



链滴

## 3- 利用 cobbler 实现自动化安装

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## 7 利用cobbler实现自动化安装

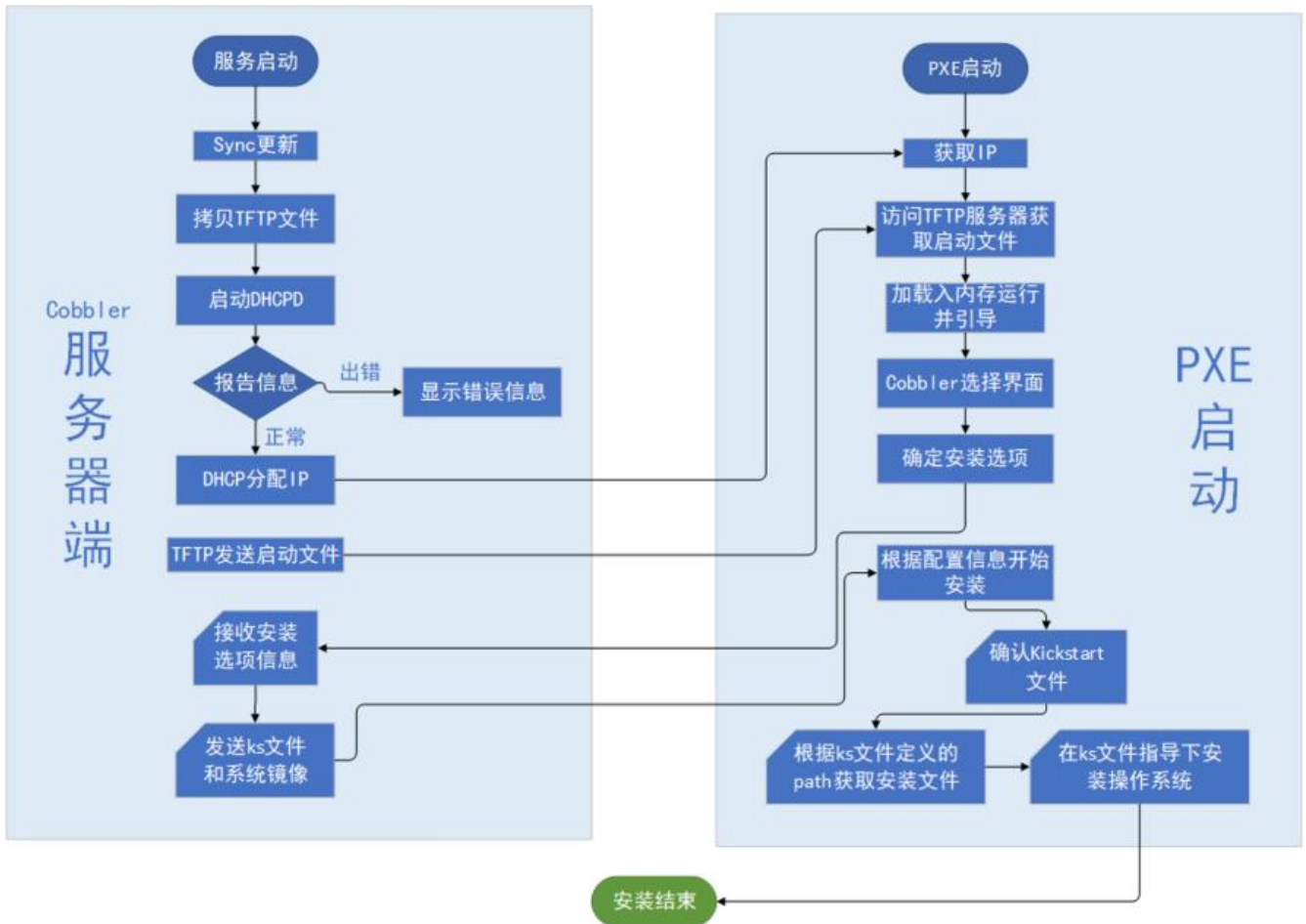
### 7.1 Cobbler简介

- Cobbler是一款Linux生态的自动化运维工具，基于Python2开发，用于自动化批量部署安装操作系统；其提供基于CLI的管理方式和WEB配置界面，其中WEB配置界面是基于Python2和Django框架开发另外，cobbler还提供了API，方便二次开发。Cobbler属于C/S模型(客户端/服务器模型)
- Cobbler主要用于快速网络安装linux操作系统，支持众多的Linux发行版如：Red Hat、Fedora、CentOS、Debian、Ubuntu和SuSE等，甚至支持windows的安装
- Cobbler实质是PXE的二次封装，将多种安装参数封装到一起，并提供统一的管理方法
- 官方文档: <https://cobbler.readthedocs.io/en/latest/index.html>

