实验三　企业网的配置与测试

班级：_____　　_____　　_____

一、 实验目的

1） 学习 VLAN 配置；

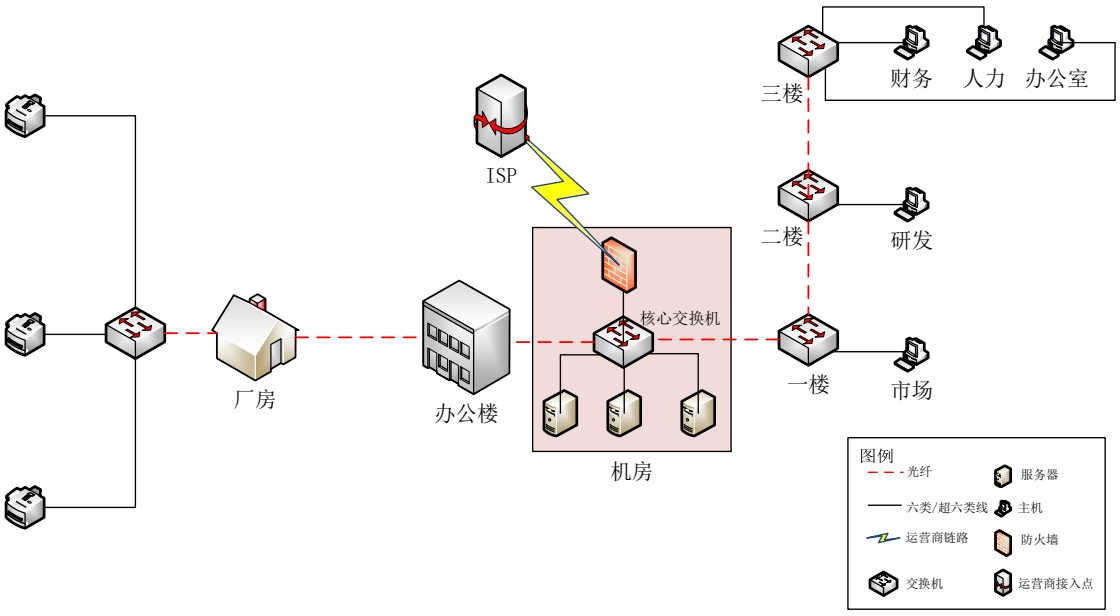
2） 学习三层交换机配置。

二、 实验器材

计算机、二层交换机、三层交换机

三、 实验内容

对于该企业网络，已经设计出其拓扑图为：

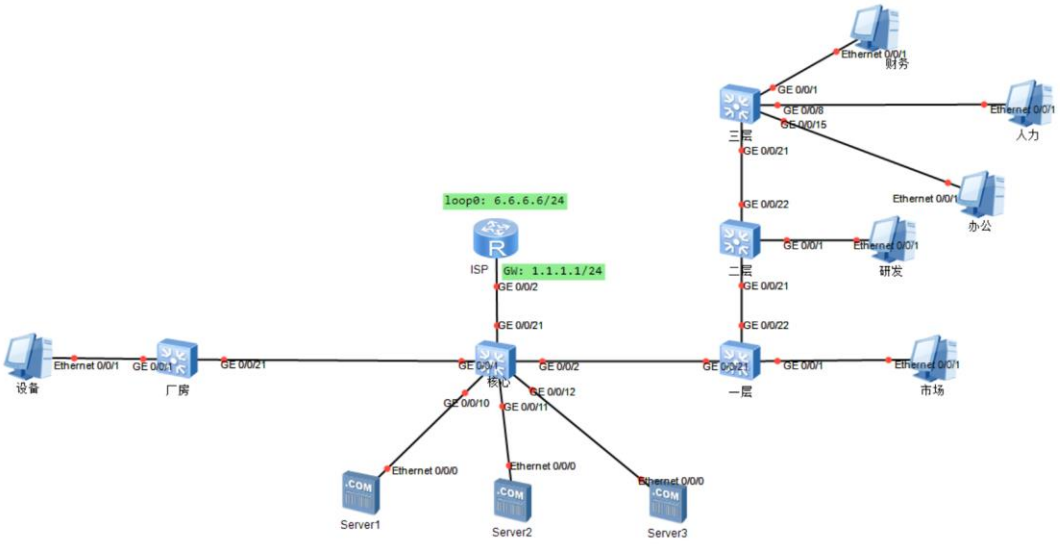


同时，为该网络划定了 VLAN 和 IP 地址，如下：

部门	设备数量	划给地址数量	网络及掩码	网关	VLAN
研发	30	64	10.0.0.0/26	10.0.0.1	10
市场	20	32	10.0.0.64/27	10.0.0.65	20
厂区	10	32	10.0.0.96/27	10.0.0.97	40
财务	7	16	10.0.0.128/28	10.0.0.129	30
人力	7	16	10.0.0.144/28	10.0.0.145	31

办公	7	16	10.0.0.160/28	10.0.0.161	32
设备间	3	8	10.0.0.176/29	10.0.0.177	50

现使用模拟器 eNSP 完成拓扑图搭建和配置，如下：



受限于模拟器功能，没有光模块，所以设计拓扑中的光纤在此处用 GigabitEthernet 接口代替。

每个交换机的位置如上图所示，现对每台设备进行配置：

1. 核心交换机

<Huawei>sys

Enter system view, return user view with Ctrl+Z.

[Huawei]un in en

Info: Information center is disabled.

[Huawei]sys core

[core]vl b 10 20 30 31 32 40 50 100

Info: This operation may take a few seconds. Please wait for a moment...done.

