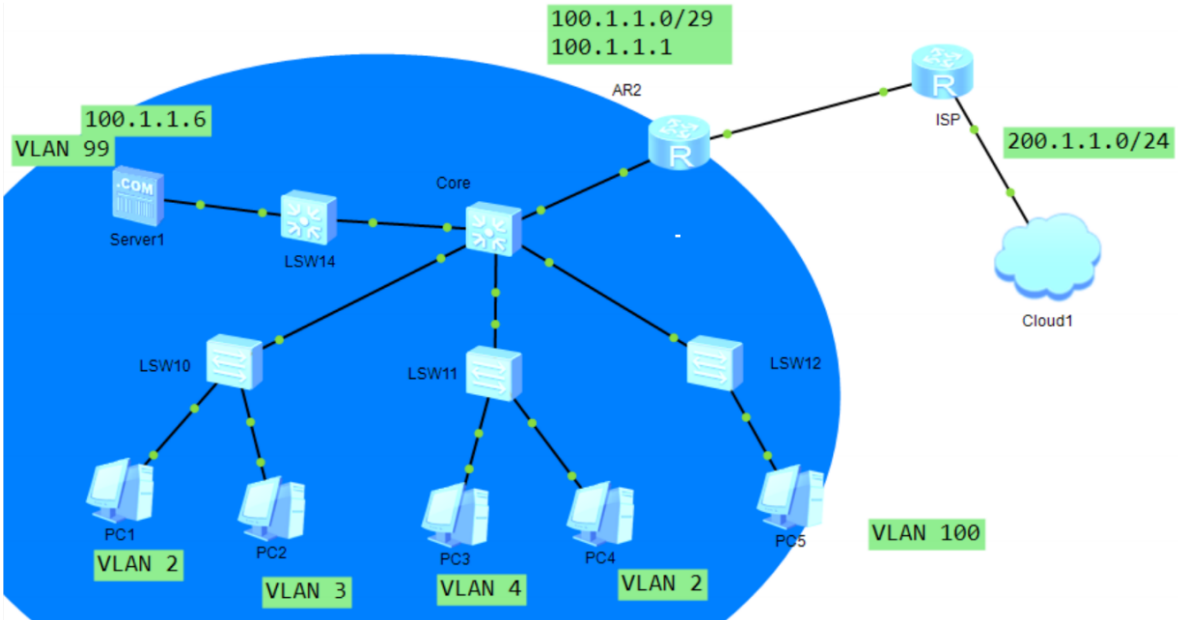
项目实验报告

一、项目需求描述

主要有以下需求：

- 要有合理的IP规划及设备使用文档备案；
- 网络要具有良好的性能，保证数据通信良好；
- 公司网站销售平台向互联网开放（通过互联网可以访问到公司电商平台）；
- 公司总部销售部、采购部、财务部、行政部有访问互联网需求；
- 整体网络要能被安全管理，如果出现设备问题，IT人员可以随时处理故障（通过互联网就可以管理 设备）

二、项目规划拓扑图



三、项目实施步骤：

3.1 IP规划方案

- 整个公司内部网络采用192.168.0.0/16网络进行规划。按照部门进行拆分成24位子网进行使用
- 设备命名采用：公司名称-部门-编号格式
- 外网地址段：100.1.1.0/29 ; 网关：100.1.1.1 ; DNS:202.106.0.20.

IP规划表格：

部门	网段	网关	所属VLAN
网络管理	192.168.1.0/24	192.168.1.254	VLAN1
销售部	192.168.2.0/24	192.168.2.254	VLAN2
采购部	192.168.3.0/24	192.168.3.254	VLAN3
加工部	192.168.4.0/24	192.168.4.254	VLAN4
财务部	192.168.5.0/24	192.168.5.254	VLAN5
行政部	192.168.6.0/24	192.168.6.254	VLAN6
服务器	192.168.100.0/24	192.168.100.254	VLAN100
设备相连1	192.168.254.0/30		VLAN254
设备相连2	192.168.254.4/30		VLAN255