### 7.2 Cobbler的相关服务

- 使用Cobbler安装系统需要一台专门提供各种服务的服务器，提供的服务包括(HTTP/FTP/NFS,TFTP/DHCP),也可以将这几个服务分别部署到不同服务器。事实上在实际应用中，总是将不同的服务分别署到专门的服务器。
- Cobbler是在HTTP、TFTP、DHCP等各种服务的基础上进行相关操作的，实际安装的大体过程类于基于PXE的网络安装:客户端(裸机)开机使用网卡引导启动，其请求DHCP分配一个地址后从TFTP服务器获取启动文件,加载到客户端本地内存中运行，并显示出可安装的系统列表；在人为的选定安装的系统类型后,客户端会到HTTP服务器下载相应的系统安装文件并执行自动安装

### 7.3 Cobbler的工作原理



- client裸机配置了从网络启动后，开机后会广播包请求DHCP服务器（cobbler server）发送其分配的一个IP
- DHCP服务器（cobbler server）收到请求后发送response，包括其ip地址
- client裸机拿到ip后再向cobbler server发送请求OS引导文件的请求
- cobbler server告诉裸机OS引导文件的名字和TFTP server的ip和port
- client裸机通过上面告知的TFTP server地址通信，下载引导文件client裸机执行该引导文件，定加载信息，选择要安装的os，期间会再向cobbler server请求kickstart文件和os image
- cobbler server发送请求的kickstart和os image
- client裸机加载kickstart文件
- client裸机接收os image，安装该os image

## 7.4 安装Cobbler及其相关的服务和组件

Cobbler所依赖的服务包括HTTPD,TFTP,DHCP等，如果有web界面要求，还需要安装相关的组件  
CentOS 8目前还没有提供Cobbler相关包

```
[18:57:52 root@centos7 ~]#yum install -y dhcp cobbler cobbler-web pykickstart
[19:00:53 root@centos7 ~]#systemctl enable --now cobblerd.service httpd.service tftp.socket dhcpd.service
```

相关包说明：

- httpd: 提供yum源, 并配合cobble-web使得cobble可以通过web网页界面进行配置管理
- tftp-server: 提供启动和菜单等相关文件网络下载功能
- cobble-web : 提供基于web的cobble管理界面
- pykickstart.noarch : 基于python的管理kickstart文件的库

#### 说明:

- Cobble依赖于epel源, 在安装cobble之前需要配置epel源
- 在安装cobble时会自因为依赖而安装httpd,tftp-server相关包

## 7.5 Cobble配置文件及各目录情况

### 7.5.1 配置文件

```

/etc/cobbler/settings      #cobbler 主配置文件
/etc/cobbler/iso/         #iso模板配置文件
/etc/cobbler/pxe          #pxe模板文件
/etc/cobbler/power        #电源配置文件
/etc/cobbler/user.conf    #web服务授权配置文件
/etc/cobbler/users.digest #web访问的用户名密码配置文件
/etc/cobbler/dhcp.template #dhcp服务器的配置模板
/etc/cobbler/dnsmasq.template #dns服务器的配置模板
/etc/cobbler/tftpd.template #tftp服务的配置模板
/etc/cobbler/modules.conf #cobbler模块的配置文件

```

### 7.5.2 数据目录

```

/var/lib/cobbler/config/   #用于存放distros, system, profiles 等信息的配置文件
/var/lib/cobbler/triggers/ #用于存放用户定义的cobble命令
/var/lib/cobbler/kickstarts/ # 默认存放kickstart文件
/var/lib/cobbler/loaders/  #存放各种引导程序

```

### 7.5.3 镜像目录

```

/var/www/cobbler/ks_mirror/ #导入的发行版系统的所有数据
/var/www/cobbler/images/    #导入发行版kernel和initrd镜像用于远程网络启动
/var/www/cobbler/repo_mirror/ #yum 仓库存储目录

```

### 7.5.4 日志目录

```

/var/log/cobbler/installing #客户端安装日志
/var/log/cobbler/cobbler.log #cobble日志

```

## 7.6 配置及启动cobble服务

检测cobble的运行环境,并根据提示逐步配置cobble

```

[19:03:38 root@centos7 ~]#cobble check
The following are potential configuration items that you may want to fix:

```

1 : The 'server' field in /etc/cobbler/settings must be set to something other than localhost, or kickstarting features will not work. This should be a resolvable hostname or IP for the boot server as reachable by all machines that will use it.

