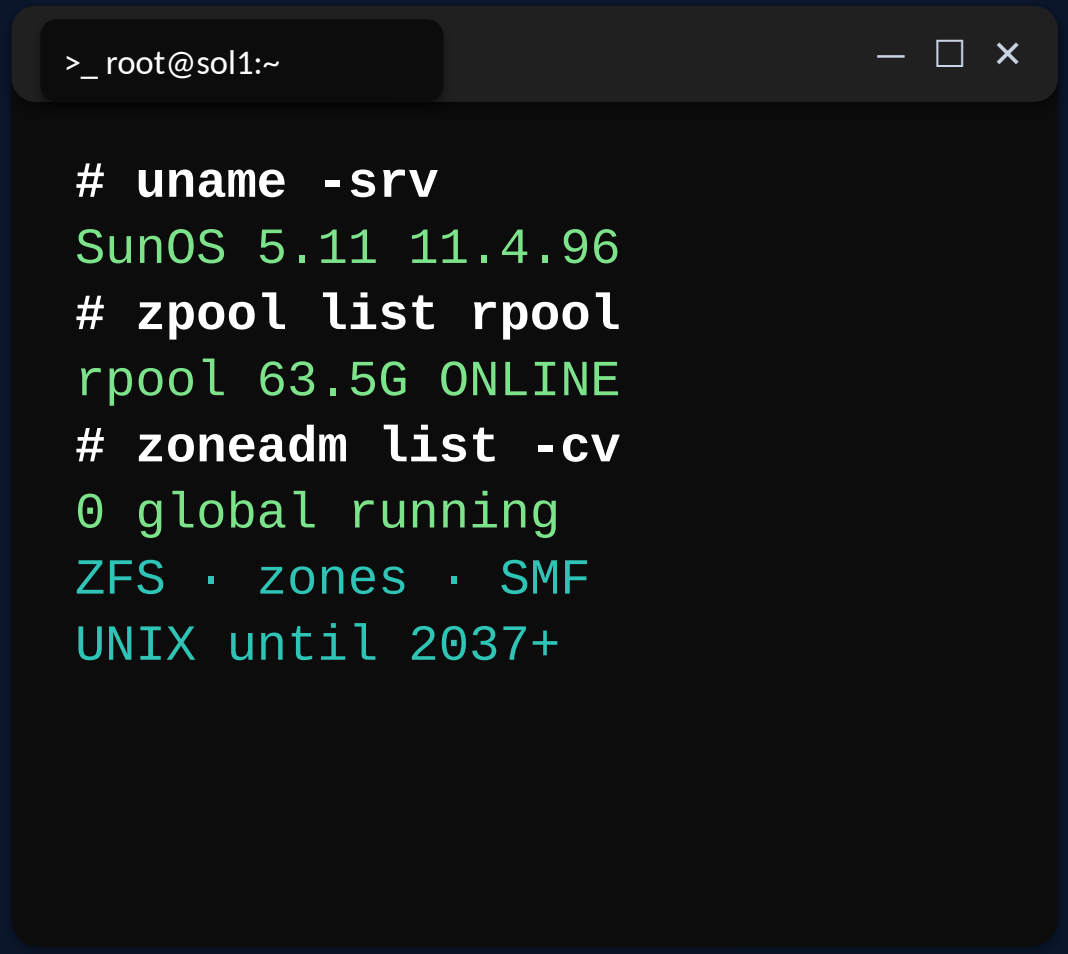


LESSON 8 OF 12

Oracle Solaris 11.4

ZFS · Zones · SMF · LDoms · OLVM

Zones: Non-global, Kernel & Immutable Zones

Full Course · Solaris 11.4 SRU96 · OVM (Nov 2026)

What You Will Learn in Lesson 8

- Zone types: global, non-global, kernel, Solaris 10 branded
- zonecfg: configure a zone with an automatic VNIC
- zoneadm: install, boot, halt, clone, uninstall
- zlogin: work inside a zone; the zone console
- Resource controls: CPU caps, memory, ZFS quotas
- Immutable zones (read-only root)
- Kernel zones and live migration

Zone Types

Type	What it is / When to use
Global zone	The host OS; manages all other zones
Non-global (solaris brand)	Container sharing the global kernel — lightest, fastest
Kernel zone (solaris-kz)	Own kernel and SRU level; live migration; needs HW virtualization
solaris10 branded zone	Run old Solaris 10 apps on 11.4 hardware
Immutable zone	Read-only root (file-mac-profile); also for the global zone
Density	Hundreds of non-global zones per server

zonecfg: Configure a Zone

```
root@sol1:~# zonecfg -z web1
Use 'create' to begin configuring a new zone.
zonecfg:web1> create                    # template SYSdefault: auto VNIC on net0
zonecfg:web1> set zonepath=/system/zones/web1
zonecfg:web1> set autoboot=true
zonecfg:web1> select anet linkname=net0
zonecfg:web1:anet> set lower-link=net1    # use the lab link
zonecfg:web1:anet> end
zonecfg:web1> add dataset ; set name=datapool/projects/web ; end
zonecfg:web1> verify ; commit ; exit
root@sol1:~# zonecfg -z web1 info
```

