    </WSDL:message>
    <WSDL:portType name="axeptoolSoap">
        <operation name="publicationObject">
            <input message="tns:publicationObjectRequest"/>
            <output message="tns:publicationObjectResponse"/>
        </operation>
        <operation name="createPublicationObject">
            <input message="tns:createPublicationObjectRequest"/>
```

```
                <output message="tns:createPublicationObjectResponse"/>
            </operation>
        </WSDL:portType>
        <WSDL:binding name="axeptoolSoap" type="tns:axeptoolSoap">
            <SOAP:binding style="document" transport="http://schemas.xmlsoap.org/soap/http"/>
            <SOAP:binding style="document" transport="http://schemas.xmlsoap.org/soap/http"/>
            <WSDL:operation name="publicationObject">
                <input>
                    <SOAP:body use="literal"/>
                </input>
                <output>
                    <SOAP:body use="literal"/>
                </output>
            </WSDL:operation>
            <WSDL:operation name="createPublicationObject">
                <input>
                    <SOAP:body use="literal"/>
                </input>
                <output>
                    <SOAP:body use="literal"/>
                </output>
            </WSDL:operation>
        </WSDL:binding>
        <WSDL:service name="axeptool">
            <WSDL:port name="axeptoolSoap" binding="tns:axeptoolSoap">
                <SOAP:address location="http://www.axmedis.org/axeptool"/>
            </WSDL:port>
        </WSDL:service>
</WSDL:definitions>
```

9 WSDL description of the Monitoring Web Service

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2006 rel. 3 sp1 (http://www.altova.com) by Fabrizio Fioravanti (EXITECH) -->
<WSDL:definitions                                   xmlns="http://schemas.xmlsoap.org/wsdl/"
xmlns:tns="http://www.axmedis.org/axeptool"                                          xmlns:SOAP-
ENV="http://schemas.xmlsoap.org/soap/envelope/"                                      xmlns:SOAP-
ENC="http://schemas.xmlsoap.org/soap/encoding/"      xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance"                                          xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:SOAP="http://schemas.xmlsoap.org/wsdl/soap/"
xmlns:MIME="http://schemas.xmlsoap.org/wsdl/mime/"
xmlns:DIME="http://schemas.xmlsoap.org/ws/2002/04/dime/wsdl/"
xmlns:WSDL="http://schemas.xmlsoap.org/wsdl/"     targetNamespace="http://www.axmedis.org/axeptool"
name="axeptool">
        <WSDL:types>
            <schema                                 xmlns="http://www.w3.org/2001/XMLSchema"
xmlns:tns="http://www.axmedis.org/axeptool"       targetNamespace="http://www.axmedis.org/axeptool"
elementFormDefault="qualified" attributeFormDefault="qualified">
                <import namespace="http://schemas.xmlsoap.org/soap/encoding/"/>
                <xsd:element name="pubStatus">
                    <xsd:complexType>
                        <xsd:sequence>
            <xsd:element name="result" type="xsd:int"/>
            <xsd:element name="axoidStatus" minOccurs="0" maxOccurs="unbounded">
              <xsd:complexType>
                <xsd:sequence>
                  <xsd:element name="axoid" type="xsd:string"/>
                  <xsd:element name="data" minOccurs="0"
maxOccurs="unbounded">
                    <xsd:complexType>
                      <xsd:sequence>
                        <xsd:element name="partNumber"/>
                        <xsd:element name="downloadNumber"/>
                      </xsd:sequence>
                    </xsd:complexType>
                  </xsd:element>
                </xsd:sequence>
              </xsd:complexType>
            </xsd:element>
          </xsd:sequence>
        </xsd:complexType>
      </xsd:element>
      <xsd:element name="resultURI">
        <xsd:complexType>
          <xsd:sequence>
            <xsd:element name="result" type="xsd:int" minOccurs="1" maxOccurs="1"/>
            <xsd:element name="uri" type="xsd:anyURI" minOccurs="0"
