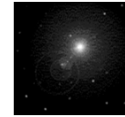


Napster: More Dissected

Meta Server

- Normally, when starting up, nap downloads a list of available servers from a meta-server such as <http://www.gotnap.com/servers.txt>.
- This list will be stored in the "servers" user variable and can be used for later /reconnect commands.
- If you want the server list to be refreshed while you are already logged into nap, use the /getservers command. This will reset the "servers" user variable to the current list of available servers. If you want to leave the server that you are currently on and connect to the next available server on the list, type /reconnect.
- To see which server you are currently connected to, type /server. To connect to a specific server, type



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Long Search

- **215 (0xd7) request resume [CLIENT]**
<checksum> <filesize>

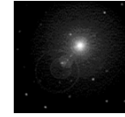
client is requesting a list of all users which have the file with the characteristics. The server responds with a list of 216 messages for each match, followed by a 217 message to terminate the list.

- **216 (0xd8) resume search response [SERVER]**
<user> <ip> <port> <filename> <checksum>
<size> <speed>

this message contains the matches for the resume request (215). The list is terminated by a 217 message.

- **217 (0xd9) end of resume search list [SERVER]**
no data.

This message terminates a list of 216 messages initiated by a 215 client request



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Upload/Download Notification

- **218 (0xda) downloading file [CLIENT]**
no body.

client sends this message to the server to indicate they are in the process of downloading a file. this adds 1 to the download count which the server maintains.

- **219 (0xdb) download complete [CLIENT]**
no body.

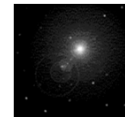
Client sends this message to the server to indicate they have completed the file for which a prior 218 message was sent. This subtracts one from the download count the server maintains.

- **220 (0xdc) uploading file [CLIENT]**
no body.

Client sends this message to indicate they are uploading a file. this adds one to the upload count maintained by the server.

- **221 (0xdd) upload complete [CLIENT]**
no body.

Client sends this message when they are finished uploading a file. this subtracts one from the upload count maintained by the server.



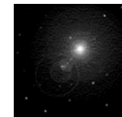
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Napster: Hot List

Hot List

- Napster allows you to specify a "hotlist" of users, and you will be notified whenever these users log on or off napster. You can add and delete users to your Hot List.
- To see who is on your hotlist, and which of those users are currently on napster, just type /notify without argument. /hotlist and /unhotlist are alternative names for /notify and /unnotify.
- Hotlists in nap are permanent; each time you make a change to your hotlist, it is automatically saved to a file (usually ~/.nap/hotlist-username). The hotlist is automatically loaded when nap starts.



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Hot List Commands

- **207 (0xcf) add hotlist entry [CLIENT]**
<user>

This message is used to add additional entries to the client's hotlist. The server will send 209 and 210 messages when a user on the hotlist has logged in or out, respectively.

- **208 (0xd0) hotlist [CLIENT]**
<user>

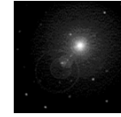
This message is used to send the initial list of hotlist entries during the initial login process. It is normally sent prior to the add file (100) commands. To add more entries to the hotlist after the initial list is sent, clients should use the 207 message instead.

- **209 (0xd1) user signon [SERVER]**
<user> <speed>

server is notifying client that a user in their hotlist, <user>, has signed on the server with link <speed>

- **210 (0xd2) user signoff [SERVER]**
<user>

server is notifying client that a user on their hotlist, <user>, has signed off the server. This message is also sent by the server when the client attempts to browse a nonexistent client. [why don't they just use 404 for this? -ed]



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Browse Hot Listed Users

- **211 (0xd3) browse a user's files [CLIENT]**
<nick>

the client sends this message when it wants to get a list of the files shared by a specific client

- **212 (0xd4) browse response [SERVER]**
<nick> "<filename>" <md5> <size> <bitrate>
<frequency> <time>

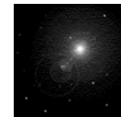
<nick> is the user contributing the file
<filename> is the mp3 file contributed
<md5> is the hash of the mp3 file
<size> is the file size in bytes
<bitrate> is the mp3 bitrate in kbps
<frequency> is the sampling frequency in Hz
<time> is the play time in seconds

Example:

```
fouser "generic band - generic song.mp3" b92870e0d41bc8e698cf2f0a1ddfeac7 443332  
128 44100 60
```

- **213 (0xd5) end of browse list [SERVER]**
<nick> [ip]

indicates no more entries in the browse list for <user>. <ip> gives the client's IP address.



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Hot List (more..)

- **301 (0x12d) hotlist ack [SERVER]**
<user>

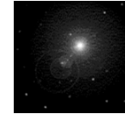
Server is notifying client that <user> has successfully be added to their hotlist.

