

# IBM Linux on Power Workshop

## 220 RHEL7 PowerKVM Guest

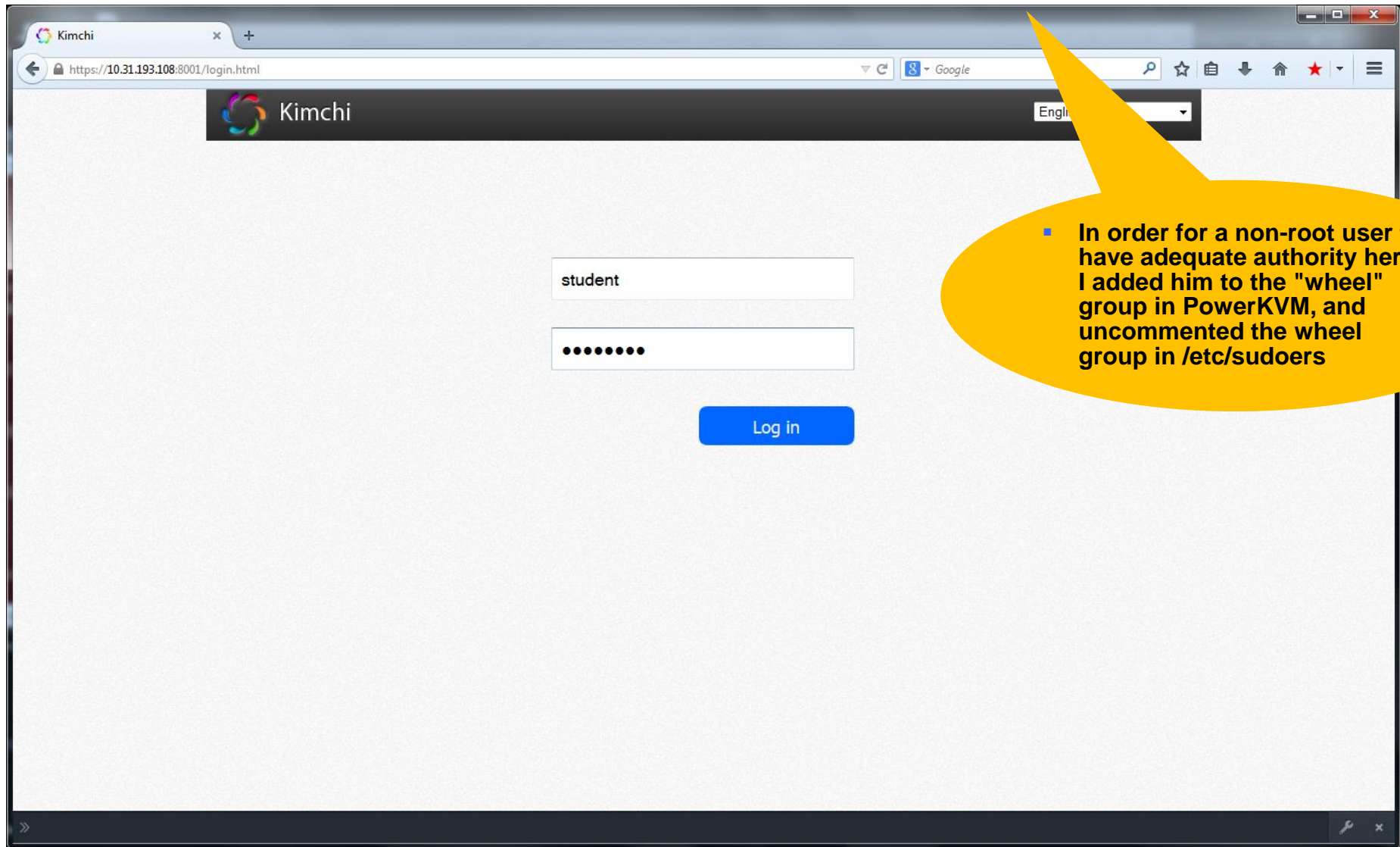


# RHEL71 PowerKVM Guest

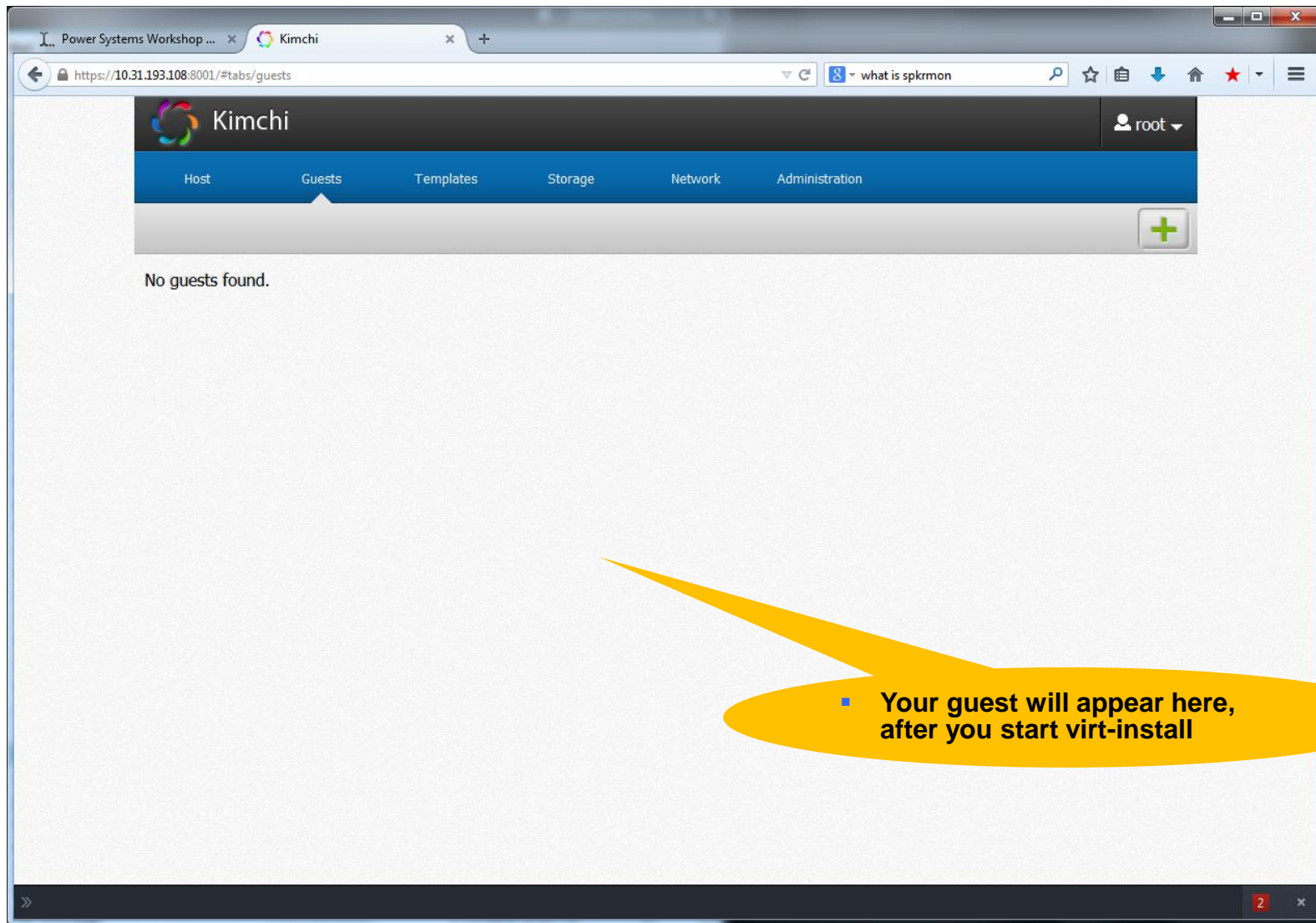
- In 2015, we were all in the browser, in PowerKVM Kimchi
  - Create a template, pointing at RHEL iso file, and a specific LUN
  - Create guest from that template, boot from iso file and install
  - virsh migrate the RHEL guest to another physical machine
- Question arose, how do we insert a kickstart file into this install?
- We use the pkvm command virt-install (see man virt-install on pkvm)
- In order to use --extra\_args "ks=", we must also use --location
- --location will point to http resource across the network
- Every student gets their own unique kickstart file - Your guest install will finish, then boot with its designated IP address and hostname
- Every student points at their own unique LUN for RHEL install