maxOccurs="1"/>
          </xsd:sequence>
        </xsd:complexType>
      </xsd:element>
      <xsd:element name="axoidList">
        <xsd:complexType>
          <xsd:sequence>
            <xsd:element name="result" type="xsd:int"/>
            <xsd:element name="axoid" type="xsd:string" minOccurs="0"
maxOccurs="unbounded"/>
          </xsd:sequence>
        </xsd:complexType>
      </xsd:element>
      <xsd:element name="downloadStatus">
        <xsd:complexType>
          <xsd:sequence>
            <xsd:element name="result" type="xsd:int"/>
            <xsd:element name="axoidStatus" minOccurs="0" maxOccurs="unbounded">
              <xsd:complexType>
                <xsd:sequence>
                  <xsd:element name="axoid" type="xsd:string"/>
                  <xsd:element name="downloadPercentage" type="xsd:float"/>
                  <xsd:element name="estimateTime" type="xsd:float"
minOccurs="0"/>
                </xsd:sequence>
              </xsd:complexType>
            </xsd:element>
          </xsd:sequence>
        </xsd:complexType>
      </xsd:element>
```

```
            <element name="int" type="xsd:int"/>
            <element name="uri" type="xsd:anyURI"/>
            <element name="string" type="xsd:string"/>
        </schema>
    </WSDL:types>
    <WSDL:message name="monitorPublicationResponse">
        <WSDL:part name="parameter" element="tns:pubStatus"/>
    </WSDL:message>
    <WSDL:message name="getPublicationObjectsListResponse">
        <WSDL:part name="resultList" element="tns:axoidList"/>
    </WSDL:message>
    <WSDL:message name="removePublicationObjectRequest">
        <WSDL:part name="axoid" element="tns:string"/>
    </WSDL:message>
    <WSDL:message name="removePublicationObjectResponse">
        <WSDL:part name="result" element="tns:int"/>
    </WSDL:message>
    <WSDL:message name="monitorDownloadResponse">
        <WSDL:part name="status" element="tns:downloadStatus"/>
    </WSDL:message>
    <WSDL:message name="getDownloadObjectsListResponse">
        <WSDL:part name="axoidList" element="tns:axoidList"/>
    </WSDL:message>
    <WSDL:message name="downloadRequest">
        <WSDL:part name="axoid" element="tns:string"/>
    </WSDL:message>
    <WSDL:message name="downloadResponse">
        <WSDL:part name="result" element="tns:int"/>
    </WSDL:message>
    <WSDL:message name="abortDownloadRequest">
        <WSDL:part name="axoid" element="tns:string"/>
    </WSDL:message>
    <WSDL:message name="abortDownloadResponse">
        <WSDL:part name="result" element="tns:int"/>
    </WSDL:message>
    <WSDL:message name="removeDownloadObjectRequest">
        <WSDL:part name="axoid" element="tns:string"/>
    </WSDL:message>
    <WSDL:message name="removeDownloadObjectResponse">
        <WSDL:part name="result" element="tns:int"/>
    </WSDL:message>
    <WSDL:message name="getObjectRequest">
        <WSDL:part name="axoid" element="tns:string"/>
    </WSDL:message>
    <WSDL:message name="getObjectResponse">
        <WSDL:part name="resultUri" element="tns:resultURI"/>
    </WSDL:message>
    <WSDL:message name="empty"/>
    <WSDL:portType name="axeptoolMonitorSoap">
        <WSDL:operation name="monitorPublication">
            <WSDL:input message="tns:empty"/>
            <output message="tns:monitorPublicationResponse"/>
        </WSDL:operation>
        <WSDL:operation name="getPublicationObjectsList">
            <WSDL:input message="tns:empty"/>
            <output message="tns:getPublicationObjectsListResponse"/>
        </WSDL:operation>
        <WSDL:operation name="removePublicationObject">
            <input message="tns:removePublicationObjectRequest"/>
            <output message="tns:removePublicationObjectResponse"/>
        </WSDL:operation>
        <WSDL:operation name="monitorDownload">
            <WSDL:input message="tns:empty"/>
            <output message="tns:monitorDownloadResponse"/>
        </WSDL:operation>
        <WSDL:operation name="getDownloadObjectsList">
            <WSDL:input message="tns:empty"/>
