Automating Production of Cross Media Content for Multi-channel Distribution
www.AXMEDIS.org

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AXMEDIA / AXEPTOOL and AXTRACK User Manuals

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Abstract: This document contains the manual of AXEPTool and AXTRACKER the major components of the P2P network of AXMEDIS.

Keyword List: P2P, content sharing, content upload.

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- You can become affiliated with AXMEDIS. This will give you the access to a huge amount of knowledge, information and source code related to the AXMEDIS Framework. If you are interested please contact P. Nesi at nesi@dsi.unifi.it. Once affiliated with AXMEDIS you will have the possibility of using the AXMEDIS specification and technology for your business.
- You can contribute to the improvement of AXMEDIS documents and specification by sending the contribution to P. Nesi at nesi@dsi.unifi.it
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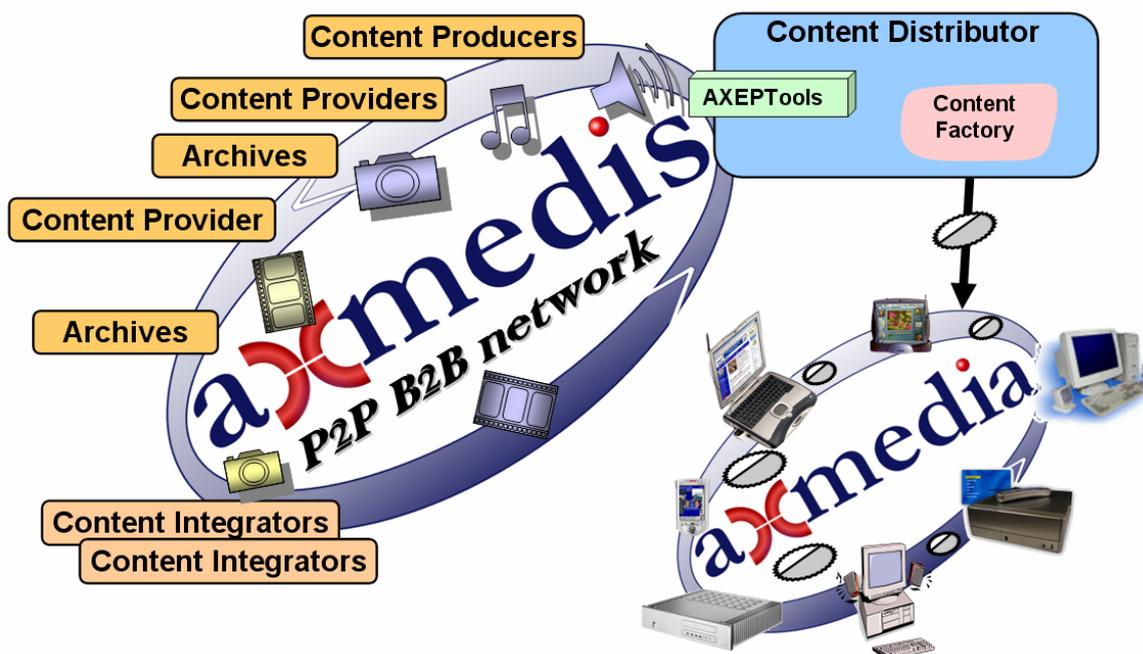
Table of Contents

1 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;
  - o automating the download and publishing of content;
  - o 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:
  - o automatic update of published content in the P2P network;
  - o automatic download of updated content in other peers of the P2P network;
  - o eventual usage of the C2C network for distributing content even among B2B users
- reduction of costs for content promotion;
  - o allowing the sharing of promotional content
- reduction of costs for content search and acquisition:

o possibility of making queries on the all connected content factories and these queries also include: classification, identification, technical descriptors of content and licensing information;

o access to content coming from all the other connected business partners endowed by an AXEPTools.
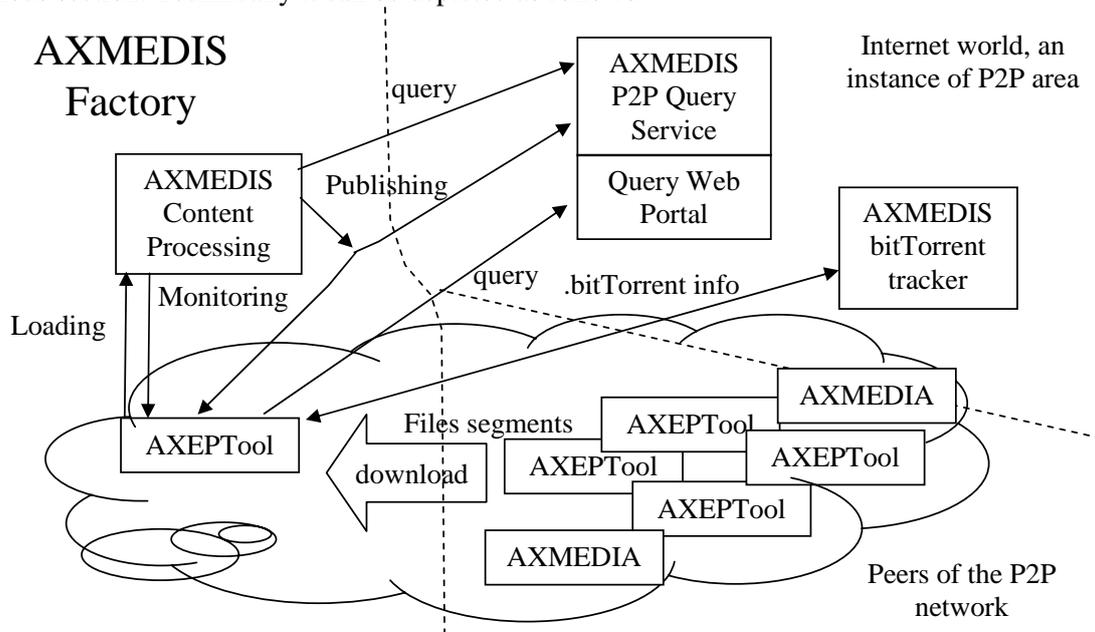
Some Distributors are interested in exploiting AXMEDIS technology to set up a legal P2P service for content distribution among their users. This solution has to be realized by using the **AXMEDIA** tool as a Peer tool of a P2P network. It is a P2P tool for distributing and sharing AXMEDIS content among 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

