17 流编辑器sed应用

流编辑器sed应用

`sed` 语法格式： `sed [选项] [定址表达式] 操作子命令 [输入文件]`

一、基础实例

案例1：转换日期格式

将日期分隔符 `/` 替换为 `-` 。

Shell 复制代码

```shell
# 将格式为yy/mm/dd的日期格式换成 yy-mm-dd
[root@shell ~]# date '+%y/%m/%d'
22/04/10
# /需要转义，替换所有/需要添加全局标志
[root@shell ~]# date '+%y/%m/%d' | sed 's/\//-/g'
22-04-10
```

案例2：统计单词频率

统计 `/etc/hosts` 文件中单词的个数。

Shell 复制代码

```shell
# 把空格替换为换行，然后排序、计数
[root@shell ~]# sed 's/ /\n/g' /etc/hosts | sort | uniq -c
      10
       1 ::1
       1 127.0.0.1
       2 localhost
       1 localhost4
       1 localhost4.localdomain4
       1 localhost6
       1 localhost6.localdomain6
       2 localhost.localdomain
```

案例3：提取IP地址

提取命令输出中的IP地址。

Shell | 复制代码

```
# 输出IP地址
[root@shell ~]# ip route show
default via 192.168.149.2 dev ens33 proto static metric 100
192.168.149.0/24 dev ens33 proto kernel scope link src 192.168.149.3 metric 100
# 提取IP地址
[root@shell ~]# ip route show | sed -n '/src/p' | cut -d' ' -f9
192.168.149.3
[root@shell ~]# ip route show | grep src | cut -d' ' -f9
192.168.149.3
# 输出IP地址
[root@shell ~]# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 00:0c:29:02:3b:51 brd ff:ff:ff:ff:ff:ff
    inet 192.168.149.3/24 brd 192.168.149.255 scope global noprefixroute ens33
       valid_lft forever preferred_lft forever
    inet6 fe80::20c:29ff:fe02:3b51/64 scope link
       valid_lft forever preferred_lft forever
# 输出IP地址
[root@shell ~]# ip a | sed -n '/inet\b/p' | cut -d' ' -f6 | cut -d '/' -f1
127.0.0.1
192.168.149.3
# 去掉127.0.0.1
[root@shell ~]# ip a | sed -n '/inet\b/p' | sed -n '/\blo\b/!p' | cut -d' ' -f6 | cut -d '/' -f1
192.168.149.3
```

案例4：关闭selinux

⚠ 危险操作！修改错误会导致操作系统不能正常启动。

```shell
[root@shell ~]# cat /etc/selinux/config

# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
#     enforcing - SELinux security policy is enforced.
#     permissive - SELinux prints warnings instead of enforcing.
#     disabled - No SELinux policy is loaded.
SELINUX=enforcing
# SELINUXTYPE= can take one of three values:
#     targeted - Targeted processes are protected,
#     minimum - Modification of targeted policy. Only selected processes are protected.
#     mls - Multi Level Security protection.
SELINUXTYPE=targeted


# 关闭selinux，替换SELINUX=行
[root@shell ~]# sed -nr '/^SELINUX=/c SELINUX=disabled' /etc/selinux/config
SELINUX=disabled
```

案例5：修改SSH服务端口号

```shell
# 查找端口号配置
[root@shell ~]# cat /etc/ssh/sshd_config
[root@shell ~]# cat /etc/ssh/sshd_config | grep ^#Port
#Port 22
# 取消注释并将SSH服务端口改为6666
[root@shell ~]# sed -n  "/^#Port/c Port 6666" /etc/ssh/sshd_config
Port 6666
```

案例6：检测yum源

```shell
# 获取yum源软件数量
[root@shell ~]# yum repolist | tail -1
repolist: 14,307
[root@shell ~]# yum repolist | tail -1| grep -o '.*: *'
repolist:
# 测试YUM源是否可用
[root@Shell ~]# yum repolist | tail -1 | sed  's/.*: *//;s/,//'
14307
```

案例7：删除文件中的数字

```shell
[root@shell ~]# cat /etc/hosts
127.0.0.1   localhost localhost.localdomain localhost4 localhost4.localdomain4
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6
# 将文件中的所有数字替换为空字符串
[root@shell ~]# cat /etc/hosts | sed 's/[0-9]//g'
...   localhost localhost.localdomain localhost localhost.localdomain
::         localhost localhost.localdomain localhost localhost.localdomain
```

二、注释处理

案例8-11均以selinux配置文件 `/etc/selinux/config` 为素材。

```shell
# 输出/etc/selinux/config内容
[root@shell ~]# cat /etc/selinux/config

# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
#     enforcing - SELinux security policy is enforced.
#     permissive - SELinux prints warnings instead of enforcing.
#     disabled - No SELinux policy is loaded.
SELINUX=enforcing
# SELINUXTYPE= can take one of three values:
#     targeted - Targeted processes are protected,
#     minimum - Modification of targeted policy. Only selected processes a
re protected.
#     mls - Multi Level Security protection.
SELINUXTYPE=targeted


