COMP 012 - Network Administration

Windows + Linux + Packet Tracer + Python Automation

SESSION 10: PYTHON FOR NETWORK AUTOMATION

ACTIVITY 10.1: PYTHON NETWORKING BASICS

Topic: Python libraries for network operations

Description: Learn Python libraries for network automation tasks

INSTRUCTIONS:

Set up Python environment:
• Install Python 3.10+ on management VM
• Create virtual environment
• pip install paramiko netmiko requests
Basic networking with Python:
• Socket programming basics
• import socket
• Create simple port scanner:
  - Scan common ports on a target
  - Display open ports
• Create ping sweep tool:
  - Scan IP range
  - Report responding hosts
Working with requests:
• GET/POST requests to APIs
• Parse JSON responses
• Example: Query network device API
File operations:
• Read device list from file
• Write results to CSV
• Parse configuration files
Add error handling throughout

Deliverables: Submit Python scripts for port scanner and ping sweep	**30 Points**

ACTIVITY 10.2: SSH AUTOMATION WITH PARAMIKO

Topic: Automating Linux server tasks via SSH

Description: Use Paramiko to automate remote server management

INSTRUCTIONS:

Install Paramiko: pip install paramiko
Basic SSH connection:

• Connect to Linux server
• Execute commands remotely
• Capture output

Create automation scripts:

Script 1 - Server Health Check:
• Connect via SSH
• Run: uptime, df -h, free -m
• Parse and format output
• Generate health report

Script 2 - Multi-Server Executor:
• Read server list from file
• Execute same command on all servers
• Collect and display results
• Handle connection failures gracefully

Script 3 - Configuration Backup:
• Connect to server
• Backup config files (/etc/)
• Download to local machine
• Timestamp backup files

Implement proper error handling and logging

Deliverables: Submit Paramiko automation scripts with documentation	**35 Points**

ACTIVITY 10.3: WINDOWS AUTOMATION WITH WINRM

Topic: Automating Windows Server with Python

Description: Use WinRM and pywinrm to automate Windows administration

INSTRUCTIONS:

Enable WinRM on Windows Server:
• Run: winrm quickconfig
• Enable basic auth if needed
• Configure firewall rule

Install pywinrm: pip install pywinrm

Basic WinRM connection:
• Connect to Windows Server
• Execute PowerShell commands
• Capture output

Create automation scripts:

Script 1 - AD User Report:
• Connect via WinRM
• Run PowerShell: Get-ADUser -Filter *
• Parse and format user list

• Export to CSV

Script 2 - Service Monitor:

• Check status of specified services

• Alert on stopped services

• Option to restart stopped services

Script 3 - Event Log Analyzer:

• Retrieve recent security events

• Filter for login failures

• Generate security report

Handle authentication securely

Deliverables: Submit WinRM automation scripts with sample outputs	**35 Points**

TOTAL POINTS: 100