2   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**, 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**: a server located to cover a P2P community in which the database of metadata are located and indexed to recover AXOIDs which are at disposal for P2P download. 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 in 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. The AXMEDIS Content has to be treated in a different manner w.r.t. traditional media, so in the bittorrent info the AXOID of the Object has to be added in the custom information.
- **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.
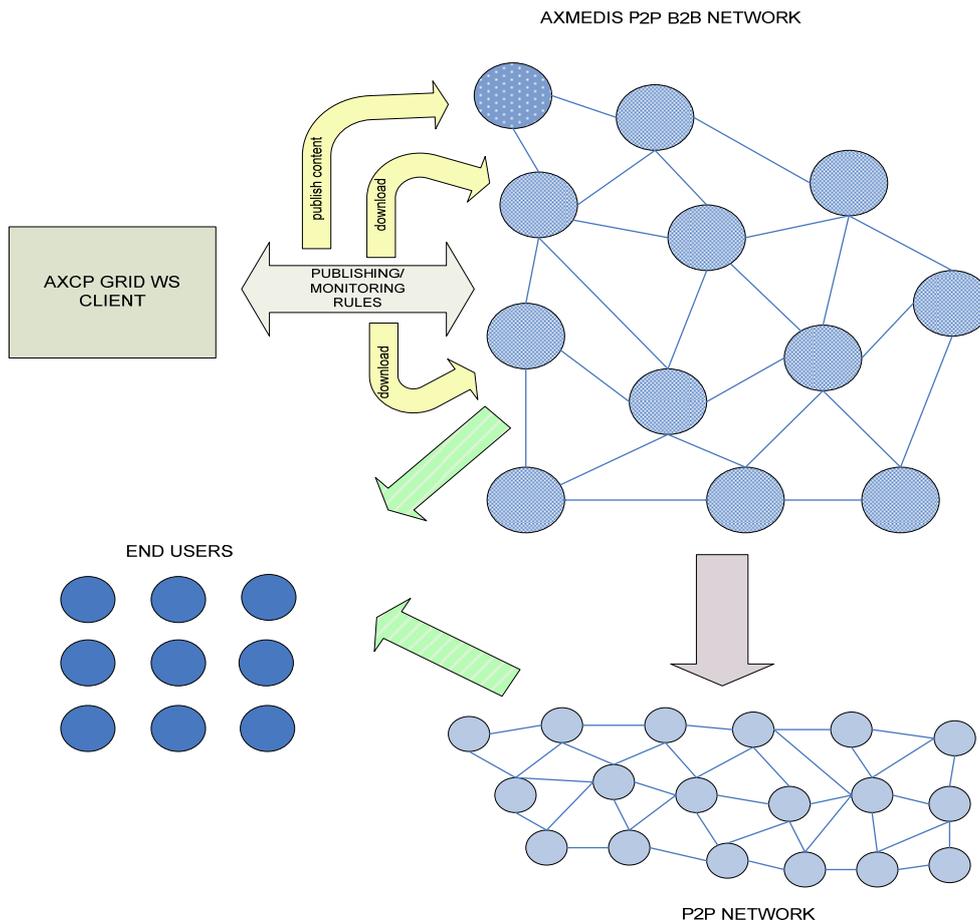
3   Controlling the B2B P2P

AXMEDIS P2P Network can be controlled and monitored through the use of an AXCP GRID which is a set of general purpose or specialized computers to execute AXCP Rules governed by the AXCP Rule Scheduler.

The distributor may choose to publish an object on the AXMEDIS P2P Network by definition of rules with the AXMEDIS Rule Editor. Each rule is written with a simple AXCP script for content production and distribution, which is an extension of Javascript: see

- http://www.axmedis.org/documenti/view_documenti.php?doc_id=1728 for the full view of AXMEDIS and for a view of the script language
- http://www.axmedis.org/documenti/view_documenti.php?doc_id=2855, and
- for details about tools http://www.axmedis.org/documenti/view_documenti.php?doc_id=2857

Each node of the AXMEDIS P2P Network can be instructed to perform download of specified objects so to achieve a fast dissemination of contents in a coordinate way, in order to reduce download time for end users accessing new published contents. The control of the B2B AXMEDIS P2P Network is performed by an AXCP Grid client, since each AXEPTool integrates a WebService listening for incoming publishing/monitoring requests. Each node can be instructed to start/stop a download or to publish an object for P2P sharing with others nodes of the network. The result should be in a fast seeding of the P2P network and thus higher performance in downloading since the beginning and with a low number of peers.
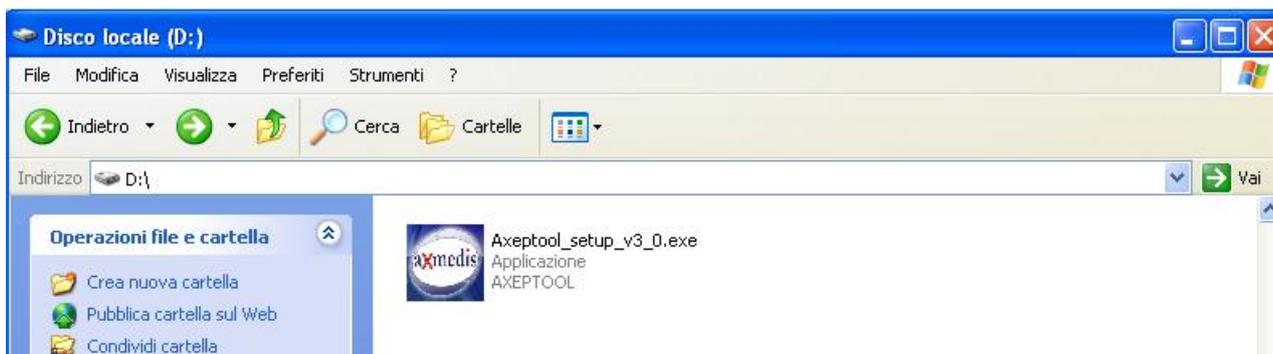
AXMEDIS P2P B2B NETWORK

