

Resolving Linux issues, kernel panics, patching/updating systems, restoring AI/ML compute nodes.  
In no particular order or groupings, just proof of my day to day :-)

// reviewing/editing ssh configurations

```
# cat /etc/ssh/moduli
# cat /etc/ssh/ssh_config
root@henry:~# cat /etc/ssh/sshd_config
# File is managed by Puppet
Port 22

AcceptEnv LANG LC_*
AllowUsers
AllowUsers
AllowUsers
AllowUsers
ChallengeResponseAuthentication yes
Ciphers aes128-ctr,aes192-ctr,aes256-ctr
ClientAliveCountMax 2
ClientAliveInterval 20
GSSAPIAuthentication yes
GSSAPICleanupCredentials yes
HostKey /etc/ssh/ssh_host_rsa_key
HostKey /etc/ssh/ssh_host_ecdsa_key
HostKey /etc/ssh/ssh_host_ed25519_key
KerberosAuthentication no
KexAlgorithms diffie-hellman-group-exchange-sha256,diffie-hellman-group16-sha512,diffie-hellman-group18-sha512
MACs hmac-sha2-512,hmac-sha2-256-etc@openssh.com,hmac-sha2-512-etc@openssh.com
MaxAuthTries 3
PermitRootLogin no
PrintMotd yes
Subsystem sftp internal-sftp
UseDNS no
UsePAM yes
X11Forwarding yes
root@henry:~#
```

// looks like setup of linux for a compute stick, checking the ip routes

```
valid_lft forever preferred_lft forever
inet fe80::2ce:39ff:fed4:14f1/64 scope link
    valid_lft forever preferred_lft forever
3: wlp3s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP
    link/ether 7[REDACTED] brd ff:ff:ff:ff:ff:ff
    inet 10[REDACTED] brd 10[REDACTED] scope global dynamic noprefixroute
        valid_lft 66767sec preferred_lft 66767sec
        inet6 fe80::fbda:96b7:17d1:7472/64 scope link noprefixroute
            valid_lft forever preferred_lft forever
nktran@icstick1:~$ ip route show
default via 1[REDACTED] dev enp2s0 proto dhcp src [REDACTED] metric 100
default via 10.153.0.1 dev wlp3s0 proto dhcp metric 600
10[REDACTED] wlp3s0 proto kernel scope link src 10[REDACTED]
    metric 600
    metric 100
    metric 100
    metric 100
    metric 100
    metric 0
10.153.0.0/16 dev wlp3s0 scope link metric 2000
    metric 1000
    metric 1000
    metric 1000
    metric 1000
    metric 0
```

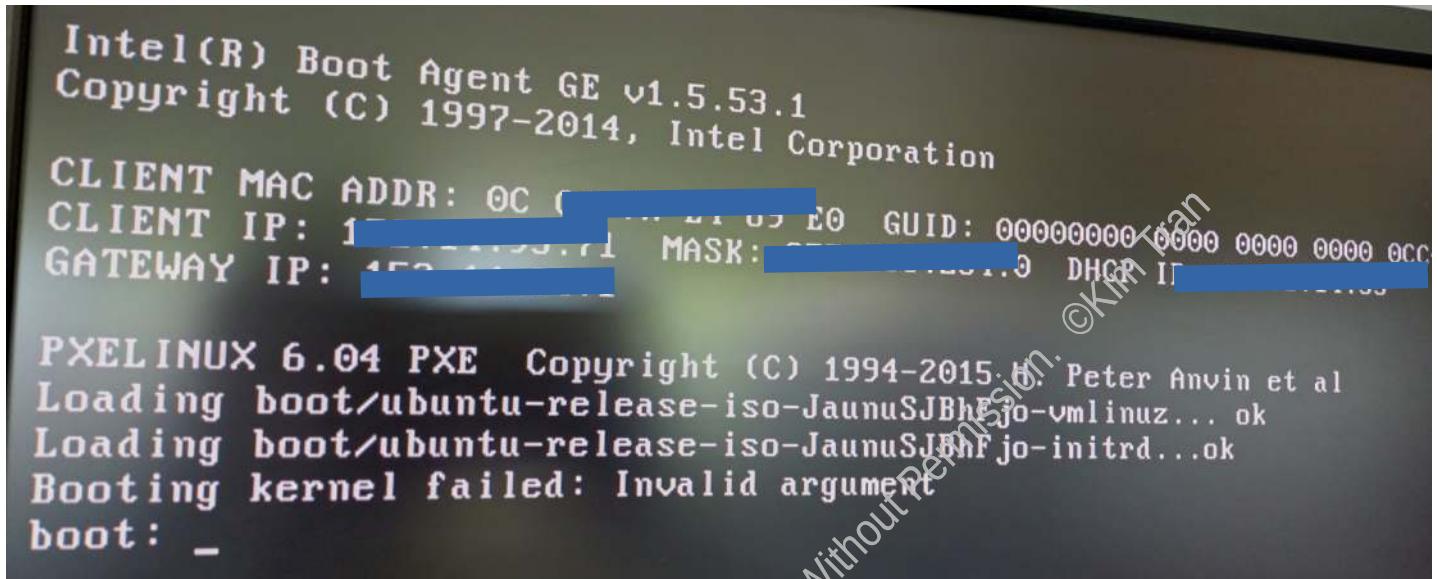
// looks like provisioning system output

```
Setting up iptables (1.6.1-2ubuntu2.1) ...
Setting up nplan (0.99-0ubuntu3~18.04.5) ...
Setting up ubuntu-minimal (1.417.5) ...
Setting up ubuntu-standard (1.417.5) ...
Setting up ufw (0.36-0ubuntu0.18.04.2) ...
Setting up liblxc1 (3.0.3-0ubuntu1~18.04.3) ...
Setting up liblxc-common (3.0.3-0ubuntu1~18.04.3) ...
Setting up lxd (3.0.3-0ubuntu1~18.04.3) ...
Processing triggers for libc-bin (2.27-3ubuntu1.6) ...
Processing triggers for systemd (237-3ubuntu10.57) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Processing triggers for dbus (12.2-1ubuntu1.4) ...
Processing triggers for rsyslog (8.32.0-1ubuntu4.2) ...
Processing triggers for ureadahead (0.100.0-21) ...
ureadahead will be reprofiled on next reboot
Processing triggers for initramfs-tools (0.130ubuntu3.13) ...
update-initramfs: Generating /boot/initrd.img-4.15.0-213-generic
W: Possible missing firmware /lib/firmware/ast_dp501-fw.bin for module ast
root@nps6:~#
```

