FTP - File Transfer Protocol

jnlin(2019-2021, CC BY-SA)
? (1996-2018)

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FTP

- FTP
  - File Transfer Protocol
  - Used to transfer data from one computer to another over the internet
  - Client-Server Architecture
  - Separated control/data connections

FTP

- FTP connections
  - Control connection
    - Created when an FTP session is established
    - Only for passing control information
  - Data connection
    - Each time that data is sent, a distinct TCP data connect is established
    - Data Connection Modes
      - Active
      - Passive

FTP

- Security concern
  - As we seen, FTP connections (both command and data) are transmitted in clear text
  - What if somebody sniffing the network?
    - We need encryption

FTP

- Solutions
  - FTP over SSH
    - A normal FTP session tunneled through a SSH channel
  - SSH File Transfer Protocol (SFTP)
    - Both commands and data are encrypted while transmitting
    - One connection, but poor performance
  - FTP over TLS (ftps, ftpes)
    - Only commands are encrypted while transmitting
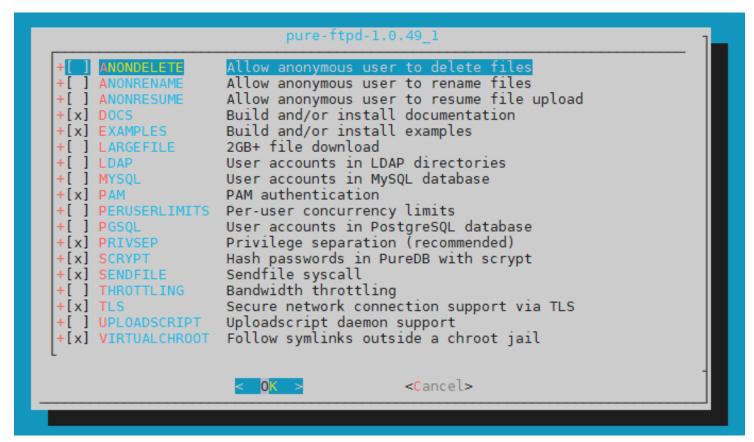   - Better performance

FTP - Pure-FTPd(1/3)

- Introduction
  - A small, easy to set up, fast and secure FTP server
  - Support chroot
  - Restrictions on clients, and system-wide.
  - Verbose logging with syslog
  - Anonymous FTP with more restrictions
  - Virtual Users, and Unix authentication
  - FXP (File eXchange Protocol)
  - FTP over TLS
  - UTF-8 support for filenames

FTP - Pure-FTPd(2/3)

- Installation
  - Ports: /usr/ports/ftp/pure-ftpd
  - Options

```
                    pure-ftpd-1.0.49_1

+[ ] ANONDELETE      Allow anonymous user to delete files
+[ ] ANONRENAME      Allow anonymous user to rename files
+[ ] ANONRESUME      Allow anonymous user to resume file upload
+[x] DOCS            Build and/or install documentation
+[x] EXAMPLES        Build and/or install examples
+[ ] LARGEFILE       2GB+ file download
+[ ] LDAP            User accounts in LDAP directories
+[ ] MYSQL           User accounts in MySQL database
+[x] PAM             PAM authentication
+[ ] PERUSERLIMITS   Per-user concurrency limits
+[ ] PGSQL           User accounts in PostgreSQL database
+[x] PRIVSEP         Privilege separation (recommended)
+[x] SCRYPT          Hash passwords in PureDB with scrypt
+[x] SENDFILE        Sendfile syscall
+[ ] THROTTLING      Bandwidth throttling
+[x] TLS             Secure network connection support via TLS
+[ ] UPLOADSCRIPT    Uploadscript daemon support
+[x] VIRTUALCHROOT   Follow symlinks outside a chroot jail


          <  OK  >              <Cancel>
```

FTP - Pure-FTPd(3/3)

○ Other options

```
nctucs [/usr/ports/ftp/pure-ftpd] -wangth- sudo make extract
…
You can use the following additional options:


LANGUAGE=lang (default: english)
- Enable compilation of one language support
  available lang: brazilian-portuguese, catalan, czech, danish, dutch,
  english, french, french-funny, german, hungarian, italian, korean,
  norwegian, polish, romanian, russian, simplified-chinese, slovak,
  spanish, swedish, traditional-chinese, Turkish
```