END USERS

P2P NETWORK

4   Installation Manual

The AXEPTool and AXMEDIA can be installed on a wide variety of systems including most Unix and Linux based systems and Windows. Unix users must build from the source and install by hand. For windows users, an installation program has been developped.

The installation procedure is straithforward, when you double click on the installer executable, you'll be greeted with a wizard, providing you a step-by-step installation procedure. Both installers for AXEPTool and AXMEDIA work exactly in the same way. So these instructions apply for both products.
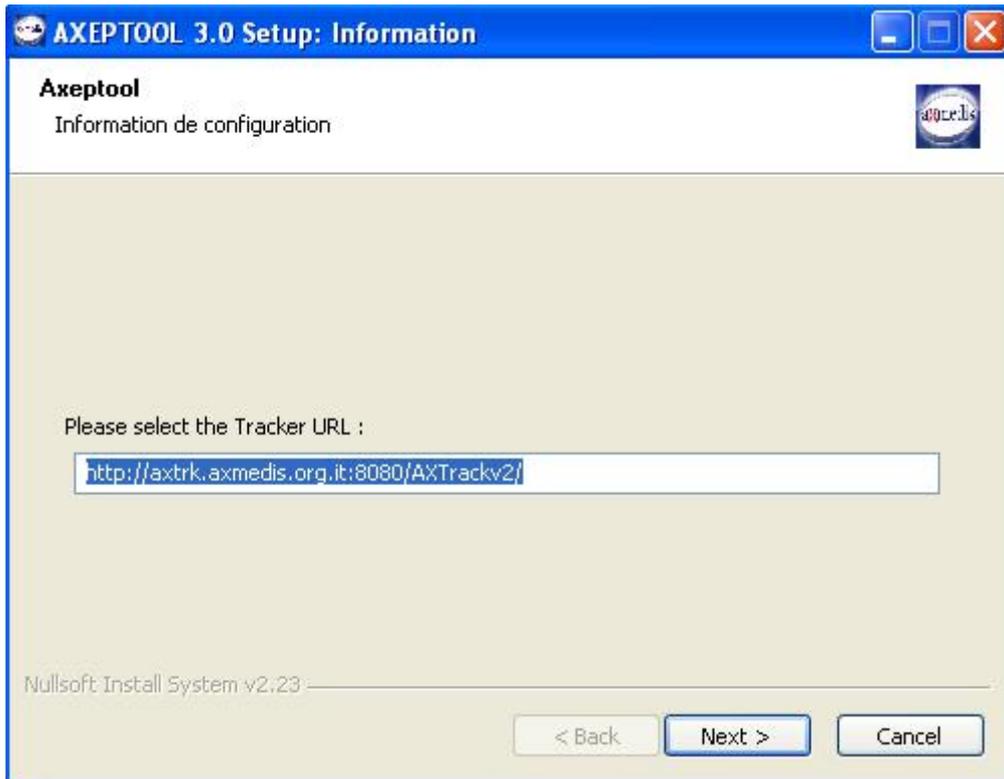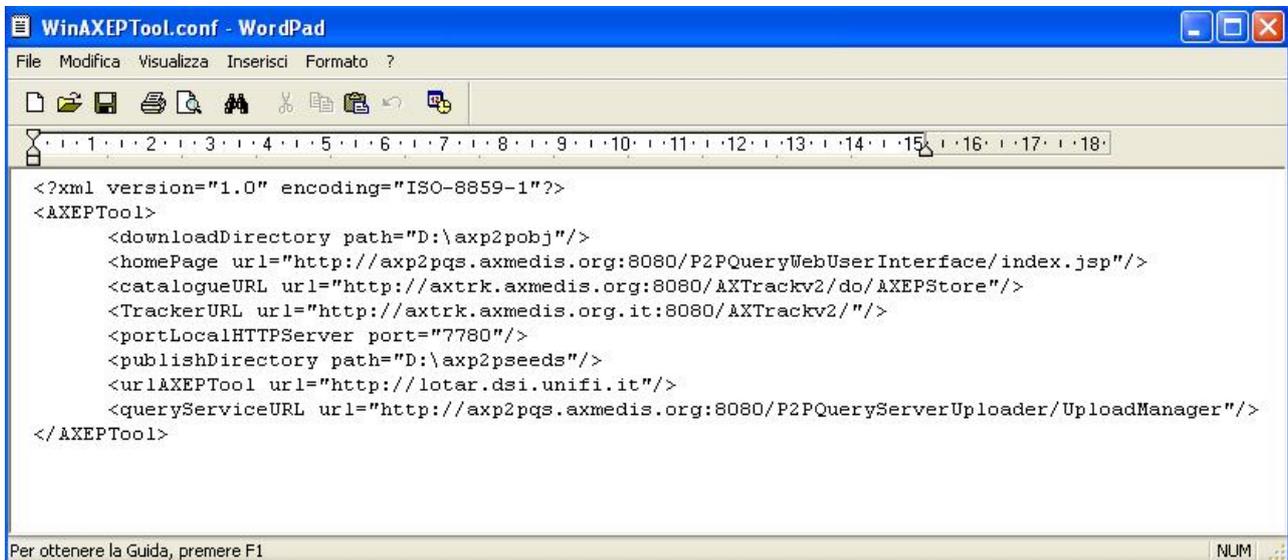
Double-click on the AXEPTool installer:

and proceed with the installation:

You can change the default installation path if you want, but you don't have to modify the default Tracker URL:

Once installed, you can customize which folders to use for the objects you want to publish or download by opening with your preferred editor the WinAXEPTool.conf file. You can find it in the AXEPTool installation directory.