- **302 (0x12e) hotlist error [SERVER]**
<user>

Server is notifying client that it was unable to add <user> to their hotlist. [can you only add registered nicks to your hotlist? -ed]

- **303 (0x12f) remove user from hotlist [CLIENT]**
<user>

Client is notifying the server that it no longer wishes to request notifications about <user> when they sign on or off the server. No response is sent in return.

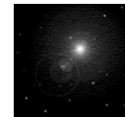


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Ignore & Block List

- Napster also allows you to specify a "Ignore List" of users, who will not be able to send or receive message to you.



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Ignore List

- **320 (0x140) user ignore list [CLIENT, SERVER]**
client: no data
server: <count>

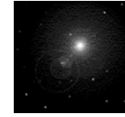
Client requests [server] to display the list of ignored users. Server returns the number of users being ignored

- **321 (0x141) user ignore list entry [SERVER]**
<user>

Server sends the requesting client each ignored nick in the list in response to a 320 request. The list is terminated by a 320 message with the number of ignored users.

- **322 (0x142) add user to ignore list [CLIENT, SERVER]**
<user>

Server acks the request by returning the nick



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Ignore List (more..)

- **323 (0x143) remove user from ignore list [CLIENT]**
<user>

- Server acks the request by returning the nick to be removed from the ignore list.

- **324 (0x144) user is not ignored [SERVER]**
<user>

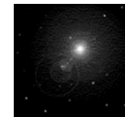
- Server indicates that <user> is not currently ignored in response to a 323 request.

- **325 (0x145) user is already ignored [SERVER]**
<user>

- Server indicates the specified user is already on the user's ignore list

- **326 (0x146) clear ignore list [CLIENT, SERVER]**
client: no data.
server: <count>

- Client requests the server clear its ignore list. Server returns the number of entries removed from the ignore list.

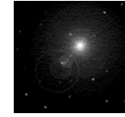


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Blocked IP

- 330 (0x14a) blocked ip list [CLIENT]
- 332 (0x14c) block ip [CLIENT]
- 333 (0x14d) unblock ip [CLIENT]



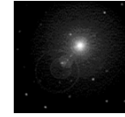
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More Napster:
Channels

Napster Channels

- Napster allows you to communicate with other users. This is done through messages or channels.
- When you join a channel, you can post messages to the channel and see what other users on the channel are saying.
- You can all see a list of available channels.
- Being on a channel is very similar to querying a user. You can be on several channels simultaneously. You can omit the channel name if you want to leave the current channel.
- You can easily create a new channel. Simply join a channel that does not already exist, and it will be created. Normally, such channels have names that start with "#", although the official Napster servers do not enforce this. Once you have created your channel, you are probably the only person on it, but you can invite others to join the channel as well.
- The channel will continue to exist as long as there at least a user on it; it will be deleted when the last user parts.



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Channels

- **400 (0x190) join channel [CLIENT]**
<channel-name>

the client sends this command to join a channel

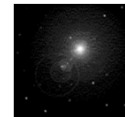
- **401 (0x191) part channel [CLIENT, SERVER]**
<channel-name>

The client sends this command to part a channel. Server sends this message to indicate that the client has parted the channel. Note that this is sometimes sent even when the client has not requested, so a client `_must_` be prepared to accept it at any time.

- **402 (0x192) send public message [CLIENT]**
<channel> <message>

- **403 (0x193) public message [SERVER]**
<channel> <nick> <text>

This message is sent by the server when a client sends a public message to a channel.
Example: 80's espinozaf hello...hola



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Channel (2)

- **404 (0x194) channel error message [SERVER]**
<text>

This message is used to send general error messages to a client that is logged in. Note: Message 0 is only sent during the login process.

Examples: User nosuchuser is not currently online. Channel #nosuchchannel does not exist! permission denied ping failed, blah is not online

- **405 (0x195) join acknowledge [SERVER]**
<channel>

The server sends this message to the client to acknowledge that it has joined the requested channel (400).

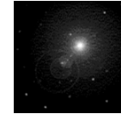
- **406 (0x196) join message [SERVER]**
<channel> <user> <sharing> <link-type>

<user> has joined <channel>

Example: 80's WilmaFlinstone 12 2

- **407 (0x197) user parted channel [SERVER]**
<channel> <nick> <sharing> <linespeed>

Example: 80's DLongley 23 7



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Channel (3)

- **408 (0x198) channel user list entry [SERVER]**

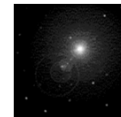
This message is identical to the join (406) message. The server will send the list of users in the channel prior to the client join command in this message. Joins that occur after the client has joined will be noted by a 406 message.