[core]int g0/0/1

[core-GigabitEthernet0/0/1]p l t

[core-GigabitEthernet0/0/1]p t a v 40

[core-GigabitEthernet0/0/1]int g0/0/2

[core-GigabitEthernet0/0/2]p l t

```
[core-GigabitEthernet0/0/2]p t a v 10 20 30 31 32
[core-GigabitEthernet0/0/2]q
[core]p g g0/0/10 to g0/0/17
[core-port-group]p l a
[core-GigabitEthernet0/0/10]p l a
[core-GigabitEthernet0/0/11]p l a
[core-GigabitEthernet0/0/12]p l a
[core-GigabitEthernet0/0/13]p l a
[core-GigabitEthernet0/0/14]p l a
[core-GigabitEthernet0/0/15]p l a
[core-GigabitEthernet0/0/16]p l a
[core-GigabitEthernet0/0/17]p l a
[core-port-group]p d v 50
[core-GigabitEthernet0/0/10]p d v 50
[core-GigabitEthernet0/0/11]p d v 50
[core-GigabitEthernet0/0/12]p d v 50
[core-GigabitEthernet0/0/13]p d v 50
[core-GigabitEthernet0/0/14]p d v 50
[core-GigabitEthernet0/0/15]p d v 50
[core-GigabitEthernet0/0/16]p d v 50
[core-GigabitEthernet0/0/17]p d v 50
[core-port-group]q
[core]int g0/0/21
[core-GigabitEthernet0/0/21]p l a
[core-GigabitEthernet0/0/21]p d v 100
[core-GigabitEthernet0/0/21]q
[core]int vl 10
[core-Vlanif10]ip add 10.0.0.1 26
[core-Vlanif10]int vl 20
[core-Vlanif20]ip add 10.0.0.65 27
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[core-Vlanif20]int vl 30

[core-Vlanif30]ip add 10.0.0.129 28

[core-Vlanif30]int vl 31

[core-Vlanif31]ip add 10.0.0.145 28

[core-Vlanif31]int vl 32

[core-Vlanif32]ip add 10.0.0.161 28

[core-Vlanif32]int vl 40

[core-Vlanif40]ip add 10.0.0.97 27

[core-Vlanif40]int vl 50

[core-Vlanif50]ip add 10.0.0.177 29

[core-Vlanif50]int vl 100

[core-Vlanif100]ip add 1.1.1.2 24

[core-Vlanif100]q

[core]ip route-s 0.0.0.0 0 1.1.1.1

[core]q

<core>sa

The current configuration will be written to the device.

Are you sure to continue?[Y/N]y

Info: Please input the file name (*.cfg, *.zip) [vrpcfg.zip]:

flash:/vrpcfg.zip exists, overwrite?[Y/N]:y

Now saving the current configuration to the slot 0.

Save the configuration successfully.

2. 一楼交换机

<Huawei>sys

Enter system view, return user view with Ctrl+Z.

[Huawei]un in en

Info: Information center is disabled.

[Huawei]sys L1

[L1]p g g0/0/21 g0/0/22

[L1-port-group]p l t

[L1-GigabitEthernet0/0/21]p l t

[L1-GigabitEthernet0/0/22]p l t

[L1-port-group]p t a v 10 20 30 31 32

[L1-GigabitEthernet0/0/21]p t a v 10 20 30 31 32

[L1-GigabitEthernet0/0/22]p t a v 10 20 30 31 32

[L1-port-group]q