If you want to change the Download Directory (you can do this either from the AXEPTool Settings) you have to edit the line:

<div align="center">

<downloadDirectory path="D:\axp2pobj"/>

</div>

Note that if you choose an non existent folder the AXEPTool will use a default directory for downloaded objects:

%your installation path%\AXEPTOOL\Download

and a default directory for published objects:

%your installation path%\AXEPTOOL\Seeds

Then you have to change this line in the WinAXEPTool.conf:

<urlAXEPTool url="http://lotar.dsi.unifi.it"/>

replacing the URL there with your own AXEPTool URL (public IP). Once done you can save the updated configuration file and start AXEPTool.

If you have a firewall installed on your PC, remember to allow this application in the firewall rules. If you have Windows Firewall enabled, you have to allow the Java Virtual Machine in the Firewall Exceptions. Confirm to unlock it:

Note that AXEPTool uses BitTorrent protocol to establish communications between the peers.

BitTorrent by default uses ports in the range of `6881-6889`. These are all TCP ports. The client starts with the lowest port in the range and sequentially tries higher ports until it can find one to which it can bind. This means that the first client you open will bind to 6881, the next to 6882, etc. Therefore, you only really need to open as many ports as simultaneous BitTorrent clients you would ever have open. For most people it's sufficient to open 6881-6889. Some recent BitTorrent implementations use DHT (Distributed hash tables), that is a dencentralized hash system allowing each node of the network to keep track of other connected peers. So, even without a tracker, the swarm can continue to work. For DHT purposes UDP protocol is used.

So, if you are using NAT you have to forward TCP ports 6881-6889 in your router (at least one of them, say TCP 6881) to your local IP address. You must open UDP protocol too on that port. Be sure to make a correspondent rule in the firewall to allow incoming connections on the ports you opened (you can customize your incoming TCP port range from AXEPTool settings too).

AXEPTool uses TCP port 7780 for grid purposes, since it integrates two different webservices for publishing objects and monitoring their status through the use of a remote client. Open and forward this port too.

PLEASE KEEP OPEN YOUR AXEPTOOL ONCE YOU FINISH YOUR DOWNLOAD AND DON'T DELETE YOUR DOWNLOADED OBJECTS FROM YOUR DISK.

5   Running the AXEPTool / AXMEDIA

The AXEPTool icon or AXMEDIA icon should be present on your desktop at this point. Double click to start the application. The main window should display itself. On the top-right of the windows, you can see the URL of the tracker to which this AXEPTool is connected. If it is not correct you can change it by going in the settings menu.

AXMEDIA is mainly a stripped down version of AXEPTool. As a result, instructions for using both product are the same. In the following documentation we will only indicate when a feature is AXEPTool specific.

The user interface is easy to use. It consist of a main browser (similar to a web browser) which allows you to browse the Axmedis network and ask for file downloads.

This browser window is using tabbed browsing (like Mozilla Firefox or Internet Explorer 7) and you can navigate between tabs in the same way. There are four tabs :

- **The home page tab :** *This can be used to greet the user, ask for login credentials or any other similar activity. This is the first pane that will be displayed when you open the application. Network designers can customize this page by changing the AXEPTool.conf configuration file.*
- **The search tab :** *This tabs points to the location of an Axmedis Query Server (or any other online software supposed to provide search capabilities on the Axmedis network). Use it to search content on Axmedis network.*
- **The catalogue tab :** *This is a link to a catalogue allowing users to browse a commercial like store. Use it to discover the files available on the Axmedis network and start a download. The AXTrack tracker provides such a catalogue but it is limited in functionality. However, network designers can implement a catalogue suited to their needs and modify the configuration file.*
- **The downloads tab :** *Use this tab to monitor the progress of your downloads, start, stop and resume them.*

Above the browser, the usual « Previous » and « Next » button retains their usual meaning in a browser.

