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OPENBSD AS WEB SERVER

STEP BY STEP CONFIGURING APACHE, PHP, AND MYSQL ON OPEN BSD

OpenBSD is a free and open-source Unix-like operating system based on the Berkeley Software Distribution. Theo de Raadt created OpenBSD in 1995 by forking NetBSD. According to de Raadt, OpenBSD is a research operating system for developing security mitigations

SESSION 1

INTRODUCING AND INSTALLATION STEP

A. WHAT IS OPENBSD?



OpenBSD is a free and open source Unix-like operating system based on Berkeley Software Distribution (BSD). Created by Theo de Raadt by take a copy of source-code from NetBSD 1.0 in 1995. OpenBSD secure by default. Many of its security features are not included in other operating systems.

The initial release, OpenBSD 1.2, was made in July 1996, followed by OpenBSD 2.0 in October of the same year. Since then, the project has issued a release every six months, each of which is supported for one year.

OpenBSD can be used as network appliance such as a router or access point. OpenBSD's security enhancements, built-in cryptography, and packet filter make it suitable for security purposes such as firewalls, intrusion-detection systems, and VPN gateways. Also used as server and can be configured as a mail server, web server, FTP server, DNS server, NFS file server or any combination of these.

Open BSD is the most secure operating system in the world with only two remote holes in the default install, in a heck of a long time!

B. STEP BY STEP INSTALLATION

```
ppb27 at pci0 dev 24 function 1 "VMware PCIE" rev 0x01
pci28 at ppb27 bus 28
ppb28 at pci0 dev 24 function 2 "VMware PCIE" rev 0x01
pci29 at ppb28 bus 29
ppb29 at pci0 dev 24 function 3 "VMware PCIE" rev 0x01
pci30 at ppb29 bus 30
ppb30 at pci0 dev 24 function 4 "VMware PCIE" rev 0x01
pci31 at ppb30 bus 31
ppb31 at pci0 dev 24 function 5 "VMware PCIE" rev 0x01
pci32 at ppb31 bus 32
ppb32 at pci0 dev 24 function 6 "VMware PCIE" rev 0x01
pci33 at ppb32 bus 33
ppb33 at pci0 dev 24 function 7 "VMware PCIE" rev 0x01
pci34 at ppb33 bus 34
isa0 at Mainbus0
pckbc0 at isa0 port 0x60/5 irq 1 irq 12
pckbd0 at pckbc0 (kbd slot)
wskbd0 at pckbd0: console keyboard, using wsdisplay1
softraid0 at root
scsibus1 at softraid0: 256 targets
root on rd0a swap on rd0b dump on rd0b
erase ^?, werase ^W, kill ^U, intr ^C, status ^T

Welcome to the OpenBSD/amd64 6.6 installation program.
(I)nstall, (U)pgrade, (A)utoinstall or (S)hell?
```

Type i and [enter] to begin OpenBSD installation.

```
Welcome to the OpenBSD/amd64 6.6 installation program.
(I)nstall, (U)pgrade, (A)utoinstall or (S)hell? i
```

```
scsibus1 at softraid0: 256 targets
root on rd0a swap on rd0b dump on rd0b
erase ^?, werase ^W, kill ^U, intr ^C, status ^T

Welcome to the OpenBSD/amd64 6.6 installation program.
(I)nstall, (U)pgrade, (A)utoinstall or (S)hell? i
At any prompt except password prompts you can escape to a shell by
typing '!'. Default answers are shown in []'s and are selected by
pressing RETURN. You can exit this program at any time by pressing
Control-C, but this can leave your system in an inconsistent state.

Choose your keyboard layout ('?' or 'L' for list) [default]
System hostname? (short form, e.g. 'foo') sidota.tangerangkota.go.id

Available network interfaces are: em0 wlan0.
Which network interface do you wish to configure? (or 'done') [em0]
IPv4 address for em0? (or 'dhcp' or 'none') [dhcp] 192.168.34.132
Netmask for em0? [255.255.255.0] 255.255.255.0
IPv6 address for em0? (or 'autoconf' or 'none') [none]
Available network interfaces are: em0 wlan0.
Which network interface do you wish to configure? (or 'done') [done]
Default IPv4 route? (IPv4 address or none) 192.168.34.2
add net default: gateway 192.168.34.2
DNS domain name? (e.g. 'example.com') [tangerangkota.go.id]
DNS nameservers? (IP address list or 'none') [none] 103.50.218.31
```