[L1]vl b 10 20 30 31 32

Info: This operation may take a few seconds. Please wait for a moment...done.

[L1]p g g0/0/1 to g0/0/20

[L1-port-group]p l a

[L1-GigabitEthernet0/0/1]p l a

[L1-GigabitEthernet0/0/2]p l a

[L1-GigabitEthernet0/0/3]p l a

[L1-GigabitEthernet0/0/4]p l a

[L1-GigabitEthernet0/0/5]p l a

[L1-GigabitEthernet0/0/6]p l a

[L1-GigabitEthernet0/0/7]p l a

[L1-GigabitEthernet0/0/8]p l a

[L1-GigabitEthernet0/0/9]p l a

[L1-GigabitEthernet0/0/10]p l a

[L1-GigabitEthernet0/0/11]p l a

[L1-GigabitEthernet0/0/12]p l a

[L1-GigabitEthernet0/0/13]p l a

[L1-GigabitEthernet0/0/14]p l a

[L1-GigabitEthernet0/0/15]p l a

[L1-GigabitEthernet0/0/16]p l a

[L1-GigabitEthernet0/0/17]p l a

[L1-GigabitEthernet0/0/18]p l a

[L1-GigabitEthernet0/0/19]p l a

[L1-GigabitEthernet0/0/20]p l a

[L1-port-group]p d v 20

[L1-GigabitEthernet0/0/1]p d v 20

[L1-GigabitEthernet0/0/2]p d v 20

[L1-GigabitEthernet0/0/3]p d v 20

[L1-GigabitEthernet0/0/4]p d v 20

[L1-GigabitEthernet0/0/5]p d v 20

[L1-GigabitEthernet0/0/6]p d v 20

[L1-GigabitEthernet0/0/7]p d v 20

[L1-GigabitEthernet0/0/8]p d v 20

[L1-GigabitEthernet0/0/9]p d v 20

[L1-GigabitEthernet0/0/10]p d v 20

[L1-GigabitEthernet0/0/11]p d v 20

[L1-GigabitEthernet0/0/12]p d v 20

[L1-GigabitEthernet0/0/13]p d v 20

[L1-GigabitEthernet0/0/14]p d v 20

[L1-GigabitEthernet0/0/15]p d v 20

[L1-GigabitEthernet0/0/16]p d v 20

[L1-GigabitEthernet0/0/17]p d v 20

[L1-GigabitEthernet0/0/18]p d v 20

[L1-GigabitEthernet0/0/19]p d v 20

[L1-GigabitEthernet0/0/20]p d v 20

[L1-port-group]q

[L1]q

<L1>sa

The current configuration will be written to the device.

Are you sure to continue?[Y/N]y

Info: Please input the file name (*.cfg, *.zip) [vrpcfg.zip]:

Now saving the current configuration to the slot 0.

Save the configuration successfully.

3. 二楼交换机

<Huawei>sys

Enter system view, return user view with Ctrl+Z.

[Huawei]un in en

Info: Information center is disabled.

[Huawei]sys L2

[L2]vl b 10 30 31 32

Info: This operation may take a few seconds. Please wait for a moment...done.

[L2]p g g0/0/21 g0/0/22

[L2-port-group]p l t

[L2-GigabitEthernet0/0/21]p l t

[L2-GigabitEthernet0/0/22]p l t

[L2-port-group]p t a v 10 30 31 32

[L2-GigabitEthernet0/0/21]p t a v 10 30 31 32

[L2-GigabitEthernet0/0/22]p t a v 10 30 31 32

[L2-port-group]q

[L2]p g g0/0/1 to g0/0/20

[L2-port-group]p l a