You can close tabs if you will (with the close button on the right of the tab's name) and you will be able to reopen the tabs with the AXEPTool menu on the left of the window.
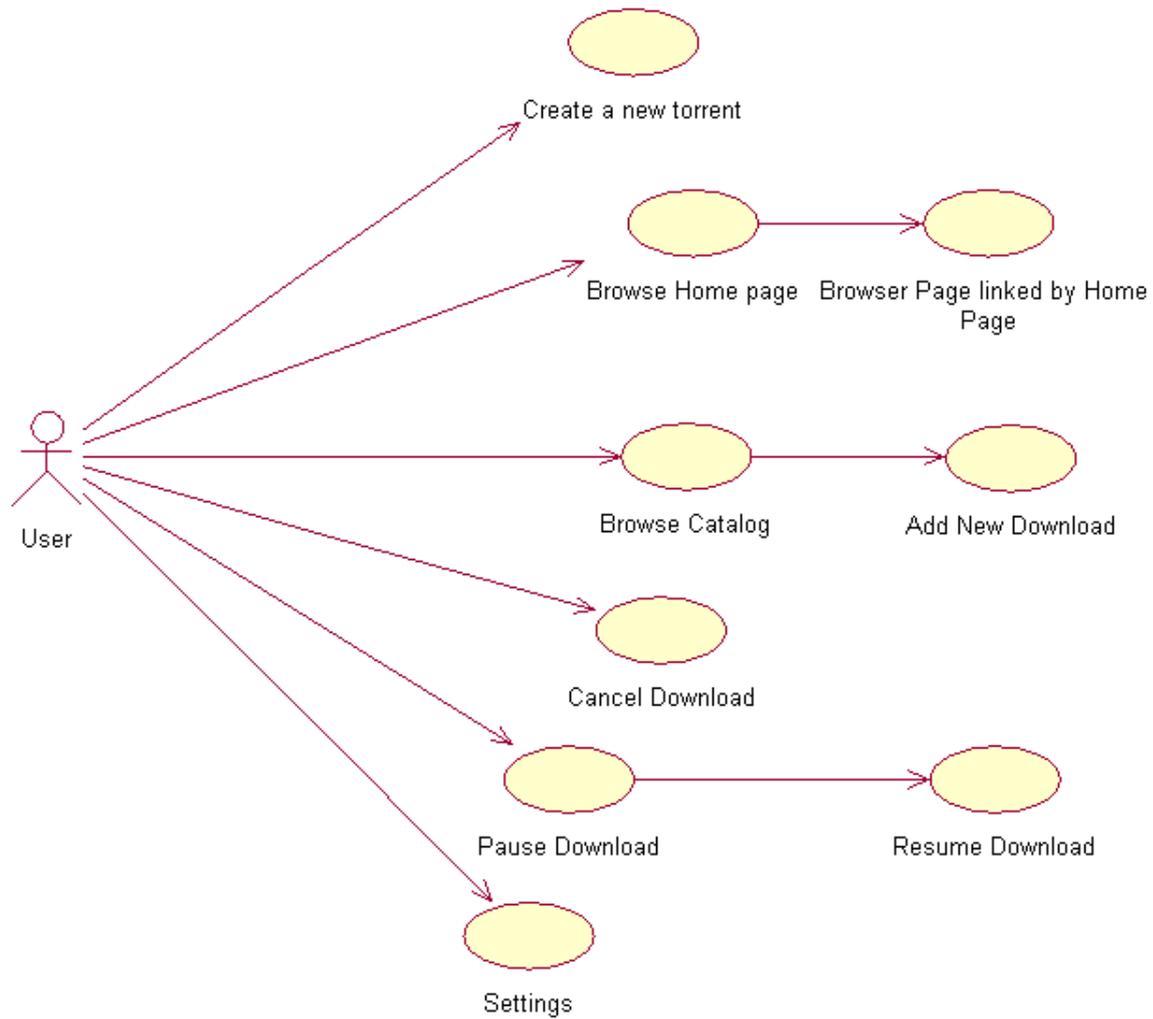
Other menu items and actions are :

- **Settings :** *Allow you to configure the software without touching the configuration file by hand. This is mostly for system administrators.*
- **Publish :** *Allow you to publish a new file (wether an Axmedis object or not) to the tracker to which the AXEPTool is connected.*

5.1 The next sections of the documentation will present you common use cases for actions you'd like to perform with the AXEPTool as a user. If you wish to developp a new catalogue or a new query interface for the AXEPTool, you can refer to AXEPTool's technical specifications for the URL format and the main architecure of the project.

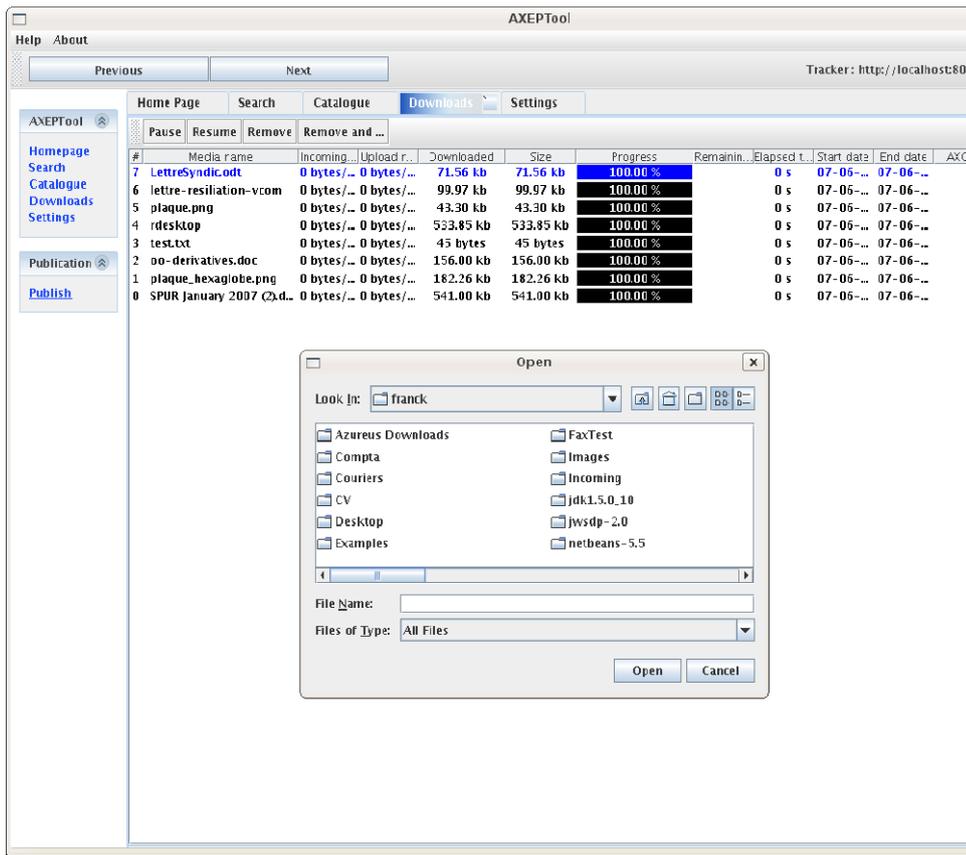## 5.2 Common use cases for AXEPTool and AXMEDIA

The following diagram presents the main actions a user can do with the AXEPTool.