```

案例8：删除空行

```shell
# 删除无内容空行
[root@shell ~]# sed -r '/^$/d' /etc/selinux/config
[root@shell ~]# sed -r '/^[ \t]*$/d' /etc/selinux/config
[root@shell ~]# sed -r '/^\s*$/d' /etc/selinux/config
# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
#     enforcing - SELinux security policy is enforced.
#     permissive - SELinux prints warnings instead of enforcing.
#     disabled - No SELinux policy is loaded.
SELINUX=enforcing
# SELINUXTYPE= can take one of three values:
#     targeted - Targeted processes are protected,
#     minimum - Modification of targeted policy. Only selected processes a
re protected.
#     mls - Multi Level Security protection.
SELINUXTYPE=targeted
```

案例9：所有行前加#

```shell
# 所有行前加注释
[root@shell ~]# sed -r 's/^/#/' /etc/selinux/config
#
## This file controls the state of SELinux on the system.
## SELINUX= can take one of these three values:
##     enforcing - SELinux security policy is enforced.
##     permissive - SELinux prints warnings instead of enforcing.
##     disabled - No SELinux policy is loaded.
#SELINUX=enforcing
## SELINUXTYPE= can take one of three values:
##     targeted - Targeted processes are protected,
##     minimum - Modification of targeted policy. Only selected processes are protected.
##     mls - Multi Level Security protection.
#SELINUXTYPE=targeted
#
#
```

案例10：行首不是#的行前加#

```shell
# 未添加#的行加#
[root@shell ~]#  cat /etc/selinux/config | sed  's/^[^#]/#&/'

# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
#     enforcing - SELinux security policy is enforced.
#     permissive - SELinux prints warnings instead of enforcing.
#     disabled - No SELinux policy is loaded.
#SELINUX=enforcing
# SELINUXTYPE= can take one of three values:
#     targeted - Targeted processes are protected,
#     minimum - Modification of targeted policy. Only selected processes are protected.
#     mls - Multi Level Security protection.
#SELINUXTYPE=targeted


```

案例11：删除配置文件中注释行

注释处理 Shell 复制代码

```shell
# 删除配置文件中#号注释行
[root@shell ~]# sed -r '/^#/d' /etc/selinux/config

SELINUX=enforcing
SELINUXTYPE=targeted


# 删除配置文件中#号注释行以及空行
[root@shell ~]# sed -r -e  '/^#/d' -e '/^$/d' /etc/selinux/config
SELINUX=enforcing
SELINUXTYPE=targeted
# 删除配置文件中#号注释行以及空行
[root@shell ~]# sed -r '/^#/d;/^$/d' /etc/selinux/config
SELINUX=enforcing
SELINUXTYPE=targeted
```

三、综合案例：修改网卡配置

案例分析：首先检查网卡配置文件是否存在，如果存在，提取网卡名称；然后用户选择网卡名称，并输入网卡配置参数；最后根据用户输入的网卡配置参数修改网卡配置文件。

该案例未真实修改配置，如需修改 `sed` 命令 `-n` 选项需修改为 `-i` 选项。

注意：grep命令只有匹配到模式时，退出状态码才为 `0` 。

Shell | 复制代码

```
[root@shell ~]# vi network_config.sh
#! /bin/bash
#读取必要的配置文件参数.
vpath="etc/sysconfig/network-scripts/"
echo "本机网卡列表为："
ip l | sed -n '/^[0-9]/p' | cut -d':' -f2 |sed 's/ //g'
read -p "请输入需要编辑的网卡名称:" devname
if [ ! -f /$vpath/ifcfg-$devname ];then
    echo "未找到${devname}网卡配置文件"
    exit
fi
read -p "请输入IP地址与子网掩码(如:192.168.149.4/24):" addr
ipaddr=$(echo $addr | cut -d/ -f1)
netmask=$(echo $addr | cut -d/ -f2)
read -p "请输入默认网关:" gateway
read -p "请输入DNS:" dns

#修改网卡配置文件.
sed -n '/BOOTPROTO/c BOOTPROTO=static' /$vpath/ifcfg-$devname
sed -n '/ONBOOT/c ONBOOT=yes' /$vpath/ifcfg-$devname
#修改IP地址.
if grep -q IPADDR /$vpath/ifcfg-$devname;then
    sed -n "/IPADDR/c IPADDR=$ipaddr" /$vpath/ifcfg-$devname
else
    echo "IPADDR=$ipaddr" >> /$vpath/ifcfg-$devname
fi
#修改子网掩码.
if grep -q PREFIX /$vpath/ifcfg-$devname;then
    sed -n "/PREFIX/c PREFIX=$netmask" /$vpath/ifcfg-$devname
else
    echo "PREFIX=$netmask" >> /$vpath/ifcfg-$devname
fi
#修改默认网关.
if grep -q GATEWAY /$vpath/ifcfg-$devname;then
    sed -n "/GATEWAY/c GATEWAY=$gateway" /$vpath/ifcfg-$devname
else
    echo "GATEWAY=$gateway" >> /$vpath/ifcfg-$devname
fi
#修改DNS服务器.
if grep -q DNS1 /$vpath/ifcfg-$devname;then
    sed -n "/DNS1/c DNS1=$dns" /$vpath/ifcfg-$devname
else
    echo "DNS1=$dns" >> /$vpath/ifcfg-$devname
fi
[root@shell ~]# . network_config.sh
```

```
本机网卡列表为:
lo
ens33
请输入IP地址与子网掩码(如:192.168.149.4/24):192.168.149.4/24
请输入默认网关:192.168.149.2
请输入DNS:192.168.149.2
BOOTPROTO=static
ONBOOT=yes
IPADDR=192.168.149.4
GATEWAY=192.168.149.2
DNS1=192.168.149.2
```