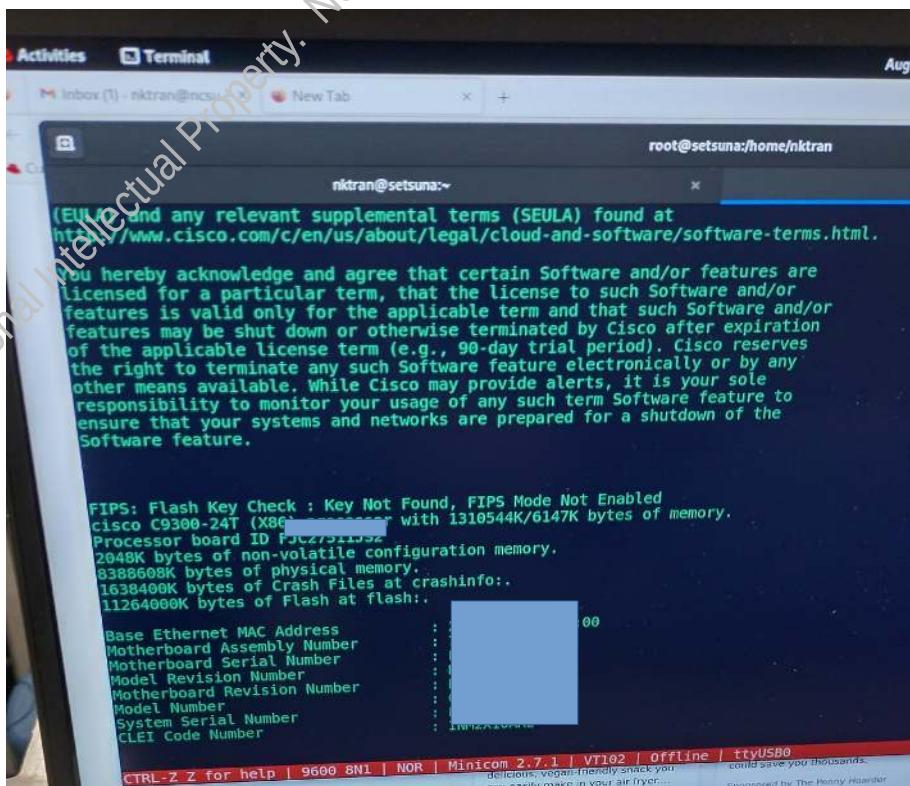
ubuntu-22.04-live-se	82%	*****		1647M	0:00:08	ETA
ubuntu-22.04-live-se	84%	*****		1688M	0:00:07	ETA
ubuntu-22.04-live-se	86%	*****		1730M	0:00:06	ETA
ubuntu-22.04-live-se	88%	*****		1772M	0:00:05	ETA
ubuntu-22.04-live-se	90%	*****		1814M	0:00:04	ETA
ubuntu-22.04-live-se	92%	*****		1856M	0:00:03	ETA
ubuntu-22.04-live-se	94%	*****		1897M	0:00:02	ETA
ubuntu-22.04-live-se	96%	*****		1939M	0:00:01	ETA
[ 70.638817]	loop0:	detected capacity change from 0 to 4110172				
ubuntu-22.04-live-se	98%	*****		1981M	0:00:00	ETA
ubuntu-22.04-live-se	100%	*****		2006M	0:00:00	ETA

BusyBox v1.30.1 (Ubuntu 1:1.30.1-7ubuntu3) built-in shell (ash)  
Enter 'help' for a list of built-in commands.