5.3 Publishing a new file

You can use the AXEPTool to publish files on the network wether they are Axmedis objects or not. Files will be published on the tracker to which you are connected. Publishing a new file is a straightforward procedure :

After clicking on the « Publish » button of the publication menu, the application will open a file chooser dialog box. Just select the file you want to publish from your local hard disk and click on Open when you are done.

The application will then open a popup window while the publication is in progress. At the end of the publication :

- The file will be published on the tracker server.
- The torrent file will be created on your local hard drive in the directory specified in your configuration.
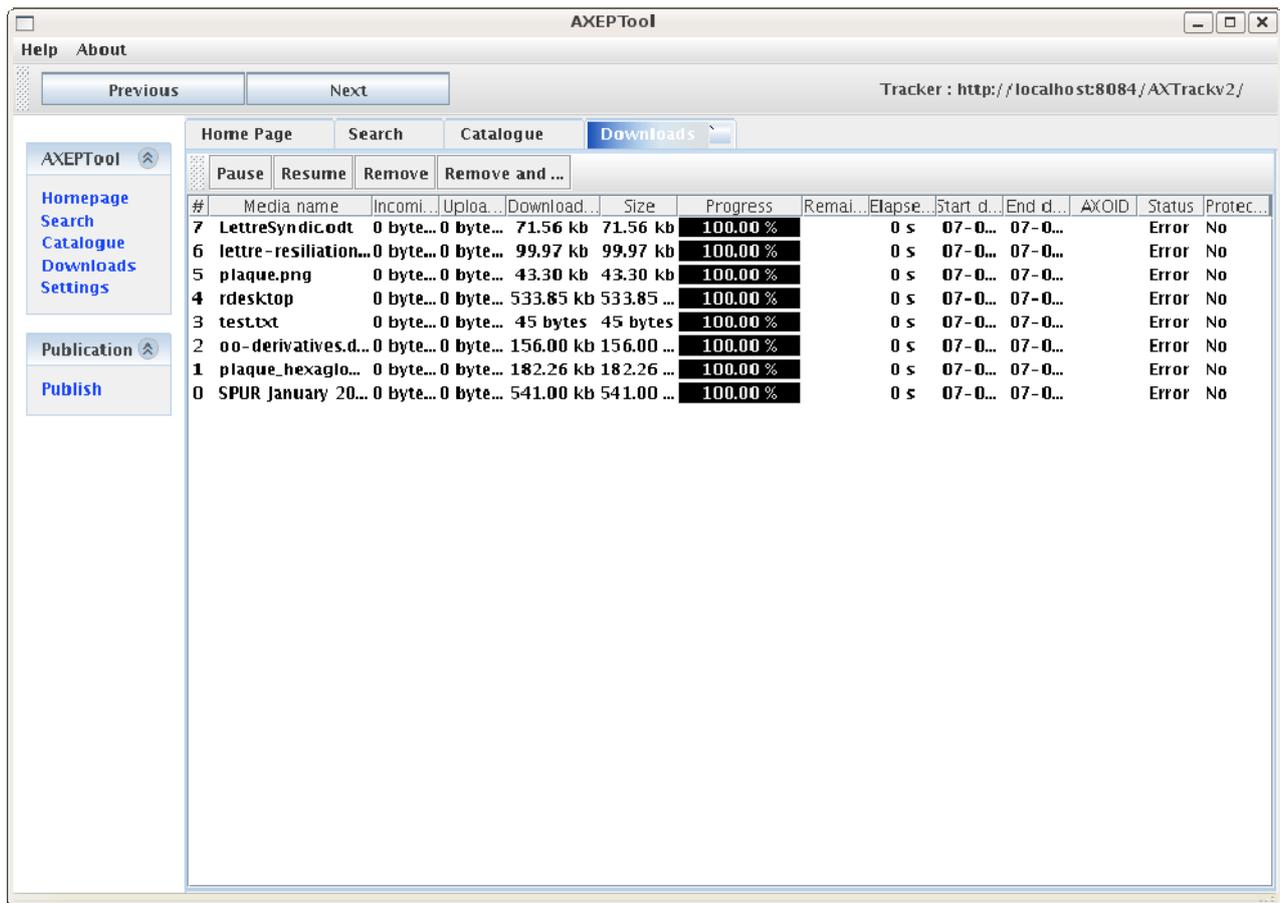
5.4   Browsing the catalogue

This section describe browsing the AXTrack provided Catalogue in order to download files. If your network administrator has choosen to use another catalogue, he must provides you with relevant instructions.

The catalogue is very simple. It displays both Axmedis Objects and Non Axmedis objects along with their size and meta-informations like AXOID and protected status.

Usage is very simple just click on the file you want to download. Once done, you can click on the « Downloads » tabs to see your download's progress.