# Kimchi login

- Even Students <https://10.31.193.108:8001> student abcd1234
- Odd Students <https://10.31.193.109:8001> student abcd1234



# Guests tab



## ssh to PowerKVM, to run virt-install

- Even Students    ssh student@10.31.193.108    student    abcd1234  
Odd Students    ssh student@10.31.193.109    student    abcd1234
- Create and install your guest. Get the blue fields from your worksheet

```
[student@s822kvm ~]$ sudo virt-install --name rhel0nn --memory=2048  
--vcpus=8,cores=1,threads=8 --os-variant=rhel7  
--disk vol=sanv7k/unit:0:0:nn --network="network=br192"  
--graphics "vnc" --location http://10.31.193.105/RHEL71  
--extra-args "ks=http://10.31.193.105/kickstart/rhel0nn-ks.cfg"
```

- Type the above as one continuous command
- You notice, the repo and kickstart are coming from another IP address, across the network. Are we missing anything on our guest?

The guest gets a DHCP address for the install, then applies a static IP from the kickstart file.



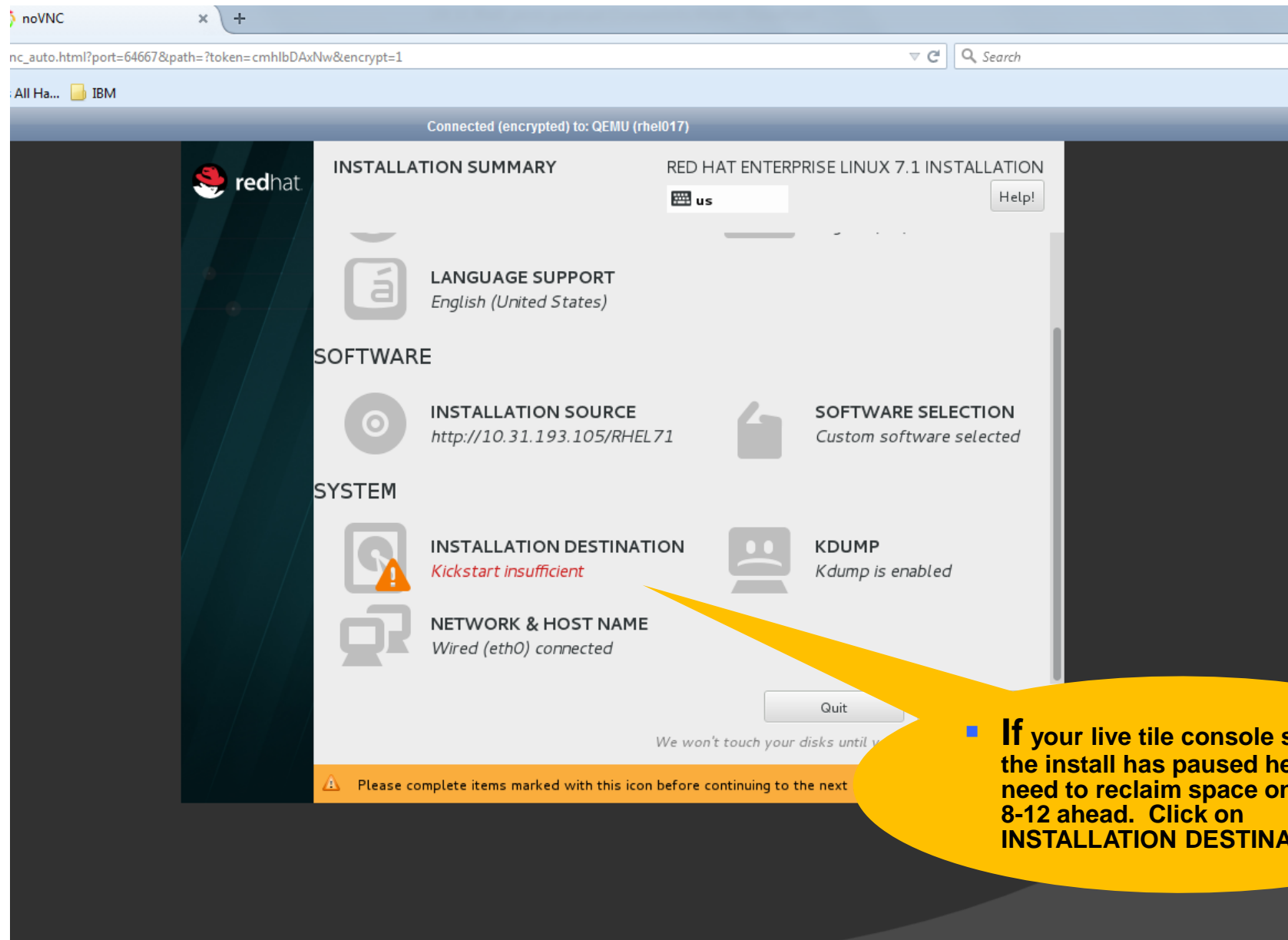
# Kimchi Guests tab

The screenshot shows the Kimchi web interface for managing virtual machines. The browser address bar indicates the URL `https://10.31.193.108:8001/#tabs/guests`. The interface displays a table of guests with columns for CPU usage, network activity (KB/s), and a Live Tile for the guest console. The guests listed are rhel006, rhel008, rhel010, rhel012, and rhel014. rhel014 is the only guest with non-zero activity: 9% CPU, 13051 KB/s network, and 2089 KB/s network. A yellow callout points to the Live Tile for rhel014, indicating that clicking on it will open the guest console.