            <output message="tns:getDownloadObjectsListResponse"/>
        </WSDL:operation>
        <WSDL:operation name="download">
            <input message="tns:downloadRequest"/>
            <output message="tns:downloadResponse"/>
        </WSDL:operation>
        <WSDL:operation name="abortDownload">
            <input message="tns:abortDownloadRequest"/>
            <output message="tns:abortDownloadResponse"/>
        </WSDL:operation>
        <WSDL:operation name="removeDownloadObject">
            <input message="tns:removeDownloadObjectRequest"/>
            <output message="tns:removeDownloadObjectResponse"/>
        </WSDL:operation>
        <WSDL:operation name="getObject">
            <input message="tns:getObjectRequest"/>
            <output message="tns:getObjectResponse"/>
        </WSDL:operation>
    </WSDL:portType>
    <WSDL:binding name="axeptoolMonitorSoap" type="tns:axeptoolMonitorSoap">
        <SOAP:binding style="document" transport="http://schemas.xmlsoap.org/soap/http"/>
        <WSDL:operation name="monitorPublication">
            <SOAP:operation soapAction="urn:#monitorPublication"/>
            <output>
                <SOAP:body use="literal"/>
            </output>
            <input>
                <SOAP:body use="literal"/>
            </input>
        </WSDL:operation>
        <WSDL:operation name="getPublicationObjectsList">
            <SOAP:operation soapAction="urn:#getPublicationObjectsList"/>
            <output>
                <SOAP:body use="literal"/>
            </output>
            <input>
                <SOAP:body use="literal"/>
            </input>
        </WSDL:operation>
        <WSDL:operation name="removePublicationObject">
            <SOAP:operation soapAction="urn:#removePublicationObject"/>
            <input>
                <SOAP:body use="literal"/>
            </input>
            <output>
                <SOAP:body use="literal"/>
            </output>
        </WSDL:operation>
        <WSDL:operation name="monitorDownload">
            <SOAP:operation soapAction="urn:#monitorDownload"/>
            <output>
                <SOAP:body use="literal"/>
            </output>
            <input>
                <SOAP:body use="literal"/>
            </input>
        </WSDL:operation>
        <WSDL:operation name="getDownloadObjectsList">
            <SOAP:operation soapAction="urn:#getDownloadObjectsList"/>
            <output>
                <SOAP:body use="literal"/>
            </output>
            <input>
                <SOAP:body use="literal"/>
            </input>
        </WSDL:operation>
        <WSDL:operation name="download">
            <SOAP:operation soapAction="urn:#download"/>
            <input>
                <SOAP:body use="literal"/>
            </input>
            <output>
                <SOAP:body use="literal"/>
            </output>
        </WSDL:operation>
        <WSDL:operation name="abortDownload">
            <SOAP:operation soapAction="urn:#abortDownload"/>
            <input>
                <SOAP:body use="literal"/>
            </input>
            <output>
                <SOAP:body use="literal"/>
            </output>
        </WSDL:operation>
        <WSDL:operation name="removeDownloadObject">
            <SOAP:operation soapAction="urn:#removeDownloadObject"/>
            <input>
                <SOAP:body use="literal"/>
            </input>
            <output>
                <SOAP:body use="literal"/>
            </output>
        </WSDL:operation>
        <WSDL:operation name="getObject">
            <SOAP:operation soapAction="urn:#getObject"/>
            <input>
                <SOAP:body use="literal"/>
            </input>
            <output>
                <SOAP:body use="literal"/>
            </output>
        </WSDL:operation>
    </WSDL:binding>
    <WSDL:service name="axeptoolMonitor">
        <WSDL:port name="axeptoolMonitorSoap" binding="tns:axeptoolMonitorSoap">
            <SOAP:address location="http://www.axmedis.org/axeptool"/>
        </WSDL:port>
    </WSDL:service>
</WSDL:definitions>
```