Install, Boot and Log In

```
root@sol1:~# zoneadm -z web1 install            # from the same publisher/SRU
Progress being logged to /var/log/zones/zoneadm.20261120T223015Z.web1.install
       Image: Preparing at /system/zones/web1/root.
Done: Installation completed in 98.4 seconds.
root@sol1:~# zoneadm -z web1 boot
root@sol1:~# zlogin -C web1                      # console: answer sysconfig once
~.                                              # leave the console
root@sol1:~# zoneadm list -cv
  ID NAME     STATUS     PATH                       BRAND    IP
   0 global   running    /                          solaris  shared
   1 web1     running    /system/zones/web1         solaris  excl
```

Inside the Zone

```
root@sol1:~# zlogin web1
root@web1:~# zonename ; uname -v
web1
11.4.90
root@web1:~# ipadm show-addr | grep net0
net0/v4    static   ok      192.168.56.61/24
root@web1:~# pkg install apache-24 ; svcadm enable apache24
root@web1:~# ps -ef | wc -l                    # only this zone's processes
root@web1:~# exit
root@sol1:~# ps -efZ | grep httpd | head -2    # global zone sees everything
root@sol1:~# zlogin web1 svcs -x               # run one command
```

Clone, Resources and Lifecycle

```
root@sol1:~# zonecfg -z web1 'add capped-cpu; set ncpus=1.5; end'
root@sol1:~# zonecfg -z web1 'add capped-memory; set physical=2g; set swap=3g; end'
root@sol1:~# zoneadm -z web1 apply             # live: no reboot needed
root@sol1:~# zonestat -z web1 5 2               # CPU / memory / network usage
root@sol1:~# zonecfg -z web2 create -t web1     # copy configuration
root@sol1:~# zoneadm -z web1 shutdown
root@sol1:~# zoneadm -z web2 clone web1         # ZFS clone: seconds
root@sol1:~# zoneadm -z web1 boot ; zoneadm -z web2 boot
root@sol1:~# zoneadm -z oldzone halt ; zoneadm -z oldzone uninstall -F
root@sol1:~# zonecfg -z oldzone delete -F
```

Immutable Zones

```
root@sol1:~# zonecfg -z web1 set file-mac-profile=fixed-configuration
root@sol1:~# zoneadm -z web1 reboot
root@sol1:~# zlogin web1
root@web1:~# touch /usr/bin/evil
touch: cannot create /usr/bin/evil: Read-only file system
root@web1:~# exit
# Admin changes: the Trusted Path — temporarily writable
root@sol1:~# zlogin -T web1                          # or: zoneadm -z web1 boot -w
# Profiles: strict, fixed-configuration, flexible-configuration
# Global zone too: zonecfg -z global set file-mac-profile=... (then reboot)
```

Kernel Zones and Live Migration

```
root@sol1:~# virtinfo                          # can this host run kernel zones?
root@sol1:~# zonecfg -z kz1 create -t SYSsolaris-kz
root@sol1:~# zonecfg -z kz1 'select virtual-cpu; set ncpus=2; end'
root@sol1:~# zonecfg -z kz1 'select capped-memory; set physical=4g; end'
root@sol1:~# zoneadm -z kz1 install ; zoneadm -z kz1 boot
root@sol1:~# zlogin kz1 pkg info entire         # its own SRU level
# Live migration to another host with the same CPU family
root@sol1:~# zoneadm -z kz1 migrate ssh://student@192.168.56.52
root@sol1:~# zoneadm -z kz1 suspend ; zoneadm -z kz1 boot   # suspend/resume
# In VirtualBox: needs nested VT-x/AMD-V (may be unavailable)
```

Summary and Homework

- Global zone manages non-global, kernel and solaris10 zones
- zonecfg create → anet lower-link → commit
- zoneadm install / boot / clone / halt / uninstall; zlogin, zlogin -C
- capped-cpu, capped-memory, zoneadm apply, zonestat
- Immutable: file-mac-profile; maintenance with zlogin -T
- Kernel zones: own SRU, migrate, suspend
- Homework: build web1, run Apache in it, clone web2, make web1 immutable

Thank You! 🙏

Free videos & PDFs: www.MyWebUniversity.com

Slides for this lesson: MyWebUniversity.com/presentations

YouTube: @MyWebUniversity · @MyWebUniversity-Dari

Wahidullah Lutfy — Founder and Director of IT of MyWebUniversity, and CS teacher

Book: The Direct Path to Linux Ubuntu (Amazon · Barnes & Noble)

Learn it, then pass it on.