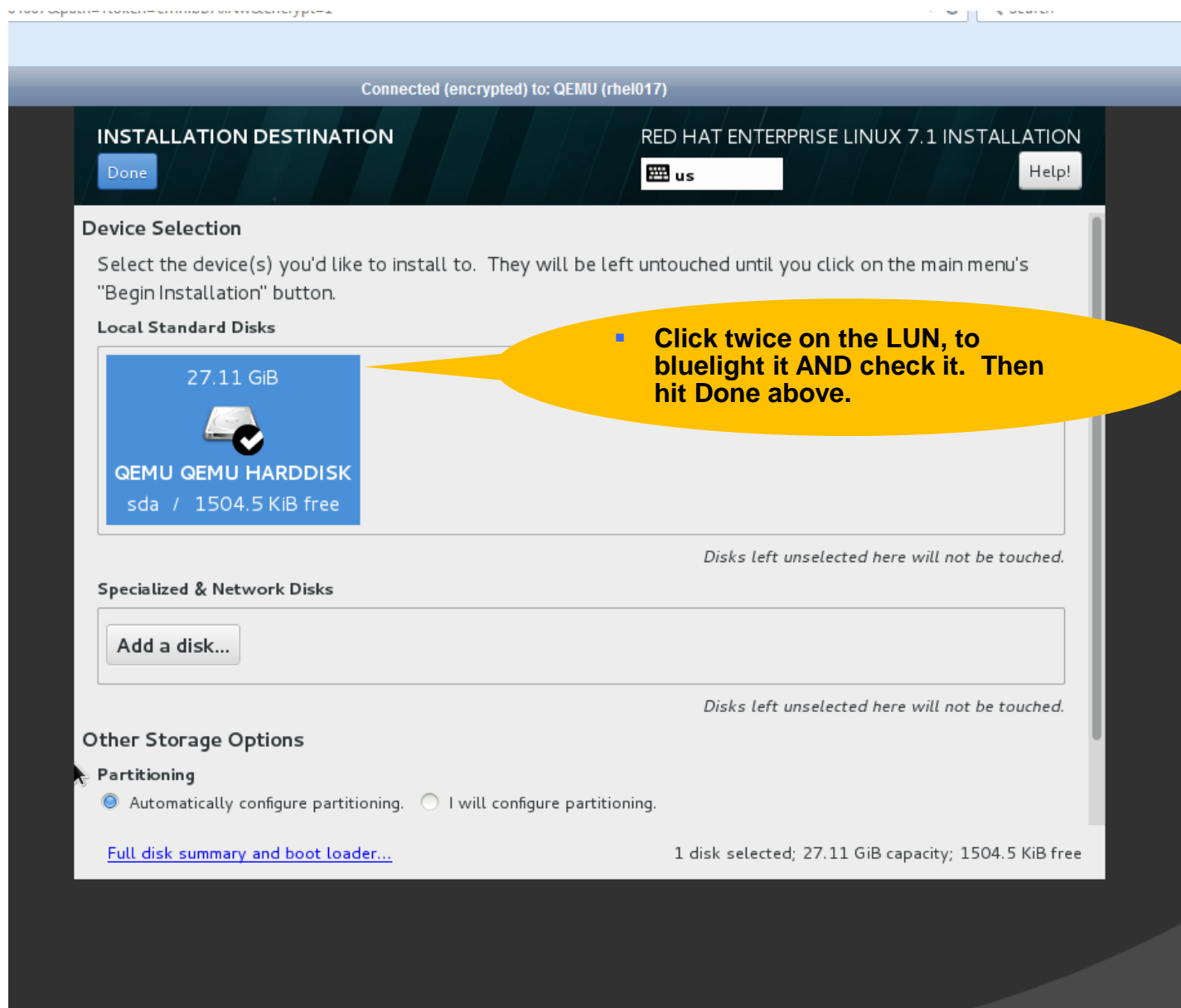
Guest	CPU	Network (KB/s)	Live Tile
rhel006	0%	0	0
rhel008	0%	0	0
rhel010	0%	0	0
rhel012	0%	0	0
rhel014	9%	13051	2089

- When your guest appears, click on the Live Tile for guest console

# Guest Live Tile console

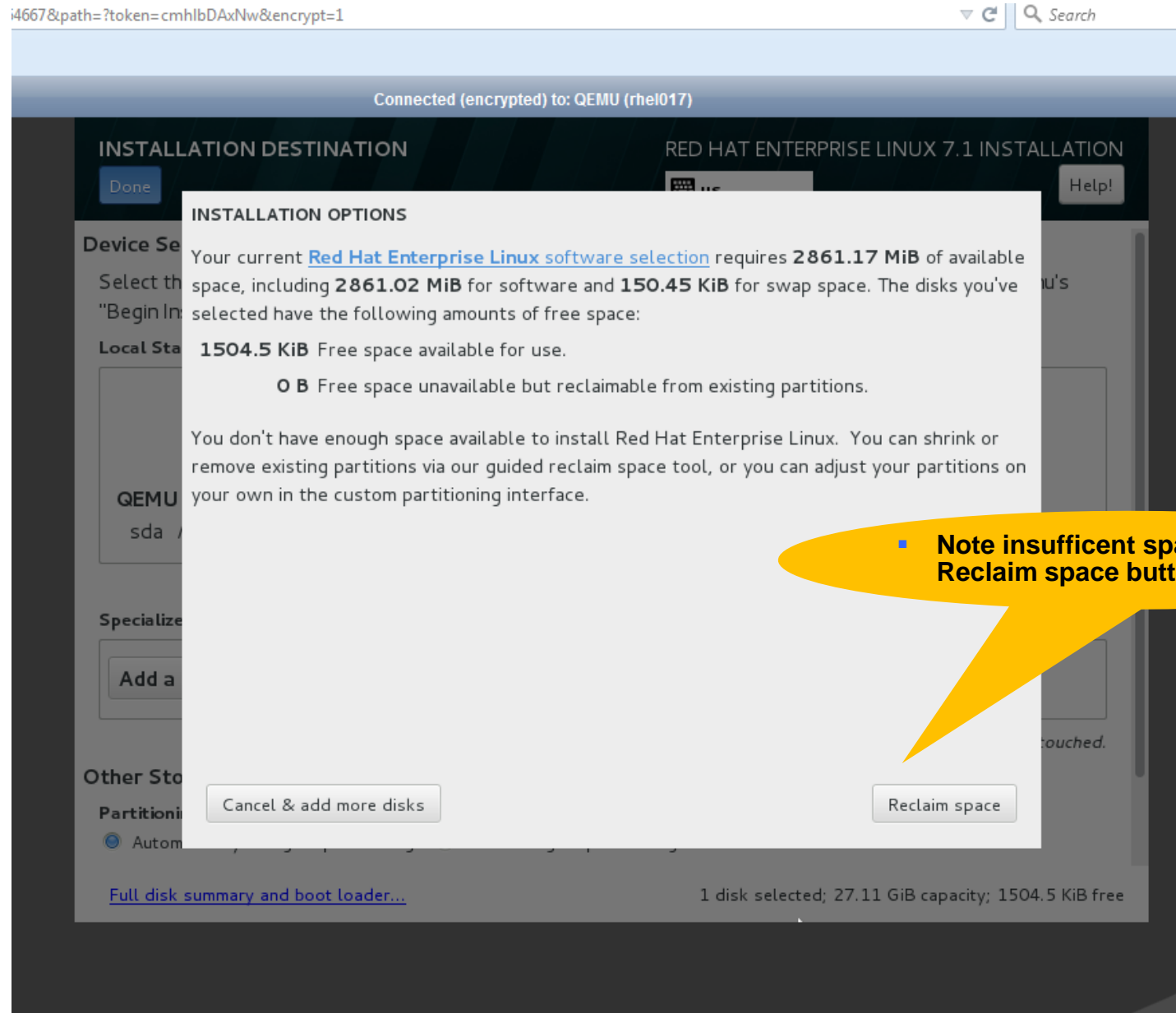


# Guest Live Tile console





# Guest Live Tile console



# Guest Live Tile console

'&path=?token=cmhlbDAxNw&encrypt=1

Connected (encrypted) to: QEMU (rhel017)

### RECLAIM DISK SPACE

You can remove existing file systems you no longer need to free up space for this installation. Removing a file system will permanently delete all of the data it contains.