10 Major Components and Related Work

A Company will provide a customisation of the BitTorrent P2P environment and tools for the usage and integrated with AXMEDIS framework for content sharing on PC. The work has been described in the deliverable DE3.1.2.2.10 and consists of the following major activities:

- Development of the AXMEDIS P2P Query Service Server
  - AXMEDIS Query WEB Portal (EXITECH)
  - AXMEDIS Query WEB Service, for queries (EXITECH)
  - Interconnection of different AXMEDIS P2P Query Service Servers
- Customisation of a BitTorrent P2P Client (probably Azureus) to play the role of AXEPTool in the AXMEDIS Framework and thus:
  - Realization and integration of a **Publication Object Interface** Module to automatize the posting of AXMEDIS objects into the P2P network, and related documentation.
  - Realization and integration of a **Monitoring Web Service and tool Module** to control the status of the downloads and taking the AXMEDIS object from the P2P network in connection with the AXCP GRID, and related documentation.
  - Integration of the **Query Interface** towards the AXMEDIS P2P Query Service and Query Support into the P2P client, and related documentation.
  - Allowing to control the access of non AXMEDIS objects into the P2P network, enabling them or excluding them.
  - Certification/verification of objects, some tools are already available in AXMEDIS, some functionalities are already present in the Azureus client.
  - Registration and Authentication of users (FUPF, DSI)
  - Verification and Authentication of tools (FUPF, DSI)
- Customisation of a BitTorrent P2P Client (probably Azureus) to play the role of AXMEDIA in the AXMEDIS Framework and thus:
  - Integration of the **Query Interface t**owards the AXMEDIS P2P Query Service with simple interface for final users.
  - Realisation of a nice and appealing/simplified user interface to access at P2P data.
- Customisation of the a BitTorrent Tracker Server to serve the P2P B2B and B2C network for content distribution in AXMEDIS:
  - Allowing to control the access of non AXMEDIS objects into the P2P network, enabling them or excluding them.
  - Realisation of an interface to access at the statistical information via Web Service, and related documentation.
- Set up, test and deployments of the above tools and components plus the whole P2P environment in collaboration with other AXMEDIS partners:
  - Set up and deploy of some instances for the serves and many instances for the clients.
  - Testing the whole solution in presence of significant workload, and related documentation and in connection with the other related AXMEDIS tools.
  - For the above mentioned AXMEDIA and AXEPTool P2P clients simple packages to allow their easy installation will be also provided.

Since some partners of the AXMEDIS consortium will work on the same tools (for the protection aspects and for the integration aspects), a support for their usage and adaptation of the P2P Environment will be also provided by subcontractor to the AXMEDIS consortium. The above mentioned tools will be derived from Open Source code and the source code of the derived tools will be posted into the AXMEDIS Framework repository. The issues related to the IPR of the subcontractor are discussed in a separate document in attach to the Consortium Agreement.

Trial, as:

- Set up and Installation of visible and accessible AXMEDIS P2P Query Service Servers
- Set up and Installation of visible and accessible .bitTorrent Tracker Servers
- Putting accessible for download AXEPTool clients

- Putting accessible for download AXMEDIA clients

Tests to be done:

- The possibility of using the P2P of AXMEDIA tools for the sharing of file for the AXEPTool for P2P B2B
- The possibility of allowing or not the sharing on the same community both AXMEDIS and other files in other formats. A clear mark has to be presented on the results of the query to put in evidence which are the AXMEDIS file with respect to those that are single resources…or that in any are not AXMEDIS file.

Modules to be implemented in a second phase

- Integration of different Tracker for one AXMEDIS Query Service Server
- Migration of information from one Tracker to others
- Statistic reports from the tracker

11 Some references:

- AXMEDIS for All document
  - http://www.axmedis.org/documenti/view_documenti.php?doc_id=1728
- Requirements document, The specific requirements are from page 66 to 70 of document http://www.axmedis.org/documenti/view_documenti.php?doc_id=1712
- Use cases document, The Use cases are from page 93 to 102 of document: http://www.axmedis.org/documenti/view_documenti.php?doc_id=1824