○ LANGUAGE

   ■ Change the language of output messages

● Startup

   ○ Add pureftpd_enable="YES" in /etc/rc.conf

FTP - Pure-FTPd Configurations(1/3)

- Configurations:
  - File: /usr/local/etc/pure-ftpd.conf
  - Documents
    - Configuration sample: /usr/local/etc/pure-ftpd.conf.sample
      - All options are explained clearly in this file.
    - Other documents
      - See /usr/local/share/doc/pure-ftpd/*

```
nctucs [/usr/ports/ftp/pure-ftpd] -wangth- ls
AUTHORS           README.LDAP      CONTACT
README.MySQL    COPYING            README.PGSQL
HISTORY           README.TLS       NEWS
README.Virtual-Users              README
THANKS            README.Authentication-Modules
pure-ftpd.png  README.Configuration-File
pureftpd.schema
```

FTP - Pure-FTPd Configurations(2/3)

```
# Restrict users to their home directory
ChrootEveryone          yes

# If the previous option is set to "no", members of the following group
# won't be restricted. Others will be. If you don't want chroot()ing anyone,
# just comment out ChrootEveryone and TrustedGID.
TrustedGID                     0

# Disallow authenticated users - Act only as a public FTP server.
AnonymousOnly                  no
# Disallow anonymous connections. Only accept authenticated users.
NoAnonymous                    yes

# If you want simple Unix (/etc/passwd) authentication, uncomment this
UnixAuthentication             yes

# Port range for passive connections - keep it as broad as possible.
PassivePortRange       30000 50000
```

FTP - Pure-FTPd Configurations(3/3)

```
# This option accepts three values:
# 0: disable SSL/TLS encryption layer (default).
# 1: accept both cleartext and encrypted sessions.
# 2: refuse connections that don't use the TLS security mechanism,
#       including anonymous sessions.
# Do _not_ uncomment this blindly. Double check that:
# 1) The server has been compiled with TLS support (--with-tls),
# 2) A valid certificate is in place,
# 3) Only compatible clients will log in.
TLS 2

# UTF-8 support for file names (RFC 2640)
# Set the charset of the server filesystem and optionally the default charset
# for remote clients that don't use UTF-8.
# Works only if pure-ftpd has been compiled with --with-rfc2640
# FileSystemCharset    UTF-8
# ClientCharset        UTF-8
```

FTP - Pure-FTPd Problem Shooting

- Logs Location
  - In default, syslogd keeps ftp logs in /var/log/xferlog
- Most frequent problems
  - pure-ftpd: (?@?) [ERROR] Unable to find the 'ftp' account
    - It's ok, but you may need it for Virtual FTP Account.
  - pure-ftpd: (?@?) [ERROR] Sorry, but that file doesn't exist: [/etc/ssl/private/pure-ftpd.pem]
    - If you set TLS = 2, then this file is needed.
  - How to generate a pure-ftpd.pem?
    - See README.TLS

FTP - Pure-FTPd Tools

- pure-*

```
nctucs [~] -wangth- ls /usr/local/sbin/pure-*
/usr/local/sbin/pure-alwaysfail        /usr/local/sbin/pure-mrtginfo
/usr/local/sbin/pure-authd             /usr/local/sbin/pure-quotacheck
/usr/local/sbin/pure-ftpd              /usr/local/sbin/pure-uploadscript
/usr/local/sbin/pure-ftpwho


nctucs [~] -wangth- ls /usr/local/bin/pure-*
/usr/local/bin/pure-pw                 /usr/local/bin/pure-statsdecode
/usr/local/bin/pure-pwconvert
```

- pure-ftpwho(8)
  - List info of users who are currently connecting to the FTP server.
- pure-pw(8)
  - Manage Virtual Users in PureDB format
  - See README.Virtual-Users

13

FTP - More Tools

- ftp/pureadmin
  - Management utility for the PureFTPd
- ftp/lftp
  - Shell-like command line ftp client
  - Support TLS
- ftp/wget, ftp/curl
  - Retrieve files from the Net via HTTP(S) and FTP
- ftp/mget
  - Multithreaded command line web-download manager
- FileZilla (ftp/filezilla)
  - A graphical cross-platform FTP client
  - Support TLS