设备命名表格：

设备名称	设备型号	所属部门	管理IP	用户名	密码	外部管理端口
CXCM-XS-01	HUAWEI-3700	销售部	192.168.1.11/24	cxcmadmin	123.com	2011
CXCM-CG-01	HUAWEI-3700	采购部	192.168.1.12/24	cxcmadmin	123.com	2012
CXCM-JG-01	HUAWEI-3700	加工部	192.168.1.13/24	cxcmadmin	123.com	2013
CXCM-CW-01	HUAWEI-3700	财务部	192.168.1.14/24	cxcmadmin	123.com	2014
CXCM-XZ-01	HUAWEI-3700	行政部	192.168.1.15/24	cxcmadmin	123.com	2015
CXCM-SERVER-01	HUAWEI-3700	服务部	192.168.1.16/24	cxcmadmin	123.com	2016
CXCM-CORE-01	HUAWEI-5700	核心交换机	192.168.1.254/24	cxcmadmin	123.com	2254
CXCM-WG-01	HUAWEI-3260	路由器		cxcmadmin	123.com	2250

设备连接表格：

设备名称	接口	对端设备	接口
CXCM-XS-01	G 0/0/1	CXCM-CORE-01	G 0/0/1
CXCM-CG-01	G 0/0/1	CXCM-CORE-01	G 0/0/2
CXCM-JG-01	G 0/0/1	CXCM-CORE-01	G 0/0/3
CXCM-CW-01	G 0/0/1	CXCM-CORE-01	G 0/0/4
CXCM-XZ-01	G 0/0/1	CXCM-CORE-01	G 0/0/5
CXCM-SERVER-01	G 0/0/1	CXCM-CORE-01	G 0/0/6
CXCM-CORE-01	G 0/0/20	CXCM-WG-01	G 0/0/1
CXCM-WG-01	G 0/0/1	CXCM-CORE-01	G 0/0/20

3.2VLAN配置案例

以销售部交换机为例：

- 配置设备名称

```
<CXCM-XS-01>system-view [Huawei]sysname CXCM-XS-01
```

- 配置接口连接描述

```
[CXCM-XS-01]interface GigabitEthernet 0/0/1
[CXCM-XS-01-GigabitEthernet0/0/1]description connect to CXCM-CORE-01 G0/0/1
[CXCM-XS-01-GigabitEthernet0/0/1]display  this
#
interface GigabitEthernet0/0/1
 description connect to CXCM-CORE-01 G0/0/1
```

- 创建VLAN并将接口加入到VLAN

```
[CXCM-XS-01]vlan 2
[CXCM-XS-01-vlan2]desc
[CXCM-XS-01-vlan2]description xiaoshoubu

[CXCM-XS-01]vlan 1 [CXCM-XS-01-vlan1]description manager [CXCM-XS-01-
vlan1]display vlan The total number of vlans is : 2
--------------------------------------------------------------------------------
U:
Up;         D: Down;         TG: Tagged;         UT: Untagged;
MP: Vlan-mapping;               ST: Vlan-stacking;
#: ProtocolTransparent-vlan;    *: Management-vlan;
--------------------------------------------------------------------------------
VID  Type    Ports
--------------------------------------------------------------------------------
```

```
1    common  UT:Eth0/0/1(D)     Eth0/0/2(U)     Eth0/0/3(D)     Eth0/0/4(D)
                 Eth0/0/5(D)     Eth0/0/6(D)     Eth0/0/7(D)     Eth0/0/8(D)
                   Eth0/0/9(D)     Eth0/0/10(D)    Eth0/0/11(D)    Eth0/0/12(D)
                    Eth0/0/13(D)    Eth0/0/14(D)    Eth0/0/15(D)
Eth0/0/16(D)                        Eth0/0/17(D)    Eth0/0/18(D)    Eth0/0/19(D)
Eth0/0/20(D)                        Eth0/0/21(D)    Eth0/0/22(D)    GE0/0/1(U)
GE0/0/2(D)
2    common
VID  Status  Property      MAC-LRN Statistics Description
--------------------------------------------------------------------------------
1    enable  default       enable  disable    manager
2    enable  default       enable  disable    xiaoshoubu
##将接口加入到相应VLAN
[CXCM-XS-01]interface Ethernet 0/0/1
[CXCM-XS-01-Ethernet0/0/1]port link-type access [CXCM-XS-01-Ethernet0/0/1]port
default vlan 2 [CXCM-XS-01-Ethernet0/0/1]dis this
#
interface Ethernet0/0/1
port link-type access
port default vlan 2
#
return
```

