



一、实验项目名称

Linux 系统的网络服务

二、实验目的

1. 了解 Web 服务的基本概念。
2. 掌握 Apache 服务器的配置与使用。

三、实验要求

要求使用 Xshell 进行登录，具体操作如下：

1. 安装并启动 Apache 服务。

```

1 centos7
[root@localhost ~]# rpm -qa | grep httpd
httpd-tools-2.4.6-93.el7.centos.x86_64
httpd-2.4.6-93.el7.centos.x86_64
[root@localhost ~]# yum -y install httpd
已加载插件：fastestmirror
Loading mirror speeds from cached hostfile
dingjun | 3.6 kB 00:00:00
没有可用软件包 httpd。
错误：无须任何处理
[root@localhost ~]# yum -y install httpd
已加载插件：fastestmirror
Loading mirror speeds from cached hostfile
软件包 httpd-2.4.6-93.el7.centos.x86_64 已安装并且是最新版本
无须任何处理

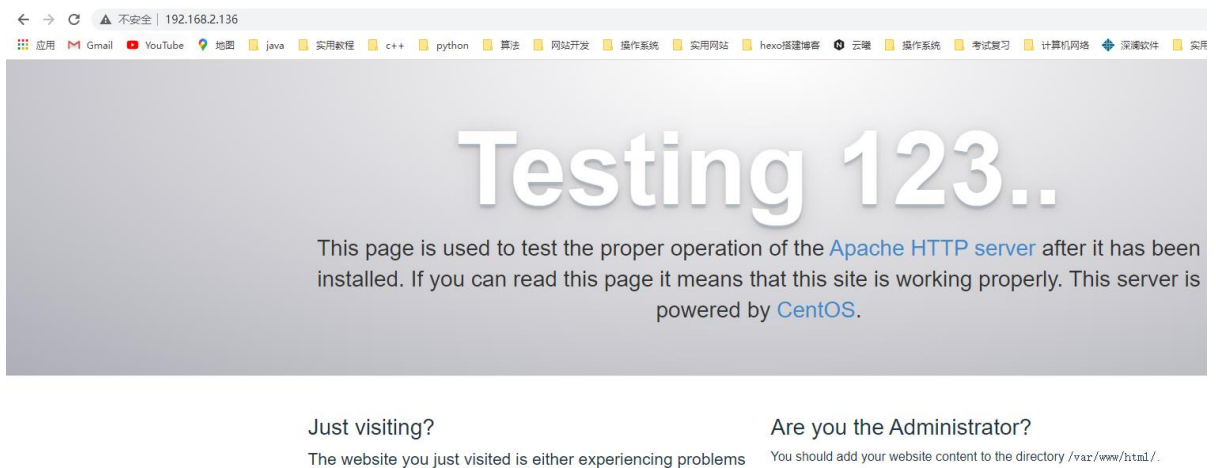
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[root@localhost ~]# systemctl start httpd
[root@localhost ~]# systemctl status httpd
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• httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; vendor preset: disabled)
   Active: active (running) since 六 2021-12-18 14:54:06 CST; 6min ago
     Docs: man:httpd(8)
           man:apachectl(8)
   Main PID: 1009 (httpd)
   Status: "Total requests: 0; Current requests/sec: 0; Current traffic: 0 B/sec"
   CGroup: /system.slice/httpd.service
           └─1009 /usr/sbin/httpd -DFOREGROUND
           └─1063 /usr/sbin/httpd -DFOREGROUND
           └─1064 /usr/sbin/httpd -DFOREGROUND
           └─1065 /usr/sbin/httpd -DFOREGROUND
           └─1066 /usr/sbin/httpd -DFOREGROUND
           └─1067 /usr/sbin/httpd -DFOREGROUND

```

```
[root@localhost ~]# firewall-cmd --permanent --add-port=80/tcp
Warning: ALREADY_ENABLED: 80:tcp 开放端口 8003119100丁俊
success
[root@localhost ~]# firewall-cmd --reload
success
```

