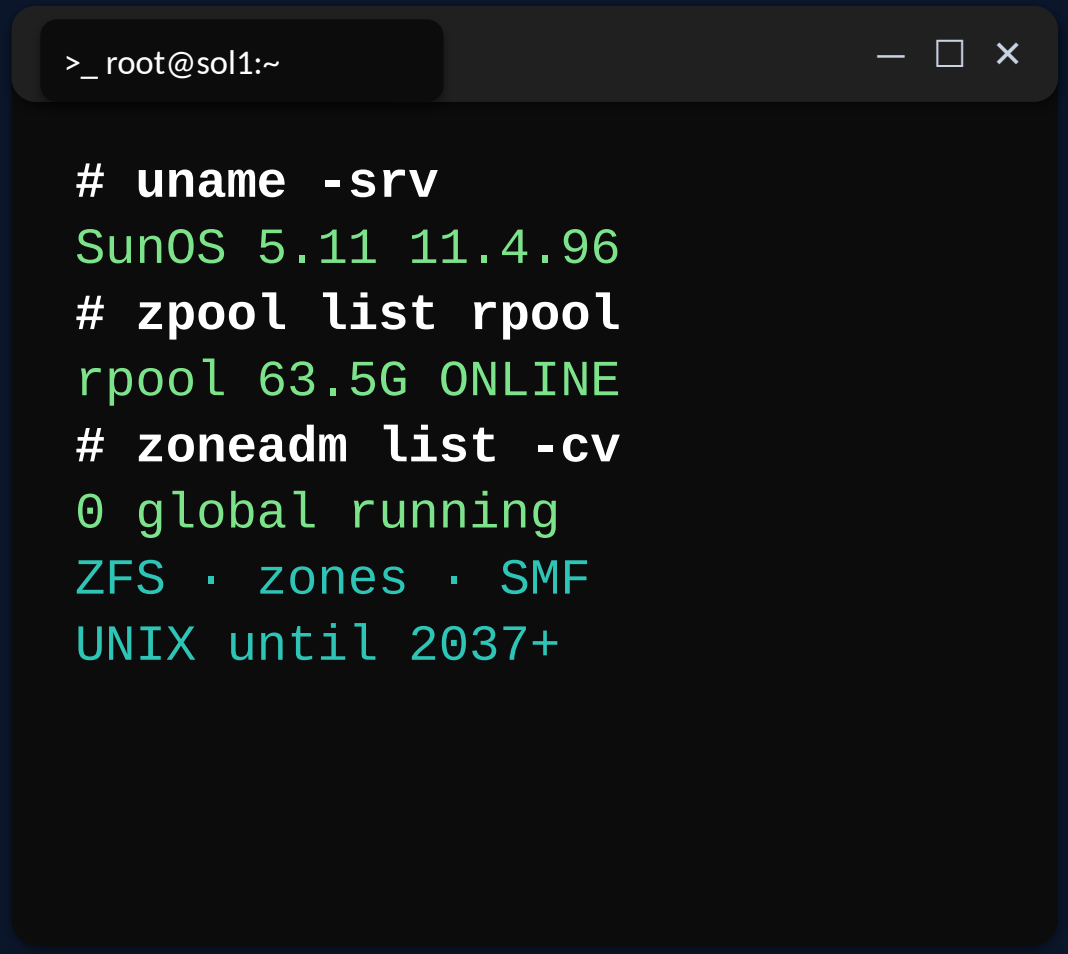


LESSON 11 OF 12

Oracle Solaris 11.4

ZFS · Zones · SMF · LDoms · OLVM

Observability & Troubleshooting: DTrace, FMA, mdb & Logs

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

What You Will Learn in Lesson 11

- A method: USE (utilization, saturation, errors) and the first 60 seconds
- Performance tools: prstat, vmstat, mpstat, iostat, zonestat
- Process tools: pfiles, pstack, ptree, truss, pmap
- DTrace: probes, providers, predicates, aggregations
- Useful DTrace one-liners and scripts
- Logs, crash dumps (dumpadm, savecore) and mdb
- Explorer and Oracle Support data collection

The First 60 Seconds

```
root@sol1:~# uptime                              # load averages
root@sol1:~# svcs -x ; fmadm faulty              # broken services? hardware faults?
root@sol1:~# tail -20 /var/adm/messages          # recent system messages
root@sol1:~# vmstat 1 5                          # r=run queue, free, sr=scan rate
root@sol1:~# mpstat 1 3                          # per-CPU usr/sys/idle
root@sol1:~# iostat -xnz 1 3                     # %b busy, asvc_t latency per disk
root@sol1:~# prstat -s cpu -n 10 1 3             # top processes; prstat -Z per zone
root@sol1:~# zpool status -x ; df -h | sort -k5 -r | head -3
root@sol1:~# dlstat show-link -i 1 net1          # network traffic
```

