# 基于NFS的KVM群集构建

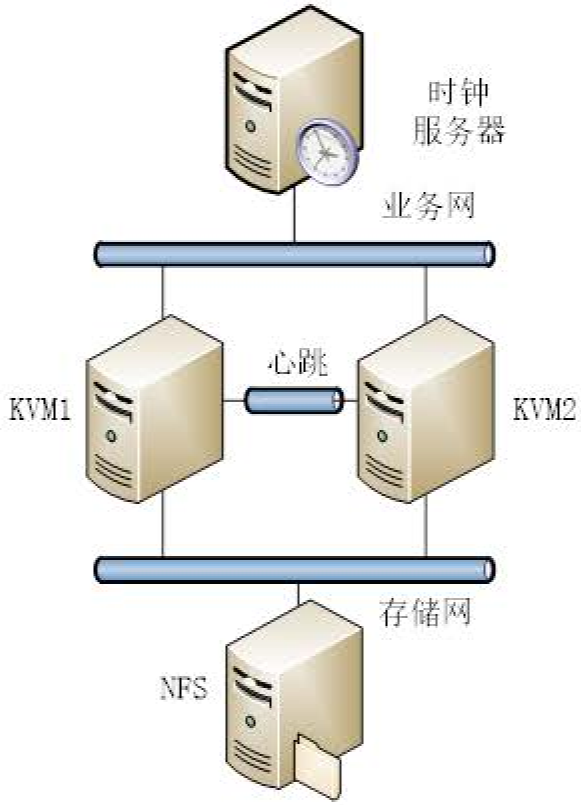
LinuxPlus

开源技术服务平台

# 概述

- 规划设计
- 节点准备
  - 阶段1：操作系统安装
  - 阶段2：群集组件安装
  - 阶段3：群集节点准备
- 配置NFS资源
- 准备虚拟机
- 配置STONTH（IPMI)
- 向群集添加虚拟机资源
- 群集测试

# 规划设计



| 主机 | LAN | Corosync | Storage |
|---|---|---|---|
| labkvm1 | 192.168.1.231 | 172.16.1.231 | 10.0.1.231 |
| labkvm2 | 192.168.1.232 | 172.16.1.232 | 10.0.1.232 |
| stor1 | 192.168.1.235 |  | 10.0.1.235 |

# 节点准备-阶段1：操作系统安装

- 操作系统安装
- 通过kickstart简化安装
- 操作系统升级

```
install
cdrom
text
keyboard --vckeymap=us --xlayouts='us'
lang en_US.UTF-8
network  --bootproto=dhcp --device=eth0 --noipv6
network  --hostname=localhost.localdomain
auth --enableshadow --passalgo=sha512
rootpw --plaintext 123456
kipx
timezone Asia/Shanghai --isUtc
ignoredisk --only-use=sda
bootloader --append=" crashkernel=auto" --
location=mbr --boot-drive=sda
autopart --type=lvm
clearpart --none --initlabel
reboot
firstboot --disable

%packages
@base
@core
@gnome-desktop
@virtualization-client
@virtualization-hypervisor
@virtualization-platform
@virtualization-tools
```

```
pacemaker
pcs
corosync
fence-agents-all

iscsi-initiator-utils

dlm
lvm2-cluster
gfs2-utils

kexec-tools
policycoreutils-python
psmisc

tigervnc-server

%addon com_redhat_kdump --enable --
reserve-mb='auto'
%end
```

# 节点准备-阶段2：群集组件安装

- 配置yum库
- 安装 Pacemaker 等群集组件

```
# yum -y install pacemaker corosync pcs \
psmisc policycoreutils-python fence-agents-all
```

# 节点准备-阶段3：群集节点准备

- 配置主机名及解析
- 配置SSH Key互信(可选）
- 配置时钟
- 配置防火墙
- 配置pcs守护程序
- 配置hacluster账户密码
- 集群配置文件

```
# hostnamectl set-hostname labkvm1
# vi /etc/hosts

# ssh-keygen -t rsa -P ''
# ssh-copy-id -i ~/.ssh/id_rsa.pub root@labkvm2

# /sbin/ntpdate time.windows.com
# crontab -e

# firewall-cmd --permanent --add-service=high-availability
# firewall-cmd --add-service=high-availability
# firewall-cmd --reload

# systemctl start pcsd
# systemctl enable pcsd

# echo "linuxplus" | passwd --stdin hacluster
# pcs cluster auth labkvm1-cr labkvm2-cr

# pcs cluster setup --name cluster1 labkvm1-cr labkvm2-cr

# pcs cluster start --all
```