5.5   The Downloads Tab

The following screenshot show the download tab :

The table lists all the currently active downloads and or files you are publishing. For each file you can see :

- **The file name :** The file will be stored with this name on your hard drive.
- **The Incoming data rate :** Allows you to see if the download is currently fast or not. Incoming data rate can fluctuate a lot on bittorrent network so you should be using the time estimation if you want a reliable estimation.
- **The Upload data rate :** The amount of data you are currently uploading to other peers. If this number is too high then probably it will disturb other network activities on your own network. Do not saturate your internet connection ! (Many of them are asymetrical).
- **The amount of bytes already downloaded along with total size**
- **A visual progress bar :** This allows you to see the progress instantly. Files which are at 100% progress are still in the list although no download is occuring. This is because it is a peer to peer network and these files are now seeding to other peers. You should not remove them unless you are constrained in terms of disk space and/or bandwidth. Also please note that if you publish a file it will appear directly in the download list with a 100% progress bar set.
- *An estimation of the time remaining : This estimation is based on past performance for the download. As speed can fluctuate gratly on peer to peer networks, this will not be as reliable as the time estimation for a regular internet download.*
- *The elapsed time along with start date and end-date*
- *The AXOID : Technical information for developpers, this is displayed only in the AXEPTool and not in the AXMEDIA tool.*
- *The status : Displays the errors and status of downloads. If the status is in error, this is probably because the tracker is unreachable.*
- *The protected bit (wether set or not)*

 The buttons above the download list allows you to control a particular download. Just select with your mouse the downloads on which you want to act and click on the button :

- **Pause :** *Will stop the download temporarily. Use this if for example you need all your bandwidth for an important VOIP call. As soon as a download is paused, the consumed bandwidth by your AXEPTool should fall in a few seconds. (Although you may expect incoming connections attempts for a few minutes due to the nature of the bittorrent protocol).*
- **Resume :** *Allows you to resume a paused download. The download will start again normally. Due to the nature of the bittorrent protocol, it will probably not resume as fast as it were when you stopped it. Finding peers takes times. (Especially when the number of seeds is far lower than the number of leechers).*
- **Remove :** *Remove the download from the download list but keeps everything (including download file and torrent file) on your hard disk*
- **Remove and delete :** *Removes the download from the download lists and delete everything from your hard disk.*

Additionally if you want to test a media file you just downloaded, you can double-click on it in the transfer list. The relevant media-player for the media type will automatically launch.

5.6   The settings menu

(This is a feature specific to the AXEPTool, it is not present in AXMEDIA)

This tab allows you to configure your AXEPTool in order to integrate it with specific networks. This is an option for system administrators. Organizations releasing the Axmedia tool are expected to pre-configure it for their end-users.
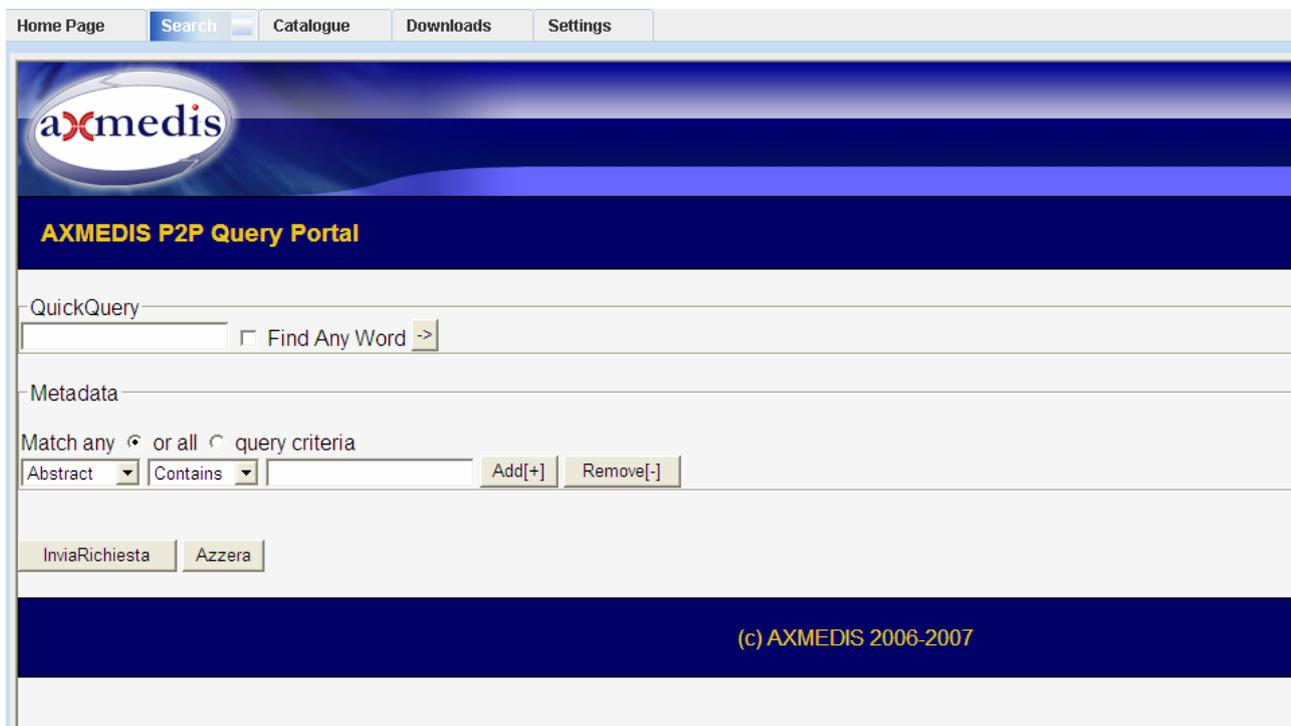
The options accessible for AXEPTool configuration are as follows :

- **Tracker URL :** *The URL of the tracker server you want to use. Please provide a tracker managed by the AXTrack tool.*
- **Download Directory :** *Enter the path where the files you download should be stored.*
- **This AXEPTool URL :** *Where the integrated web server should listen. This is for developpers and advanced users only.*

- *Listen starting port :* *The bittorrent port on which you can listen. This feature is useful if your AXEPTool is behind a NAT firewall. This way you can use port redirection to allow more than one AXEPTool behind this NAT firewall. If unsure of what this means, ask your system administrator.*
- *I'm connected to a proxy :* *If your company connects you to the internet through a proxy server, you should check this box. If you do so, you must fill in the parameters below. If you do not, the values below will just be ignored. If the AXEPTool does not work in your corporate environement, ask your system administrator if there is a proxy and if so, fill the configuration.*
- *Proxy Server Address :* *The URL of your proxy server.*
- *Proxy Port :* *The port of your proxy server.*
- *Proxy Login :* *The login of your proxy server.*
- *Proxy Password :* *The password of your proxy server.*

When you are satisfied with your settings, you can click on validate. Once done, you should restart your AXEPTool for everything to take effect.

