The Chinese University of Hong Kong
Department of Information Engineering

IERG 4841 Networking Laboratory II
Advance computer network design and setup
(Student Manual)

Introduction

This course is helpful for you to accumulate practical experience on the Computer Network design and setup. To get involved, you will find it more interesting than you expected. Spending plenty of time on practicing and designing every details of the whole network, you will be enriched with new techniques. As potential engineers (rather than operators), getting the design mind-set and debugging skills ready are both essential.

Background

Your company had won the tender from one initial start SME firm. You are the only one who responses to this project which help the SME firm to set up an office network and build a private cloud to hold their servers. You need to follow the tender specification, which your company submitted, to complete the project within 12 weeks. The whole project has been divided into 4 phases. At the end of each phase, you need to do a mini presentation and pass the user acceptant test. (Demo)

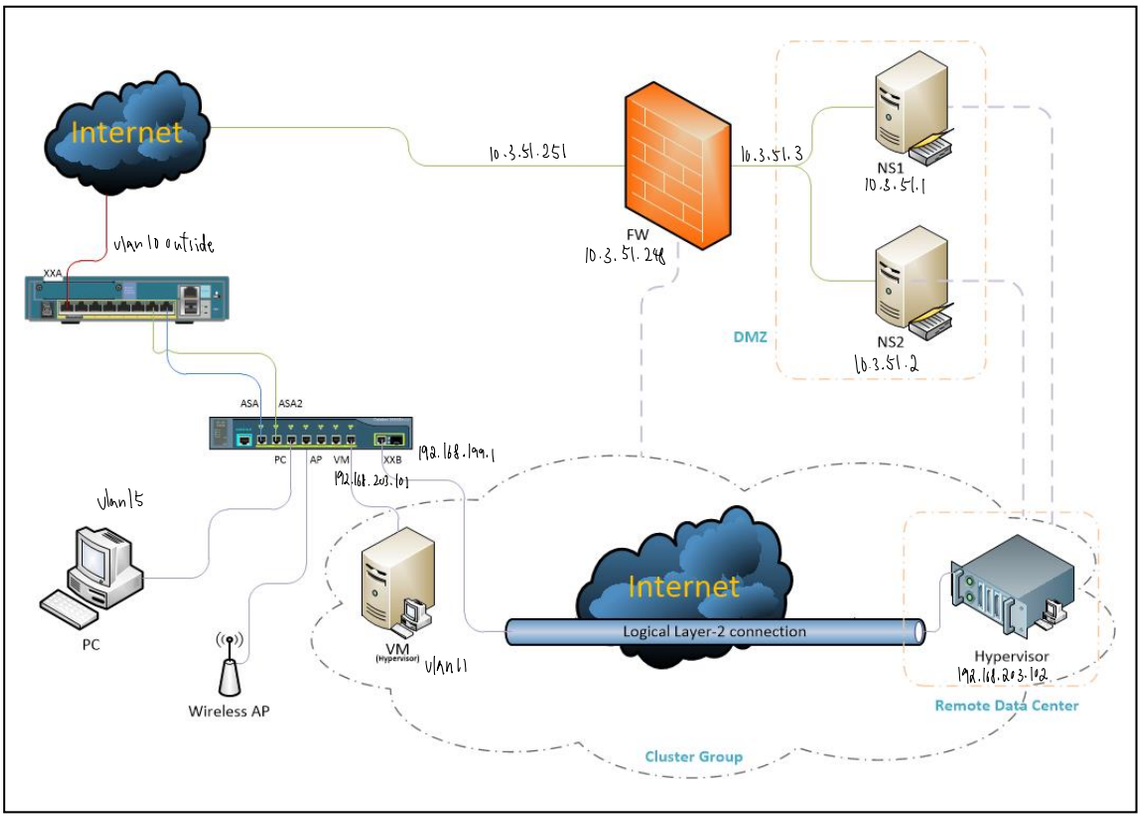
At the end of whole project, you need to submit the final report to your supervisor to show him what you have done and learn in the project.

Missions

- Phase 1:
  - Configure the switch and firewall device such that the office machine can connect to internet.
- Phase 2:
  - Servers setup and management
    - Setup the management network, which only those authenticated users can access, to manage the VM hypervisors at office and data center.
    - Provision the firewall VM to protect web and name servers.
    - Provision the web and name servers.

- Phase 3:
  - Deploy IPv6 to the servers
- Phase 4:
  - Deploy wireless AP with WPA.
  - Deploy wireless AP with captive portal
  - Deploy wireless AP with EAP-PEAP

Network Diagram



Understanding your equipment

- At main office (RM910):
  - Cisco 2960G-8TC-L switch
    - 8x 10/100/1000Mbps Gigabit-Ethernet ports
    - 1x SFP port
  - Cisco 1200 Aironet access point
  - Cisco ASA5505 Adaptive Security Appliance
    - 8x 10/100Mbps Fast-Ethernet port
  - Dell Optiplex 990 desktop PC w/Windows10 installed.
  - Dell Precision 5820 Workstation w/ESXi 6.7 Hypervisor installed.
  - KVM switch have been connecting your PC and the ESXi hypervisor. Double pressing the [scroll lock] key can switch between them.
    - If [scroll lock] key not work, try press [CTRL] twice.

- At Data Center side:
  - ESXi 6.7 server virtualization platform which located at Data Center with IP: 192.168.203.101
  - One 1-Gbps L2 extension link to main office

Demo & Report

- You need to perform a demonstration to your TA during the demo period.
- You need to submit a report at the end of the course which within 5 pages. Your report should include:
  - Summarize your work
  - Pros & Cons of the current infrastructure
  - How to improve

References

- Linux man page of iptables (*http://linux.die.net/man/8/iptables*)
- Linux man page of ip6tables (*http://linux.die.net/man/8/ip6tables*)
- Configure the dial up service on Cisco ASA device (*http://www.cisco.com/c/en/us/td/docs/security/asa/asa91/configuration/vpn/asa_91_vpn_config/vpn_l2tp_ipsec.html*)
- Troubleshooting for IPsec related problem (*http://www.cisco.com/c/en/us/support/docs/security-vpn/ipsec-negotiation-ike-protocols/5409-ipsec-debug-00.html*)
- The VMware document (*https://docs.vmware.com/en/VMware-vSphere/index.html*)
- Linux IPv6 How-to (*http://www.tldp.org/HOWTO/Linux+IPv6-HOWTO/*)
- Windows IPv6 technology note (*http://technet.microsoft.com/en-us/network/bb530961.aspx*)
- Virtual LAN concept and configuration samples (*https://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst2960/software/release/15-0_2_ez/configuration/guide/scg_2960/swvlan.pdf*)