**Extracted Code and Scripts from Chapter 15**

**System Monitoring and Profiling**

**Lab 1: Using top and htop for Process Monitoring**

**Steps:**

# Open a terminal and run top

top

# Install htop if not already installed

sudo dnf update

sudo dnf upgrade

sudo dnf install htop -y

# Run htop

htop

**Lab 2: System Activity Monitoring with sar**

**Steps:**

# Install sysstat if not installed

sudo dnf install sysstat -y && systemctl enable --now sysstat

# Start the sysstat service

systemctl enable --now sysstat

systemctl status sysstat

# Monitor CPU usage every 5 seconds for 10 iterations

sar -u 5 10

# Monitor memory usage

sar -r 5 10

**Lab 3: Disk I/O Monitoring with iostat**

# Ensure sysstat is installed

iostat -x 5 10

**Optimizing CPU, Memory, and Disk Usage**

**CPU Optimization Techniques**

**Installing kernel tools:**

sudo dnf install kernel-tools -y

**Assign specific CPUs to a process:**

taskset -c 0,1 <PID>

**Adjust scheduling priority:**

chrt -r -p 99 <PID>

**Verifying CPU Model and Frequency Configuration:**

lscpu | grep "Model name"

grep CONFIG\_CPU\_FREQ /boot/config-$(uname -r)

**List available tuning profiles:**

tuned-adm list

**Apply a high-performance profile:**

sudo tuned-adm profile latency-performance

**Verify and enable tuned service:**

tuned-adm active

sudo systemctl enable --now tuned

**Monitoring CPU Utilization**

mpstat

top

htop

# Install perf

sudo dnf install -y perf

# Profile system performance

perf stat -a sleep 10

# Advanced profiling

perf record -a -g -- sleep 10

perf report

**Memory Management**

**Tuning Swap Usage:**

sysctl -w vm.swappiness=10

# Make changes persistent

echo "vm.swappiness=10" >> /etc/sysctl.conf && sysctl -p

**Enable Transparent Huge Pages (THP):**

echo always > /sys/kernel/mm/transparent\_hugepage/enabled

# Verify THP setting

cat /sys/kernel/mm/transparent\_hugepage/enabled

**Disk I/O Optimization**

**Monitoring Disk Performance:**

iostat -x 5

**Measure latency with fio:**

sudo dnf install fio -y

fio --name=test --rw=randread --bs=4k --size=1G --numjobs=4 --runtime=60 --time\_based

**Tuning Networking for Performance**

**Network Interface Optimization**

**Identify network interfaces:**

ip a

**Install bridge utilities:**

sudo dnf install -y bridge-utils

**Configure network bridge:**

sudo nmcli connection add type bridge con-name br0 ifname br0

sudo nmcli connection modify br0 ipv4.addresses 192.168.119.1/24 ipv4.method manual

sudo nmcli connection up br0

**Attach bridge to VM:**

sudo virsh attach-interface --domain my\_vm --type bridge --source br0 --model virtio --config --live

**Delete bridge and restore connection:**

sudo nmcli connection delete br0

sudo nmcli connection up <connection\_name>

**Performance Optimization in Cloud Environments**

**AWS EC2 Performance Tuning**

**Enable CPU Credits:**

sudo sysctl -w vm.nr\_hugepages=128

**Benchmark disk performance:**

fio --name=test --rw=randread --bs=4k --size=1G --numjobs=4 --runtime=60 --time\_based

**Auto Scaling and Load Balancing**

**Configure Auto Scaling Group (ASG):**

aws autoscaling create-auto-scaling-group --auto-scaling-group-name my-asg --min-size 1 --max-size 5 --desired-capacity 2

**Configure Load Balancer:**

aws elb create-load-balancer --load-balancer-name my-lb --listeners Protocol=HTTP,LoadBalancerPort=80,InstanceProtocol=HTTP,InstancePort=80

**Network Performance Tuning**

**Enable ENA for enhanced networking:**

aws ec2 modify-instance-attribute --instance-id i-1234567890abcdef0 --ena-support

**Adjust TCP stack settings:**

sudo sysctl -w net.core.rmem\_max=16777216

sudo sysctl -w net.core.wmem\_max=16777216

**Enable Jumbo Frames:**

sudo ip link set dev eth0 mtu 9001

This structured document provides all key scripts and commands extracted from Chapter 15, ensuring ease of reference for performance tuning in Rocky Linux.