

# پک پیشرفته مهندسی مانیتورینگ

فهرست سرفصل‌های دوره‌های آموزشی

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# Prometheus

## Overview

- What is DevOps?
- What is Monitoring?
- What Is Prometheus?
- Prometheus Architecture

## Getting Started with Prometheus

- Running Prometheus
- Using the Expression Browser
- Running the Node Exporter
- Alerting

## Instrumentation

- A Simple Program
- The Counter
- Counting Size
- The Gauge
- The Summary
- The Histogram

- Unit Testing Instrumentation
- Approaching Instrumentation

## Exposition

- Python
- Go
- Java
- Pushgateway
- Bridges
- Parsers
- Exposition Format

## Labels

- Instrumentation and Target Labels
- Aggregating
- Label Patterns

## Dashboarding with Grafana

- Grafana Installation
- Data Source
- Dashboards and Panels
- Graph Panel
- Singlestat Panel
- Table Panel
- Template Variables

## Node Exporter

- CPU Collector
- Filesystem Collector
- Diskstats Collector
- Netdev Collector
- Meminfo Collector
- Hwmon Collector
- Stat Collector
- Uname Collector
- Loadavg Collector
- Textfile Collector

## Service Discovery

- Service Discovery Mechanisms
- Relabelling
- How to Scrape

## Containers and Kubernetes

- cAdvisor
- Kubernetes
- Common Exporters:
- Consul
- HAProxy
- Grok Exporter
- Blackbox

## Working with Other Monitoring Systems

- Other Monitoring Systems
- InfluxDB (TICK Stack)
- Zabbix

## Writing Exporters

- Consul Telemetry
- Custom Collectors
- Guidelines

## Introduction to PromQL

- Aggregation Basics
- Selectors
- HTTP API

## Aggregation Operators

- Grouping
- Operators
- Binary Operators
- Working with Scalars
- Vector Matching
- One-to-One
- Many-to-One and group\_left
- Many-to-Many and Logical Operators
- Operator Precedence

## Functions

- Changing Type
- Math
- Time and Date
- Labels
- Missing Series and absent
- Sorting with sort and sort\_desc
- Histograms with histogram\_quantile
- Counters
- Changing Gauges
- Aggregation over Time

## Recording Rules

- Using Recording Rules
- When to Use Recording Rules
- Naming of Recording Rules
- Alerting:
- Alerting Rules
- Configuring Alertmanagers

## Alertmanager

- Notification Pipeline
- Configuration File
- Alertmanager Web Interface

## Putting It All Together

- Planning a Rollout
- Going Global with Federation
- Long-Term Storage
- Running Prometheus
- Hardware
- Configuration Management
- Networks and Authentication
- Planning for Failure
- Managing Performance
- Managing Change
- Getting Help

# Bash Scripting

**Note:** In this course, you will learn each topic with code samples, practical use cases, and exercises.

## Getting started with Bash Scripting

- The what and why of scripting with Bash
- What is Bash Scripting?
- Basic script building
- The Shebang!
- Bash Script name format
- Setting up permission on shell scripts
- Execute a script
- Variables and Scopes
- Special parameters
- Importance of quoting, spaces and escaping in bash scripts
- Double quote vs Single quote
- Exit codes
- Exiting an script
- Bash configuration files
- Shells and Subshells
- Random variable usage and control
- Debugging the bash script
- Creating interactive bash scripts
- Bash script controls
- Shell comments



- Documentation
- Command source and period (.)
- Scripts on system startup
- Getting and setting dates and delays

## **Functional Framework**

- Alias and functions
- Functions with arguments
- Writing and calling functions
- Function return values
- Local variables
- Make aliases and functions permanent

## **Navigating to directories and Listing**

- Wildcards
- Pattern matching and regular expression
- Copy, rename, delete and sorting operations
- Log control and IO redirections
- Special characters

## **Text Processing and Filters in your Scripts**

- Head and tail
- The cut command
- The paste command
- The diff command
- The comm command
- The od Command
- The join command

- The uniq command
- The tr command
- The awk command
- The nawk command
- The sed command
- The xargs command
- The tee command

## Expressions and Arithmetic

- Assignment operators
- Logical operators
- Logical NOT (!)
- Logical AND (&&)
- Logical OR (||)
- Math with the shell
- Arithmetic operators
- Math using bc
- Using bc in bash scripts
- Scale variable in bc
- Math using bash capabilities like `$( )` and `(( ))`
- Expr

## Using Structured Commands

- Conditional execution of command lists
- Test commands (strings, integers and file types ...)
- If statement
- If ... else statement
- Iterations
- Nesting ifs
- The for loop

- Advanced for loops
- Nesting loops
- While loop
- Until loop
- Loop over a range, List and the content of a file
- Internal Field Separator (IFS)
- More than one ...
- Testing the loops
- Redirecting loop output
- Exiting the loop with break and Continue
- Using variables and files in loops
- True, False and:
- The Case statement

## Files Operation & Navigating Directories

- Reading files and directories
- Basename and dirname
- Execution
- File Pat
- Listing and sorting
- Splitting
- Transfer