# 准备NFS服务器资源 1/2

## 安装配置NFS

```
# yum -y install nfs-utils

# systemctl enable rpcbind
# systemctl start rpcbind
# systemctl enable nfs-server
# systemctl start nfs-server
```

## 配置防火墙

```
# systemctl enable firewalld
# systemctl start firewalld
# firewall-cmd --permanent --add-service=nfs
# firewall-cmd --permanent --add-service=rpc-bind
# firewall-cmd --permanent --add-service=mountd
# firewall-cmd -reload
```

# 准备NFS服务器资源 2/2

- 创建Export目录

```
# mkdir /vm
# chmod a+w /vm/
# vi /etc/exports
添加如下内容
/vm *(rw,no_root_squash,sync)
# systemctl restart nfs-server
```

- 在每个节点上测试读写

```
[root@labkvm1 ~]# showmount -e 10.0.1.235
Export list for 10.0.1.235:
/vm *
[root@labkvm1 ~]# mkdir /vm
[root@labkvm1 ~]# mount 10.0.1.235:/vm /vm
[root@labkvm1 ~]# cp ~/anaconda-ks.cfg /vm/testlabkvm1.txt
......
```

# 配置KVM主机的SeLinux

- 使用setsebool命令来启用KVM使用nfs的功能

```
# whatis setsebool
setsebool (8)          - set SELinux boolean value

# setsebool
Usage:  setsebool [ -NPV ] boolean value | bool1=val1 bool2=val2...

If the -P option is given, all pending values are written to the policy
file on disk. So they will be persistent across reboots.
persistent  [pə'sɪst(ə)nt]

[ALL]# setsebool -P virt_use_nfs 1

# getsebool virt_use_nfs
virt_use_nfs --> on
```

# 准备测试用的虚拟机

- Window 2003 Server

```
virt-install --name=win2k3a \
 --disk device=disk,bus=virtio,path='/vm/win2k3a.qcow2' \
 --vcpus=1 --ram=512 \
 --network network=default,model=virtio \
 --graphics vnc \
 --boot hd
```

- CentOS 7.2

```
# virt-install --name=centos7a  \
 --disk device=disk,bus=virtio,path='/vm/centos7-1511-disk0.qcow2'  \
 --vcpus=1 --ram=512  \
 --network network=default,model=virtio  \
 --graphics vnc  --boot hd
```

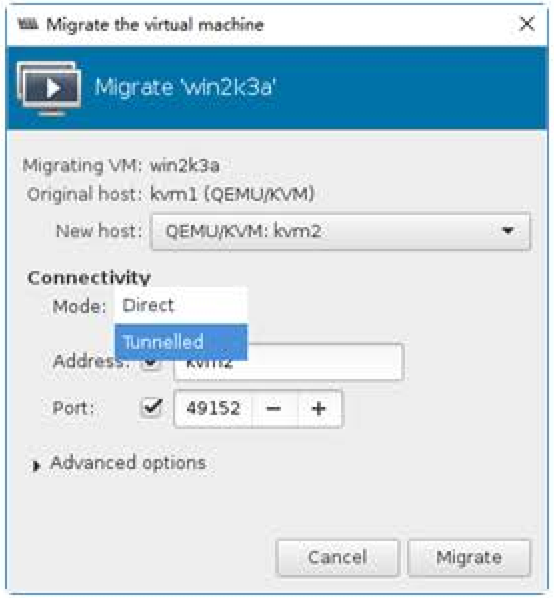
# 测试机的动态迁移

- 配置源及目标宿主机的防火墙

```
[ALL]# firewall-cmd --add-port=16509/tcp --permanent
[ALL]# firewall-cmd --add-port=49152-49215/tcp --permanent
[ALL]# firewall-cmd -reload
```

- 使用virt-manager及virsh均可

```
# virsh migrate --domain centos7a \
  qemu+ssh://labkvm1-cr/system --live
```



