**HDF5 data server file and command reference**

1

**Root file**

projects

2

files

/

…

mnt

n

**Commands**

Command sequences are always terminated with \n Output sequence is always terminated with \n. Communication is plain ASCII.

QUERY

Retrieves a range of values from data array, with or without an index.

QUERY

Username

Password

positions range value type (“positions”, “markers”, “indexes”)

positions range type (“list”, “range” , “all”)

positions number\_of\_ indexes (ignored for “all” and “range”, cannot be blank)

stride\_positions (int)

taxa range value type (“taxa”, “indexes”)

taxa range type (“list”, “range” , “all”)

taxa number\_of\_ indexes (ignored for “all” and “range”, cannot be blank)

stride\_taxa (int)

destination (“std”, “file”)

format (“let”, “num”)

orientation (“auto”, “pf”, “tf”, “nodata”)

project name

chromosome name

positions 1 index value

positions 2 index value

positions 3 index value

…

positions n index value

taxa 1 index value

taxa 2 index value

taxa 3 index value

…

taxa n index value

Return:

file name if file destination chosen (one line output in this case)

Encoding

Data element size

Output orientation: tf or pf

Positions size

Taxa size

Data ascii array, one row per line

Positions vector (ascii)

Alleles vector (ascii)

Taxa vector (ascii)

Markers vector (ascii, optional, only if markers present)

QUERY positions/markers/taxa tables

TABLE

Username

Password

Name (“positions”, “markers”, “taxa”, “alleles”)

project name

chromosome name (ignored for “taxa”)

starting\_index

ending\_index

MOUNT

MOUNT

password\_admin

file\_name (must be local)

UMOUNT

UMOUNT

password\_admin

file\_name

CREATE INDEX

INDEX

password\_admin

file\_name

LIST PROJECTS

PLIST

LIST FILES

FLIST

LIST FILES in data directory

AFLIST

password\_admin

FILE INFO

FINFO

File\_name

PROJECT INFO

PINFO

Project\_name

LIST ALL

LISTALL

QUIT

QUIT

Password\_admin

ADD USER

USERADD

Password\_admin

Username

Userpassword

DELETE USER

USERDEL

Password\_admin

Username

CHANGE USER PASSWORD

USERPASS

Username

Oldpass

Newpass

USER ACCESS LIST

USERACC

Password\_admin

Username

Project 1

…

Project n

LIST ALL USERS AND ACCESS RIGHTS

ULIST

Password\_admin

Return:

USER uname upasshash

Project1

…

Project n

…

CHECK USER LOGIN

LOGIN

Username

Password

Return:

OK or ERR

Project1

…

ProjectncwPASS

**HDF5 data server installation**

Server can be installed as root, or as a user. The installation consists of two elements: network port server programs and HDF5 database engine. Port servers respond to requests on chosen inetd port and forward them to database engine via named pipes. One request is processed by the engine at a time.

All the files needed for installation are on CBSU ftp server in <ftp://cbsuftp.tc.cornell.edu/jarekp/hdf5>

1. Download hdf5server.tar file with installation files.
2. Decide where will your server be located, in this manual it will be /usr/local/hdf5
3. Go to /usr/local and unpack the server:  
   tar -xf /path\_to\_tar\_file/hdf5server.tar
4. QUERY data can be dumped to a file (option “file”). In this case output file will be created in temp directory (see config file below). If you plan to use this feature you may want to export this directory via NFS, or add it to your Apache WWW server as a symbolic link (make sure it is readable to everyone):

ln –s /usr/local/hdf5/tmp /var/www/html/hdf5data

You will be able to retrieve the files using WWW: http://server.address.edu/hdf5data/datafilename

1. Go to /usr/local/hdf5 directory and edit config.txt to reflect you server location. Change communication mode to “std” (no quotes) and make sure “current password” line is empty (the line should be there, but empty):

=====

#current password

#database dir path

/usr/local/hdf5/data/

#database file path

hdf5serverroot.h5

#temp directory

/usr/local/hdf5/tmp

#communication mode: std (stdout/stdin), \_name (named pipe with name 'name')

std

=====

1. Start the database engine in direct communication mode:  
   ./hdf5  
   The server will create new root hdf5 file and ask to set admin password:  
   Password not set - please enter password  
   Please type the password and press enter  
   Type QUIT<enter>password<enter><enter>  
   to terminate server. NOTE: all the activity is logged in cbsuhdf5.log.
2. Attach a sample hdf5 file to test the server in direct mode. Download file test.h5 from CBSU ftp server to /usr/local/hdf5/data. Start the server in direct mode, mount test.h5 file, list its projects and project info:  
   >./hdf5  
   MOUNT<enter>  
   password<enter>  
   test.h5<enter>  
   <enter>  
   end of input - executing

START Thu May 3 13:41:40 2012

END Thu May 3 13:41:40 2012

Command execution successful

execution 0.006 seconds

total 9.430 seconds

Command COMPLETED  
PLIST<enter>  
<enter>  
end of input - executing

START Thu May 3 13:42:17 2012

1 projects attached

/mnt0/project0 grape

END Thu May 3 13:42:17 2012

Command execution successful

execution 0.000 seconds

total 0.367 seconds

Command COMPLETED  
PINFO<enter>  
grape<enter>  
<enter>  
end of input - executing

START Thu May 3 13:42:26 2012

/mnt0/project0 grape

type genotyping

version 001

genomeversion regenv2

orientation pf

status 0

coordinate\_system chromosome

encoding IUPAC

= taxa 88 indexed

chromosome 1 chr1

= data\_array\_pf 88 367

= positions 367

= markers 367 indexed

chromosome 2 chr2  
…..

1. Quit the server. Edit the file config.txt and change communication mode to named pipe:  
   #communication mode: std (stdout/stdin), \_name (named pipe with name 'name')

\_hdf5pipe

1. Install xinetd if you don’t have installed (yum install xinetd).
2. Switch xinetd on (chkconfig xinetd on).
3. Edit file in hdf5/etc/hdf5comm and substitute /usr/local/hdf5 with your installation path. Copy the file to /etc/xinetd.d. Edit file /etc/services and add (or replace) replace two lines defining service port 12001:  
   …..  
   hdf5comm 12001/tcp # cbsu hdf5 server

hdf5comm 12001/udp # cbsu hdf5 server  
….  
Restart xinetd:

/etc/init.d/xinetd restart

1. Copy hsd5 server startup file cbsuhdf5d to /etc/init.d . Start hdf5 server engine:  
   /etc/init.d/cbsuhdf5d start
2. If you’d like this service to start automatically you need to switch it on:  
   chkconfig cbsuhdf5d on
3. Try your server:  
   telnet localhost 12001  
   You should be able to communicate with it in the same way as in the direct mode above.
4. The server is now available to the local machine only. In order to make it available to the other machines you need to add the following line to /etc/sysconfig/iptables:  
   -A INPUT -m state --state NEW -m tcp -p tcp --dport 12001 -j ACCEPT  
   and then restart iptables (/etc/init.d/iptables restart). Skip this step if you want to access the server locally.