- 配置管理地址，并设置管理网段网关路由

```
[CXCM-XS-01]interface Vlanif 1
[CXCM-XS-01-Vlanif1]ip address 192.168.1.11 24
[CXCM-XS-01-Vlanif1]dis this
#
interface Vlanif1
 ip address 192.168.1.11 255.255.255.0
 # return

[CXCM-XS-01]ip route-static 0.0.0.0 0.0.0.0 192.168.1.254
```

3.3配置trunk

以销售部交换机为例:

```
[CXCM-XS-01]interface GigabitEthernet 0/0/1
[CXCM-XS-01-GigabitEthernet0/0/1]port link-type trunk
[CXCM-XS-01-GigabitEthernet0/0/1]port trunk allow-pass vlan 2
[CXCM-XS-01-GigabitEthernet0/0/1]dis this
#
interface GigabitEthernet0/0/1
 description connect to CXCM-CORE-01 G0/0/1
 port link-type trunk port trunk allow-pass vlan 2
#
 return
```

3.4核心交换机配置

核心交换机负责全部内网不同网段之间通信，是网络架构的核心。

- 创建VLAN

```
[CXCM-CORE-01]vlan batch 2 to 6 100 254
[CXCM-CORE-01]vlan 1
[CXCM-CORE-01-vlan1]description manager
[CXCM-CORE-01-vlan1]quit
[CXCM-CORE-01]vlan 2
[CXCM-CORE-01-vlan2]description xiaoshoubu
[CXCM-CORE-01-vlan2]quit
.....

[CXCM-CORE-01]display vlan
The total number of vlans is : 8
--------------------------------------------------------------------------------
U:
Up;         D: Down;         TG: Tagged;         UT: Untagged;
MP: Vlan-mapping;               ST: Vlan-stacking;
#: ProtocolTransparent-vlan;    *: Management-vlan;
--------------------------------------------------------------------------------
VID  Type    Ports
--------------------------------------------------------------------------------
1    common  UT:GE0/0/1(U)      GE0/0/2(D)      GE0/0/3(D)      GE0/0/4(D)
                 GE0/0/5(D)      GE0/0/6(D)      GE0/0/7(D)      GE0/0/8(D)
                   GE0/0/9(D)      GE0/0/10(D)     GE0/0/11(D)     GE0/0/12(D)
                    GE0/0/13(D)     GE0/0/14(D)     GE0/0/15(D)     GE0/0/16(D)
                      GE0/0/17(D)     GE0/0/18(D)     GE0/0/19(D)
GE0/0/20(D)                           GE0/0/21(D)     GE0/0/22(D)     GE0/0/23(D)
  GE0/0/24(D)
2    common
3    common
4    common
5    common
6common
100  common
254  common

VID  Status  Property      MAC-LRN Statistics Description
--------------------------------------------------------------------------------

1    enable  default       enable  disable    manager
2    enable  default       enable  disable    xiaoshoubu
3    enable  default       enable  disable    caigoubu
4    enable  default       enable  disable    jiagongbu
5    enable  default       enable  disable    caiwubu
6    enable  default       enable  disable    xingzhengbu
100  enable  default       enable  disable    server
254  enable  default       enable  disable    for-device-connect
```

- 配置接口描述

```
[CXCM-CORE-01]interface GigabitEthernet 0/0/1
[CXCM-CORE-01-GigabitEthernet0/0/1]description connect to CXCM-XS-01 G0/0/1
[CXCM-CORE-01-GigabitEthernet0/0/1]dis this
#
interface GigabitEthernet0/0/1
 description connect to CXCM-XS-01 G0/0/1
#
return
```