Migrate the virtual machine

Migrate 'win2k3a'

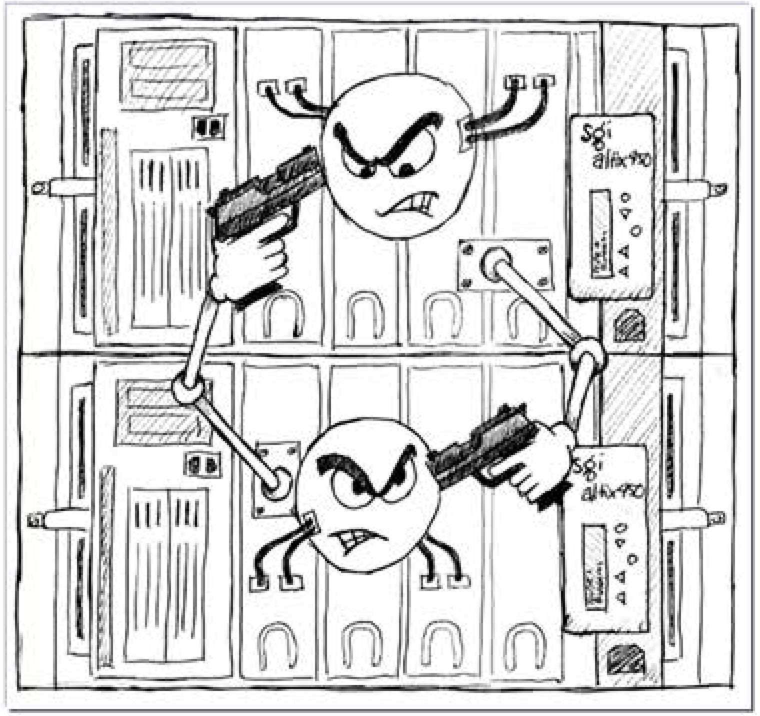
Migrating VM: win2k3a
Original host: kvm1 (QEMU/KVM)
New host: QEMU/KVM: kvm2