在浏览器中访问 http:ip 地址成功



2. 在物理机的浏览器上访问主目录下以自己姓名命名的目录，要求以清单方式列出文件，需要验证。

```
[root@localhost ~]# cd /etc/httpd
[root@localhost httpd]# ls
conf  conf.d  conf.modules.d  logs  modules  run
[root@localhost httpd]# cd conf
[root@localhost conf]# ls
httpd.conf  magic
[root@localhost conf]# cp httpd.conf httpd.conf.bak
[root@localhost conf]# ls
httpd.conf  httpd.conf.bak  magic
[root@localhost conf]# cd /var/www/html
[root@localhost html]# ls
[root@localhost html]# mkdir dingjun
[root@localhost html]# ls
dingjun
[root@localhost html]# cd dingjun
[root@localhost dingjun]# echo "My name is dingjun" > dingjun.txt
[root@localhost dingjun]# ls
dingjun.txt
[root@localhost dingjun]# echo "My name is Dingjun" >> dingjun.html
[root@localhost dingjun]# ls
dingjun.html  dingjun.txt
```

因为我们没有在该目录写主页，默认会以文件列表清单进行显示。

← → ↻ 不安全 | 192.168.2.136/dingjun/ 8003119100丁俊

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Index of /dingjun

Name	Last modified	Size	Description
Parent Directory	-	-	
dingjun.html	2021-12-18 15:43	19	
dingjun.txt	2021-12-18 15:43	19	

显示文件清单

3. 基于 IP 地址的虚拟主机搭建，需要验证。

配置虚拟网卡的 ip 地址

```
[root@localhost sysconfig]# cd network-scripts/
[root@localhost network-scripts]# ls
ifcfg-ens33  ifdown-ippv  ifdown-routes  ifup  ifup-ipv6  ifup-ppp  ifup-tunnel
ifcfg-lo     ifdown-ipv6  ifdown-sit     ifup-aliases  ifup-isdn  ifup-routes  ifup-wireless
ifdown      ifdown-isdn  ifdown-Team    ifup-bnep     ifup-plip  ifup-sit    init.ipv6-global
ifdown-bnep ifdown-post  ifdown-TeamPort ifup-eth      ifup-plusb ifup-Team    network-functions
ifdown-eth  ifdown-ppp   ifdown-tunnel  ifup-ippv     ifup-post  ifup-TeamPort network-functions-ipv6
[root@localhost network-scripts]# vi ifcfg-ens33
```

添加 3 个虚拟网卡地址

```
TYPE="Ethernet"
PROXY_METHOD="none"
BROWSER_ONLY="no"
BOOTPROTO="static"
DEFROUTE="yes"
IPV4_FAILURE_FATAL="no"
IPV6INIT="yes"
IPV6_AUTOCONF="yes"
IPV6_DEFROUTE="yes"
IPV6_FAILURE_FATAL="no"
IPV6_ADDR_GEN_MODE="stable-privacy"
NAME="ens33"
UUID="1b9de83a-4912-40ee-9a57-c182a5f7db1d"
DEVICE="ens33"
ONBOOT="yes"
IPADDR=192.168.2.136
IPADDR1=192.168.2.201
IPADDR2=192.168.2.202
GATEWAY=192.168.2.1
NETMASK=255.255.255.0
```

重启网络服务

```
[root@localhost network-scripts]# systemctl restart network
```

在/var/www 目录中新建虚拟主机目录 DJ201、DJ202，并添加主页文件

```
[root@localhost network-scripts]# cd /var/www 8003119100丁俊
[root@localhost www]# mkdir DJ201
[root@localhost www]# mkdir DJ202
[root@localhost www]# ls
cgi-bin DJ201 DJ202 html
[root@localhost www]# echo "*****dingjun201*****" > 201/index.html
-bash: 201/index.html: 没有那个文件或目录
[root@localhost www]# echo "*****dingjun201*****" > DJ201/index.html
[root@localhost www]# ls
cgi-bin DJ201 DJ202 html
[root@localhost www]# cat DJ201
cat: DJ201: 是一个目录
[root@localhost www]# cat DJ201/index.html
*****dingjun201*****
```

```
[root@localhost www]# echo "*****dingjun202*****" > DJ202/index.html
[root@localhost www]# cat DJ202/index.html
*****dingjun202*****
[root@localhost www]#
```

切换到 http.conf 文件中

```
:e /etc/httpd/conf/httpd.conf
```

vi 切换到不同文件的操作

```
[root@localhost httpd]# mkdir myhost 8003119100丁俊
[root@localhost httpd]# ls
conf conf.d conf.modules.d logs modules myhost run
[root@localhost httpd]# vi conf/http.conf
[root@localhost httpd]# vi conf/httpd.conf
[root@localhost httpd]# vi myhost/DJ201.conf
[root@localhost httpd]# vi myhost/DJ202.conf
```