(initramfs) done.  
Unable to find a live file system on the network



// looks like a login to a cisco switch/router for configuration



// looks like an upgrade installation of ubuntu

```
If you continue, an additional ssh daemon will be started at port
'1022'.
Do you want to continue?

Continue [yN] y

Starting additional sshd

To make recovery in case of failure easier, an additional sshd will
be started on port '1022'. If anything goes wrong with the running
ssh you can still connect to the additional one.
If you run a firewall, you may need to temporarily open this port. As
this is potentially dangerous it's not done automatically. You can
open the port with e.g.:
'iptables -I INPUT -p tcp --dport 1022 -j ACCEPT'

To continue please press [ENTER]

Reading package lists... Done
Building dependency tree
Reading state information... Done
```

// looks like pre-upgrade check for rhel 7/8

```
Check all generated results messages and notify user about them.
Debug output written to /var/log/leapp/leapp-preupgrade.log
=====
REPORT OVERVIEW
=====

Upgrade has been inhibited due to the following problems:
 1. Leapp detected a processor which is no longer supported in RHEL 8. Upgrade cannot proceed.

HIGH and MEDIUM severity reports:
 1. Packages not signed by Red Hat found on the system
 2. Difference in Python versions and support in RHEL 8
 3. SSSD Domain "ncsu.edu": sudo rules containing wildcards will stop working.
 4. Upgrade can be performed, but KDE will be uninstalled.
 5. Upgrade can be performed, but KDE/Qt apps will be uninstalled.
 6. Module pam_pkcs11 will be removed from PAM configuration.

Reports summary:
 Errors:          0
 Inhibitors:      1
 HIGH severity reports: 3
 MEDIUM severity reports: 3
 LOW severity reports:  8
 INFO severity reports: 3

Before continuing consult the full report:
 A report has been generated at /var/log/leapp/leapp-report.json
 A report has been generated at /var/log/leapp/leapp-report.txt
=====
END OF REPORT OVERVIEW
=====
```

// looks like more upgrade checks complaining about nfs being on and active

```
h exit code 32.
May 09 16:33:39 localhost upgrade[1390]: CalledProcessError: Command '['/bin/mount', '-a'] failed with
amStart: Actor remove_upgrade_boot_entry has crashed: Traceback (most recent call last):
May 09 16:33:39 localhost upgrade[1390]:   File "/usr/lib/python2.7/site-packages/leapp/repository/ac
May 09 16:33:39 localhost upgrade[1390]:     actor_instance.run(*args, **kwargs)
May 09 16:33:39 localhost upgrade[1390]:   File "/usr/lib/python2.7/site-packages/leapp/actors/_init
_.py", line 289, in run
May 09 16:33:39 localhost upgrade[1390]:     self._process(*args)
May 09 16:33:39 localhost upgrade[1390]:   File "/usr/share/leapp-repository/repositories/system_upgr
ade/common/actors/removeupgradebootentry/actor.py", line 20, in process
May 09 16:33:39 localhost upgrade[1390]:     remove_boot_entry()
May 09 16:33:39 localhost upgrade[1390]:   File "/usr/share/leapp-repository/repositories/system_upgr
ade/common/actors/removeupgradebootentry/libraries/removeupgradebootentry.py", line 41, in remove_bo
ot_entry
May 09 16:33:39 localhost upgrade[1390]:     '/bin/mount', '-a'
May 09 16:33:39 localhost upgrade[1390]:   File "/usr/lib/python2.7/site-packages/leapp/libraries/std
lib/_init_.py", line 192, in run
May 09 16:33:39 localhost upgrade[1390]:     result=result
May 09 16:33:39 localhost upgrade[1390]: CalledProcessError: Command '['/bin/mount', '-a'] failed with
May 09 16:33:39 localhost upgrade[1390]: exit code 32.
May 09 16:33:39 localhost upgrade[1390]: =====
May 09 16:33:39 localhost upgrade[1390]: terminated with
```

```
==_entry
May 09 15:07:35 localhost upgrade[887]:   '/bin/mount', '-a'
lib/_init_.py", line 192, in run
May 09 15:07:35 localhost upgrade[887]:     result=result
May 09 15:07:35 localhost upgrade[887]: CalledProcessError: Command '['/bin/mount', '-a'] failed with
May 09 15:07:35 localhost upgrade[887]: =====
May 09 15:07:35 localhost upgrade[887]: Actor remove_upgrade_boot_entry unexpectedly terminated with
exit code: 1 - Please check the above details
May 09 15:07:35 localhost upgrade[887]: =====
May 09 15:07:36 localhost upgrade[887]: Debug output written to /var/log/leapp/leapp-upgrade.log
May 09 15:07:36 localhost upgrade[887]: =====
May 09 15:07:36 localhost upgrade[887]: REPORT OVERVIEW
May 09 15:07:36 localhost upgrade[887]: =====
May 09 15:07:36 localhost upgrade[887]: HIGH and MEDIUM severity reports:
May 09 15:07:36 localhost upgrade[887]: 1. Packages not signed by Red Hat found on the system
May 09 15:07:36 localhost upgrade[887]: 2. Difference in Python versions and support in RHEL 8
May 09 15:07:36 localhost upgrade[887]: 3. SSSD Domain "ncsu.edu": sudo rules containing wildcar
ds will stop working.
May 09 15:07:36 localhost upgrade[887]: 4. Module pam_pkcs11 will be removed from PAM configurat
ion
May 09 15:07:36 localhost upgrade[887]: 5. Upgrade can be performed, but KDE will be uninstalled
May 09 15:07:36 localhost upgrade[887]: 6. Upgrade can be performed, but KDE/Qt apps will be uni
nstalled.
May 09 15:07:36 localhost upgrade[887]: Reports summary:
May 09 15:07:36 localhost upgrade[887]: Errors: 1
May 09 15:07:36 localhost upgrade[887]: Inhibitors: 0
May 09 15:07:36 localhost upgrade[887]: HIGH severity reports: 3
```