2 : For PXE to be functional, the 'next\_server' field in /etc/cobbler/settings must be set to something other than 127.0.0.1, and should match the IP of the boot server on the PXE network.

3 : change 'disable' to 'no' in /etc/xinetd.d/tftp

4 : Some network boot-loaders are missing from /var/lib/cobbler/loaders, you may run 'cobbler get-loaders' to download them, or, if you only want to handle x86/x86\_64 netbooting, you may ensure that you have installed a \*recent\* version of the syslinux package installed and can ignore this message entirely. Files in this directory, should you want to support all architectures, should include pxelinux.0, menu.c32, elilo.efi, and yaboot. The 'cobbler get-loaders' command is the easiest way to resolve these requirements.

5 : enable and start rsyncd.service with systemctl

6 : debmirror package is not installed, it will be required to manage debian deployments and repositories

7 : The default password used by the sample templates for newly installed machines (default\_password\_crypted in /etc/cobbler/settings) is still set to 'cobbler' and should be changed, try: "openssl passwd -1 -salt 'random-phrase-here' 'your-password-here'" to generate new one

8 : fencing tools were not found, and are required to use the (optional) power management features. install cman or fence-agents to use them

Restart cobblerd and then run 'cobbler sync' to apply changes.

1.更改/etc/xinetd.d/tftp配置文件

```
vim /etc/xinetd.d/tftp
```

```
disable = yes --> disable = no
```

```
systemctl restart xinetd
```

2.联网下载boot引导程序文件

```
cobbler get-loaders
```

3.没有网络情况下拷贝启动文件到TFTP服务文件夹

```
cp -a /usr/share/syslinux/{pxelinux.0,menu.c32} /var/lib/tftpboot
```

4.更改/etc/cobbler/settings配置文件的server项为提供cobblerd服务的主机地址,也就是本机地址

```
sed -nri 's#server:127.0.0.1#server:192.168.100.100#' /etc/cobbler/settings
```

更改后的整行内容:server:192.168.100.100

5.更改/etc/cobbler/settings配置文件的next\_server项,指明tftp服务器地址,使得客户端能够找到TFTP服务器

```
sed -i 's/next_server: 127.0.0.1/next_server: 192.168.100.100/' /etc/cobbler/settings
```

更改后的整行内容:next\_server:192.168.100.100

6.配置相应的选项来使用cobbler管理dhcp服务和tftp服务

```
manage_dhcp: 1
```

```
manage_tftpd: 1
```

7.pxe\_just\_once选项,该选项置1表示在pxe安装块结束时在cobbler系统中做相应的记录,这样会免

如果客户机的BIOS选项中PXE启动处于第一位导致的循环重启;如果第一个启动硬件不是PXE启动那置0。

```
pxe_just_once: 1
```

配置完成后重启

```
systemctl restart cobblerd
```

## 7.7 cobbler命令用法

```
[19:06:03 root@centos7 ~]#cobbler usage
```

=====

```
cobbler ...  
[add|edit|copy|getks*|list|remove|rename|report] [options|--help]  
cobbler [options|--help]
```

### 可以使用下面的方式得到使用帮助

```
[19:07:39 root@centos7 ~]#cobbler distro --help  
[19:07:39 root@centos7 ~]#cobbler distro add --help
```

### 常见用法:

```
#列出当前导入的linux发行版条目  
[19:09:10 root@centos7 ~]#cobbler distro list  
#报告当前所有的linux发行版详细信息  
[19:09:18 root@centos7 ~]#cobbler distro report  
#导入系统源文件生成仓库  
[19:11:10 root@centos7 ~]#cobbler import --name=centos-8.0-x86_64 --path=/mnt --arch=x  
6_64  
#将linux发行版系统镜像与其对应的ks文件建立关联  
[19:11:26 root@centos7 ~]#cobbler profile --name=centos7 --distro=centos7-x86_64 --kickst  
rt=/var/lib/cobbler/kickstarts/ks7.cfg
```