- **409 (0x199) end of channel user list [SERVER]**
<channel>

this message is sent by the server to indicate it has sent all information about the users in a channel

- **410 (0x19a) channel topic [CLIENT, SERVER]**
<channel> <topic>

sent when joining a channel or a new topic is set. A client requesting topic change also uses this message. [why didn't they put a field to indicate WHO changed the topic? As it is now you can only tell that it was changed. -ed]



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Channel Ban List

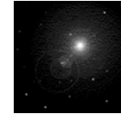
- **420 (0x1a4) channel ban list [CLIENT, SERVER]**

Format: <channel>

This command is used by clients to request the list of channel bans, and by the server to indicate the end of the channel ban list for a channel (also see 421).

- **421 (0x1a5) channel ban list entry [SERVER]**
- **422 (0x1a6) channel ban [CLIENT]**
<channel> <user|ip> ["<reason>"]
- **423 (0x1a7) channel unban [CLIENT]**
<channel> <user|ip> ["<reason>"]
- **424 (0x1a8) channel ban clear [CLIENT]**
Format: <channel>
- **425 channel motd (alternate topic (?)) [SERVER]**
Format: <message>

- [The server sends this command when a user joins one of the predefined channels. It seems to send a default message if the topic for the channel is the default, otherwise it sends the current channel topic. -ed]



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Invitation to Channel

- **430 invite a user [CLIENT, SERVER]**
client: <nick> <channel>
server: <nick> <channel> "<topic>" <unknown_digit> <unknown_text>

This command is used by Napster 2.0 BETA 9.6 to invite a user to a channel.

client:
<nick> - nick of invited user
<channel> - channel user <nick> was invited to

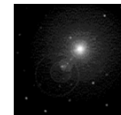
server:
<nick> - nick of user who was inviting
<channel> - channel
<topic> - channel's topic
<unknown_digit> - ??? ("0" works fine)
<unknown_text> - ??? ("Hello!" works fine)

Last two arguments i cannot check because i temporary don't have internet access (e-mail only). If someone will test this message on napster.com servers please send me results. When user receives 430 message user should reply with 431 or 432.

Client example: CyberAlien2 #test_channel
Server example: CyberAlien3 #test_channel "Welcome to the #test_channel." 0 Hello!!!! If anyone known what should server reply instead of "0 Hello!" please tell me.

- **431 invitation accepted [CLIENT]**
<user> <channel>

<user> - user who was inviting
- **432 invitation declined [CLIENT]**
format: copy of command received in 430 message



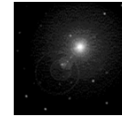
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More Napster: Firewalled Down Load

Climbing Firewalls

- Most firewalls allow only outgoing connections, not incoming ones. The napster protocol can compensate for this to a certain extent, by arranging things so that firewalled clients initiate connections to non-firewalled clients, and not the other way around. In this way, both uploads and downloads are possible between a firewalled and a non-firewalled client. However, between two clients that are both firewalled, neither uploads nor downloads are possible.
- If you are behind a firewall, then nap needs to know about it, in order to be able to compensate for it. However, nap can't find this out on its own. The way to tell nap that you are behind a firewall is to set `dataport = 0` in your configuration file. If you are behind a firewall, you may also need to set up an http proxy so that nap can read its server list.



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Firewalled Download

- **500 (0x1f4) alternate download request [CLIENT] { to server}**
<nick> "<filename>"

requests that <nick> make an outgoing connection to the requesters client and send <filename>. this message is for use when the person sharing the file can only make an outgoing tcp connection because of firewalls blocking incoming messages. this message should be used to request files from users who have specified their data port as 0 in their login message

- **501 (0x1f5) alternate download ack [SERVER] {to firewalled uploader}**
<nick> <ip> <port> "<filename>" <md5> <speed>

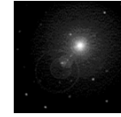
this message is sent to the uploader when their data port is set to 0 to indicate they are behind a firewall and need to push all data outward. The uploader is responsible for connecting to the downloader to transfer the file.

- **600 (0x258) request user's link speed [CLIENT]**
<nick>

- **601 (0x259) link speed response [SERVER]**
<nick> <linespeed>

- **602 (0x25a) ??? [CLIENT]**
<?>

server returns a 404 with "*gulp* Drink milk, it does a body good!"



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Firewalled Download (cont..)

- **607 (0x25f) upload request [SERVER]**
<nick> "<filename>" <speed>

this message is used to notify the client that user <nick> has requested upload of <filename>

Example: lefty "generic band - generic song.mp3" 7

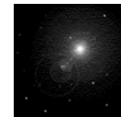
- **608 (0x260) accept upload request [CLIENT]**
<nick> "<filename>"

client is notifying server that upload of <filename> to <nick> is accepted, and that the requesting client may begin download

Example: lefty "generic band - generic song.mp3"

- **609 (0x261) accept failed [SERVER]**
<nick> "<filename>"

this message is sent by the server when the client that the file was requested from does not accept the upload request.



