Strathmore UNIVERSITY

FACULTY OF INFORMATION TECHNOLOGY
BACHELOR OF BUSINESS INFORMATION TECHNOLOGY
BBT 4106-WAN TECHNOLOGIES AND ENTERPRISE NETWORKS
Class Project 1

Instructions

This project will be done in groups of Two. It will require about three weeks to complete. You will submit your complete project between **28th October and 1st November** The specific date shall be communicated in due course.

The Scenario

Below is a topology with three companies: Dodo Enterprise, Kelele Limited and Smart People Company. Each organization has its own partial topology shown below. Kelele limited has three routers: a headqurater's (HQ) and two branches (Arusha and Dodoma). Kelele Limited will use multiarea OSPF in it's domain. Smart People Company has two branches; Cape and Durban which will use EIGRP and be connected via frame-relay. Dodo Enterprise has one router named Kigali.

Some of the missing network adresses are given in **Table 1** below. *Note the missing or modified IP addresses in green highlight*

Network	IP Address
HQ-ISP	30.30.30.0/30
HQ-Dodoma	30.30.30.4/30
HQ-Arusha	30.30.30.8/30
ISP-Cape	50.50.50.0/30
ISP-Durban	50.50.50.4/30
Cape-Durban	50.50.50.8/30

Table 1: The Addressing Table

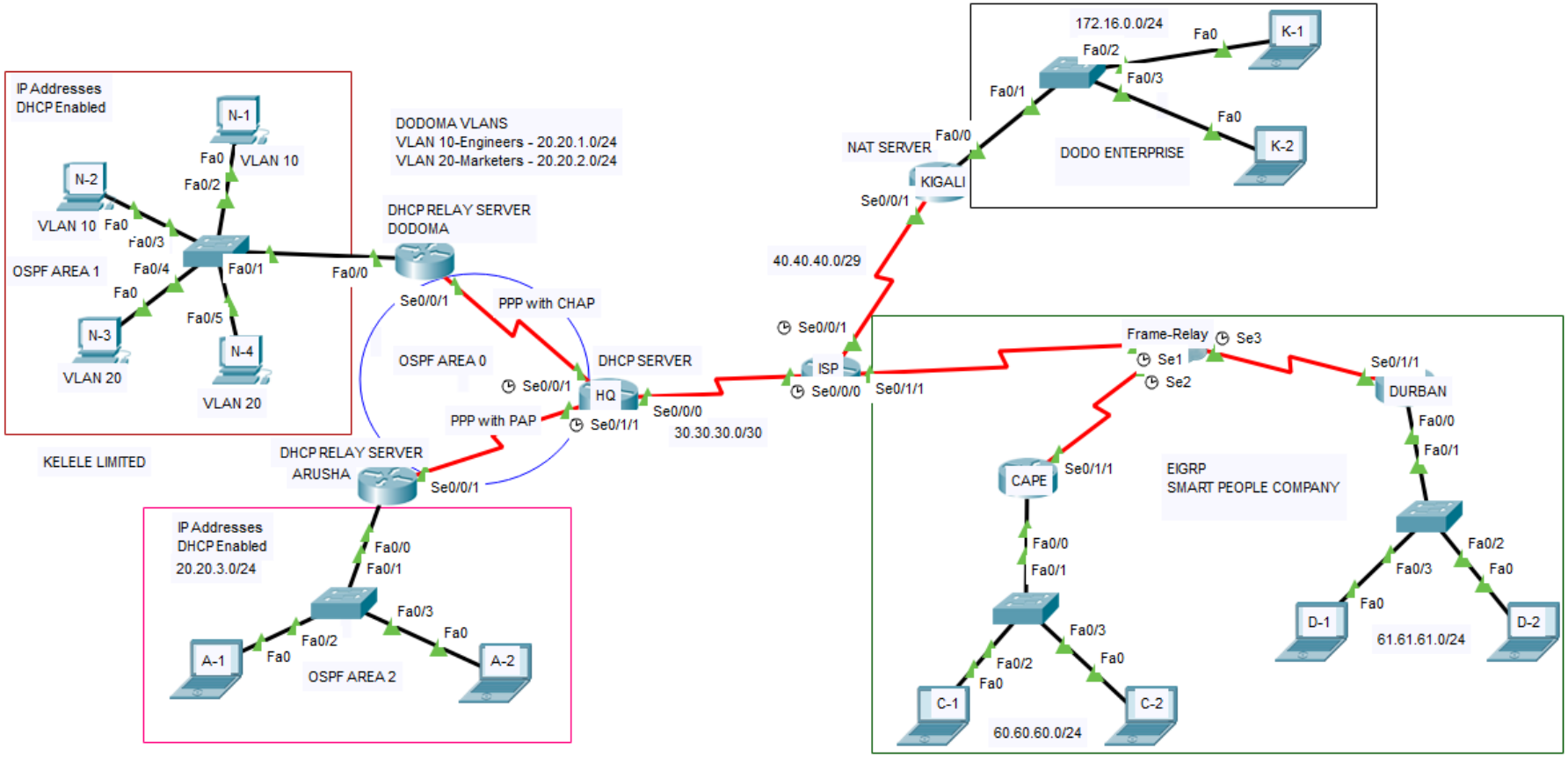
The public IP addresses for the Dodo Enterprise

Network	IP Address
Dodo LAN Private IP	172.16.0.0/24
Dodo LAN Public IP	40.40.40.0/29

Table 2: The Network Address Translation Table

Examine the topology and perform the required tasks.

