Secure VPN Implementation on Ubuntu Using OpenVPN to Establish Private Connectivity

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ABSTRACT

Virtual Private Networks (VPN) enhances online security by safeguarding privacy, encrypting data transmissions, and provides anonymity for users. By routing Internet traffic through a VPN tunnel, users can access websites and online services securely, even when using public Wi-Fi networks or accessing geo-restricted content. We have created a free personal Virtual Private Network using a Raspberry PI model 4 B in conjunction with a VMware Workstation

BACKGROUND

- ☐ Install and configure the necessary software packages for setting up a VPN server on Ubuntu 16.04. on Raspberry PI and VMware Workstation
- ☐ Configure network interfaces and IP addressing to ensure proper communication between the VPN server and clients
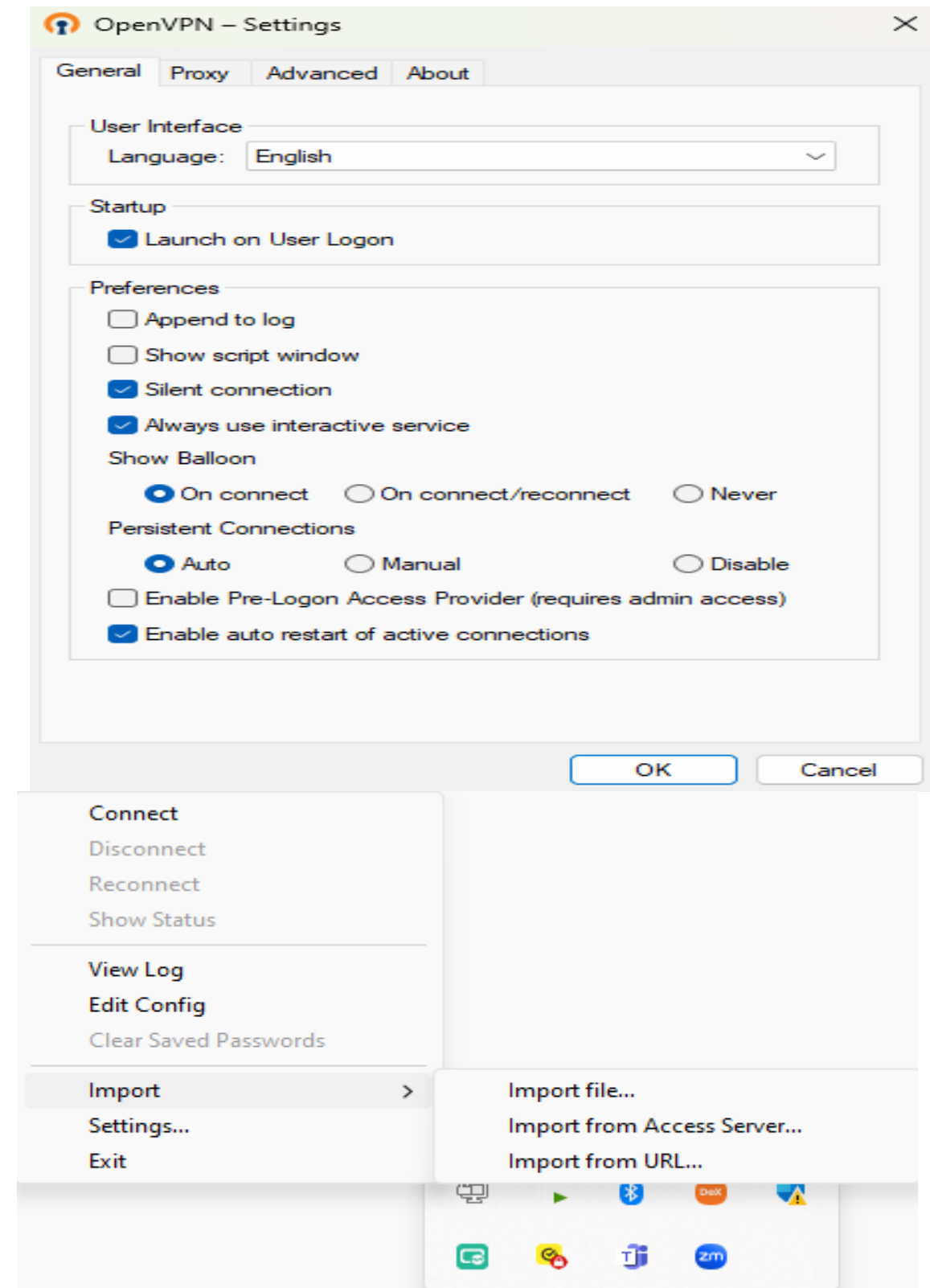- ☐ Document the configuration steps and troubleshooting procedures for future reference

PROCESS

- • **VM Component:** Install Easyrsa and configure CA variables to desired specifications
- • Generate server key, server certificate and client certificates for each client
- • **Server Component:** Install OpenVPN on raspberry PI, copy key files and server.conf file from CA machine to openvpn directory
- • Enable IP forwarding, restart service
- • Then start and enable OpenVPN

TOOLS

- • *UbuntuOS, Flash drive, Raspberry pi imager, Raspberry pi model 4B, VMWare software, Laptop, OpenVPN Software*

FUTURE WORKS

- • Implement additional VPN servers in different locations
- • Investigate the integration of additional security features such as two-factor authentication (2FA), intrusion detection/prevention systems etc

RESULTS

CONCLUSIONS

- • *The successful implementation of a secure VPN infrastructure using a Raspberry Pi server and VMware-hosted Certificate Authority (CA) machine has been achieved*
- • *By following detailed steps, robust security practices have been upheld, balancing accessibility and security*
- • *Opportunities for future enhancement include expansion of VPN infrastructure*