**Connectivity**

Mode: Direct / Tunnelled
Address: ☑ kvm2
Port: ☑ 49152

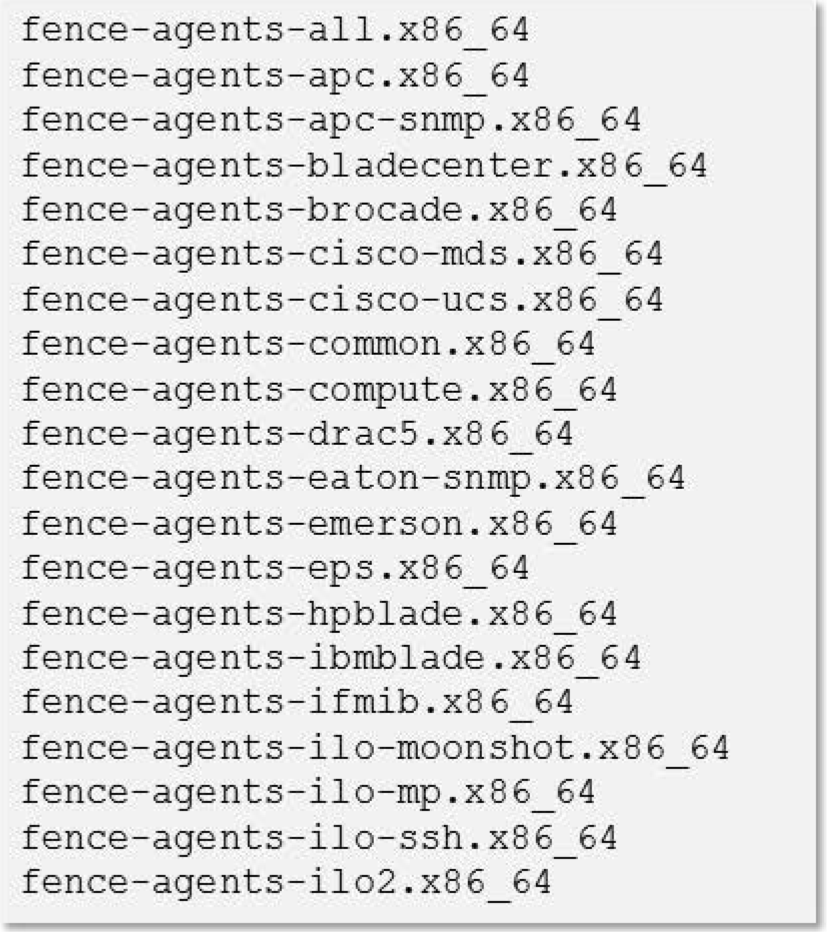
# ◆ 配置STONTH

- 考察可用的STONITH agent
- 配置群集的STONITH

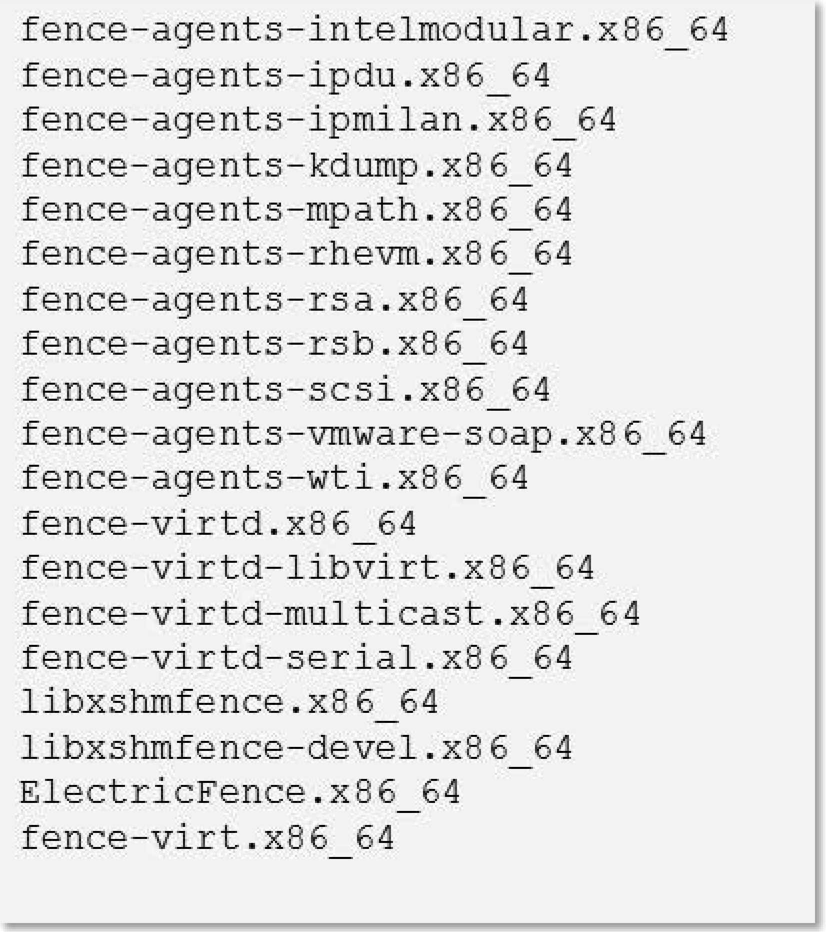


# 考察可用的STONITH agent

- 通过yum search fence- 或查看安装光盘查看可用的agent



```
fence-agents-all.x86_64
fence-agents-apc.x86_64
fence-agents-apc-snmp.x86_64
fence-agents-bladecenter.x86_64
fence-agents-brocade.x86_64
fence-agents-cisco-mds.x86_64
fence-agents-cisco-ucs.x86_64
fence-agents-common.x86_64
fence-agents-compute.x86_64
fence-agents-drac5.x86_64
fence-agents-eaton-snmp.x86_64
fence-agents-emerson.x86_64
fence-agents-eps.x86_64
fence-agents-hpblade.x86_64
fence-agents-ibmblade.x86_64
fence-agents-ifmib.x86_64
fence-agents-ilo-moonshot.x86_64
fence-agents-ilo-mp.x86_64
fence-agents-ilo-ssh.x86_64
fence-agents-ilo2.x86_64
```



```
fence-agents-intelmodular.x86_64
fence-agents-ipdu.x86_64
fence-agents-ipmilan.x86_64
fence-agents-kdump.x86_64
fence-agents-mpath.x86_64
fence-agents-rhevm.x86_64
fence-agents-rsa.x86_64
fence-agents-rsb.x86_64
fence-agents-scsi.x86_64
fence-agents-vmware-soap.x86_64
fence-agents-wti.x86_64
fence-virtd.x86_64
fence-virtd-libvirt.x86_64
fence-virtd-multicast.x86_64
fence-virtd-serial.x86_64
libxshmfence.x86_64
libxshmfence-devel.x86_64
ElectricFence.x86_64
fence-virt.x86_64
```