- 配置trunk

```
[CXCM-CORE-01]interface GigabitEthernet 0/0/1
[CXCM-CORE-01-GigabitEthernet0/0/1]port link-type trunk
[CXCM-CORE-01-GigabitEthernet0/0/1]port trunk allow-pass vlan 2
[CXCM-CORE-01-GigabitEthernet0/0/1]
[CXCM-CORE-01-GigabitEthernet0/0/1]dis this
#
interface GigabitEthernet0/0/1
 description connect to CXCM-XS-01 G0/0/1
 port link-type trunk port trunk allow-pass vlan 2
#
return
```

- 配置vlanif接口

```
[CXCM-CORE-01]interface Vlanif 1
[CXCM-CORE-01-Vlanif1]ip address 192.168.1.254 24
[CXCM-CORE-01-Vlanif1]quit

[CXCM-CORE-01]interface Vlanif 2
[CXCM-CORE-01-Vlanif1]ip address 192.168.2.254 24
[CXCM-CORE-01-Vlanif1]quit

......其他VLANif接口配置类似
```

- 配置到互联网路由

```
[CXCM-CORE-01]interface GigabitEthernet 0/0/20
[CXCM-CORE-01-GigabitEthernet0/0/20]port link-type access
[CXCM-CORE-01-GigabitEthernet0/0/20]port default vlan 254

[CXCM-CORE-01]interface Vlanif 254
[CXCM-CORE-01-Vlanif254]ip address 192.168.254.2 30

[CXCM-CORE-01]ip route-static 0.0.0.0 0.0.0.0 192.168.254.1
```

3.5路由器配置

- 基本信息配置

```
[Huawei]sysname CXCM-WG-01
[CXCM-WG-01]interface GigabitEthernet 0/0/1
[CXCM-WG-01-GigabitEthernet0/0/1]description connect to CXCM-CORE-01 G0/0/20
```

- IP地址配置

```
[CXCM-WG-01]interface GigabitEthernet 0/0/1
[CXCM-WG-01-GigabitEthernet0/0/1]ip address 192.168.254.1 30
```

- 内网路由配置

```
[CXCM-WG-01]ip route-static 192.168.0.0 16 192.168.254.2
```

- 外网接口配置

```
[CXCM-WG-01]interface GigabitEthernet 0/0/0
[CXCM-WG-01-GigabitEthernet0/0/0]description connect to ISP
[CXCM-WG-01-GigabitEthernet0/0/0]ip address 100.1.1.2 29
[CXCM-WG-01-GigabitEthernet0/0/0]quit

[CXCM-WG-01]ip route-static 0.0.0.0 0.0.0.0 100.1.1.1
```

- 共享上网配置

```
[CXCM-WG-01]acl 2000
[CXCM-WG-01-acl-basic-2000]description for-internet-con
[CXCM-WG-01-acl-basic-2000]rule permit source 192.168.1.0 0.0.0.255
[CXCM-WG-01-acl-basic-2000]rule permit source 192.168.2.0 0.0.0.255
[CXCM-WG-01-acl-basic-2000]rule permit source 192.168.3.0 0.0.0.255
[CXCM-WG-01-acl-basic-2000]rule permit source 192.168.5.0 0.0.0.255
[CXCM-WG-01-acl-basic-2000]rule permit source 192.168.6.0 0.0.0.255
[CXCM-WG-01-acl-basic-2000]dis this
[V200R003C00]
#
acl number 2000
 description for-internet-con
 rule 5 permit source 192.168.1.0 0.0.0.255
 rule 10 permit source 192.168.2.0 0.0.0.255
 rule 15 permit source 192.168.3.0 0.0.0.255
 rule 20 permit source 192.168.5.0 0.0.0.255
 rule 25 permit source 192.168.6.0 0.0.0.255
#
return

[CXCM-WG-01]interface GigabitEthernet 0/0/0
[CXCM-WG-01-GigabitEthernet0/0/0]nat outbound 2000
```