## 7.8 将linux发行版导入到cobbler在httpd服务的文件夹下

```
[19:12:44 root@centos7 ~]#cobbler import --name=centos6 --path=/var/www/html/centos6/  
sos/x86_64 --arch=x86_64  
[19:12:44 root@centos7 ~]#cobbler import --name=centos7 --path=/var/www/html/centos7/  
sos/x86_64 --arch=x86_64  
[19:12:44 root@centos7 ~]#cobbler import --name=centos8 --path=/var/www/html/centos8/  
sos/x86_64 --arch=x86_64
```

### 导入后重启并同步

```
[19:14:26 root@centos7 ~]#systemctl restart cobblerd  
[19:15:23 root@centos7 ~]#cobbler sync
```

### 范例:

```
[19:16:05 root@centos7 ~]#du -sh /var/www/cobbler/ks_mirror/*  
0 /var/www/cobbler/ks_mirror/centos6-x86_64  
0 /var/www/cobbler/ks_mirror/centos-8.0-x86_64  
0 /var/www/cobbler/ks_mirror/config
```

## 7.9 配置linux发行版和关联相应的ks文件

### 拷贝事先准备好的ks文件至/var/lib/cobbler/kickstarts目录下

```
[root@centos7 ~]#cp /var/www/html/ks/centos{6,7,8}.ks /var/lib/cobbler/kickstarts
```

### 将linux发行版系统镜像与其对应的ks文件建立关联

```
cobbler profile --name=centos6 --distro=centos6-x86_64 --kickstart=/var/lib/cobbler/kickstar
```



```
s/centos6.cfg
cobbler profile --name=centos7 --distro=centos7-x86_64 --kickstart=/var/lib/cobbler/kickstar
s/centos7.cfg
cobbler profile --name=centos8 --distro=centos8-x86_64 --kickstart=/var/lib/cobbler/kickstar
s/centos8.cfg
```

**注意**，在导入distro时，cobbler会自动生成distro条目，这些并未和ks文件关联，可以使用

```
cobbler profile remove --name=PROFILE_NAME
```

删除后，再关联ks文件。

**建立关联后重启并同步**

```
[19:14:26 root@centos7 ~]#systemctl restart cobblerd
[19:15:23 root@centos7 ~]#cobbler sync
```

**查看详细信息**

```
cobbler report
```

## 7.10 启动菜单优化

修改/etc/cobbler/pxe/pxedefault.template模板文件，重启同步

```
[root@centos7 ~]#vim /etc/cobbler/pxe/pxedefault.template
DEFAULT menu
PROMPT 0
MENU TITLE Welcome! | www.wangxiaochun.com # 自定义项
TIMEOUT 200
TOTALTIMEOUT 6000
ONTIMEOUT $pxe_timeout_profile
LABEL local
MENU LABEL (local installation) # 自定义项1
MENU DEFAULT
LOCALBOOT -1
$pxe_menu_items
MENU end
[root@centos7 ~]#systemctl restart cobblerd
[root@centos7 ~]#cobbler sync
```

**重启同步后cobbler更新文件/var/lib/tftpboot/pxelinux.cfg/default**

```
vim /var/lib/tftpboot/pxelinux.cfg/default
```

## 7.11 基于web界面来管理配置cobbler

### 7.11.1 安装cobbler-web

```
yum install cobbler-web
systemctl restart httpd
```

### 7.11.2 访问web界面

用浏览器访问: [https://cobblerserver/cobbler\\_web](https://cobblerserver/cobbler_web)

cobbler-web界面的默认账号, 用户名: cobbler 密码:cobbler

cobbler访问图示

## 7.13 实战案例: CentOS 7 基于cobbler实现系统的自动化装

### 7.13.1 环境准备

两台主机

一台主机: CentOS 7 充当 Cobbler, http, dhcp, tftp 服务器, 并关闭防火墙和SELinux

一台主机: 充当测试机, 用于实现自动化安装Linux系统

网络要求: 关闭Vmware软件中的NAT模式中的DHCP服务, 两个主机网卡基于NAT模式

### 7.13.2 安装相关包并启动服务

```
[19:29:34 root@centos7 ~]#yum install cobbler cobbler dhcp -y
[19:29:44 root@centos7 ~]#systemctl enable --now cobblerd httpd tftpd dhcpd
```

### 7.13.3 修改cobbler相关的配置

```
[19:30:18 root@centos7 ~]#cobbler check
The following are potential configuration items that you may want to fix:
```

1 : The 'server' field in /etc/cobbler/settings must be set to something other than localhost, or kickstarting features will not work. This should be a resolvable hostname or IP for the boot server as reachable by all machines that will use it.