Process Tools

Tool	Shows
ptree <pid>	Parent/child tree of a process
pfiles <pid>	Open files and sockets (with ports)
pstack <pid>	Stack trace of every thread — where is it stuck?
pmap -x <pid>	Memory map: heap, stack, libraries
pargs / penv <pid>	Arguments / environment
truss -f -p <pid>	System calls live (like strace); -c for a summary
pwdx / pkill / pgrep	Working directory; find and signal processes
prstat -mL -p <pid>	Microstates per thread: CPU, lock wait, sleep

DTrace Concepts

Concept	Example
Probe	provider:module:function:name e.g. syscall::read:entry
Providers	syscall, proc, sched, io, fbt (kernel), pid (user), profile
Predicate	/execname == "httpd"/ — filter when the action runs
Action	printf(), trace(), stack(), ustack()
Aggregation	@[execname] = count(); quantize(), avg(), sum()
Safety	Runs in kernel, but cannot crash it; ~zero cost when off
Rights	root, or dtrace_proc / dtrace_user / dtrace_kernel privileges

DTrace One-liners

```
root@sol1:~# dtrace -l | wc -l                    # how many probes?
# Who is making system calls?
root@sol1:~# dtrace -n 'syscall:::entry { @[execname] = count(); }'
# Which files are being opened, by whom?
root@sol1:~# dtrace -n 'syscall::openat:entry { printf("%s %s", execname, copyinstr(arg1)); }'
# New processes as they start
root@sol1:~# dtrace -n 'proc:::exec-success { trace(curpsinfo->pr_psargs); }'
# Disk I/O size distribution per process
root@sol1:~# dtrace -n 'io:::start { @[execname] = quantize(args[0]->b_bcount); }'
# What is on CPU? (sample kernel stacks 997 times a second)
root@sol1:~# dtrace -n 'profile-997 /arg0/ { @[stack()] = count(); }'
```

A DTrace Script: Slow Reads in httpd

```
root@sol1:~# cat /var/tmp/slowread.d
#!/usr/sbin/dtrace -s
#pragma D option quiet
syscall::read:entry /execname == "httpd"/ { self->ts = timestamp; }
syscall::read:return /self->ts/ {
    @lat["read latency (ns)"] = quantize(timestamp - self->ts);
    self->ts = 0;
}
tick-10s { printa(@lat); exit(0); }
root@sol1:~# chmod +x /var/tmp/slowread.d ; /var/tmp/slowread.d
# Ready-made scripts: /usr/demo/dtrace, DTrace Toolkit, 'dtrace -h' for USDT
```

Logs, Crash Dumps and mdb

```
root@sol1:~# tail /var/adm/messages ; dmesg | tail
root@sol1:~# svcs -L apache24 | xargs tail -5      # SMF log of a service
root@sol1:~# dumpadm                               # dump device, savecore dir
      Dump content: kernel with ZFS metadata
       Dump device: /dev/zvol/dsk/rpool/dump (dedicated)
Savecore directory: /var/crash
root@sol1:~# coreadm -e global -g /var/cores/core.%f.%p   # app core files
root@sol1:~# ls /var/crash/data/*/                 # after a panic: vmdump.0
root@sol1:~# savecore -vf vmdump.0 ; mdb 0
> ::status
> ::msgbuf ! tail
> ::panicinfo
> $q
```

Getting Help from Oracle Support

Tool	Use
Oracle Explorer	Collects config + logs: /usr/sbin/explorer (support/explorer pkg)
sosreport-style data	explorer -w default ; attach the .tar.gz to the SR
Crash dump	vmdump.N from /var/crash; upload with the SR
fmdump -eV	Error telemetry for hardware cases
My Oracle Support	SR, knowledge docs, SRU readmes (needs contract)
CBE users	Oracle Solaris community forums; docs.oracle.com

Summary and Homework

- First 60 s: uptime, svcs -x, fmadm faulty, vmstat, mpstat, iostat -xnz, prstat
- P tools: ptree, pfiles, pstack, pmap, truss, prstat -mL
- DTrace: provider:module:function:name, predicates, aggregations
- One-liners for syscalls, opens, new processes, I/O, CPU stacks
- Logs, dumpadm/savecore, mdb ::status ::msgbuf ::panicinfo
- Explorer + crash dump + fmdump for Oracle Support
- Homework: run three one-liners while installing a package; write slowread.d for sshd

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.