The Topology



Device Reference Table

Device	Model
Routers	2811 (found in miscelleneaous)
Switches	2960

Part A: Address Planning

Examine **Table 1**: **The Addressing Table** above. Determine what IP addresses you will configure on the topology and fill the table below

Device	Interface	IP Address	Subnet Mask	Default Gateway
HQ	S0/0/0			
	S0/0/1			
	S0/1/1			
Dodoma	S0/0/1.x			
	S0/0/1.y			
	Fa0/0			
Arusha	S0/0/1			
	Fa0/0			
Kigali	S0/0/1			
	Fa0/0			
ISP	S0/0/0			
	S0/0/1			
	S0/1/1.2			
	S0/1/1.3			
Cape	S0/1/1.1			
	S0/1/1.3			
	Fa0/0			
Durban	S0/1/1.1			
	S0/1/1.2			
	Fa0/0			

Part B: Configure Basic Router Settings

a) Configure Host Names on ALL routers

b) Configure interface address on

i. Dodoma *(s0/0/1)*

ii. Arusha *(all interfaces)*

iii. HQ *(all interfaces)*

iv. ISP *(s0/0/0 only)*

v. Kigali (*all interfaces)*

****Ensure that you include clock rates on the approriate interfaces. Use 128000 as the clock rate.*

vi. Hosts: A-1, A-2, K-1, K-2, C-1, C-2, D-1 and D-2

Part C: Configure VLANs and inter-VLAN Routing

a) Configure VLANs on Dodoma LAN switch. *Refer to topology for VLAN Ids and Names.*
b) Configure the appropriate inter-VLAN routing on Dodoma.

Part D: Configure DHCP

a) On HQ configure DHCP. *Refer the topology for addressing information.*
b) Configure Dodoma and Arusha your relay DHCP servers.
c) Enable DHCP service on the PCs on Dodoma LAN and Arusha LAN
d) Test for connectivity between devices on Dodoma LAN *(the ping should succeed)*
e) Test for connectivity between devices on Arusha LAN *(the ping should succeed)*
f) Test for connectivity between devices on Dodoma LAN and Arusha LAN *(the ping should fail).* Why does this test fail?_____

Part E: Configure Multi-Area OSPF

a) On Kelele Limted routers, configire multi-area OSPF
b) Test for connectivity between Arusha and Dodoma LANs. *(the ping should succeed).).* Why does this test succeed?_____

Part F: Configure PPP with Authentication

a) Examine the topology and determine appropraite PPP user names and passwords
b) Configure PPP with CHAP authentication on appropriate interfces
c) Configure PPP with PAP authentication on the appropriate interfaces
d) Test for connectivity between the PCs in Arusha and Dodoma LANs. The ping should work.

Part G: Configure Point-to-Point Framerelay

a) Determine the DLCI values to use for your framerelay connections on ISP, Durban and Cape. *Refer to the table in Part A and the topology.*
b) Configure point-to-point framerelay on the appropriate interfaces of ISP, Durban and Cape
c) From your configurations in (b) above, test if the interfaces in the same network can communicate.

Part H: Configure EIGRP

a) On Smart People Company routers configure EIGRP. **NB:** *Do not adverstise the networks between ISP and HQ and ISP and Kigali*
b) Test for connectivity between nodes in Smart People Company

Part I: Configure Static Routing

a) Aggregate (summarise) all the network addresses for LANs on Arusha and Dodoma
b) Using your result in (e) above configure a summary static route on the ISP. This route will be the route used access the nodes on Arusha and Dodoma from the ISP and the other remote locations.
c) Aggregate all networks between Arusha and HQ and Dodoma and HQ

d) Using your result in (c) above configure a summary static route on the ISP. This route will be the route used access the links between Arusha and HQ and Dodoma and HQ from the ISP and the other remote locations.
e) On HQ configure a default static route pointing to the ISP and propagate (redistribute) it in the OSPF protocol updates.
f) On Cape configure a default static route pointing to the ISP and propagate (redistribute) it in the EIGRP protocol updates
g) On ISP configure a default static route to Dodo's public network address
h) On Dodo Enterprise configure a default static route allowing it communicate with all other external networks.
i) Test for connectivity. Can all devices communicate?_____

Part J: Configure NAT

a) On Kigali configure NAT. Ensure that only the private IP ranges on Dodo Enterprise LANs are the ones being translated into the public IP given on page 1.
NB: Use the data given in *Table 2: The Network Address Translation Table (on page 1).*
b) Confirm the entries on Kigali router's NAT translation table.
c) Test for connectivity again by pinging from a remote node using the IP addresses given in Kigali router's NAT translation table. Can all external nodes communicate with the nodes on Dodo LAN?_____

Part K: Configure ACLs

a) On Dodoma configure ACLs that will deter any external node from getting a successful telnet and ping access into the PCs on any of its VLANs.
b) Test to confirm that your ACL works.

Part M: Submit your work and prepare to present it.