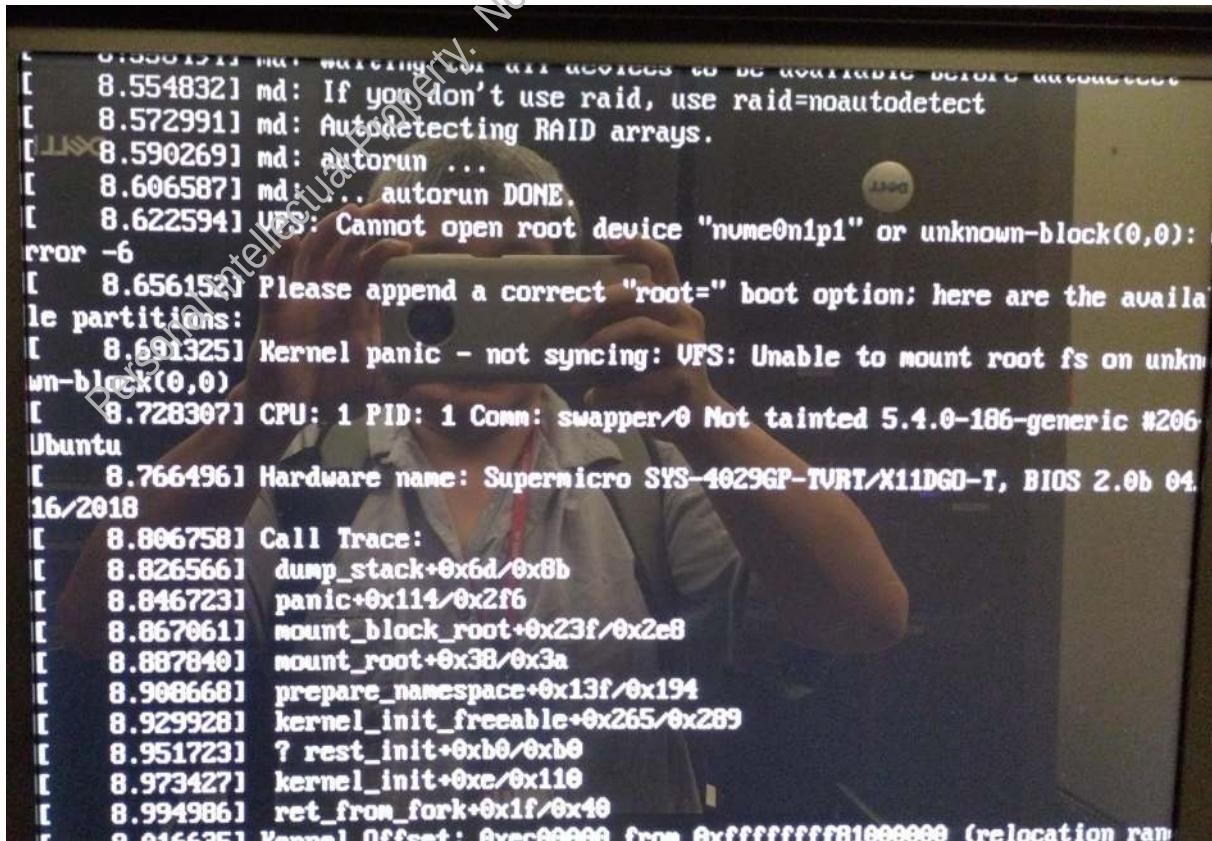
// fixing intermittent network gremlins :-)

```
-- 
-- The start-up result is done.
[root@localhost ~]# ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default
    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: enp3s0f0: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether ac:1f:6b:02:7d:b6 brd ff:ff:ff:ff:ff:ff
3: enp3s0f1: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default qlen
    link/ether 00:0c:29:4e:46:41 brd ff:ff:ff:ff:ff:ff
```

// looks like fixing missing/corrupt system libraries/modules

```
no file '/usr/lib64/lua/5.1 posix.lua'  
no file '/usr/lib64/lua/5.1 posix/init.lua'  
no file '/usr/lib64/lua/5.1 posix.so'  
no file '/usr/lib64/lua/5.1 loadall.so'  
stack traceback:  
[C]: in function 'require'  
/usr/share/lmod/lmod/libexec/addto:65: in main chunk  
[C]: in ?  
/usr/bin/lua: /usr/share/lmod/lmod/libexec/addto:65: module 'posix' not found:  
no field package.preload['posix']  
no file '/usr/share/lua/5.1 posix.lua'  
no file '/usr/share/lua/5.1 posix/init.lua'  
no file '/usr/lib64/lua/5.1 posix.lua'  
no file '/usr/lib64/lua/5.1 posix/init.lua'  
no file '/usr/lib64/lua/5.1 posix.so'  
no file '/usr/lib64/lua/5.1 loadall.so'  
stack traceback:  
[C]: in function 'require'  
/usr/share/lmod/lmod/libexec/addto:65: in main chunk  
[C]: in ?  
/usr/bin/lua: /usr/share/lmod/lmod/libexec/addto:65: module 'posix' not found:  
no field package.preload['posix']  
no file '/usr/share/lua/5.1 posix.lua'  
no file '/usr/share/lua/5.1 posix/init.lua'  
no file '/usr/lib64/lua/5.1 posix.lua'
```

