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Linux与云计算——第二阶段Linux服务器架设 第六章：目录Directory服务器架设—FreeIPA

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Linux与云计算——第二阶段Linux服务器架设

第六章：目录Directory服务器架设—FreeIPA

1 FreeIPA 配置FreeIPA服务器

Configure IPA Server to share users' account in your local network.

[1] Install FreeIPA.

[root@dlp ~]# yum -y install ipa-server ipa-server-dns bind bind-dyndb-ldap

[2] Setup FreeIPA Server.

[root@dlp ~]# vi /etc/hosts

add own IP

10.0.0.30 dlp.srv.world dlp

[root@dlp ~]# ipa-server-install --setup-dns

The log file for this installation can be found in /var/log/ipaserver-install.log

=====

This program will set up the IPA Server.

This includes:

* Configure a stand-alone CA (dogtag) for certificate management

* Configure the Network Time Daemon (ntpd)

* Create and configure an instance of Directory Server

* Create and configure a Kerberos Key Distribution Center (KDC)

* Configure Apache (httpd)

To accept the default shown in brackets, press the Enter key.

setup DNS (existing BIND settings is over-written)

Existing BIND configuration detected, overwrite? [no]: yes

Enter the fully qualified domain name of the computer on which you're setting up server software. Using the form <hostname>.<domainname>

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```
Example: master.example.com.

# confirm the hostname and Enter
Server host name [dlp.srv.world]:

The domain name has been determined based on the host name.

# confirm the domain name and Enter
Please confirm the domain name [srv.world]:

The kerberos protocol requires a Realm name to be defined.
This is typically the domain name converted to uppercase.

# confirm realm name and Enter
Please provide a realm name [SRV.WORLD]:
Certain directory server operations require an administrative user.
This user is referred to as the Directory Manager and has full access
to the Directory for system management tasks and will be added to the
instance of directory server created for IPA.
The password must be at least 8 characters long.

# Directory Manager's password
Directory Manager password:
Password (confirm):

The IPA server requires an administrative user, named 'admin'.
This user is a regular system account used for IPA server administration.

# IPA admin's password
IPA admin password:
Password (confirm):

# answer with yes or no for setting DNS forwarder
Do you want to configure DNS forwarders? [yes]:
Enter the IP address of DNS forwarder to use, or press Enter to finish.
# specify DNS forwarder's IP if you set DNS forwarder
Enter IP address for a DNS forwarder: 10.0.0.10
DNS forwarder 10.0.0.10 added
# Enter with empty if DNS forwarder is OK
Enter IP address for a DNS forwarder:
# answer with yes or no for setting reverse zone
Do you want to configure the reverse zone? [yes]:
# reverse zone name if you set reverse zone
Please specify the reverse zone name [0.0.10.in-addr.arpa.]:

The IPA Master Server will be configured with:
Hostname:          dlp.srv.world
IP address:        10.0.0.30
Domain name:       srv.world
Realm name:        SRV.WORLD

BIND DNS server will be configured to serve IPA domain with:
Forwarders:        10.0.0.10
Reverse zone:      0.0.10.in-addr.arpa.

# confirm settings and proceed with "yes"
Continue to configure the system with these values? [no]: yes

The following operations may take some minutes to complete.
Please wait until the prompt is returned.

Configuring NTP daemon (ntpd)
...
...
...

=====
Setup complete

Next steps:
```

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```
1. You must make sure these network ports are open:
    TCP Ports:
        * 80, 443: HTTP/HTTPS
        * 389, 636: LDAP/LDAPS
        * 88, 464: kerberos
    UDP Ports:
        * 88, 464: kerberos
        * 123: ntp

2. You can now obtain a kerberos ticket using the command: 'kinit
admin'

    This ticket will allow you to use the IPA tools (e.g., ipa user-
add)

    and the web user interface.

Be sure to back up the CA certificate stored in /root/cacert.pl2
This file is required to create replicas. The password for this
file is the Directory Manager password
[3] Get Kerberos tickets and change default shell.
[root@dlp ~]# kinit admin
Password for admin@SRV.WORLD:# IPA admin password
[root@dlp ~]# klist # confirm
Ticket cache: KEYRING:persistent:0:0
Default principal: admin@SRV.WORLD

Valid starting                Expires                Service principal
03/21/2015 14:25:53          03/24/2015 14:25:50  krbtgt/SRV.WORLD@SRV.WORLD

[root@dlp ~]# ipa config-mod --defaultshell=/bin/bash
Maximum username length: 32
Home directory base: /home
Default shell: /bin/bash
Default users group: ipausers
Default e-mail domain: srv.world
Search time limit: 2
Search size limit: 100
User search fields: uid,givenname,sn,telephonenumber,ou,title
Group search fields: cn,description
Enable migration mode: FALSE
Certificate Subject base: O=SRV.WORLD
Password Expiration Notification (days): 4
Password plugin features: AllowNthash
SELinux user map order: guest_u:s0$guest_u:s0$user_u:s0$staff_u:s0-
s0:c0.c1023$unconfined_u:s0-s0:c0.c1023
Default SELinux user: unconfined_u:s0-s0:c0.c1023
Default PAC types: MS-PAC
[4] If Firewalld is running, allow FreeIPA services.
[root@dlp ~]# firewall-cmd --add-service={ssh,dns,freeipa-ldap,freeipa-ldaps} --
permanent
success
[root@dlp ~]# firewall-cmd --reload
Success

2 增加用户账户

    Add User Accounts on FreeIPA Server.
[1] Add a user. The password set on here is required to change at initial login.
[root@dlp ~]# ipa user-add cent --first=CentOS --last=Linux --password
Password:# set password
Enter Password again to verify:

-----
Added user "cent"

-----

User login: cent
First name: CentOS
Last name: Linux
Full name: CentOS Linux
Display name: CentOS Linux
Initials: CL
Home directory: /home/cent
```



