Simple Network VPN Configuration Guide

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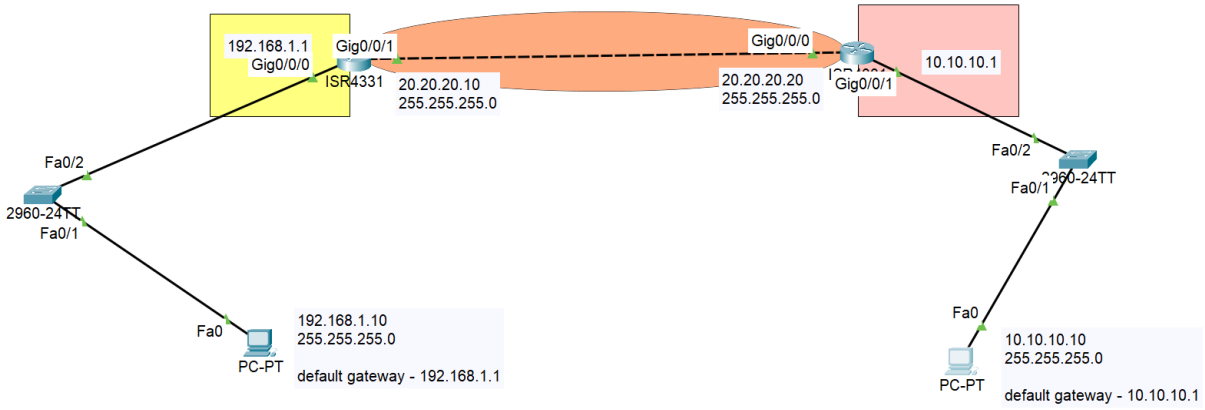
Network Overview

This guide provides easy-to-follow steps for setting up a VPN connection between two networks in Packet Tracer.



Network Components:

- **Router UK (ISR4331)**: Left side router with IP 192.168.1.1
- **Router Singapore (ISR4331)**: Right side router with IP 10.10.10.1
- **Two PC endpoints**: One PC in each network

IP Addressing:

- UK Network: 192.168.1.0/24
- Singapore Network: 10.10.10.0/24
- Connection between routers: 20.20.20.0/24

Step-by-Step Configuration

1. Basic Router Setup

Router UK:

```
enable
configure terminal
hostname UK

! Set up the interface connected to the local network
interface GigabitEthernet0/0/0
```

```
 ip address 192.168.1.1 255.255.255.0
 no shutdown

! Set up the interface connected to the other router
interface GigabitEthernet0/0/1
 ip address 20.20.20.10 255.255.255.0
 no shutdown
```

Router Singapore:

```
enable
configure terminal
hostname Singapore

! Set up the interface connected to the other router
interface GigabitEthernet0/0/0
 ip address 20.20.20.20 255.255.255.0
 no shutdown

! Set up the interface connected to the local network
interface GigabitEthernet0/0/1
 ip address 10.10.10.1 255.255.255.0
 no shutdown
```

2. Set Up Routing with OSPF

OSPF is a routing protocol that helps routers learn about different networks.

Router UK:

```
router ospf 1
 network 192.168.1.0 0.0.0.255 area 0
 network 20.20.20.0 0.0.0.255 area 0
```

Router Singapore:

```
router ospf 1
 network 10.10.10.0 0.0.0.255 area 0
 network 20.20.20.0 0.0.0.255 area 0
```

3. Set Up VPN Tunnel

Router UK:

```
! Create security policy
crypto isakmp policy 10
 authentication pre-share
 encryption aes 256
 hash sha
 group 5
 lifetime 3600

! Set the shared password
crypto isakmp key StrongKey123 address 20.20.20.20
```

```
! Create encryption settings
crypto ipsec transform-set TSET esp-aes 256 esp-sha-hmac
 mode tunnel

! Define which traffic to encrypt
no access-list 101
access-list 101 permit ip 192.168.1.0 0.0.0.255 10.10.10.0 0.0.0.255

! Create VPN map
crypto map CMAP 10 ipsec-isakmp
 set peer 20.20.20.20
 set transform-set TSET
 match address 101

! Apply VPN settings to the interface
interface GigabitEthernet0/0/1
 crypto map CMAP
```

Router Singapore:

```
! Create security policy
crypto isakmp policy 10
 authentication pre-share
 encryption aes 256
 hash sha
 group 5
 lifetime 3600

! Set the shared password
crypto isakmp key StrongKey123 address 20.20.20.10

! Create encryption settings
crypto ipsec transform-set TSET esp-aes 256 esp-sha-hmac
 mode tunnel

! Define which traffic to encrypt
no access-list 101
access-list 101 permit ip 10.10.10.0 0.0.0.255 192.168.1.0 0.0.0.255

! Create VPN map
crypto map CMAP 10 ipsec-isakmp
 set peer 20.20.20.10
 set transform-set TSET
 match address 101

! Apply VPN settings to the interface
interface GigabitEthernet0/0/0
 crypto map CMAP
```

Testing the Connection

From PC Terminal:

1. **Open the PC**: Click on either PC in your Packet Tracer simulation
2. **Open Command Prompt**: Click on the "Desktop" tab, then click on "Command Prompt"
3. **Test Connection**: Type the ping command to test

From UK PC (192.168.1.10):

```
ping 10.10.10.10
```

From Singapore PC (10.10.10.10):

```
ping 192.168.1.10
```

If you see replies instead of "Request timed out" messages, your connection is working!

What a Successful Ping Looks Like:

```
C:\> ping 10.10.10.10

Pinging 10.10.10.10 with 32 bytes of data:
Reply from 10.10.10.10: bytes=32 time=1ms TTL=128
Reply from 10.10.10.10: bytes=32 time=1ms TTL=128
Reply from 10.10.10.10: bytes=32 time=1ms TTL=128
Reply from 10.10.10.10: bytes=32 time=1ms TTL=128

Ping statistics for 10.10.10.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss)
```

Common Problems and Solutions

Problem: Ping doesn't work between PCs

1. **Check if routers can ping each other**: On Router UK:

   ```
   ping 20.20.20.20
   ```

   On Router Singapore:

   ```
   ping 20.20.20.10
   ```

2. **Verify PC settings**:

   - UK PC should have:
     - IP: 192.168.1.10
     - Mask: 255.255.255.0
     - Gateway: 192.168.1.1
   - Singapore PC should have:
     - IP: 10.10.10.10
     - Mask: 255.255.255.0

- Gateway: 10.10.10.1

3. **Make sure access lists are correct**: The most common issue is with the access lists. Make sure you've entered this command on both routers:

   Router UK:

   ```
   no access-list 101
   access-list 101 permit ip 192.168.1.0 0.0.0.255 10.10.10.0 0.0.0.255
   ```

   Router Singapore:

   ```
   no access-list 101
   access-list 101 permit ip 10.10.10.0 0.0.0.255 192.168.1.0 0.0.0.255
   ```

Safety Tips

1. In a real network, use a stronger password than "StrongKey123"

2. Save your configurations with:

   ```
   copy running-config startup-config
   ```

This guide shows how to connect two networks with a secure VPN tunnel in Packet Tracer.