Disk	Name	File System	Reclaimable Space	Action
▼ 27.1 GiB QEMU QEMU HARDDISK	sda		27.11 GiB total	Preserve
└─ PPC PReP Boot	sda1	prepboot	Not resizeable	Preserve
└─ /boot (Red Hat Enterprise Linux Server Linux 7.1 for ppc64)	sda2	xfs	Not resizeable	Preserve
└─ rhel_rhel017	sda3	lvmpv	Not resizeable	Preserve
└─ Free space			1504.5 KiB	

Preserve Delete Shrink Delete all

1 disks; 27.11 GiB reclaimable space (in file systems)

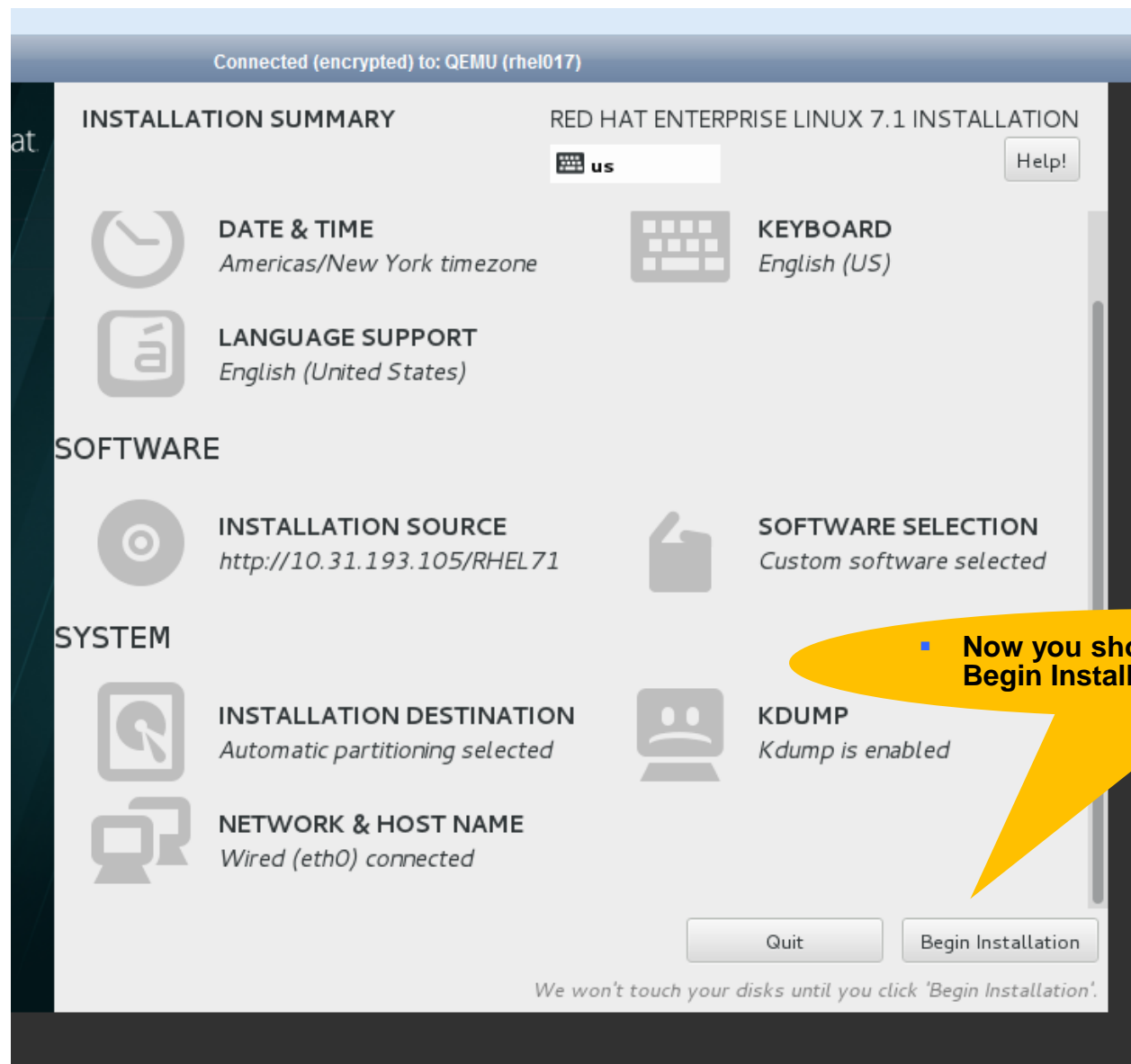
Total selected space to reclaim: 0

Installation requires a total of 2861.02 MiB for system data.