// looks like fixing a kernel panic preventing bootup and normal startup

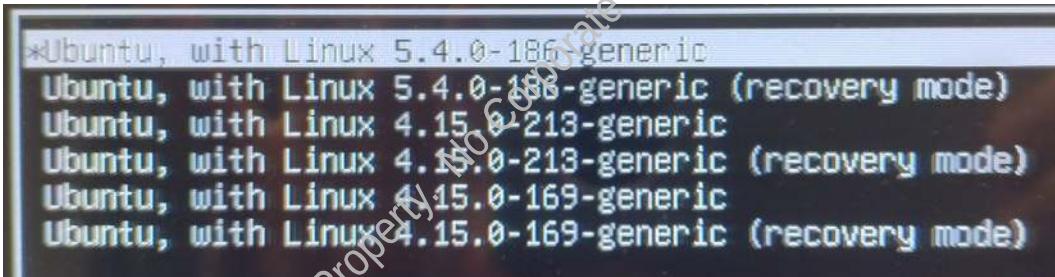


```
[ 8.550151] md: warning: all devices seem to be read-only before auto-detect  
[ 8.554832] md: If you don't use raid, use raid=noautodetect  
[ 8.572991] md: Autodetecting RAID arrays.  
[ 8.590269] md: autorun ...  
[ 8.606587] md: ... autorun DONE.  
[ 8.622594] VFS: Cannot open root device "num0n1p1" or unknown-block(0,0): error -6  
[ 8.656152] Please append a correct "root=" boot option; here are the available partitions:  
[ 8.691325] Kernel panic - not syncing: VFS: Unable to mount root fs on unknown-block(0,0)  
[ 8.728307] CPU: 1 PID: 1 Comm: swapper/0 Not tainted 5.4.0-186-generic #206-Ubuntu  
[ 8.766496] Hardware name: Supermicro SYS-40296P-TURIX11DGO-T, BIOS 2.0b 04/16/2018  
[ 8.806758] Call Trace:  
[ 8.826566] dump_stack+0x6d/0x8b  
[ 8.846723] panic+0x114/0x2f6  
[ 8.867061] mount_block_root+0x23f/0x2e8  
[ 8.887840] mount_root+0x38/0x3a  
[ 8.908668] prepare_namespace+0x13f/0x194  
[ 8.929928] kernel_init_freeable+0x265/0x289  
[ 8.951723] ? rest_init+0xb0/0xb0  
[ 8.973427] kernel_init+0xe/0x10  
[ 8.994986] ret_from_fork+0x1f/0x40  
[ 9.016635] Kernel Offset: 0x0c80000 from 0xffffffff81000000 (relocation ran)
```

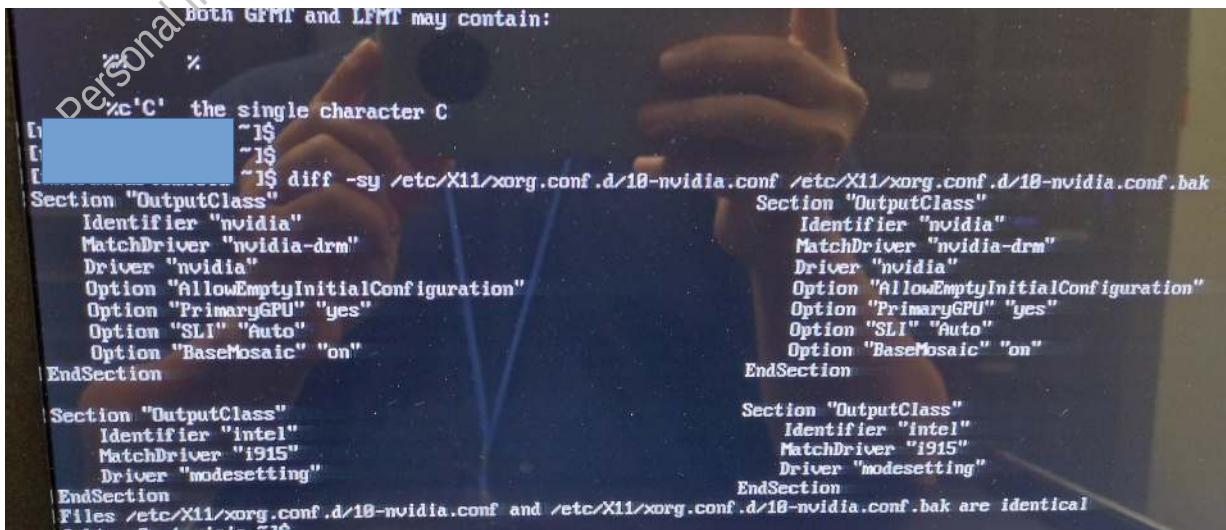
## 8.806758] Call Trace:

```
8.826566] dump_stack+0x6d/0x8b
8.846723] panic+0x114/0x2f6
8.867061] mount_block_root+0x23f/0x2e8
8.887840] mount_root+0x38/0x3a
8.908668] prepare_namespace+0x13f/0x194
8.929928] kernel_init_freeable+0x265/0x289
8.951723] ? rest_init+0xb0/0xb0
8.973427] kernel_init+0xe/0x110
8.994986] ret_from_fork+0x1f/0x40
9.016635] Kernel Offset: 0xec00000 from 0xffffffff81000000
:: 0xffffffff80000000-0xffffffffffffbfffffff)
[ 9.068766] ---[ end Kernel panic - not syncing: VFS: Unable to
on unknown-block(0,0) ]---
```