[L2-GigabitEthernet0/0/1]p l a

[L2-GigabitEthernet0/0/2]p l a

[L2-GigabitEthernet0/0/3]p l a

[L2-GigabitEthernet0/0/4]p l a

[L2-GigabitEthernet0/0/5]p l a

[L2-GigabitEthernet0/0/6]p l a

[L2-GigabitEthernet0/0/7]p l a

[L2-GigabitEthernet0/0/8]p l a

[L2-GigabitEthernet0/0/9]p l a

[L2-GigabitEthernet0/0/10]p l a

[L2-GigabitEthernet0/0/11]p l a

[L2-GigabitEthernet0/0/12]p l a

[L2-GigabitEthernet0/0/13]p l a

[L2-GigabitEthernet0/0/14]p l a

[L2-GigabitEthernet0/0/15]p l a

[L2-GigabitEthernet0/0/16]p l a

[L2-GigabitEthernet0/0/17]p l a

[L2-GigabitEthernet0/0/18]p l a

[L2-GigabitEthernet0/0/19]p l a

[L2-GigabitEthernet0/0/20]p l a

[L2-port-group]p d v 10

[L2-GigabitEthernet0/0/1]p d v 10

[L2-GigabitEthernet0/0/2]p d v 10

[L2-GigabitEthernet0/0/3]p d v 10

[L2-GigabitEthernet0/0/4]p d v 10

[L2-GigabitEthernet0/0/5]p d v 10

[L2-GigabitEthernet0/0/6]p d v 10

[L2-GigabitEthernet0/0/7]p d v 10

[L2-GigabitEthernet0/0/8]p d v 10

[L2-GigabitEthernet0/0/9]p d v 10

[L2-GigabitEthernet0/0/10]p d v 10

[L2-GigabitEthernet0/0/11]p d v 10

[L2-GigabitEthernet0/0/12]p d v 10

[L2-GigabitEthernet0/0/13]p d v 10

[L2-GigabitEthernet0/0/14]p d v 10

[L2-GigabitEthernet0/0/15]p d v 10

[L2-GigabitEthernet0/0/16]p d v 10

[L2-GigabitEthernet0/0/17]p d v 10

[L2-GigabitEthernet0/0/18]p d v 10

[L2-GigabitEthernet0/0/19]p d v 10

[L2-GigabitEthernet0/0/20]p d v 10

[L2-port-group]q

[L2]q

<L2>sa

The current configuration will be written to the device.

Are you sure to continue?[Y/N]y

Info: Please input the file name (*.cfg, *.zip) [vrpcfg.zip]:

Now saving the current configuration to the slot 0.

Save the configuration successfully.

4. 三楼交换机

<Huawei>sys

Enter system view, return user view with Ctrl+Z.

[Huawei]un in en

Info: Information center is disabled.

[Huawei]sys L3

[L3]int g0/0/21

[L3-GigabitEthernet0/0/21]p l t

[L3-GigabitEthernet0/0/21]p t a v 30 31 32

[L3-GigabitEthernet0/0/21]q

[L3]vl b 30 31 32

Info: This operation may take a few seconds. Please wait for a moment...done.

[L3]p g g0/0/1 to g0/0/7

[L3-port-group]p l a

[L3-GigabitEthernet0/0/1]p l a

[L3-GigabitEthernet0/0/2]p l a

[L3-GigabitEthernet0/0/3]p l a

[L3-GigabitEthernet0/0/4]p l a

[L3-GigabitEthernet0/0/5]p l a

[L3-GigabitEthernet0/0/6]p l a

[L3-GigabitEthernet0/0/7]p l a

[L3-port-group]p d v 30

[L3-GigabitEthernet0/0/1]p d v 30