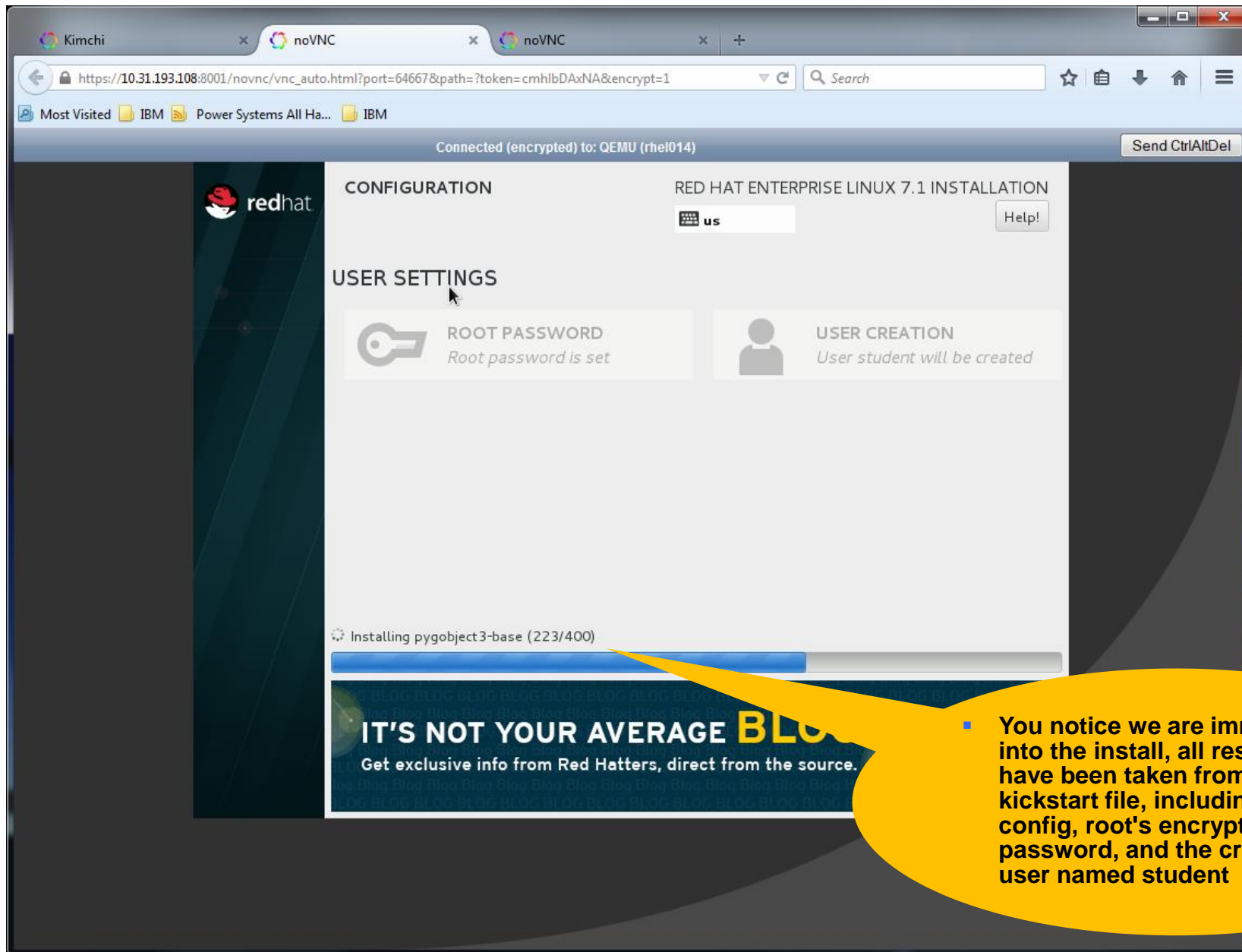
Cancel Reclaim space

- Hit Delete all, then hit Reclaim space below

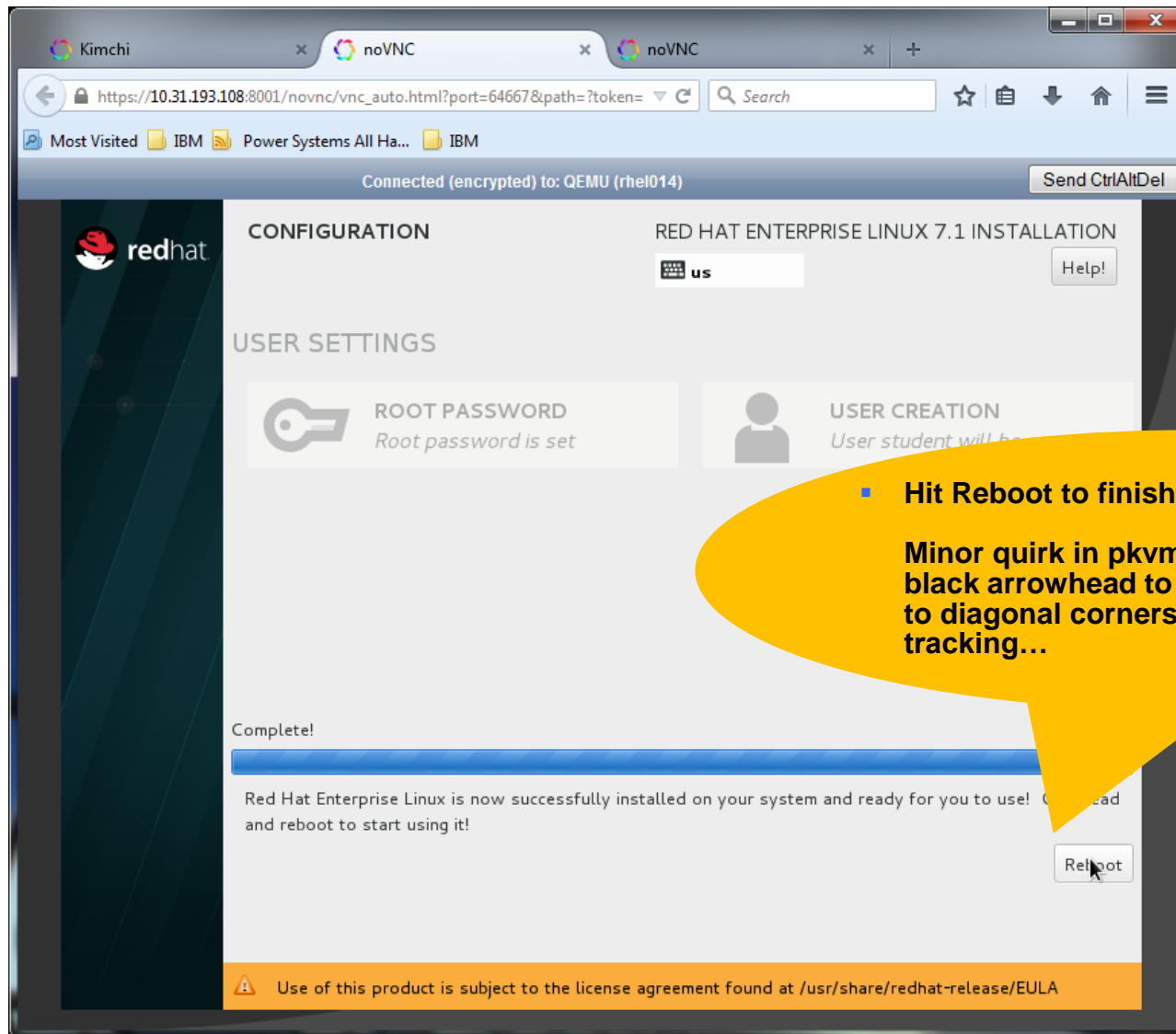
# Guest Live Tile console



# Guest Live Tile console

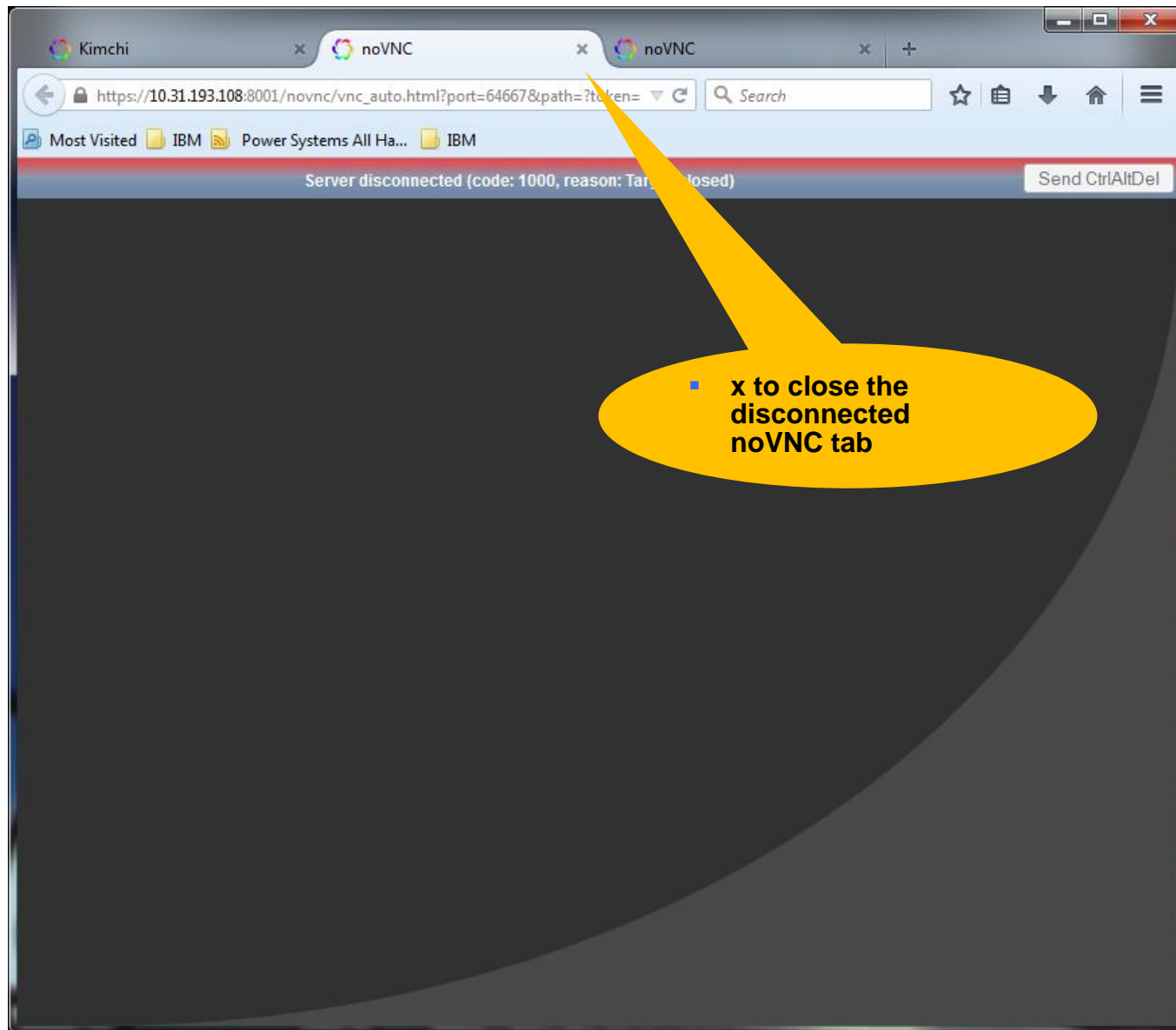


# Guest Live Tile console





# Guest Live Tile console



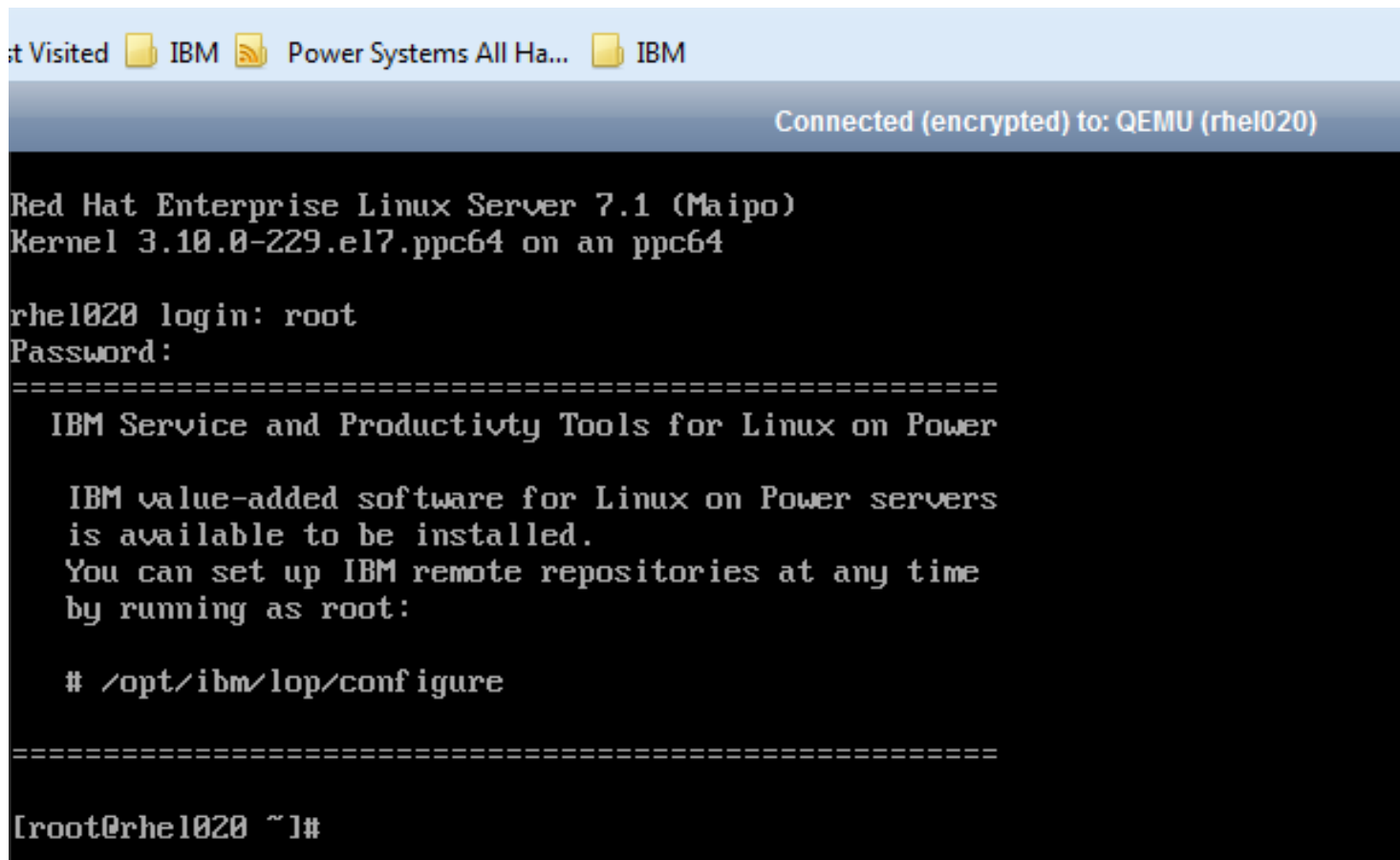
# Back on guests tab, click again on your Live Tile

The screenshot shows the Kimchi web interface with the following data:

Guest Name	CPU	Mem	Net	Console	Actions
rhel006	0%	0 KB/s	0 KB/s	Console	Refresh, Stop, Start, Actions
rhel008	0%	0 KB/s	0 KB/s	Console	Refresh, Stop, Start, Actions
rhel010	0%	0 KB/s	0 KB/s	Console	Refresh, Stop, Start, Actions
rhel012	0%	0 KB/s	0 KB/s	Console	Refresh, Stop, Start, Actions
rhel014	9%	13051 KB/s	2089 KB/s	Console	Refresh, Stop, Start, Actions

A yellow callout bubble points to the 'rhel012' tile with the text: "Open the Live Tile console on your rebooted guest".

## Login on console, see prompt for /opt/ibm/lop/configure



```
at Visited IBM Power Systems All Ha... IBM
Connected (encrypted) to: QEMU (rhel020)

Red Hat Enterprise Linux Server 7.1 (Maipo)
Kernel 3.10.0-229.el7.ppc64 on an ppc64

rhel020 login: root
Password:
=====
IBM Service and Productivity Tools for Linux on Power

IBM value-added software for Linux on Power servers
is available to be installed.
You can set up IBM remote repositories at any time
by running as root:

# /opt/ibm/lop/configure
=====

[root@rhel020 ~]#
```

- The kickstart file installed, wget, dialog.ppc64, and ibm-power-repo, the repository definitions for IBM Service and Productivity Tools
- Recent license changes require you to run /opt/ibm/lop/configure and agree to license terms

# Login on console, see prompt for /opt/ibm/lop/configure

```
Do you agree with this notice? Press the PageDown key to scroll down

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The freeware packages ("Code") provided here are made available as a