// looks like normal bootup post kernel panic resolution :-)



// looks like fixing display driver issues



// restoring/fixing a redbarn hpc compute node



// restoring a nvidia/gpu compute node in the AI/ML learning lab



// As to that \$70k+ Nvidia DGX workstation, AI/ML deep learning supercomputer rebuild?  
Well, that's in the NCSU / ECE servicenow helpdesk ticket system. Just look up my worked ticket history :-)

When I performed a bare metal restore and rebuild of that \$70K+ deep learning AI/ML supercomputer, Nvidia DGXworkstation out of vendor contract support, reinstalled vanilla base os, system drivers and firmware, gpu cuda and toolkit drivers, management and utility layer api's, restoring the system back to the DGX platform configuration, verified and addressed all system issues and placed back into production use...

That was just another day, just another linux system that was down and needed to be brought back to life :-D

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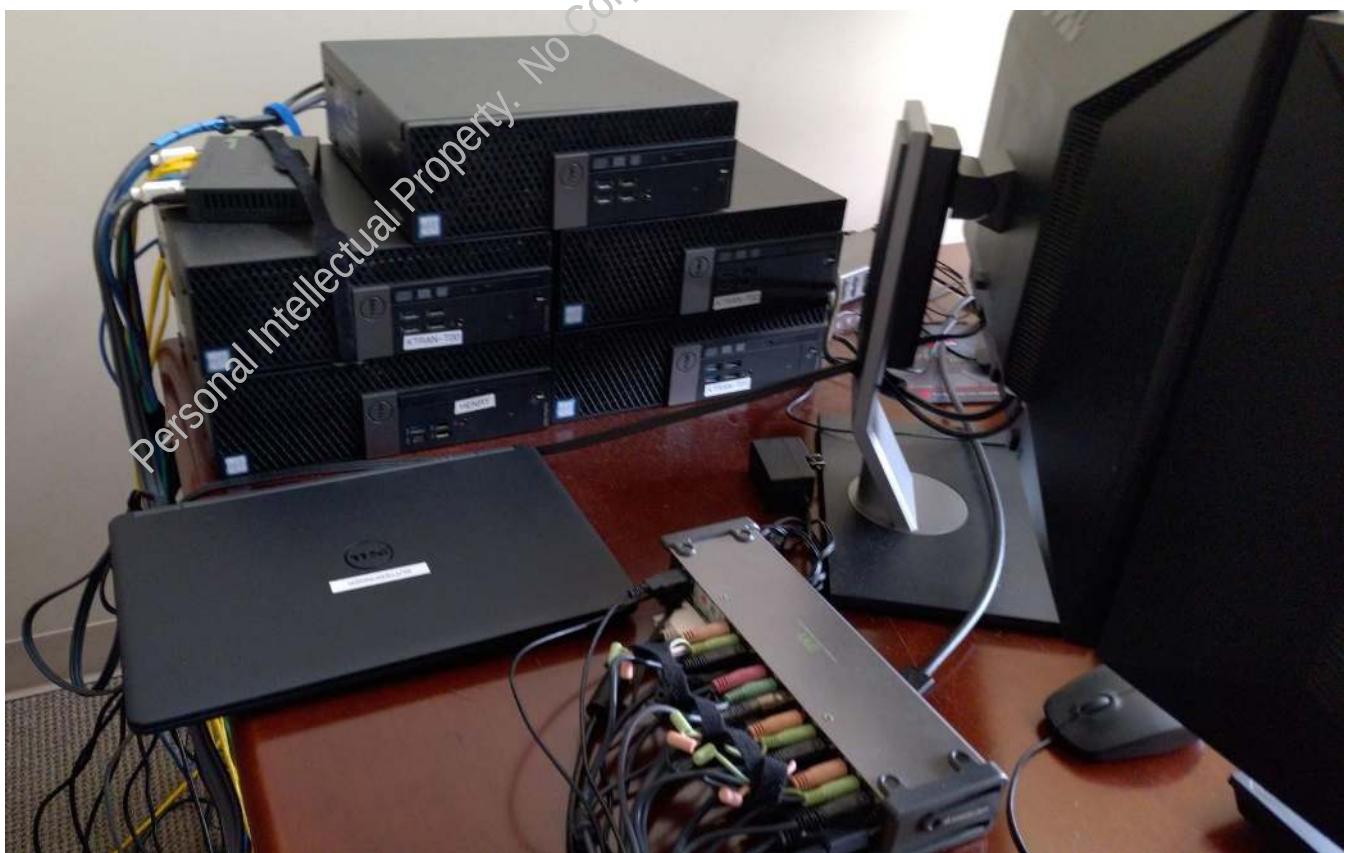
// Working in the server room for the AI/ML gpu compute nodes, server farms/clusters