Follow these steps

```
Choose your keyboard layout ('?' or 'L' for list) [default] [Press enter for default]
System hostname? (short form, e.g. 'foo') sidota.tangerangkota.go.id [Press Enter]
```

```

Available network interfaces are: em0 wlan0.
Which network interface do you wish to configure? (or 'done') [em0] [Press enter]
Ipv4 address for em0? (or 'dhcp' or 'none') [dhcp] 192.168.34.132
Netmask for em0? [255.255.255.0] 255.255.255.0
IPv6 address for em0? (or 'autoconf' or 'none') [none] [Press Enter]
Available network interfaces are: em0 wlan0
Which network interface do you wish to configure? (or 'done') [done] [Press Enter]
Default IPv4 route? (IPv4 address or none) 192.168.34.2
Add net default: gateway 192.168.34.2
DNS domain name? (e.g. 'example.com') [tangerangkota.go.id] [Press Enter]
DNS nameserver? (IP address list or 'none') [none] 103.50.218.31

```

NOTES :

Choose your own ip address. Press enter for dhcp ip address or defined your ip address, gateway, and DNS manually for static ip configuration.

```

Available disks are: wd0.
Which disk is the root disk? ('?' for details) [wd0]
No valid MBR or GPT.
Use (W)hole disk MBR, whole disk (G)PT or (E)dit? [whole]
Setting OpenBSD MBR partition to whole wd0...done.
The auto-allocated layout for wd0 is:
#          size      offset  fstype [fssize bsize  cpg]
  a:    634.6M            64  4.2BSD   2048 16384    1 # /
  b:    751.9M        1299648    swap
  c:  20480.0M              0  unused
  d:    895.3M        2839488  4.2BSD   2048 16384    1 # /tmp
  e:   1339.9M        4673088  4.2BSD   2048 16384    1 # /var
  f:   1984.6M        7417152  4.2BSD   2048 16384    1 # /usr
  g:    674.7M       11481536  4.2BSD   2048 16384    1 # /usr/X11R6
  h:   2477.7M       12863392  4.2BSD   2048 16384    1 # /usr/local
  i:   1493.8M       17937728  4.2BSD   2048 16384    1 # /usr/src
  j:   5507.7M       20997088  4.2BSD   2048 16384    1 # /usr/obj
  k:   4713.3M       32276768  4.2BSD   2048 16384    1 # /home
Use (A)uto layout, (E)dit auto layout, or create (C)ustom layout? [a] -

```

Disk partitioning step. You can choose **a** for auto layout partition, or **e** for editing or resizing partition, also you can choose **c** to create your own partition layout. In this case, i choose **a** to auto layout partition.

```
Use (A)uto layout, (E)dit auto layout, or create (C)ustom layout? [a] [Press Enter]
```

```

Let's install the sets!
Location of sets? (cd0 disk http nfs or 'done') [cd0]
Pathname to the sets? (or 'done') [6.6/amd64]

Select sets by entering a set name, a file name pattern or 'all'. De-select
sets by prepending a '-', e.g.: '-game*'. Selected sets are labelled '[X]'.
  [X] bsd           [X] comp66.tgz     [X] xbase66.tgz   [X] xserv66.tgz
  [X] bsd.rd        [X] man66.tgz     [X] xshare66.tgz
  [X] base66.tgz    [X] game66.tgz    [X] xfont66.tgz
Set name(s)? (or 'abort' or 'done') [done] -game*
  [X] bsd           [X] comp66.tgz     [X] xbase66.tgz   [X] xserv66.tgz
  [X] bsd.rd        [X] man66.tgz     [X] xshare66.tgz
  [X] base66.tgz    [ ] game66.tgz    [X] xfont66.tgz
Set name(s)? (or 'abort' or 'done') [done]
Directory does not contain SHA256.sig. Continue without verification? [no] yes
Installing bsd          100% :*****: 18250 KB  00:03
Installing bsd.rd        0% :          0      --:-- ETA