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implied, including without limitation any warranty of

48%
< I agree >      <I do not agree>
```

- Hit space on "I agree" to agree with notice, give it about 20 sec...
- Scroll down to see root # prompt

# Login on console, see prompt for /opt/ibm/lop/configure

Connected (encrypted) to: QEMU (rhel020)

Send CtrlA

```
[root@rhel020 ~]# yum repolist enabled
Loaded plugins: product-id, subscription-manager
This system is not registered to Red Hat Subscription Management. You can use subscription-manager to register.
Advance_Toolchain | 1.1 kB | 00:00:00
IBM_Power_SDK_Tools | 2.5 kB | 00:00:00
IBM_Power_Tools | 2.5 kB | 00:00:00
(1/3): IBM_Power_SDK_Tools/primary_db | 16 kB | 00:00:00
(2/3): IBM_Power_Tools/primary_db | 35 kB | 00:00:00
(3/3): Advance_Toolchain/primary | 27 kB | 00:00:05
Advance_Toolchain 191/191
repo id repo name status
Advance_Toolchain Advance Toolchain 191
IBM_Power_SDK_Tools IBM Power SDK Tools 11
IBM_Power_Tools IBM Power Tools 35
RHEL71DVD RHEL71DVD 3,796
repolist: 4,033
[root@rhel020 ~]#
```

- # yum repolist enabled

■ To see all the repositories configured



# What was in the kickstart?

- If you would like to review it
- How do these files compare?

```
# more /root/anaconda-ks.cfg
```

```
# wget http://10.31.193.105/kickstart/rhel0nn-ks.cfg
```

## DNS - DOMAIN - search directive

- You **should** already have a search directive in /etc/resolv.conf, because we used a fully qualified hostname in the kickstart file.

```
# cat /etc/resolv.conf
# Generated by NetworkManager
search pvw.ibm.com
nameserver 10.31.197.47
```

- If **search directive is missing**, playing along with Network Manager, we use nmcli to insert it. On the RHEL pkvm guest console...

```
# nmcli con modify "System eth0" +ipv4.dns-search "pvw.ibm.com"
# ifdown eth0
# ifup eth0
```

- Or you could use nmtui. But you should not need either nmcli or nmtui in this lab.