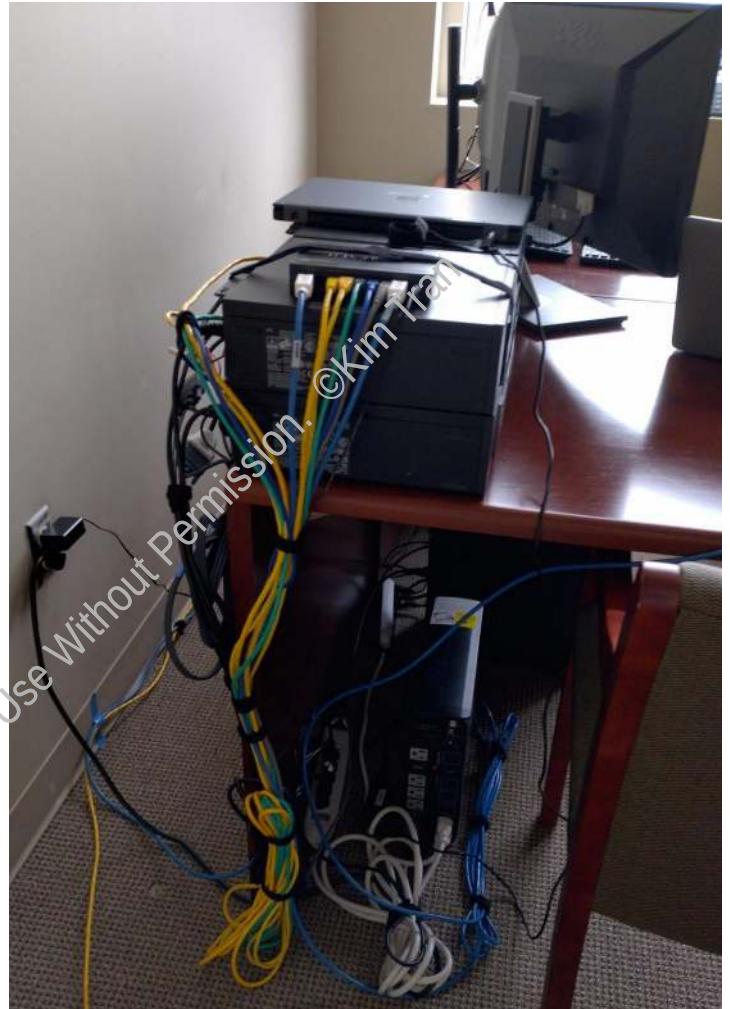
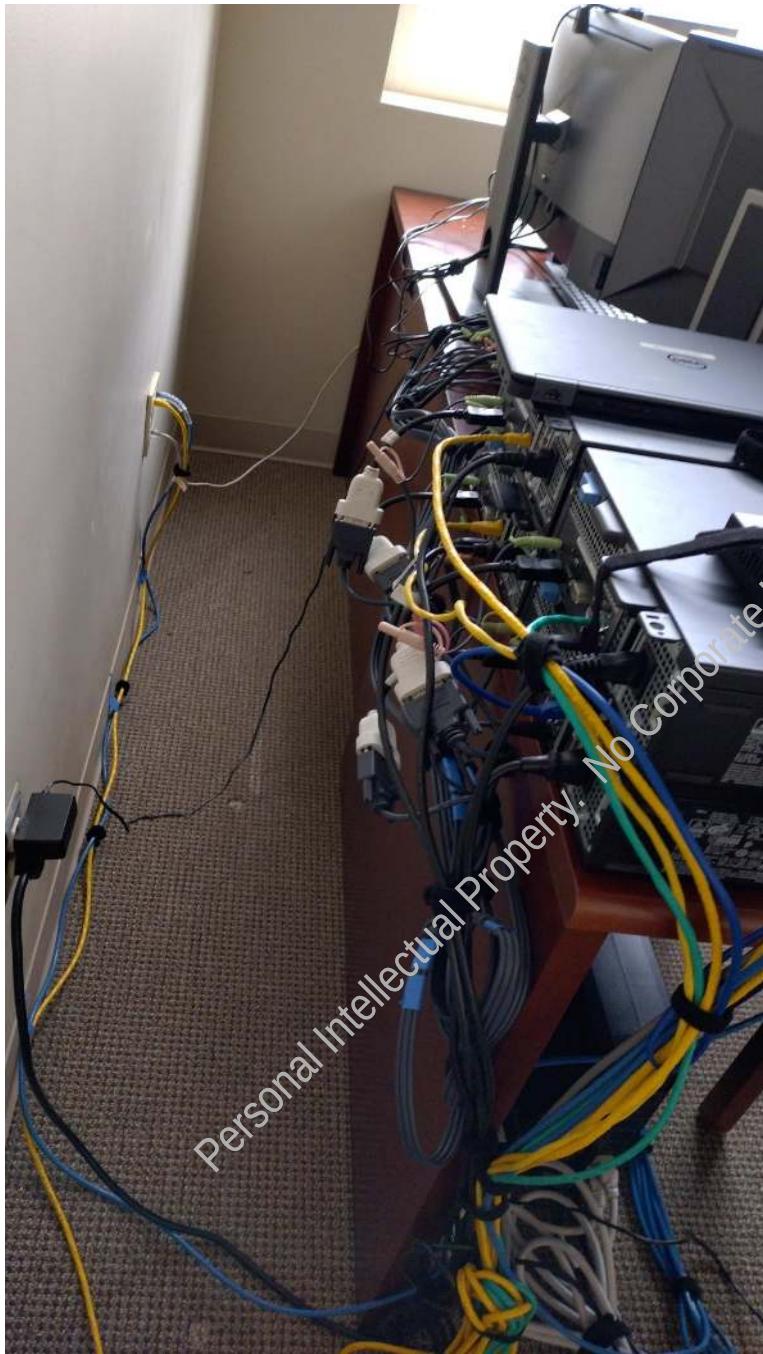