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```

GECOS field: CentOS Linux
Login shell: /bin/bash
Kerberos principal: cent@SRV.WORLD
Email address: cent@srv.world
UID: 1219600001
GID: 1219600001
Password: True
Kerberos keys available: True

# confirm
[root@dlp ~]# ipa user-find cent
-----
1 user matched
-----
User login: cent
First name: CentOS
Last name: Linux
Home directory: /home/cent
Login shell: /bin/bash
Email address: cent@srv.world
UID: 1219600001
GID: 1219600001
Account disabled: False
Password: True
Kerberos keys available: True
-----
Number of entries returned 1
[2] Add Existing local Users to IPA Directory ( set the same password with the
username on this example, but it is required to change at initial login )
[root@dlp ~]# vi ipauser.sh
# extract local users who have 1000-9999 digit UID
# this is an example
#!/bin/bash

for line in `grep "x:[1-9][0-9][0-9][0-9]:" /etc/passwd`
do
    USER=`echo $line | cut -d: -f1`
    FIRST=`echo $line | cut -d: -f5 | awk {'print $1'}`
    LAST=`echo $line | cut -d: -f5 | awk {'print $2'}`

    [ ! "$FIRST" ] && FIRST=$USER
    [ ! "$LAST" ] && LAST=$USER

    echo $USER | ipa user-add $USER --first=$FIRST --last=$LAST --password
done
[root@dlp ~]# sh ipauser.sh
-----
Added user "redhat"
-----
User login: redhat
First name: redhat
Last name: redhat
Full name: redhat redhat
Display name: redhat redhat
Initials: rr
Home directory: /home/redhat
GECOS field: redhat redhat
Login shell: /bin/bash
Kerberos principal: redhat@SRV.WORLD
Email address: redhat@srv.world
UID: 1219600003
GID: 1219600003
Password: True
Kerberos keys available: True
-----
Added user "ubuntu"
-----
User login: ubuntu
First name: ubuntu

```

```

Last name: ubuntu
Full name: ubuntu ubuntu
Display name: ubuntu ubuntu
Initials: uu
Home directory: /home/ubuntu
GECOS field: ubuntu ubuntu
Login shell: /bin/bash
Kerberos principal: ubuntu@SRV.WORLD
Email address: ubuntu@srv.world
UID: 1219600004
GID: 1219600004
Password: True
Kerberos keys available: True

```

3 配置FreeIPA客户端

Configure FreeIPA Client to connect to FreeIPA Server.

[1] Add DNS entry for FreeIPA client on FreeIPA server first.

```
# ipa dnsrecord-add [domain name] [record name] [record type] [record]
```

```
[root@dlp ~]# ipa dnsrecord-add srv.world client01 --a-rec 10.0.0.51
```

```
Record name: client01
```

```
A record: 10.0.0.51
```

[2] Install Client tools on FreeIPA Client Host and change DNS settings.

```
[root@client01 ~]# yum -y install ipa-client
```

```
[root@client01 ~]# nmcli c modify enol6777736 ipv4.dns 10.0.0.30
```

```
[root@client01 ~]# nmcli c down enol6777736; nmcli c up enol6777736
```

[3] Setup as a FreeIPA Client. Sync time with FreeIPA server before it.