2 : For PXE to be functional, the 'next\_server' field in /etc/cobbler/settings must be set to something other than 127.0.0.1, and should match the IP of the boot server on the PXE network.

3 : Some network boot-loaders are missing from /var/lib/cobbler/loaders, you may run 'cobbler get-loaders' to download them, or, if you only want to handle x86/x86\_64 netbooting, you may ensure that you have installed a \*recent\* version of the syslinux package installed and can ignore this message entirely. Files in this directory, should you want to support all architectures, should include pxelinux.0, menu.c32, elilo.efi, and yaboot. The 'cobbler get-loaders' command is the easiest way to resolve these requirements.

4 : enable and start rsyncd.service with systemctl

5 : debmirror package is not installed, it will be required to manage debian deployments and repositories

6 : The default password used by the sample templates for newly installed machines (default\_password\_crypted in /etc/cobbler/settings) is still set to 'cobbler' and should be changed, try: "openssl passwd -1 -salt 'random-phrase-here' 'your-password-here'" to generate new one

7 : fencing tools were not found, and are required to use the (optional) power management features. install cman or fence-agents to use them

Restart cobblerd and then run 'cobbler sync' to apply changes.

#生成新密码, 默认安装好的系统root密码为cobbler



```
[19:30:44 root@centos7 ~]#openssl passwd -1 '123456'
$1$4.EYMEZn$Qk6A2SYOJ260HO6kvg7ND0
#根据以上提示, 只需要做1, 2, 8这三项即可, 修改下面四行
[19:31:12 root@centos7 ~]#vim /etc/cobbler/settings
default_password_crypted: "$1$4.EYMEZn$Qk6A2SYOJ260HO6kvg7ND0"
next_server: 192.168.10.71 #tftp服务器的IP
server: 192.168.10.71 #cobbler服务器IP
manage_dhcp: 1 #设置为1, 表示通过cobbler生成dhcpd.conf配置文件
pxe_just_once: 1 #设置为1,防止重复安装系统
[19:34:59 root@centos7 ~]#systemctl restart cobblerd.service
```

## 7.13.4 实现dhcp服务

```
#修改dhcp的模版文件下面的行, 用来生成dhcp的配置文件
subnet 192.168.10.0 netmask 255.255.255.0 {
option routers 192.168.10.2;
option domain-name-servers 114.114.114.114;
option subnet-mask 255.255.255.0;
range dynamic-bootp 192.168.10.200 192.168.10.254;
[19:38:01 root@centos7 ~]#cobbler sync
[19:38:26 root@centos7 ~]#systemctl start dhcpd
```

## 7.13.5 下载启动的相关文件

```
[19:38:32 root@centos7 ~]#cobbler get-loaders
[19:40:13 root@centos7 ~]#ls /var/lib/cobbler/loaders/
COPYING.elilo COPYING.yaboot grub-x86_64.efi menu.c32 README
COPYING.syslinux elilo-ia64.efi grub-x86.efi pxelinux.0 yaboot
[19:40:32 root@centos7 ~]#tree /var/lib/tftpboot/
```

```
/var/lib/tftpboot/
├── boot
│   └── grub
│       └── menu.lst
├── etc
├── grub
│   ├── efi-default
│   └── images -> ../images
├── images
├── images2
├── memdisk
├── menu.c32
├── ppc
├── pxelinux.0
├── pxelinux.cfg
│   └── default
├── s390x
└── profile_list
```

10 directories, 7 files

```
[19:41:01 root@centos7 ~]#tree /var/lib/tftpboot/
/var/lib/tftpboot/
├── boot
│   └── grub
```

```

├── menu.lst
├── etc
├── grub
│   ├── efi/default
│   ├── grub-x86_64.efi
│   ├── grub-x86.efi
│   └── images -> ../images
├── images
├── images2
├── memdisk
├── menu.c32
├── ppc
├── pxelinux.0
├── pxelinux.cfg
│   └── default
├── s390x
│   └── profile_list
└── yaboot

