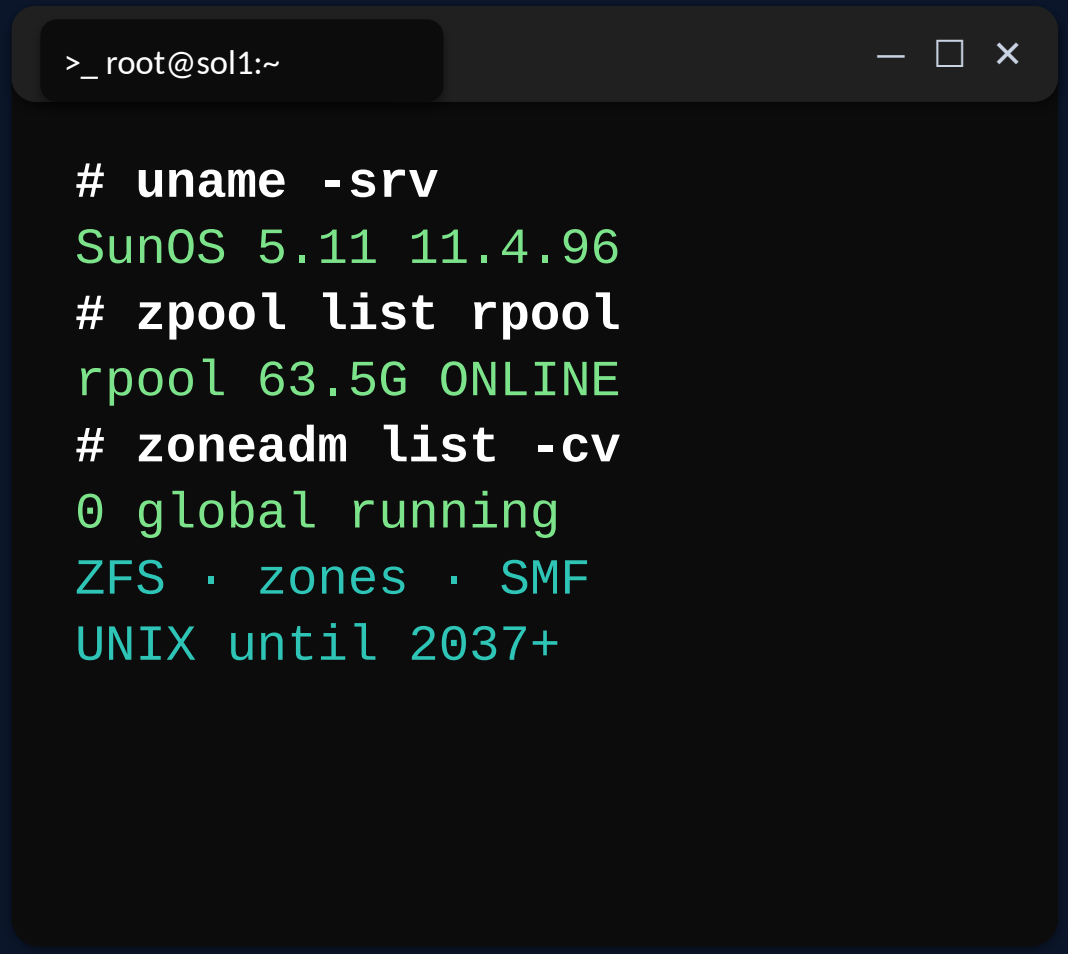


LESSON 6 OF 12

Oracle Solaris 11.4

ZFS · Zones · SMF · LDoms · OLVM

Networking: dladm, ipadm, Link Aggregation & Packet Filter

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

What You Will Learn in Lesson 6

- Layers: physical NIC → datalink (net0) → IP interface → address
- dladm: show-phys, show-link, rename, VNICs, etherstubs
- ipadm: interfaces, static / DHCP / IPv6 addresses
- DNS, name service switch and routes
- Resilience: link aggregation, DLMP and IPMP
- Packet Filter (pf) firewall
- Troubleshooting: ping, traceroute, snoop, netstat

dladm: Data Links

```
root@sol1:~# dladm show-phys
LINK    MEDIA     STATE  SPEED  DUPLEX  DEVICE
net0    Ethernet  up     1000   full    e1000g0
net1    Ethernet  up     1000   full    e1000g1
root@sol1:~# dladm show-link
root@sol1:~# dladm show-phys -L          # physical location of each port
root@sol1:~# dladm rename-link net1 lab0  # meaningful names (when unused)
root@sol1:~# dladm show-linkprop -p mtu,speed net0
root@sol1:~# dladm set-linkprop -p mtu=9000 net0   # jumbo frames, if switch allows
```

ipadm: Interfaces and Addresses

```
root@sol1:~# netadm list                          # NCP: DefaultFixed = manual
root@sol1:~# ipadm create-ip net1
root@sol1:~# ipadm create-addr -T static -a 192.168.56.51/24 net1/v4
root@sol1:~# ipadm create-addr -T dhcp net0/dhcp
root@sol1:~# ipadm create-addr -T addrconf net1/v6      # IPv6 link-local + SLAAC
root@sol1:~# ipadm show-addr
ADDROBJ    TYPE     STATE   ADDR
lo0/v4     static   ok      127.0.0.1/8
net0/dhcp  dhcp     ok      10.0.2.15/24
net1/v4    static   ok      192.168.56.51/24
root@sol1:~# ipadm delete-addr net1/v4 ; ipadm show-if
```