四、综合案例：修改sshd配置

案例分析：读取sshd配置文件，搜索相关配置项，如果存在则直接修改，如果不存在，则在文件末尾追加。

注意! `grep -q` 静默模式，不显示输出。

Shell | 复制代码

```shell
#为了避免修改现有配置文件，修改备份文件。
[root@shell ~]# cp  /etc/ssh/sshd_config  /etc/ssh/sshd_config.bak
[root@shell ~]# sed -n /^[^#]/p  /etc/ssh/sshd_config.bak
HostKey /etc/ssh/ssh_host_rsa_key
HostKey /etc/ssh/ssh_host_ecdsa_key
HostKey /etc/ssh/ssh_host_ed25519_key
SyslogFacility AUTHPRIV
AuthorizedKeysFile      .ssh/authorized_keys
PasswordAuthentication yes
ChallengeResponseAuthentication no
GSSAPIAuthentication yes
GSSAPICleanupCredentials no
UsePAM yes
X11Forwarding yes
AcceptEnv LANG LC_CTYPE LC_NUMERIC LC_TIME LC_COLLATE LC_MONETARY LC_MESSAGES
AcceptEnv LC_PAPER LC_NAME LC_ADDRESS LC_TELEPHONE LC_MEASUREMENT
AcceptEnv LC_IDENTIFICATION LC_ALL LANGUAGE
AcceptEnv XMODIFIERS
Subsystem       sftp    /usr/libexec/openssh/sftp-server
```

Shell | 复制代码

```
[root@shell ~]# vi enhence_sshd.sh
#!/bin/bash
#功能描述(Description):修改SSHD配置文件,提升SSH安全性.

config_file="/etc/ssh/sshd_config.bak"
PORT=12345

#将默认端口号修改为自定义端口号.
if grep -q "^Port" $config_file;then
    sed -i "/^Port/c Port $PORT" $config_file
else
    echo "Port $PORT" >> $config_file
fi

#禁止root远程登陆SSH服务器.
if grep -q "^PermitRootLogin" $config_file;then
    sed -i '/^PermitRootLogin/s/yes/no/' $config_file
else
    sed -i '$a PermitRootLogin no' $config_file
fi

#禁止使用密码远程登陆SSH服务器.
if grep -q "^PasswordAuthentication" $config_file;then
    sed -i '/^PasswordAuthentication/s/yes/no/' $config_file
else
    sed -i '$a PasswordAuthentication no' $config_file
fi

#禁止X11图形转发功能.
if grep -q "^X11Forwarding" $config_file;then
    sed -i '/^X11Forwarding/s/yes/no/' $config_file
else
    sed -i '$a X11Forwarding no' $config_file
fi

#禁止DNS查询.
if grep -q "^UseDNS" $config_file;then
    sed -i '/^UseDNS/s/yes/no/' $config_file
else
    sed -i '$a UseDNS no' $config_file
fi

[root@shell ~]# . enhence_sshd.sh
[root@shell ~]# sed -n /^[^#]/p  /etc/ssh/sshd_config.bak
HostKey /etc/ssh/ssh_host_rsa_key
```

```
HostKey /etc/ssh/ssh_host_ecdsa_key
HostKey /etc/ssh/ssh_host_ed25519_key
SyslogFacility AUTHPRIV
AuthorizedKeysFile      .ssh/authorized_keys
PasswordAuthentication no
ChallengeResponseAuthentication no
GSSAPIAuthentication yes
GSSAPICleanupCredentials no
UsePAM yes
X11Forwarding no
AcceptEnv LANG LC_CTYPE LC_NUMERIC LC_TIME LC_COLLATE LC_MONETARY LC_MESSAGES
AcceptEnv LC_PAPER LC_NAME LC_ADDRESS LC_TELEPHONE LC_MEASUREMENT
AcceptEnv LC_IDENTIFICATION LC_ALL LANGUAGE
AcceptEnv XMODIFIERS
Subsystem       sftp    /usr/libexec/openssh/sftp-server
Port 12345
PermitRootLogin no
UseDNS no
```

课程目标

- 知识目标：熟练掌握 `sed` 命令的基本语法。
- 技能目标：能够利用 `sed` 命令完成实战场景的处理。

课外拓展

- 进一步了解 `sed` 命令的应用场景。

参考资料

- `sed --help` 或 `man sed`
- 《Linux Shell核心编程指南》，丁明一，电子工业出版社