```
[root@client01 ~]# ipa-client-install
```

Discovery was successful!

Hostname: client01.srv.world

Realm: SRV.WORLD

DNS Domain: srv.world

IPA Server: dlp.srv.world

BaseDN: dc=srv,dc=world

```
# confirm settings and proceed with "yes"
```

Continue to configure the system with these values? [no]: yes

```
# answer with admin
```

User authorized to enroll computers: admin

Synchronizing time with KDC...

Unable to sync time with IPA NTP server, assuming the time is in sync. Please check that 123 UDP port is opened.

Password for admin@SRV.WORLD:

Successfully retrieved CA cert

```
Subject:      CN=Certificate Authority,O=SRV.WORLD
```

```
Issuer:       CN=Certificate Authority,O=SRV.WORLD
```

```
Valid From:   Fri Mar 20 01:42:15 2015 UTC
```

```
Valid Until:  Tue Mar 20 01:42:15 2035 UTC
```

Enrolled in IPA realm SRV.WORLD

```
.....
```

```
.....
```

Configured /etc/ssh/ssh_config

Configured /etc/ssh/sshd_config

Client configuration complete.

```
# configure mkhomedir if you need ( homedirs of users are created at initial login )
```

```
[root@client01 ~]# authconfig --enablemkhomedir --update
```

getsebool: SELinux is disabled

```
[root@client01 ~]# exit
```

logout

CentOS Linux 7 (Core)

Kernel 3.10.0-123.20.1.el7.x86_64 on an x86_64

client01 login: redhat # IPA user

Password: # password

Password expired. Change your password now. # required to change the password when initial login

Current Password: # current password

New password: # new password

Retype new password:

```
Creating home directory for redhat.  
[redhat@client01 ~]$ # just logged in
```

4 基础配置

```
[1] Add a FreeIPA user account.  
[root@dlp ~]# ipa user-add cent --first=CentOS --last=Linux --password  
Password:  
Enter Password again to verify:
```

```
-----  
Added user "cent"
```

```
-----  
User login: cent  
First name: CentOS  
Last name: Linux  
Full name: CentOS Linux  
Display name: CentOS Linux  
Initials: CL  
Home directory: /home/cent  
GECOS field: CentOS Linux  
Login shell: /bin/bash  
Kerberos principal: cent@SRV.WORLD  
Email address: cent@srv.world  
UID: 1781800001  
GID: 1781800001  
Password: True  
Kerberos keys available: True
```

```
[2] Lock or unlock a FreeIPA user.  
[root@dlp ~]# ipa user-disable cent
```

```
-----  
Disabled user account "cent"
```

```
-----  
[root@dlp ~]# ipa user-enable cent
```

```
-----  
Enabled user account "cent"
```

```
[3] Search a FreeIPA user.  
[root@dlp ~]# ipa user-find cent
```

```
-----  
1 user matched
```

```
-----  
User login: cent  
First name: CentOS  
Last name: Linux  
Home directory: /home/cent  
Login shell: /bin/bash  
Email address: cent@srv.world  
UID: 1781800001  
GID: 1781800001  
Account disabled: False  
Password: True  
Kerberos keys available: True
```

```
-----  
Number of entries returned 1
```

```
-----  
[root@dlp ~]# ipa user-show --raw cent  
uid: cent  
givenname: CentOS  
sn: Linux  
homedirectory: /home/cent  
loginshell: /bin/bash  
mail: cent@srv.world  
uidnumber: 1781800001  
gidnumber: 1781800001  
nsaccountlock: False  
has_password: True  
has_keytab: True  
[4] Delete a FreeIPA user.  
[root@dlp ~]# ipa user-del cent
```

```
Deleted user "cent"
```

```
[5] Add a FreeIPA group.
[root@dlp ~]# ipa group-add --desc='Development Group' development
```

```
Added group "development"
```

```
Group name: development
Description: Development Group
GID: 1781800006
```

```
[6] Add members in a FreeIPA group.
[root@dlp ~]# ipa group-add-member --users=redhat,ubuntu development
Group name: development
Description: Development Group
GID: 1781800006
Member users: redhat, ubuntu
```

```
Number of members added 2
```

```
[7] Add a group in a FreeIPA group.
[root@dlp ~]# ipa group-add-member --groups=development hiroshima
Group name: hiroshima
Description: State Group
GID: 1781800007
Member groups: development
```

```
Number of members added 1
```

```
[8] Search a FreeIPA group.
[root@dlp ~]# ipa group-find development
```

```
1 group matched
```

```
Group name: development
Description: Development Group
GID: 1781800006
Member users: redhat, ubuntu
Member of groups: hiroshima
```

```
Number of entries returned 1
```

```
[9] Delete a FreeIPA group.
[root@dlp ~]# ipa group-del hiroshima
```

```
Deleted group "hiroshima"
```

5 使用WEB图形化界面

It's possible to operate FreeIPA Server on Web Management Console.

[1] Start Web browser on any Client on the same network of FreeIPA Server and access to "https://(FreeIPA server's hostname or IP address)/", then, login form to IPA server is shown like follows. Login with a FreeIPA user. This example use admin user like follows.

[2] Just logged noramlly. It's possible to operate FreeIPA server on GUI easily.

6 FreeIPA Replication

Configure FreeIPA Replication.

[1] Install FreeIPA server's tools on the Replica Host and change DNS settings.