3.6DHCP配置

销售部为例

```
[CXCM-CORE-01]dhcp enable
[CXCM-CORE-01]interface Vlanif 2
[CXCM-CORE-01-Vlanif2]dhcp select interface
[CXCM-CORE-01-Vlanif2]dhcp server lease day 5
[CXCM-CORE-01-Vlanif2]dhcp server dns-list 202.106.0.20
[CXCM-CORE-01-Vlanif2]dis this
#
```

```
interface Vlanif2
 ip address 192.168.2.254 255.255.255.0
 dhcp select interface
 dhcp server lease day 5 hour 0 minute 0
 dhcp server dns-list 202.106.0.20
#
 return
```

3.7发布内网服务器

```
[CXCM-WG-01]interface GigabitEthernet 0/0/0
[CXCM-WG-01-GigabitEthernet0/0/0]nat static enable
[CXCM-WG-01-GigabitEthernet0/0/0]nat static protocol tcp global 100.1.1.3 80 ins
ide 192.168.100.100 80
[CXCM-WG-01-GigabitEthernet0/0/0]dis this
[V200R003C00]
#
interface GigabitEthernet0/0/0
 description connect to ISP
 ip address 100.1.1.2 255.255.255.248
 nat static protocol tcp global 100.1.1.3 www inside 192.168.100.100 www netmask
 255.255.255.255
 nat outbound 2000
 nat static enable
 #
 return
```

3.8设备安全管理

以销售部交换机为例：

- 设置console接口密码

```
[CXCM-XS-01]user-interface console 0
[CXCM-XS-01-ui-console0]authentication-mode password
[CXCM-XS-01-ui-console0]set authentication password cipher 123.com
```

- 设置只能通过SSH安全访问

```
##配置AAA用户
[CXCM-XS-01]aaa
[CXCM-XS-01-aaa]local-user cxcmadmin password cipher 123.com
[CXCM-XS-01-aaa]local-user cxcmadmin service-type ssh
[CXCM-XS-01-aaa]local-user cxcmadmin privilege level 15
[CXCM-XS-01-aaa]dis this
#
aaa
 authentication-scheme default
 authorization-scheme default
 accounting-scheme default
 domain default
 domain default_admin
 local-user admin password simple admin
 local-user admin service-type http
 local-user cxcmadmin password cipher %O'KCYR90a)NZPO3JBXBHA!!
```

```
 local-user cxcmadmin privilege level 15
 local-user cxcmadmin service-type ssh
 #
 return

##启用SSH验证
[CXCM-XS-01]user-interface vty 0 4
[CXCM-XS-01-ui-vty0-4]authentication-mode aaa
[CXCM-XS-01-ui-vty0-4]protocol inbound ssh
[CXCM-XS-01-ui-vty0-4]dis this
#
user-interface vty 0 4
 authentication-mode aaa protocol inbound ssh
#
return

##配置SSH服务
[CXCM-XS-01]stelnet server enable
[CXCM-XS-01]ssh user cxcmadmin authentication-type password
[CXCM-XS-01]ssh user cxcmadmin service-type stelnet
```

- 配置从外网可以安全远程访问设备

```
[CXCM-WG-01]interface GigabitEthernet 0/0/0
[CXCM-WG-01-GigabitEthernet0/0/0]nat static protocol tcp global 100.1.1.4 2011
inside 192.168.1.11 22
[CXCM-WG-01-GigabitEthernet0/0/0]dis this
[V200R003C00]
#
interface GigabitEthernet0/0/0
 description connect to ISP
 ip address 100.1.1.2 255.255.255.248
 nat static protocol tcp global 100.1.1.3 www inside 192.168.100.100 www netmask
 255.255.255.255
 nat static protocol tcp global 100.1.1.4 2011 inside 192.168.1.11 22 netmask 25
5.255.255.255
 nat outbound 2000
 nat static enable
#
return
```

项目总结

- ip规划 注意以下几点：
  - pc的网关的指向
  - 规则：交换机支持网络位相同的IP地址通讯。
  - 路由器支持不同的网络位IP地址通讯。
  - 网络位：子网掩码255对应IP地址部分
  - 主机位：子网掩码0对应IP地址部分
- DHCP角色
  - DHCP服务器：负责提供网络配置信息
  - DHCP客户端：请求网络配置信息，一般为电脑主机