# Alternate commands for networking

net-tools	iproute2
arp -na	ip neigh
ifconfig	ip link
ifconfig -a	ip addr show
ifconfig --help	ip help
ifconfig -s	ip -s link
ifconfig eth0 up	ip link set eth0 up
ipmaddr	ip maddr
iptunnel	ip tunnel
netstat	ss
netstat -i	ip -s link
netstat -g	ip maddr
netstat -l	ss -l
netstat -r	ip route
route add	ip route add
route del	ip route del
route -n	ip route show
vconfig	ip link

LinOxide.com  
Detailed : <http://linoxide.com/linux-command/use-ip-command-linux/>

- Just FYI, we are being led to new commands...
- Or...  
# yum -y install net-tools  
if you miss ifconfig

# SMT

- Check SMT state

```
# ppc64_cpu --smt  
SMT=8
```

■ 2015, pkvm 2.1, we had to make an XML edit and a reboot of guest to get SMT turned on. We did put some SMT settings into the virt-install command, and pkvm 3.1 better handles SMT

- virt-install, we asked for --vcpus=8,cores=1,threads=8

```
# ppc64_cpu --info  
Core    0:    0*    1*    2*    3*    4*    5*    6*    7*
```

```
# ppc64_cpu --threads-per-core  
Threads per core: 8
```

- ```
# ppc64_cpu --cores-present  
Number of cores present = 1
```

- ```
# lscpu | grep -i byte  
Byte Order:          Big Endian
```

■ Just FYI

# Migrate RHEL7 Guest to the other machine

- In your KVM login, if you are odd...

```
[student@p8kvm ~]$ sudo virsh migrate rhel0nn --undefinesource --persistent  
qemu+ssh://10.31.193.108/system
```

- I've already exchanged ssh public keys for root on each machine, so you won't be prompted for destination KVM root password.

In your KVM login, if you are even...

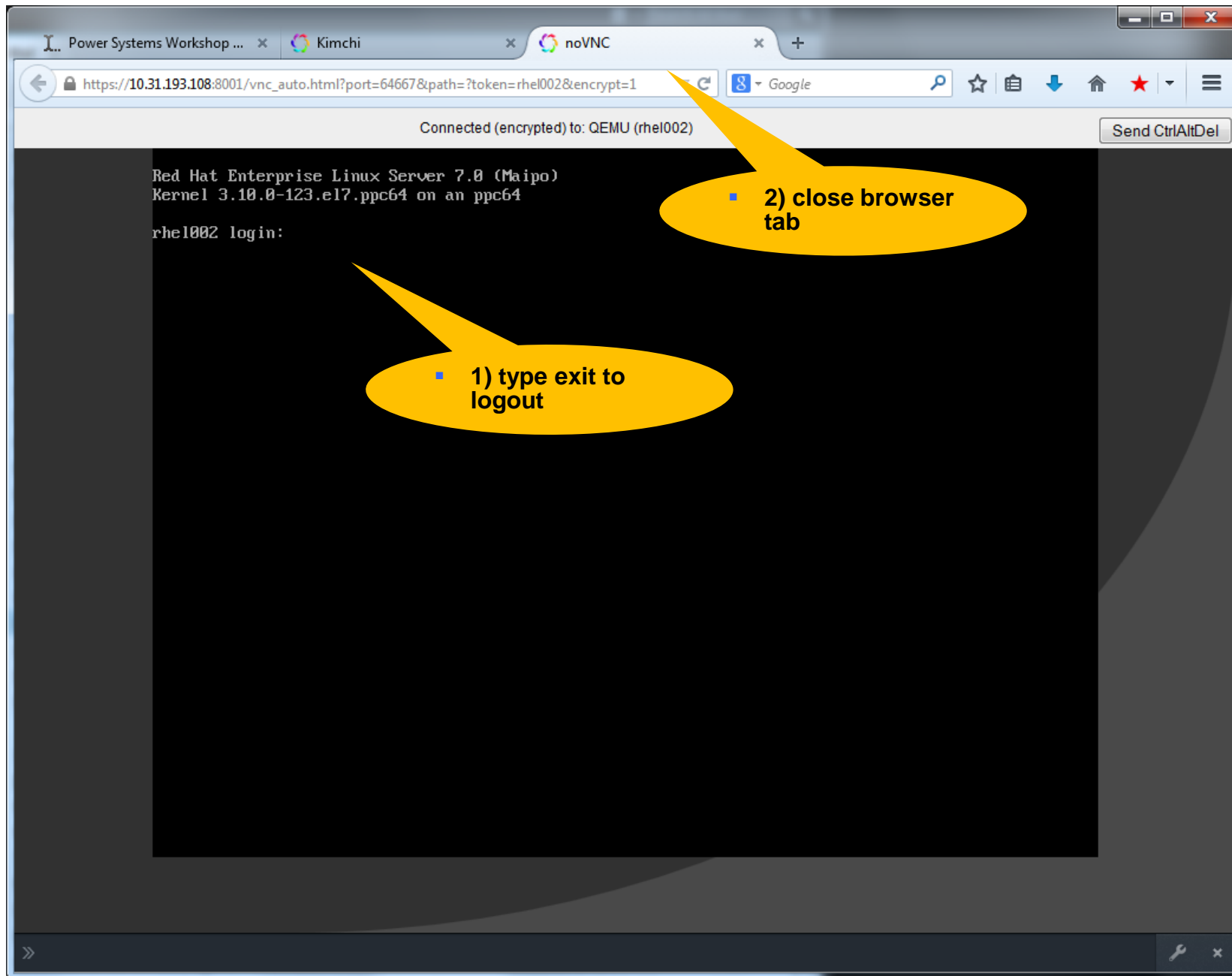
```
[student@s822kvm ~]$ sudo virsh migrate rhel0nn --undefinesource --persistent  
qemu+ssh://10.31.193.109/system
```

- Did you see your guest blank out and disappear?
- Browser into the other machine, and check for it
- ssh into the other KVM, and move it back





# Guest console logout



## CLI guest console

- PowerKVM can open command line console to guest

```
[student@s822kvm ~]$ sudo virsh console rhel0nn
Connected to domain rhel00n
Escape character is ^]
```

```
Red Hat Enterprise Linux Server 7.0 (Maipo)
Kernel 3.10.0-123.el7.ppc64 on an ppc64
```

```
rhel0nn login:
```

- To exit this console `ctrl + ]`

- This is good when the java based console in the browser

**"studdddddders."**

## sudo in RHEL70 - just FYI

- "wheel" group, password required, is already uncommented in /etc/sudoers
  - Put non-root users in wheel group to run commands
  - At this time user student is put into the wheel group in the kickstart file
  - Non-root user will need to logout, and login again
  - sudo violators are recorded in /var/log/secure
  - As root in RHEL70, do a tail -f /var/log/secure
- 
- Example below, from when student was not in the wheel group

```
[root@rhel003 log]# tail -f /var/log/secure
Feb 16 15:20:13 rhel003 login: pam_unix(login:session): session closed
for user root
Feb 16 15:20:19 rhel003 login: pam_unix(login:session): session opened
for user student by LOGIN(uid=0)
Feb 16 15:20:19 rhel003 login: LOGIN ON hvc0 BY student
Feb 16 15:20:29 rhel003 sudo: student : user NOT in sudoers ; TTY=hvc0 ;
PWD=/home/student ; USER=root ; COMMAND=/sbin/ifconfig -a
Feb 16 15:20:43 rhel003 su: pam_unix(su-l:session): session opened for
user root by student(uid=1000)
```