```

Choose packet to install. I deselect game66 from pakct installation because i don't need this. You can deselect packet from installation list with type **-packetname***

```
Set name(s)? (or 'abort' or 'done') [done] -game* [Press Enter]
Set name(s)? (or 'abort' or 'done') [done] [Press Enter]
```

```
Directory does not contain SHA256.sig. Continue without verification? [no] yes
Installing bsd      100% |*****| 18250 KB  00:03
Installing bsd.rd   100% |*****| 10058 KB  00:02
Installing base66.tgz 100% |*****| 236 MB   01:08
Extracting etc.tgz  100% |*****| 260 KB   00:00
Installing comp66.tgz 100% |*****| 72109 KB  00:24
Installing Man66.tgz 100% |*****| 7418 KB   00:02
Installing xbase66.tgz 100% |*****| 22092 KB  00:07
Extracting xetc.tgz  100% |*****| 7017 KB   00:00
Installing xshare66.tgz 100% |*****| 4482 KB   00:03
Installing xfont66.tgz 100% |*****| 39342 KB  00:10
Installing xserv66.tgz 100% |*****| 15757 KB  00:03
Location of sets? (cd0 disk http nfs or 'done') [done]
Time appears wrong. Set to 'Wed Nov 27 13:13:47 WIB 2019'? [yes]
Saving configuration files... done.
Making all device nodes... done.
Relinking to create unique kernel... done.

CONGRATULATIONS! Your OpenBSD install has been successfully completed!

When you login to your new system the first time, please read your mail
using the 'mail' command.
```

```
Exit to (S)hell, (H)alt or (R)eboot? [reboot] r
```

```
Location of sets? (cd0 disk http nfs or 'done') [done] [Press Enter]
Time appears wrong. Set to 'Wed Nov 27 13:13:47 WIB 2019'? [yes] [Press Enter]
```

Installation step has finished. You can reboot the server with type **r** then press [enter]

SESSION 2

IP ADDRESS, HOSTNAME, & SSH CONFIGURATION

A. SSH CONFIGURATION

For security reason, you must change your defaault ssh port to another free port.

```
# nano /etc/ssh/sshd_config
```

Example Change Line 11 : Port 22 -> Port 1212

```
Port 1212
#AddressFamily any
#ListenAddress 0.0.0.0
#ListenAddress ::
```

```
# rcctl restart sshd
```

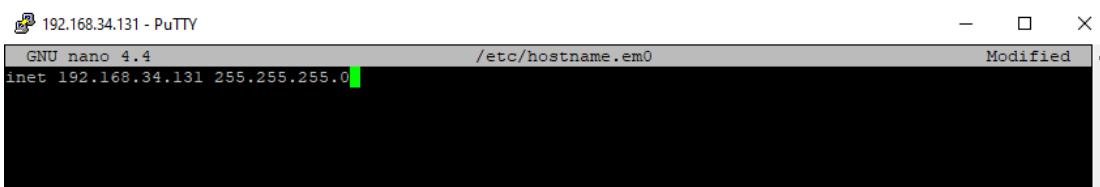
B. IP ADDRESS CONFIGURATION

Before we begin configuration step, for convenience, use the nano text editor to change configuration files. You can install nano text editor with this command.

```
# pkg_add nano
```

```
# nano /etc/hostname.[iface-name]
```

Add your ip address and netmask like this.



```
GNU nano 4.4          /etc/hostname.em0          Modified
inet 192.168.34.131 255.255.255.0
```

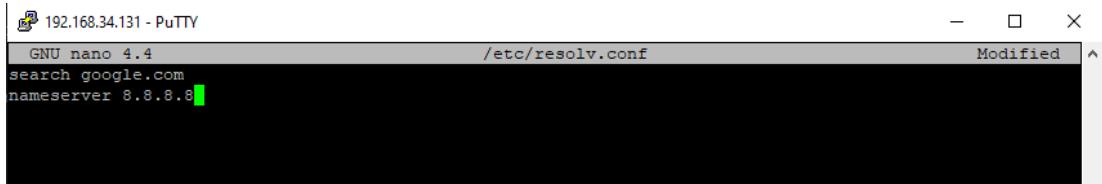
Add the gateway. By default, file /etc/mygate is unavailable. You can create it manually and add your ip gateway inside it.

```
# nano /etc/mygate
```

```
192.168.34.2
```