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More Napster: Direct Browse

Direct Browsing

- **640 direct browse request [CLIENT, SERVER]**
Client: <nick>
Server: <nick> [ip port]

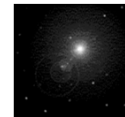
Client: request files for <nick> Server: <nick> is requesting your files. Optionally, <ip> and <port> are given if the client getting browsed is firewalled. This message is sent to initiate a direct client to client browsing of shared files. See section 5.3.

- **641 direct browse accept [CLIENT, SERVER]**
Client: <nick>
Server: <nick> <ip> <port>

The client to be browsed sends this message back to the server to indicate it is willing to accept a direct browse from <nick>. The server sends this message to the requestor of the browse to indicate where it should connect in order to do a direct browse from <nick>. See section 5.3

- **642 direct browse error [SERVER]**
<nick> "message"

Server sends this message in response to a 640 request if there is an error (eg. both clients are firewalled, or the browse is not sharing any files). See section 5.3



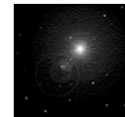
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More Napster: Social Engineering

Few User Reporting Commands

- **610 (0x262)** **kill (disconnect) a user [CLIENT]**
 <nick> ["<reason>"]
 client request to disconnect a user.
- **611 (0x263)** **nuke a user [CLIENT]**
 <nick>
 client request to delete account for <nick>
- **612 (0x264)** **ban user [CLIENT]**
 <nick | ip> ["<reason>"]
 client request to place a ban on either a specific nickname or an ip address
- **622 (0x26e)** **muzzle a user [CLIENT]**
 <nick> ["<reason>"]
 client requests that <nick> not be allowed to send public messages
- **623 (0x26f)** **un-muzzle a user [CLIENT]**
 <nick> ["<reason>"]
 client requests that the enforced silence on <nick> be lifted
- **624 (0x270)** **un-nuke a user [CLIENT]**
 <user>



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More Napster: Resource Management

Queue Limit

- **619 (0x26b)** **queue limit [CLIENT]**
Format: <nick> "<filename>" <n>

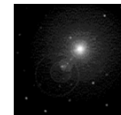
A client may limit the number of downloads from a particular client. Once the limit for a particular user has been reached, the uploading client can send this message to notify the downloader that they have hit the limit and can't have any more simultaneous downloads. <nick> is the user who hit the limit, <filename> is the file they were trying to download when they hit the limit, and <n> is the number of simultaneous downloads allowed.

Example: joejob "C:\MP3\Generic Band - Generic Song.mp3" 3

- **620 (0x26c)** **queue limit [SERVER]**
<nick> "<filename>" <filesize> <digit>

This message is sent by the server in response to the 619 client request, when one user needs to notify another that they have reached the maximum allowed simultaneous downloads. When the server receives the 619 request from the uploading client, it sends the 620 message to the downloading client. The only difference in format is the addition of the <nick> field in the 620 message which specifies the username of the uploading agent which is notifying the downloader that the queue is full.

Example: joejob "C:\MP3\Generic Band - Generic Song.mp3" 1234567 3



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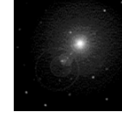
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Upload/Download Bandwidth

- 100 (0x64) client notification of shared file [CLIENT]
Format: "<filename>" <md5> <size> <bitrate>
<frequency> <time>

The bitrate is enforced while serving.

- It is possible to limit the bandwidth of up- and downloads. It is possible to set a limit on the bandwidth per connection, and to set an overall limit on the total bandwidth taken by all connections. This is done separately for uploads and downloads.
- Up- and download bandwidth limits are given in kilobytes per second, and they are set via the user variables *bandwidthup*, *bandwidthup1*, *bandwidthdown*, *bandwidthdown1*.
- It is possible to change the bandwidth limits at any time. Such changes will immediately take effect, even for transfers that are already in progress. Note that bandwidth limits for downloads only affect the rate at which nap reads data, not the rate at which data arrives from the network. If data arrives on the network at a higher rate than nap reads it, then the operating system will usually buffer such data. Thus, the actual network bandwidth may not go down until the buffer is full.
- Claim an appropriate connection speed. This is out of fairness to other users. For instance, if you limit your bandwidth to 10k/s, you should probably set your connection speed to 56k, even if you are really on a T3 connection. To some extent, nap will try to enforce this kind of etiquette.



FOUNDATION OF
PEER-TO-PEER
SYSTEMS

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Next Class:
Gnutella 0.4