// AI/ML gpu server farms/clusters compute nodes : Keeping these workloads backbone up and alive :-)

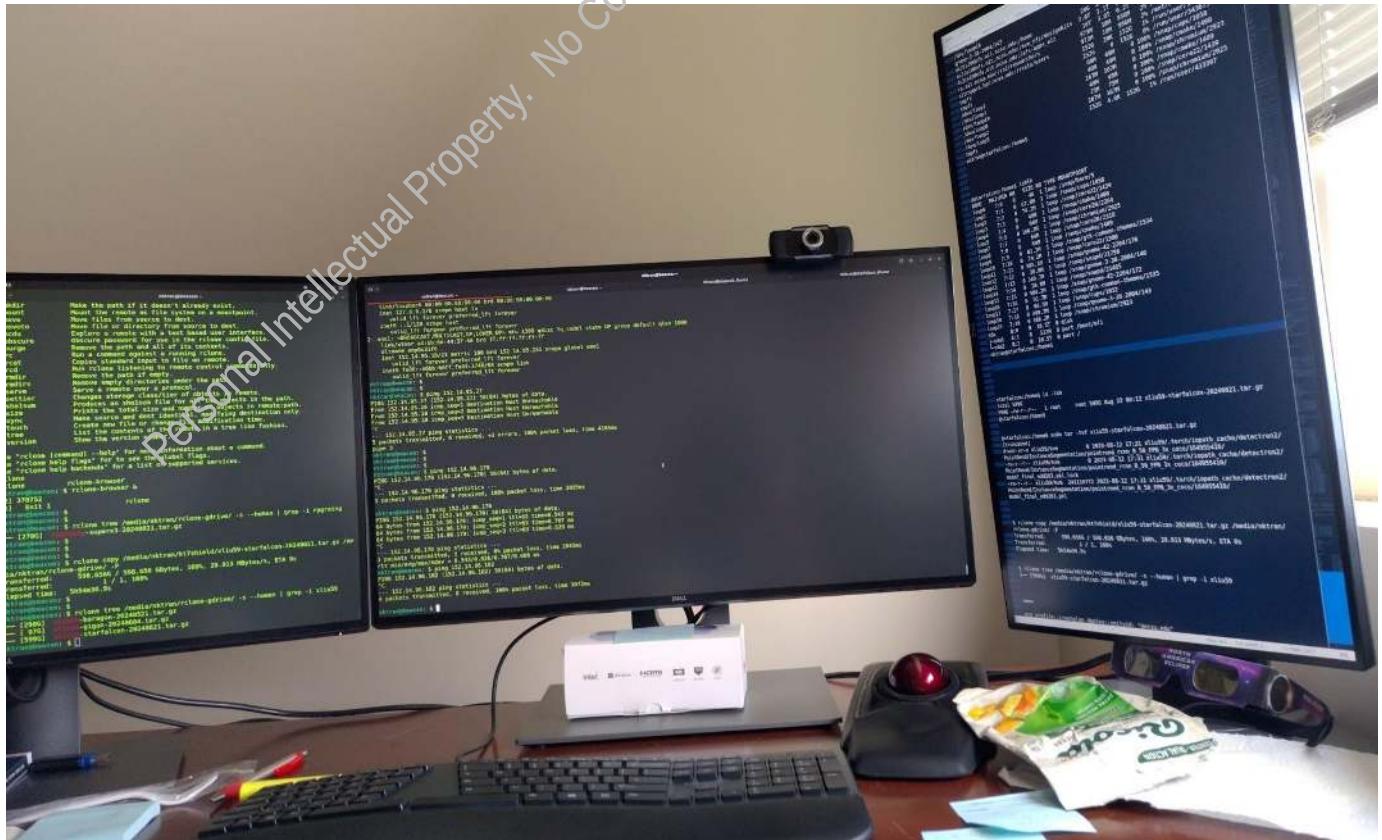


// My workstation setup to support the AI/ML/Linux server farms/compute nodes :-)





// Is this enough proof of systems utilization and multitasking? :-)



// The question was, do I need all these monitors and systems?

The answer is YES :-)