Next, add your ip DNS in /etc/resolv.conf

```
# nano /etc/resolv.conf
```



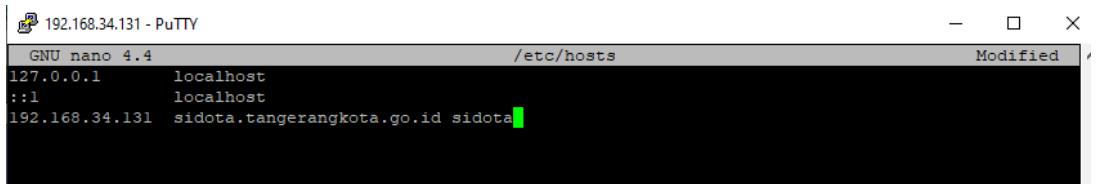
```
GNU nano 4.4                               /etc/resolv.conf                         Modified
search google.com
nameserver 8.8.8.8
```

Restart network service with this command

```
# sh /etc/netstart
```

C. HOSTNAME CONFIGURATION

```
# nano /etc/hosts
```



```
GNU nano 4.4                               /etc/hosts                                Modified
127.0.0.1      localhost
::1            localhost
192.168.34.131 sidota.tangerangkota.go.id sidota
```

```
# nano /etc/myname
```

Example

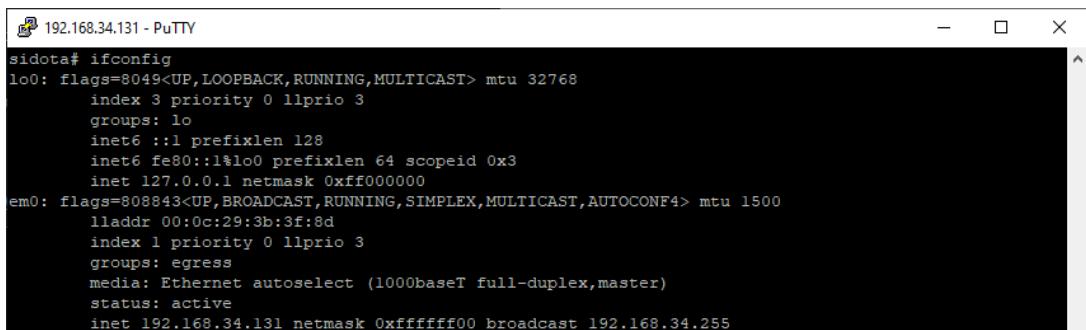
```
sidota.tangerangkota.go.id
```

```
sidota# hostname
sidota.tangerangkota.go.id
sidota# hostname -s
sidota
sidota#
```

```
# sh /etc/netstart
```

Check ip address and hostname

```
# ifconfig
```



```
sidota# ifconfig
lo0: flags=8049<UP,LOOPBACK,RUNNING,MULTICAST> mtu 32768
    index 3 priority 0 llprio 3
    groups: lo
    inet6 ::1 prefixlen 128
        inet6 fe80::1:1o0 prefixlen 64 scopeid 0x3
        inet 127.0.0.1 netmask 0xff000000
em0: flags=808843<UP,BROADCAST,RUNNING,SIMPLEX,MULTICAST,AUTOCONF4> mtu 1500
    lladdr 00:0c:29:3b:3f:8d
    index 1 priority 0 llprio 3
    groups: egress
    media: Ethernet autoselect (1000baseT full-duplex,master)
    status: active
    inet 192.168.34.131 netmask 0xffffffff broadcast 192.168.34.255
```

```
# hostname
```

```
sidota# hostname
sidota.tangerangkota.go.id
sidota# hostname -s
sidota
sidota#
```