虚拟地址 192.168.2.201 的网站目录

```
<VirtualHost 192.168.2.201>
    DocumentRoot "/var/www/DJ201"
    DirectoryIndex index.html
    <Directory "/var/www/DJ201">
        Options Indexes FollowSymLinks
        AllowOverride None
        Require all granted
    </Directory>
</VirtualHost>
```


虚拟地址 192.168.2.202 的网站目录

```
<VirtualHost 192.168.2.202>
    DocumentRoot "/var/www/DJ202"
    DirectoryIndex index.html
<Directory "/var/www/DJ202">
    Options Indexes FollowSymLinks
    AllowOverride None
    Require all granted
</Directory>
</VirtualHost>
```

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```
[root@localhost httpd]# vi conf/httpd.conf
[root@localhost httpd]# systemctl restart httpd
```

把自定义的虚拟地址对应的目录包含到主配置文件 httpd.conf 中

```
# Supplemental configuration
#
# Load config files in the "/etc/httpd/conf.d" directory.
IncludeOptional conf.d/*.conf
IncludeOptional myhost/*.conf
```

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修改为自定义的目录

通过虚拟 ip 地址访问特定的网站目录

192.168.2.201

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*****dingjun201*****

192.168.2.202

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@@@@@@@dingjun202@@@@@@@

4. 基于端口号的虚拟主机搭建，需要验证。

```
eg1 01n 05201 05202 html
[root@localhost www]# mkdir 8081
[root@localhost www]# mkdir 8082
[root@localhost www]# echo "----dingjun8081----" > 8081/index.html
-bash: echo: 未找到命令
[root@localhost www]# echo "----dingjun8081----" > 8081/index.html
[root@localhost www]# echo "----dingjun8082----" > 8082/index.html
[root@localhost www]# cat 8081/index.html
----dingjun8081----
[root@localhost www]# cat 8082/index.html
----dingjun8082----
```

从 118 行这里开始复制 “a50yy

```
# Note that from this point forward you must specifically allow
# particular features to be enabled - so if something's not working as
# you might expect, make sure that you have specifically enabled it
# below.
#
#
# DocumentRoot: The directory out of which you will serve your
# documents. By default, all requests are taken from this directory, but
# symbolic links and aliases may be used to point to other locations.
DocumentRoot "/var/www/html"
#
# Relax access to content within /var/www.
#
<Directory "/var/www">
    AllowOverride None
    # Allow open access:
    Require all granted
</Directory>
```

```
<VirtualHost 192.168.2.136:8081>
    DocumentRoot "/var/www/8081"
    DirectoryIndex index.html
<Directory "/var/www/8081">
    Options Indexes FollowSymLinks
    AllowOverride None
    Require all granted
</Directory>
</VirtualHost>
~
~
~
```

```

<VirtualHost 192.168.2.136:8082>
    DocumentRoot "/var/www/8082"
    DirectoryIndex index.html
    <Directory "/var/www/8082">
        Options Indexes FollowSymLinks
        AllowOverride None
        Require all granted
    </Directory>
</VirtualHost>

```

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在 http.conf 配置文件中添加对 8081、8082 端口的监听

```

# ports, instead of the default. See also the <VirtualHost>
# directive.
#
# Change this to Listen on specific IP addresses as shown
# below to
# prevent Apache from glomming onto all bound IP addresses
#
#Listen 12.34.56.78:80
Listen 80
Listen 8081
Listen 8082
#
# Dynamic Shared Object (DSO) Support
#
# To be able to use the functionality of a module which was
# built as a DSO you

```

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增加8081、8082的监听

重启 httpd 服务

```
[root@localhost myhost]# systemctl restart httpd
```

通过端口访问特定网站目录

← → ↻ ⚠ 不安全 | 192.168.2.136:8081

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----dingjun8081----

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← → ↻ 不安全 | 192.168.2.136:8082 > ☆
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----dingjun8082----

5. 个人 Web 站点的发布，需要验证。

编辑 userdir.conf 文件

```
[root@localhost httpd]# cd conf.d
[root@localhost conf.d]# ls
autoindex.conf  README  userdir.conf  welcome.conf
[root@localhost conf.d]# cp userdir.conf userdir.conf.bak
[root@localhost conf.d]# vi userdir.conf
```

除 root 用户以外都可以使用，配置用户的目录位置