```

10 directories, 10 files

### 7.13.6 修改菜单的标题信息（可选）

```

[19:42:12 root@centos7 ~]#vim /etc/cobbler/pxe/pxedefault.template
ENU TITLE Cobbler | http://zhangzhuo.ltd/
[19:42:19 root@centos7 ~]#cobbler sync
[19:42:50 root@centos7 ~]#cat /var/lib/tftpboot/pxelinux.cfg/default
DEFAULT menu
PROMPT 0
MENU TITLE Cobbler | http://zhangzhuo.ltd/
TIMEOUT 200
TOTALTIMEOUT 6000
ONTIMEOUT local

LABEL local
MENU LABEL (local)
MENU DEFAULT
LOCALBOOT -1

MENU end

```

### 7.13.7 导入CentOS系统的安装文件，生成相应的YUM源

```

[19:48:45 root@centos7 ~]#cobbler import --name=centos-8.2-x86_64 --path=/mnt/centos8
--arch=x86_64
[19:53:52 root@centos7 ~]#cobbler import --name=centos-7-x86_64 --path=/mnt/centos7 --
rch=x86_64
[20:01:29 root@centos7 ~]#cobbler import --name=centos-6-x86_64 --path=/mnt/centos6 --
rch=x86_64
[20:03:46 root@centos7 ~]#du -sh /var/www/cobbler/ks_mirror/*
3.8G /var/www/cobbler/ks_mirror/centos-6-x86_64
9.6G /var/www/cobbler/ks_mirror/centos-7-x86_64
7.8G /var/www/cobbler/ks_mirror/centos-8.2-x86_64

```

```
[20:04:04 root@centos7 ~]#cobbler distro list
centos-6-x86_64
centos-7-x86_64
centos-8.2-x86_64
[20:05:30 root@centos7 ~]#cobbler profile list
centos-6-x86_64
centos-7-x86_64
centos-8.2-x86_64
#默认生成的是最小化安装
```

## 7.13.8 准备 kickstart文件,并关联至指定的YUM源

```
[20:12:53 root@centos7 ~]#vim ks-centos8.cfg
url --url=$tree #注意此行必须指定
[20:15:30 root@centos7 ~]#cp ks-centos* /var/lib/cobbler/kickstarts/
#将kickstart文件, 关联指定的YUM源和生成菜单列表, 先删除在新建
[20:14:00 root@centos7 ~]#cobbler profile remove --name=centos-8.2-x86_64
[20:14:40 root@centos7 ~]#cobbler profile add --name=centos-8.2-x86_64 --distro=centos-8-
2-x86_64 --kickstart=/var/lib/cobbler/kickstarts/ks-centos8.cfg
[20:16:55 root@centos7 ~]#cobbler profile remove --name=centos-7-x86_64
[20:17:21 root@centos7 ~]#cobbler profile add --name=centos-7-x86_64 --distro=centos-7-
86_64 --kickstart=/var/lib/cobbler/kickstarts/ks-centos7.cfg
[20:17:23 root@centos7 ~]#cobbler profile remove --name=centos-6-x86_64
[20:17:59 root@centos7 ~]#cobbler profile add --name=centos-6-x86_64 --distro=centos-6-
86_64 --kickstart=/var/lib/cobbler/kickstarts/ks-centos6.cfg
```

## 7.13.9 测试客户端基于Cobbler实现自动安装

### 7.13.10 支持UEFI安装

修改文件设置时间, 默认不显示菜单, 最好使用默认应答脚本

```
#修改模版文件
[root@cobbler-centos7 ~]#vim /etc/cobbler/pxe/efidefault.template
[root@cobbler-centos7 ~]#cat /var/lib/tftpboot/grub/efidefault
default=0
timeout=60
$grub_menu_items
#使模版生效
[root@cobbler-centos7 ~]#cobbler sync
#验证生效
[root@cobbler-centos7 ~]#head -n 2 /var/lib/tftpboot/grub/efidefault
default=0
timeout=0

#应答文件中必须该的
%pre
parted -s /dev/sda mklabel gpt  安装前脚本格式化硬盘为gpt格式
%end

#boot分区格式必须是这样
part /boot/efi --fstype="efi" --ondisk=sda --size=1024 --fsoptions="defaults,uid=0,gid=0,um
```

```
sk=0077,shortname=winnt"
```

### 7.13.11 实现cobbler 的web管理

```
[root@centos7 ~]#yum -y install cobbler-web  
[root@centos7 ~]#systemctl restart httpd
```

通过浏览器访问下面地址: [https://cobblerserver/cobbler\\_web](https://cobblerserver/cobbler_web)