SESSION 3

APACHE, PHP 7.3, & MySQL CONFIGURATION

A. APACHE, PHP 7.3, & MARIADB INSTALLATION

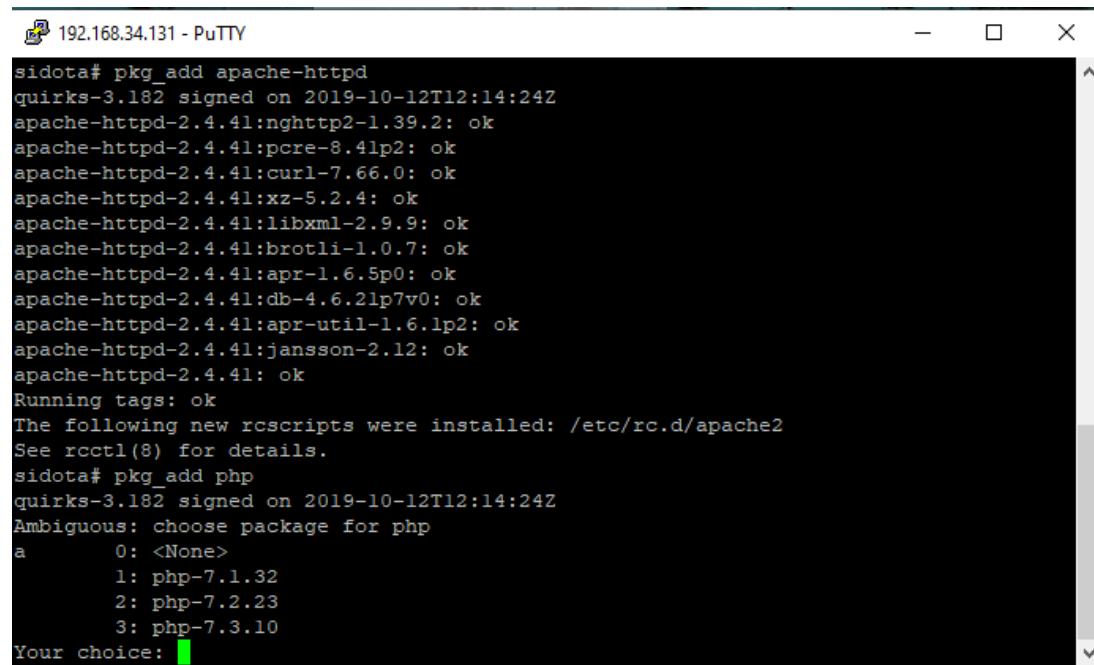
```
# pkg_add apache-httdp
```

Install PHP

```
# pkg_add php
```

Choose the newest version of php or following your desire. And then install php module/extension. Choose version of php modules same as php version.

```
# pkg_add php-gd php-pdo_mysql php-intl php-curl php-apache php-mysqli php-mcrypt php-zip
```



```
sidota# pkg_add apache-httdp
quirks-3.182 signed on 2019-10-12T12:14:24Z
apache-httdp-2.4.41:nhttp2-1.39.2: ok
apache-httdp-2.4.41:pcre-8.41p2: ok
apache-httdp-2.4.41:curl-7.66.0: ok
apache-httdp-2.4.41:xz-5.2.4: ok
apache-httdp-2.4.41:libxml-2.9.9: ok
apache-httdp-2.4.41:brotli-1.0.7: ok
apache-httdp-2.4.41:apr-1.6.5p0: ok
apache-httdp-2.4.41:db-4.6.2lp7v0: ok
apache-httdp-2.4.41:apr-util-1.6.1p2: ok
apache-httdp-2.4.41:jansson-2.12: ok
apache-httdp-2.4.41: ok
Running tags: ok
The following new rcscripts were installed: /etc/rc.d/apache2
See rcctl(8) for details.
sidota# pkg_add php
quirks-3.182 signed on 2019-10-12T12:14:24Z
Ambiguous: choose package for php
a      0: <None>
      1: php-7.1.32
      2: php-7.2.23
      3: php-7.3.10
Your choice:
```

Install MariaDB server

```
# pkg_add mariadb-server
```

Create symlink for php and php modules:

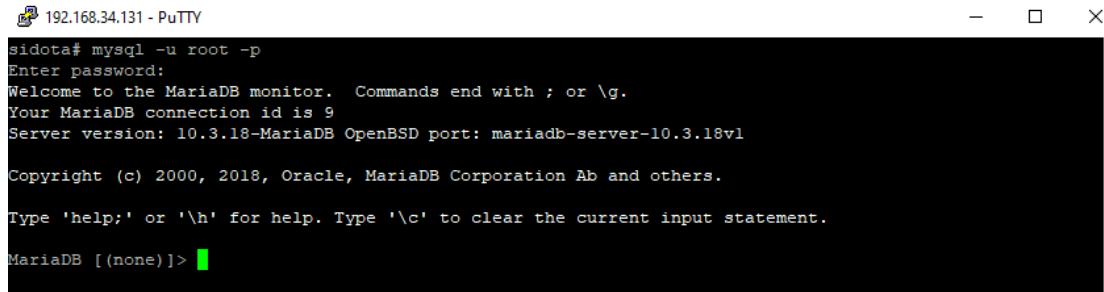
```
# ln -sf /var/www/conf/modules.sample/php-7.3.conf /var/www/conf/modules/php.conf
# ln -sf /etc/php-7.3.sample/curl.ini /etc/php-7.3/curl.ini
# ln -sf /etc/php-7.3.sample/gd.ini /etc/php-7.3/gd.ini
# ln -sf /etc/php-7.3.sample/intl.ini /etc/php-7.3/intl.ini
# ln -sf /etc/php-7.3.sample/mysqli.ini /etc/php-7.3/mysqli.ini
# ln -sf /etc/php-7.3.sample/opcache.ini /etc/php-7.3/opcache.ini
# ln -sf /etc/php-7.3.sample/pdo_mysql.ini /etc/php-7.3/pdo_mysql.ini
# ln -sf /etc/php-7.3.sample/zip.ini /etc/php-7.3/zip.ini
```