DNS, Name Service and Routes

```
root@sol1:~# svccfg -s dns/client setprop config/nameserver = net_address: \
      "(192.168.56.1 8.8.8.8)"
root@sol1:~# svccfg -s dns/client setprop config/search = astring: "lab.local"
root@sol1:~# svccfg -s name-service/switch setprop config/host = astring: "files dns"
root@sol1:~# svcadm refresh dns/client name-service/switch ; svcadm enable dns/client
root@sol1:~# getent hosts oracle.com
root@sol1:~# route -p add default 10.0.2.2       # -p = persistent
root@sol1:~# route -p add -net 10.20.0.0/16 192.168.56.1
root@sol1:~# netstat -rn ; route -p show
root@sol1:~# svccfg -s system/identity:node setprop config/nodename = sol1
```

Resilience: Aggregation, DLMP, IPMP

Technology	How it works
Trunk aggregation (LACP)	Ports bundled to one switch; more bandwidth; needs switch config
DLMP aggregation	Ports to different switches; no switch config; failover
IPMP	IP-level group; test addresses or link-based probe; any switch
Use in zones/LDoms	VNICs on top of an aggregation inherit its resilience

Creating an Aggregation and IPMP

```
# DLMP aggregation over two ports (on a real server)
root@sol1:~# ipadm delete-ip net2 ; ipadm delete-ip net3
root@sol1:~# dladm create-aggr -m dlmp -l net2 -l net3 aggr0
root@sol1:~# ipadm create-ip aggr0
root@sol1:~# ipadm create-addr -T static -a 10.10.0.21/24 aggr0/v4
root@sol1:~# dladm show-aggr -x aggr0
# IPMP group
root@sol1:~# ipadm create-ip net4 ; ipadm create-ip net5
root@sol1:~# ipadm create-ipmp -i net4 -i net5 ipmp0
root@sol1:~# ipadm create-addr -T static -a 10.10.1.21/24 ipmp0/v4
root@sol1:~# ipmpstat -g ; ipmpstat -i
```

Virtual Networks: VNICs and Etherstubs

```
root@sol1:~# dladm create-vnic -l net1 vnic0              # VNIC on a real link
root@sol1:~# dladm create-etherstub stub0                 # internal virtual switch
root@sol1:~# dladm create-vnic -l stub0 web_vnic0
root@sol1:~# dladm create-vnic -l stub0 db_vnic0
root@sol1:~# dladm set-linkprop -p maxbw=200M web_vnic0   # bandwidth limit
root@sol1:~# dladm show-vnic
LINK         OVER   SPEED  MACADDRESS        MACADDRTYPE
vnic0        net1   1000   2:8:20:4a:1c:9e   random
web_vnic0    stub0  200    2:8:20:7d:33:10   random
root@sol1:~# flowadm add-flow -l net1 -a transport=tcp,local_port=443 https1
```

Packet Filter (pf) Firewall

```
root@sol1:~# pkg install network/firewall
root@sol1:~# vim /etc/firewall/pf.conf
set skip on lo0
block in log all
pass out all keep state
pass in proto tcp from 192.168.56.0/24 to any port 22 keep state
pass in proto tcp to any port { 80 443 } keep state
pass in inet proto icmp all
root@sol1:~# pfctl -nf /etc/firewall/pf.conf     # syntax check
root@sol1:~# svcadm enable firewall
root@sol1:~# pfctl -s rules ; pfctl -s states | head
```

Troubleshooting the Network

```
root@sol1:~# dladm show-phys ; ipadm show-addr      # link up? address ok?
root@sol1:~# ping -s 192.168.56.52 56 3
root@sol1:~# traceroute -n 8.8.8.8
root@sol1:~# netstat -an -f inet | grep LISTEN
root@sol1:~# netstat -s -P tcp | grep -i retrans
root@sol1:~# snoop -d net1 -c 20 host 192.168.56.52 port 22
root@sol1:~# snoop -o /var/tmp/cap.snoop -d net1   # save; open in Wireshark
root@sol1:~# dlstat show-link -i 5 net1            # live traffic counters
root@sol1:~# svcs -xv network/physical network/routing-setup
```

Summary and Homework

- dladm = links (net0, VNICs, aggr); ipadm = IP interfaces and addresses
- Static / DHCP / addrconf addresses; route -p for persistent routes
- DNS and nsswitch are SMF properties
- Resilience: trunk (LACP), DLMP, IPMP
- Etherstubs + VNICs = private virtual networks; flowadm for QoS
- pf firewall: /etc/firewall/pf.conf, pfctl, svcadm enable firewall
- Homework: build stub0 with two VNICs, write a pf.conf that allows SSH only from 192.168.56.0/24

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.