

Advance Bash Shell Scripting

Duration: 5 Days

Prerequisites: Linux Knowledge Required

Course Objective: This course teaches advanced shell scripting and text processing skills. Participants will learn to create and manage scripts, use variables, work with files, process text, and handle commands. It also covers tools like sed and awk, job control, and shell security, helping learners automate tasks and work more efficiently in a Linux environment.

Lab Requirement: Koenig-DC (<https://linuxlab.koenig-solutions.com>)

Module 1 – Introduction to Shell

What is shell

Installation of shell

Shell features

Bash Keywords

Built-in Commands

Linux Commands

Specialized Navigation and History Commands

Shell Aliases

Bash Hash Table

The Set and Shopt Commands

Key binding with bind command

The Colon Command

Long and Multi-line Command

Lab Session

Module 2 – Script Basics

Writing small Script

How to execute a script

Creating a Well-Behaved Script

The Header • Global Declarations

Sanity Checks

The Main Script

Cleanup

Stopping a Script

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Module 3 – Variables

Variable basics

Predefined variables

System variables

Special shell variable

Customizing shell prompt

Variable attributes

Arrays variable

local variable

Exporting variables

Use of quotations

Escape characters Advance Bash Shell Scripting

The eval command

Reading keyboard input

Basic redirection and pipe

File descriptors

Module 4 – Expressions

Basic if command

let Features

File test operators

Arithmetic comparison operators

String comparison operators

Arithmetic comparison with double parentheses

Parameter substitution and expansion

Brackets and Extended brackets test construct

Curly brackets construct

Parentheses and double parentheses

Regular expression

Extended regular expression

POSIX character classes

Globbing options

Here Documents

Logical expressions

Lab Session

Module 5 - Compound Commands

Command Status Codes

if Command

case Command

while Loop

until Loop

for Loops

Embedded let

Grouping Commands

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Module 6 - Parameters and getopt

Positional Parameters

The getopt Command

getopt internal variables

The getopt Command

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Module 7 – Job Control and Signals

Job Control

Signals

The suspend Command

Traps

Exit Handlers

The killall Command

Being Nice

Process Status

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Module 8 – Text File Basics

Working with Pathnames

File Truncation

Identifying Files

Creating and Deleting Files

Moving and Copying Files

More Information About Files

Verifying Files

Splitting Large Files

Tabs and Spaces

Temporary Files

Lock Files

Named Pipes

Process Substitution

Opening Files

Using head and tail

File Statistics

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Module 9 – Text File Processing

Finding Lines

Locating Files

Finding Files

Sorting

Character Editing (tr)

Compressing Files

Lab Session

Module 10 – Console Scripting

The Linux Console

The Console Keyboard

The Console Display

select Menus

Custom Menus

Lab Session

Module 11 – Functions and Script Execution

Shell Functions

Local Variables

Recursion and Nested Functions

Function Attributes

Running Scripts

The Linux Execution Environment

The Source Command (.)

Switching Scripts with exec

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Module 12 – Shell Security

The Basic Linux Security Model

Knowing Who You Are (id)

Transferring Ownership (chown/chgrp)

Changing Access Rights (chmod)

Default Access Rights (umask)

setuid/setgid and Scripts

The chroot Command

Resource Limits (ulimit)

Restricted Shells

Secure File Deletion

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Module 13 – Sed 'Stream Editor'

The essential command: s for substitution

Substitute Flags

/g - Global replacement

/1, /2, etc. Specifying which occurrence

Write to a file with /w filename

Combining substitution flags

Arguments and invocation of sed

Multiple commands with -e command

sed -f scriptname

sed in shell script

A sed interpreter script

Addresses and Ranges of Text

Restricting to a line number

Patterns

Ranges by line number

Ranges by patterns

Delete with d

Grouping with { and }

Multi-Line Patterns

Lab Session

Module 14 – Awk Programming

Getting Started

The Structure of an AWK Program

Running an AWK Program

Computing and Printing

Printing Line Numbers

Putting Text in the Output Sorting the Output

Selection by Text Content

Combinations of Patterns

BEGIN and END

Computing with AWK

Computing Sums and Averages

String Concatenation

Built-in Functions

Counting Lines, Words, and Characters

Control-Flow Statements

Expressions as Patterns

String-Matching, Compound and Range Patterns

Regular Expressions

The printf Statement

Output into Files

Lab Session