5.7   The search tab

The search tab is only a browser link to AXMEDIS's query interface. In order to use it, please refer to the corresponding documentation.

6   AXMEDIS P2P Tools: AXTRACK

The AXTrack is a bittorrent tracker. It keeps track of each piece of file shared on the network. In Bittorrent, each file is decomposed into small pieces. Keeping the location of each piece on the network is the work of the tracker.

The tracker's administration can be performed through the AXEPTool's integrated web browser.
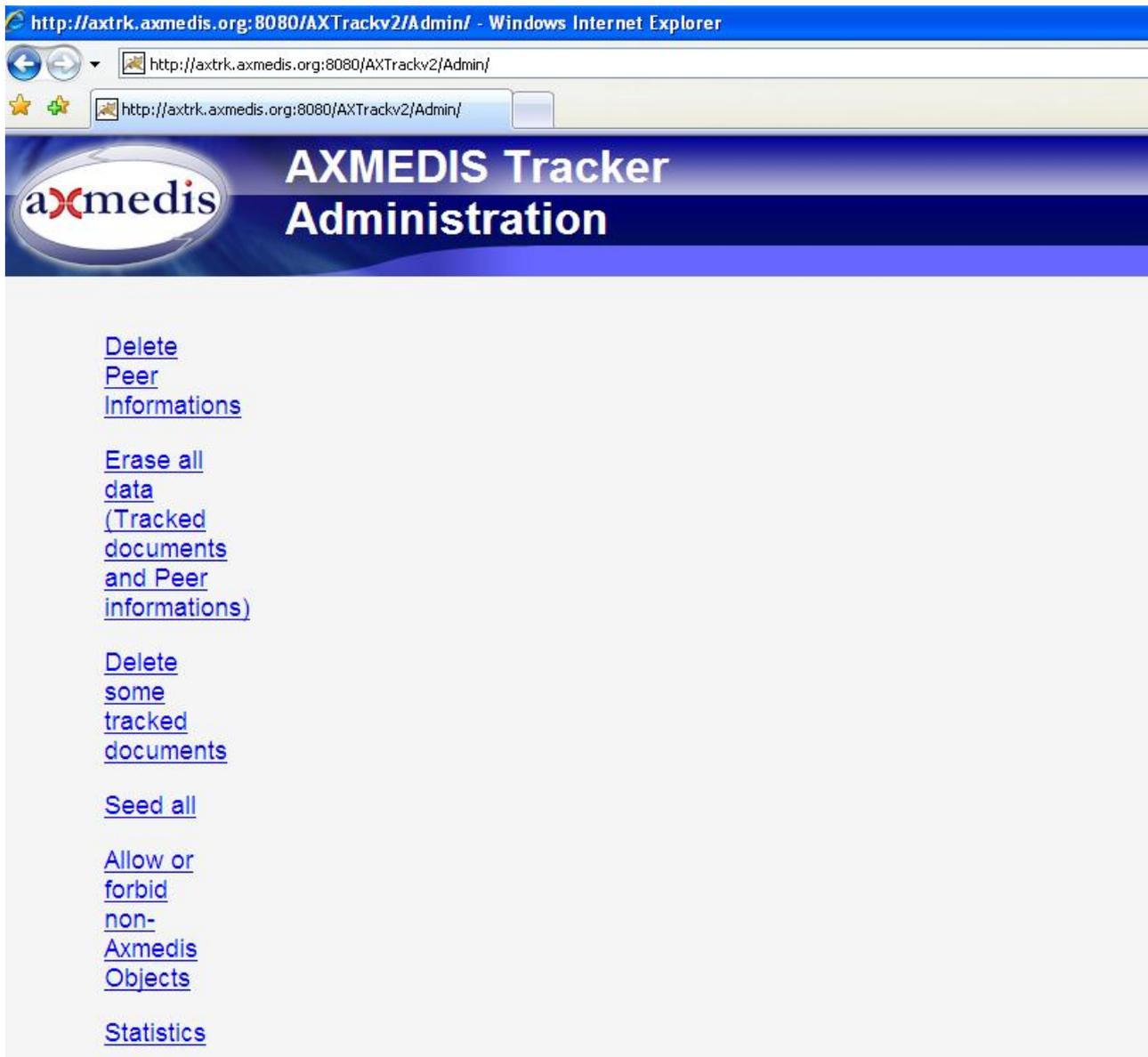
You can access the AXTrack web page by browsing <u>*http://trackerhostname:8080/AXTrackv2/*</u>

where trackerhostname *is the host name or ip address of your tracker machine.*

Logging with the right credentials you can access the administrative interface panel which has several options:

- Delete Peer Informations*, that allows to delete all peer informations from the AXTrack's database;*

- Erase all data (Tracked documents and Peer informations)*, that allows to delete all tracked documents and Peers informations from the AXTrack's database;*

- Delete some tracked documents*, that allows to delete some tracked documents from the AXTrack's catalogue. In this case the correspondent object record in the AXTrack's database table will be deleted together its .torrent file from the torrents folder;*

- Seed all*;*

- Allow or forbid non-Axmedis Objects*, that allows to turn ON/OFF the publication of non AXMEDIS Objects (to be exclusively used for AXMEDIS content distribution as a administration feature);*

- Statistics*, that reports the list of all the objects in the AXTrack's catalogue with their correspondent torrent id, infohash, number of times they were downloaded and a flag telling if an object is banned or not from sharing;*

+