# Without DHCP on subnet, virt-install guest fails here

Just FYI... It says run journalctl

```
Connected (encrypted) to: QEMU (rhel012)

[ 9.043185] sd 0:0:0:0: [sda] 56863744 512-byte logical blocks: (29.1 GB/27.1 GiB)
[ 9.044895] sd 0:0:0:0: [sda] Write Protect is off
[ 9.045970] sd 0:0:0:0: [sda] Write cache: enabled, read cache: enabled, doesn't support DPO or FUA
[ 9.050410] sda: unknown partition table
[ 9.052949] sd 0:0:0:0: [sda] Attached SCSI disk
[ OK ] Started dracut pre-trigger hook.
      Starting udev Coldplug all Devices...
[ OK ] Started udev Coldplug all Devices.
      Starting dracut initqueue hook...
[ OK ] Reached target System Initialization.
[ OK ] Reached target Basic System.
      Mounting Configuration File System...
[ OK ] Mounted Configuration File System.
dracut-initqueue[571]: RTNETLINK answers: File exists
dracut-initqueue[571]: Warning: Could not boot.
dracut-initqueue[571]: Warning: /dev/root does not exist
      Starting Setup Virtual Console...
[ OK ] Started Setup Virtual Console.
      Starting Dracut Emergency Shell...
Warning: /dev/root does not exist

Generating "/run/initramfs/rdsosreport.txt"

Entering emergency mode. Exit the shell to continue.
Type "journalctl" to view system logs.
You might want to save "/run/initramfs/rdsosreport.txt" to a USB stick or /boot
after mounting them and attach it to a bug report.

dracut:/#
```

# Without DHCP on subnet, at the end of journalctl

Again, just FYI, No DHCPOFFERS received...

```
Jan 29 13:35:54 localhost systemd[1]: Mounted Configuration File System.
Jan 29 13:35:54 localhost multipathd[206]: sda: add path (uevent)
Jan 29 13:35:54 localhost multipathd[206]: sda: spurious uevent, path already in pathvec
Jan 29 13:35:55 localhost dracut-initqueue[638]: Starting dhcp for interface eth0
Jan 29 13:35:55 localhost dracut-initqueue[638]: dhcp: PREINIT eth0 up
Jan 29 13:35:55 localhost dhclient[716]: DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 8
Jan 29 13:36:03 localhost dhclient[716]: DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 12
Jan 29 13:36:15 localhost dhclient[716]: DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 11
Jan 29 13:36:26 localhost dhclient[716]: DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 18
Jan 29 13:36:44 localhost dhclient[716]: DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 12
Jan 29 13:36:56 localhost dhclient[716]: No DHCPOFFERS received.
Jan 29 13:36:57 localhost dracut-initqueue[638]: dhcp failed
Jan 29 13:36:57 localhost dracut-initqueue[638]: RTNETLINK answers: File exists
Jan 29 13:40:05 localhost dracut-initqueue[638]: Warning: Could not boot.
Jan 29 13:40:05 localhost dracut-initqueue[638]: Warning: /dev/root does not exist
Jan 29 13:40:05 localhost systemd[1]: Starting Setup Virtual Console...
Jan 29 13:40:05 localhost systemd[1]: Started Setup Virtual Console.
Jan 29 13:40:05 localhost systemd[1]: Starting Dracut Emergency Shell...
lines 589-624/624 (END)
```



# FYI, setup on the http server was minimal

At 10.31.193.105...

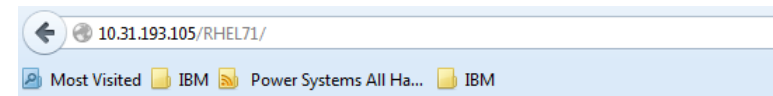
```
# ls /iso/RHEL*
```

```
/iso/RHEL-7.1-20150219.1-Server-ppc64-dvd1.iso
```

```
# grep RHEL-7 /etc/fstab
```

```
/iso/RHEL-7.1-20150219.1-Server-ppc64-dvd1.iso /var/www/html/RHEL71 iso9660 ro,loop
```

Browser to <http://10.31.193.105/RHEL71> and see directory from the RHEL71 media



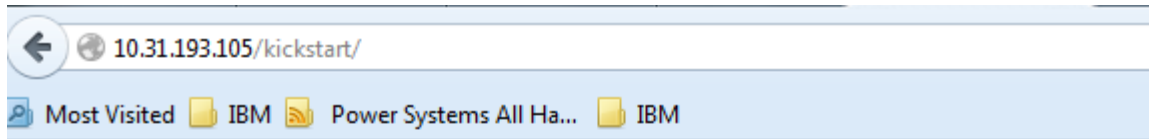
## Index of /RHEL71

Name	Last modified	Size	Description
<a href="#">Parent Directory</a>		-	
<a href="#">EULA</a>	04-Apr-2014 07:02	8.1K	
<a href="#">GPL</a>	06-Mar-2012 08:06	18K	
<a href="#">LiveOS/</a>	19-Feb-2015 10:06	-	
<a href="#">Packages/</a>	19-Feb-2015 10:06	-	
<a href="#">RPM-GPG-KEY-redhat-beta</a>	02-Feb-2015 05:48	3.3K	
<a href="#">RPM-GPG-KEY-redhat-release</a>	02-Feb-2015 05:48	3.1K	
<a href="#">TRANS.TBL</a>	19-Feb-2015 10:06	1.5K	
<a href="#">boot/</a>	19-Feb-2015 10:06	-	
<a href="#">images/</a>	19-Feb-2015 10:06	-	
<a href="#">media.repo</a>	19-Feb-2015 09:46	114	
<a href="#">ppc/</a>	19-Feb-2015 10:06	-	
<a href="#">release-notes/</a>	19-Feb-2015 10:06	-	
<a href="#">repodata/</a>	19-Feb-2015 10:06	-	














Apache/2.2.15 (Red Hat) Server at 10.31.193.105 Port 80

# FYI, setup on the http server was minimal

Browser to <http://10.31.193.105/kickstart> and see list of kickstart files



The screenshot shows a web browser window with the address bar displaying [10.31.193.105/kickstart/](http://10.31.193.105/kickstart/). Below the address bar, there are tabs for 'Most Visited', 'IBM', 'Power Systems All Ha...', and 'IBM'. The main content area displays the title 'Index of /kickstart' and a table of files and directories.

	<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Description</u>
	<a href="#">Parent Directory</a>	-	-	-
	<a href="#">cent020-ks.cfg</a>	04-Feb-2016 16:46	1.6K	
	<a href="#">dhcpd.template.conf</a>	11-Feb-2014 16:23	725	
	<a href="#">ibm-power-repo-2.1.1-2.noarch.rpm</a>	23-Jun-2015 16:07	490K	
	<a href="#">ibm-power-repo-3.0.0-8.noarch.rpm</a>	05-Feb-2016 11:14	254K	
	<a href="#">rhel002-ks.cfg</a>	05-Feb-2016 13:34	0	
	<a href="#">rhel003-ks.cfg</a>	05-Feb-2016 13:36	1.7K	
	<a href="#">rhel004-ks.cfg</a>	05-Feb-2016 13:40	1.7K	
	<a href="#">rhel004-ks.orig</a>	05-Feb-2016 13:39	1.7K	
	<a href="#">rhel005-ks.cfg</a>	05-Feb-2016 13:40	1.7K	
	<a href="#">rhel005-ks.orig</a>	05-Feb-2016 13:39	1.7K	
	<a href="#">rhel006-ks.cfg</a>	05-Feb-2016 13:40	1.7K	
	<a href="#">rhel006-ks.orig</a>	05-Feb-2016 13:39	1.7K	

- Your kickstart file did a wget of the ibm-power-repo and then rpm installed it