# 配置群集的STONITH

- 在所有节点上安装Agent

```
[all]# yum -y install fence-agents-ipmilan

查找与设备有关的参数
# pcs stonith describe fence_ipmilan
```

- 配置群集的STONITH

```
# cd
# pcs cluster cib stonith_cfg

# pcs -f stonith_cfg stonith create ipmi-fencing fence_ipmilan \
pcmk_host_list="node1 node2" ipaddr=10.0.1.1 login=testuser \
passwd=abc123 op monitor interval=60s

# pcs -f stonith_cfg property set stonith-enabled=true

# pcs cluster cib-push stonith_cfg
```

# ◆ 创建虚拟机资源

- 所有节点可以访问虚拟机配置文件和磁盘镜像文件
- 虚拟机由群集软件控制而不是由libvirt来控制

```
# mkdir /vm/qemu_config
# virsh shutdown win2k3a
# cp /etc/libvirt/qemu/win2k3a.xml /vm/qemu_config/

# virsh undefine win2k3a

# pcs resource create win2k3a_res VirtualDomain \
 hypervisor="qemu:///system" \
 config="/vm/qemu_config/win2k3a.xml" \
 meta allow-migrate="true" priority="100" \
 migration_transport=ssh \
 op start timeout="120s" \
 op stop timeout="120s" \
 op monitor timeout="30"interval="10" \
 op migrate_from interval="0" timeout="120s" \
 op migrate_to interval="0" timeout="120"
```

# 迁移测试

## 移动资源

```
# pcs resource move win2k3a_res
# pcs resource move win2k3a_res labkvm1-cr
资源属性：meta allow-migrate="true"决定了迁移模式
```

## 节点待机

```
# pcs cluster standby/unstandby labkvm2-cr
```

## 节点停机

```
# pcs cluster stop
Stopping Cluster (pacemaker)...
Stopping Cluster (corosync)...
```

# 总结

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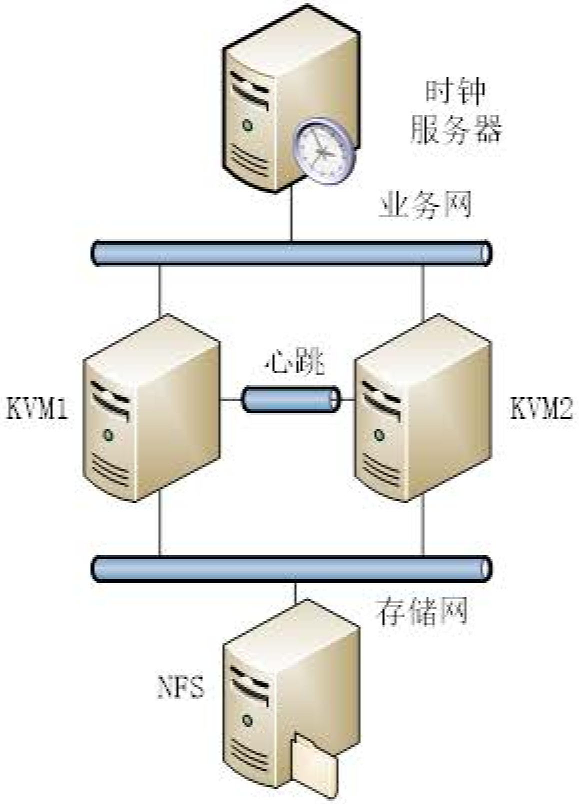
时钟
服务器
业务网
心跳
KVM1
KVM2
存储网
NFS