Set MySQL root Password

```
# mysql_install_db
# rcctl enable mysqld
# rcctl start mysqld
# mysqladmin -u root password "y0uRp455w0Rd"
```

Now you can remote your database as root user

```
# mysql -u root -p
```



```
sidota@ 192.168.34.131 - PuTTY
sidota# mysql -u root -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 9
Server version: 10.3.18-MariaDB OpenBSD port: mariadb-server-10.3.18vl

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> 
```

B. APACHE CONFIGURATION

```
# nano /etc/apache2/httpd2.conf
```

Follow instructions below

```
Uncomment Line 82 :
LoadModule rewrite_module /usr/local/lib/apache2/mod_rewrite.so

Uncomment and change Line 224 :
#ServerName www.example.com:80 -> ServerName sidota.tangerangkota.go.id:80

Change Line 215 :
ServerAdmin you@example.com -> ServerAdmin webadmin@tangerangkota.go.id

Change Line 262 :
Options Indexes FollowSymLinks -> Options -Indexes -MultiViews

Change Line 269 :
AllowOverride None -> AllowOverride All

Add index.php in line 282 :
DirectoryIndex index.html -> DirectoryIndex index.php index.html
```

```
Add this on line 420 :
AddType application/x-httpd-php .php
AddType application/x-httpd-php-source .phps
```

Save configuration and exit. Then start apache and php-fpm service.

```
# rcctl enable php73_fpm
# rcctl start php73_fpm
# rcctl enable apache2
# rcctl start apache2
```

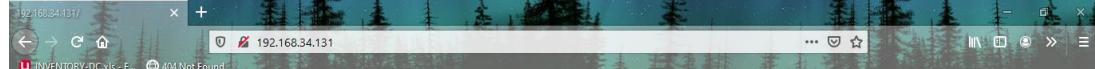
Create info.php file in /var/www/htdocs/ directory and write this script below.

```
# nano /var/www/htdocs/info.php
```

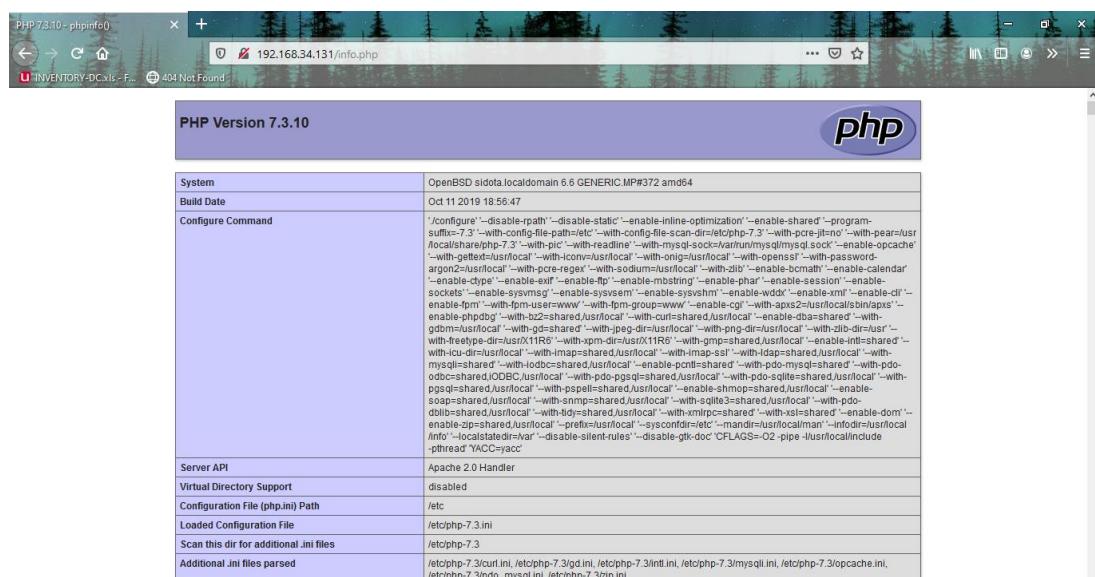


```
192.168.34.131 - PuTTY
GNU nano 4.4
<?php phpinfo();?>
```

