TK014: Linux Performance Tuning and Analysis

Duration

5.0 Days

Course Content

1. Tunning principals and the USE method

- 1.1. What is Performance Tuning?
- 1.2. Performance Tuning Methodology
- 1.3. Model System
- 1.4. Establish a Baseline
- 1.5. Establish Performance Targets
- 1.6. Identify Bottleneck
- 1.7. Tune
- 1.8. Measure, Monitor, Evaluate, Repeat
- 1.9. Final Thoughts
- 1.10. The USE Method
- 1.11. Gathering USE Metrics

2. Linux internals review

- 2.1. The Linux Operating System Components
- 2.2. Open Standards
- 2.3. Memory Layout
- 2.4. Important Kernel Threads
- 2.5. Device Files in Linux

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2.6. Managing Linux Device Files

2.7. udev

2.8. Random Numbers and /dev/random

2.9. Block Devices and the Device Mapper

2.10. List Block Devices

2.11. SCSI Devices

2.12. File Systems with Linux

2.13. Hardware Discovery Tools

2.14. Cache and Write Barriers

2.15. Advanced LVM: Components & Object Tags

2.16. Advanced LVM: Automated Storage Tiering

2.17. Advanced LVM: Thin Provisioning

2.18. Advanced LVM: Striping & Mirroring

2.19. Advanced LVM: RAID Volumes

2.20. Kernel Modules

3. LINUX USERSPACE ARCHITECTURE

3.1. systemd System and Service Manager

3.2. Using systemd

3.3. Security Model Overview

4. LOG FILE ADMINISTRATION

4.1. System Logging

4.2. systemd Journal

4.3. systemd Journal’s journactl

4.4. Secure Logging with Journal’s Log Sealing

4.5. gnome-system-log

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4.6. Rsyslog

4.7. /etc/rsyslog.conf

4.8. Log Management

4.9. Log Anomaly Detector

4.10. Sending logs from the shell

5. Monitoring and troubleshooting

5.1. Viewing Processes

5.2. System Status Memory

5.3. System Status I/O

5.4. System Status CPU

5.5. Performance Trending with sar

5.6. Determining Service to Process Mapping

5.7. Analyzing Process Memory Usage with pmap

5.8. Realtime Monitoring of Resources Cgroups

5.9. strace and ltrace

5.10. lsof and fuser

5.11. ss/netstat and rpcinfo

5.12. tcpdump and wireshark

6. BENCHMARK TOOLS

6.1. Benchmark Tools

6.2. Disk/Filesystem Benchmarks

6.3. Network Benchmarks

6.4. Phoronix Test Suite

7. SYSTEMTAP

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7.1. SystemTap Overview

7.1. SystemTap Features

7.1. SystemTap Requirements

7.1. Invoking SystemTap

7.1. The 5 passes of stap

7.1. SystemTap Probe Point Syntax

7.1. SystemTap Probe Modes

7.1. SystemTap Probe Points

7.1. SystemTap process Probes

7.1. Listing and Using Probe Points

7.1. Built-in SystemTap Functionality

7.1. SystemTap Example Repositories

7.1. SystemTap Advanced Example

7.1. SystemTap Documentation

8. Performance CO-PILOT

8.1. Performance Co-Pilot Introduction

8.2. PCP Architecture

8.3. PCP Performance Metrics

8.4. PCP Installation

8.5. PCP Performance Monitoring

8.6. PCP Centralized Logging

8.7. PCP Inference Engine

8.8. PCP Deployment Strategies

8.9. PCP Advanced Topics

9. Remote metric gathering with SNMP

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9.2. SNMP Operation - Query

9.3. MIBs and OID Namespace

9.4. SNMP Security

9.5. SNMP for Linux

10. LINUX PERF

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10.2. perf Commands Typical Workflow

10.3. perf Events

10.4. perf stat

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11. LINUX TUNABLES

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11.2. Consider OS Upgrade

11.3. Tuning CPU - NUMA

11.4. Tuning CPU - Scheduling

11.5. Huge Memory Pages

11.6. Tuning Virtual Memory Manager

11.7. Dropping Caches

11.8. I/O Scheduler

11.9. Tuning Filesystems

11.10. Network Tuning

11.11. tuned

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