```
[root@repl01 ~]# yum -y install ipa-server ipa-server-dns bind bind-dyndb-ldap
# change DNS to FreeIPA server
[root@repl01 ~]# nmcli c modify eno16777736 ipv4.dns 10.0.0.30
[root@repl01 ~]# nmcli c down eno16777736; nmcli c up eno16777736
[2] Add DNS entry for Replica Host on FreeIPA server.
```

```
# ipa dnsrecord-add [domain name] [record name] [record type] [record]
[root@dlp ~]# ipa dnsrecord-add srv.world repl01 --a-rec 10.0.0.61
Record name: repl01
A record: 10.0.0.61

[root@dlp ~]# ipa-replica-prepare repl01.srv.world --ip-address 10.0.0.61
Directory Manager (existing master) password:          # Directory Manager password

Preparing replica for repl01.srv.world from dlp.srv.world
Creating SSL certificate for the Directory Server
Creating SSL certificate for the dogtag Directory Server
Creating SSL certificate for the Web Server
Exporting RA certificate
Copying additional files
Finalizing configuration
Packaging replica information into /var/lib/ipa/replica-info-repl01.srv.world.gpg
Adding DNS records for repl01.srv.world
Using reverse zone 0.0.10.in-addr.arpa.

# transfer generated key to Replica Host
[root@dlp ~]# scp /var/lib/ipa/replica-info-repl01.srv.world.gpg
root@repl01.srv.world:/var/lib/ipa/
root@repl01.srv.world's password:
replica-info-repl01.srv.world.gpg 100% 35KB 34.6KB/s 00:00
[3] On FreeIPA server, If Firewalld is running, allow FreeIPA replication service.
[root@dlp ~]# firewall-cmd --add-service=freeipa-replication --permanent
success
[root@dlp ~]# firewall-cmd --reload
Success
[4] On FreeIPA replication Host, If Firewalld is running, allow FreeIPA services.
[root@repl01 ~]# firewall-cmd --add-service={ssh,dns,freeipa-ldap,freeipa-ldaps,freeipa-replication} --permanent
success
[root@repl01 ~]# firewall-cmd --reload
Success
[5] Setup as a Replica Server on FreeIPA Replica.
The following example set "--no-forwarders" for DNS, but if you set it, specify
like "--forwarder=x.x.x.x".
[root@repl01 ~]# ipa-replica-install --setup-ca --setup-dns --no-forwarders
/var/lib/ipa/replica-info-repl01.srv.world.gpg
Directory Manager (existing master) password:          # Directory Manager password

Run connection check to master
Check connection from replica to remote master 'dlp.srv.world':
Directory Service: Unsecure port (389): OK
Directory Service: Secure port (636): OK
Kerberos KDC: TCP (88): OK
Kerberos Kpasswd: TCP (464): OK
HTTP Server: Unsecure port (80): OK
HTTP Server: Secure port (443): OK
PKI-CA: Directory Service port (7389): OK

The following list of ports use UDP protocol and would need to be
checked manually:
Kerberos KDC: UDP (88): SKIPPED
Kerberos Kpasswd: UDP (464): SKIPPED

Connection from replica to master is OK.
Start listening on required ports for remote master check
Get credentials to log in to remote master
admin@SRV.WORLD password:          # admin password

Execute check on remote master
.....
.....
Global DNS configuration in LDAP server is empty
You can use 'dnsconfig-mod' command to set global DNS options that
would override settings in local named.conf files
```



```
Restarting the web server
[6] Get Kerberos tickets on Replica Host and make sure it's possible to get datas on
FreeIPA Directory. If possible, it's OK to setup replication settings.
    For FreeIPA Clients, it's not necessary to set additional settings, Clients can
continue to authenticate even if a Server is down.
[root@repl01 ~]# kinit admin
Password for admin@SRV.WORLD:          # admin password
[root@repl01 ~]# klist
Ticket cache: KEYRING:persistent:0:0
Default principal: admin@SRV.WORLD

Valid starting                Expires                Service principal
03/21/2015 15:13:38    03/24/2015 15:13:35    krbtgt/SRV.WORLD@SRV.WORLD

[root@repl01 ~]# ipa user-find
-----
4 users matched
-----
    User login: admin
    Last name: Administrator
    Home directory: /home/admin
    Login shell: /bin/bash
    UID: 1219600000
    GID: 1219600000
    Account disabled: False
    Password: True
    Kerberos keys available: True

    User login: cent
    First name: CentOS
    Last name: Linux
    Home directory: /home/cent
    Login shell: /bin/bash
    Email address: cent@srv.world
    UID: 1219600001
    GID: 1219600001
    Account disabled: False
    Password: True
    Kerberos keys available: True
.....
.....
```

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