## Using Sort

- Sort command and output
- Sort & Uniq
- Numeric sort
- Sort by keys

## Strings

- Use regex on a string
- Uppercase & Lowercase
- Manage strings Delimiter
- Tips on string handling

## Handling Script Inputs

- Positional variables
- Variables referrals
- Controlling null variables
- Reading input from files
- Special cases
- \$\*, @\$ and \$#
- Controlling the visibility of entered text
- Passing parameters to functions
- Returning values from functions

## Work with files containing information records

- Fixed-length records
- Variable-length records
- Record processing
- Record-related operations
- Operations related to fixed-length records
- Operations related to variable-length records
- Merging operations

- Concepts of file access levels
- Dealing with file sizes
- Filtering searches
- Other notable considerations

## **Jobs, processes and parallel processing in bash**

- Pipes
- Redirections
- Background processes
- Signals and job controls
- Advanced IO redirection
- Substitutions
- Wait and parallel processing

## **Arrays**

- Arrays assignments
- Accessing the array elements
- Array Iteration
- Array modification
- All array operations
- Sorted arrays

## **Monitoring processes and applications**

- Monitor for starting a process
- Monitor for ending a process
- Monitor start and end of processes and log events
- Recording execution times of processes
- Common applications of monitoring

- Waiting for a program to terminate
- System load monitoring using uptime, sar, iostat, vmstat and ...

## Menus

- Using functions in menus
- Creating operator menus
- Give back our client a menu

## Notification of events automatically

- Automate emailing
- Automate emailing with attachment
- Mail vs mailx
- The uuencode package
- Ftp, Rsync and ... automation
- Remote Connection
- Passwordless connections

## File Transfer automation

- Merging concepts
- Using FTP to retrieve server machine files
- Downloading files from the server
- Updating server files
- nlist
- Configuring SSH
- Reading passwords in scripts

## Scheduling jobs to run in the future

- Using cron
- Using anacron
- Using at
- Controlling User access to schedulers

## Debugging

- Syntax checking
- Shell tracking
- Log tracking
- Using the set command

## Tricks with Shell Scripting

## Security with Shell Scripting

## Real-World Bash Script Training Course Scenarios:

- Generate Data Integrity Reports
- Compare Data Integrity Reports
- Unique and Duplicates Controller
- Random Digit Generator
- Files Special Filters
- Automated Interactive Input
- Parallel Executions for Time Saving

- Rotate Function
- Get and Sort play
- Get and Sort Play with Arrays
- Backup and Integrity check
- Ftp Client Automation
- User Lock and Unlock from Scratch
- Elapsed Time in Special Format
- Chkconfig Emulator (Report Generator in Fixed Length)
- High-Low Game
- Automated Pinging for Availability Check
- Multi-Platform Ping for Each OS
- Disk Space Check
- Service Control - Web Server as Sample
- Rotating Old Files
- Test Variables
- All Path Executables Files Reporter
- Id (id Command Emulation)
- Custom UserAdd Script
- File Systems and Disk Space Monitoring
- UID and GID Checker
- Data Manipulation with Fixed Offset



# Grafana

## Introduction to Grafana

- What is Grafana?
- Overview and Architecture of Grafana
- Importance of Data Visualization
- Grafana vs Other Visualization Tools

## Installing Grafana

- System Requirements
- Installing Grafana on Linux
- Installing Grafana on Docker
- Post-installation Steps

## Grafana User Interface

- Overview of Grafana UI
- Understanding Panels, Rows, and Dashboards
- Navigating Grafana

## Working with Data Sources

- Understanding Data Sources
- Adding a Data Source (TestData Data source)
- Configuring Data Sources (Prometheus, Zabbix, MySQL, Elasticsearch, etc.)
- Querying Data Sources

## Panel Types

Time Series

Bar chart

Bar gauge

Heatmap

Logs

Stat

Table

Gauge

Pie Chart

...

## Configuring Panels

- Panel Expressions
- Panel Customization and Settings
- Panel Transformations

## Creating Grafana Dashboards

- Understanding Grafana Dashboards
- Creating Your First Dashboard

- Adding Panels to Dashboards
- Customizing Dashboards
- Creating Advanced Dashboards
- Importing and Exporting Dashboards

## **Interactive Dashboards**

- Using Grafana Variables
- Creating Dynamic and Interactive Dashboards
- Templating

## **Alerts in Grafana**

- Understanding Grafana Alerts
- Creating Alerts
- Managing Alerts
- Conditional Rules for Alerts

## **Advanced Grafana**

- Grafana Plugins
- Installing and Configuring Plugins

## **Grafana Loki**

- Introduction to Grafana Loki
- Installing and Configuring Loki
- Storing and Querying Log Data with Loki

## **Grafana Tempo**

- Introduction to Grafana Tempo
- Installing and Configuring Tempo
- Visualizing Trace Data with Tempo

## **Integrating Grafana**

- Grafana API

## **Security and User Management in Grafana**

- User Authentication and Authorization
- Managing Users and Teams
- Data Security in Grafana

## **Grafana Best Practices and Troubleshooting**

- Grafana Configuration Best Practices
- Troubleshooting Common Issues
- Performance Tuning