Open your client's browser. Type your server's ip in browser URL. In this case, my ip is <http://192.168.34.131>. Also check php configuration in <http://192.168.34.131/info.php>



It works!



System	OpenBSD sidota.localdomain 6.6 GENERIC.MP#372 amd64
Build Date	Oct 11 2019 18:56:47
Configure Command	'/configure' '--disable-rpath' '--enable-static' '--enable-inline-optimization' '--enable-shared' '--program-suffix=-7.3' '--with-config-file-path=/etc' '--with-config-file-scan-dir=/etc/php-7.3' '--with-pcre-jit=no' '--with-pear=/usr/local/share/php-7.3' '--with-pic' '--with-readline' '--with-tls=openssl' '--with-xml' '--with-zip' '--with-xmlrpc' '--with-argon2' '--with-cgi' '--with-curl' '--with-dba' '--with-dom' '--with-domxml' '--with-domxsl' '--with-domxslt' '--with-embed' '--with-enchant' '--with-enchant-bomstr' '--enable-calendar' '--enable-dtrace' '--enable-exif' '--enable-ftp' '--enable-mbstring' '--enable-phar' '--enable-session' '--enable-sockets' '--enable-sysvmsg' '--enable-sysvshm' '--enable-wddx' '--enable-xim' '--enable-dri' '--enable-fpm' '--with-fpm-user=wwww' '--with-fpm-group=www' '--enable-cgi' '--with-apxs2=/usr/local/sbin/apxs' '--enable-phpdbg' '--with-bz2=shared,/usr/local' '--with-curl=shared,/usr/local' '--enable-dba=shared' '--with-gdsm=/usr/local' '--with-gdshared' '--with-jpeg=shared,/usr/local' '--with-png=shared,/usr/local' '--with-jbig2=shared,/usr/local' '--with-tiff=shared,/usr/local' '--with-pspell=shared,/usr/local' '--with-pspellshared' '--with-pspellshared=shared,/usr/local' '--with-imap=shared,/usr/local' '--with-imap-ssl' '--with-ldap=shared,/usr/local' '--with-mysqli=shared' '--with-odbc=shared,/ODBC/usr/local' '--with-pdo=pgsql=shared,/usr/local' '--with-pdo-mysql=shared' '--with-pdo-odbc=shared,/ODBC/usr/local' '--with-pdo-psql=shared,/usr/local' '--with-pdo-sqlite=shared,/usr/local' '--with-pgsql=shared,/usr/local' '--with-pspell=shared,/usr/local' '--enable-shmop=shared,/usr/local' '--enable-soap=shared,/usr/local' '--with-snmp=shared,/usr/local' '--with-sqlite3=shared,/usr/local' '--with-pdo-dblib=shared,/usr/local' '--with-tdb=shared,/usr/local' '--with-xmippc=shared' '--with-xsl=shared' '--enable-dom' '--enable-zip=shared,/usr/local' '--prefix=/usr/local' '--sysconfdir=/etc' '--mandir=/usr/local/man' '--infodir=/usr/local/info' '--localstatedir=/var' '--disable-silent-rules' '--disable-gtk-doc' 'CFLAGS=-O2 -pipe' '-I/usr/local/include' '-fthreadsafe' 'YACC=yacc'
Server API	Apache 2.0 Handler
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc
Loaded Configuration File	/etc/php-7.3.ini
Scan this dir for additional .ini files	/etc/php-7.3
Additional .ini files parsed	/etc/php-7.3/curl.ini, /etc/php-7.3/igbinary.ini, /etc/php-7.3/intl.ini, /etc/php-7.3/mysqli.ini, /etc/php-7.3/opcache.ini, /etc/php-7.3/pdo_mysql.ini, /etc/php-7.3/zip.ini