```
# of a username on the system (depending on home dir
# permissions).
#
UserDir disabled root

#
# To enable requests to /~user/ to serve the user's
html
# directory, remove the "UserDir disabled" line above
uncomment
# the following line instead:
#
UserDir public_html
</IfModule>
```

```
"
<Directory "/home/*/public_html">
    AllowOverride None
    Options None
    Require method GET POST OPTIONS
</Directory>
```

重启 httpd 服务生效>

创建用户修改密码


```
[root@localhost conf.d]# useradd dingjun
正在创建信箱文件：文件已存在
[root@localhost conf.d]# passwd dingjun
更改用户 dingjun 的密码 。
新的 密码：
重新输入新的 密码：
抱歉，密码不匹配。
新的 密码：
重新输入新的 密码：
passwd: 所有的身份验证令牌已经成功更新。
```

配置用户页面主页文件 Index.html

```
[root@localhost dingjun]# cd /home/dingjun
[root@localhost dingjun]# cd public_html/
[root@localhost public_html]# ls
index.html
```

```
This is dingjun's SITE
~
~
```



The screenshot shows a web browser window with the address bar displaying '192.168.2.136/~dingjun/'. The page content is 'This is dingjun's SITE'. The browser's toolbar includes links to '应用', 'Gmail', 'YouTube', '地图', 'java', '实用教程', 'c++', 'python', and '算法'.

6. 按照给定参考资料对 Apache 服务器进行个性化定制服务。（选做）

一、配置默认主页为 jsp

在 DirectoryIndex 参数上第一个添加为 index.jsp, 这样 apache 会自动寻找/var/www/html 中的 index.jsp 页面作为主页，如果没有就用 index.html 作为主页。

```
#
# DirectoryIndex: sets the file that Apache will serve if a directory
# is requested.
#
<IfModule dir_module>
    DirectoryIndex index.jsp index.html
</IfModule>

#
```

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添加 jsp 表单作为网址主页面

```
<%@ page language="java" contentType="text/html; charset=UTF-8"
    pageEncoding="UTF-8"%>
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
<title>Insert title here</title>
</head>
<body>
    <h1>欢迎来到丁俊的表单 </h1>
    <form action="beandemo.jsp" method="post">
        用户名:<input type="text" name="username">
        密码:<input type="password" name="password">
        <input type="submit" value="Submit">
    </form>
</body>
</html>
```

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主页改成jsp页面-表单

直接用服务器 ip 访问

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<%@ page language="java" contentType="text/html; charset=UTF-8" pageEncoding="UTF-8"%>

欢迎来到丁俊的表单

用户名: 密码:

二、当客户请求的网页不存在，提示 apache 的版本信息

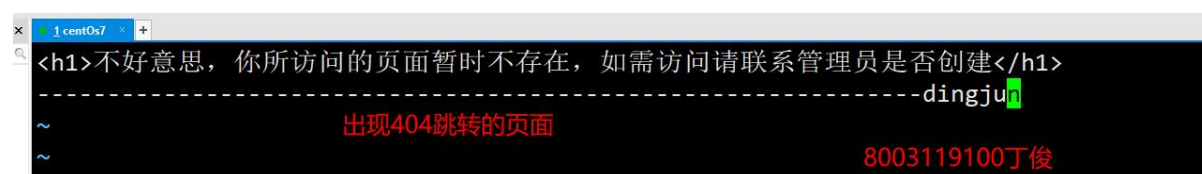


三、配置 404NotFound 页面

```
#
# Some examples:
#ErrorDocument 500 "The server made a boo boo."
ErrorDocument 404 /error.html
#ErrorDocument 404 "/cgi-bin/missing_handler.pl"
#ErrorDocument 402 http://www.example.com/subscription_info.html
#
```

在/var/www/html 目录下添加 error.html 文件，如下

```
[root@localhost html]# ls
dingjun  error.html  index.jsp
```



访问不存在的页面 404 跳转到自定义界面。



四、主要仪器设备及耗材

计算机、VMware、CentOS 7、word

五、实验步骤

六、实验数据及处理结果

七、思考讨论题或体会或对改进实验的建议

通过本次实验，我学会了如何在 linux 系统上通过 Apache 服务配置虚拟主机和个人站点，并可以访问到。

八、参考资料

[1] 文东戈,赵艳芹.Linux 操作系统实用教程（第 2 版）[M].北京：清华大学出版社.2019,9.