[L3-GigabitEthernet0/0/2]p d v 30

[L3-GigabitEthernet0/0/3]p d v 30

[L3-GigabitEthernet0/0/4]p d v 30

[L3-GigabitEthernet0/0/5]p d v 30

[L3-GigabitEthernet0/0/6]p d v 30

[L3-GigabitEthernet0/0/7]p d v 30

[L3-port-group]q

[L3]p g g0/0/8 to g0/0/14

[L3-port-group]p l a

[L3-GigabitEthernet0/0/8]p l a

[L3-GigabitEthernet0/0/9]p l a

[L3-GigabitEthernet0/0/10]p l a

[L3-GigabitEthernet0/0/11]p l a

[L3-GigabitEthernet0/0/12]p l a

[L3-GigabitEthernet0/0/13]p l a

[L3-GigabitEthernet0/0/14]p l a

[L3-port-group]p d v 31

[L3-GigabitEthernet0/0/8]p d v 31

[L3-GigabitEthernet0/0/9]p d v 31

[L3-GigabitEthernet0/0/10]p d v 31

[L3-GigabitEthernet0/0/11]p d v 31

[L3-GigabitEthernet0/0/12]p d v 31

[L3-GigabitEthernet0/0/13]p d v 31

[L3-GigabitEthernet0/0/14]p d v 31

[L3-port-group]q

[L3]p g g0/0/15 to g0/0/20

[L3-port-group]p l a

[L3-GigabitEthernet0/0/15]p l a

[L3-GigabitEthernet0/0/16]p l a

[L3-GigabitEthernet0/0/17]p l a

[L3-GigabitEthernet0/0/18]p l a

[L3-GigabitEthernet0/0/19]p l a

[L3-GigabitEthernet0/0/20]p l a

[L3-port-group]p d v 32

[L3-GigabitEthernet0/0/15]p d v 32

[L3-GigabitEthernet0/0/16]p d v 32

[L3-GigabitEthernet0/0/17]p d v 32

[L3-GigabitEthernet0/0/18]p d v 32

[L3-GigabitEthernet0/0/19]p d v 32

[L3-GigabitEthernet0/0/20]p d v 32

[L3-port-group]q

[L3]q

<L3>sa

The current configuration will be written to the device.

Are you sure to continue?[Y/N]y

Info: Please input the file name (*.cfg, *.zip) [vrpcfg.zip]:

Now saving the current configuration to the slot 0.

Save the configuration successfully.

5.厂房交换机

<Huawei>sys

Enter system view, return user view with Ctrl+Z.

[Huawei]un in en

Info: Information center is disabled.

[Huawei]sys Factory

[Factory]vl 40

[Factory-vlan40]q

[Factory]p g g0/0/1 to g0/0/20

[Factory-port-group]p l a

[Factory-GigabitEthernet0/0/1]p l a

[Factory-GigabitEthernet0/0/2]p l a

[Factory-GigabitEthernet0/0/3]p l a

[Factory-GigabitEthernet0/0/4]p l a

[Factory-GigabitEthernet0/0/5]p l a

[Factory-GigabitEthernet0/0/6]p l a

[Factory-GigabitEthernet0/0/7]p l a

[Factory-GigabitEthernet0/0/8]p l a

[Factory-GigabitEthernet0/0/9]p l a

[Factory-GigabitEthernet0/0/10]p l a

[Factory-GigabitEthernet0/0/11]p l a

[Factory-GigabitEthernet0/0/12]p l a

[Factory-GigabitEthernet0/0/13]p l a

[Factory-GigabitEthernet0/0/14]p l a

[Factory-GigabitEthernet0/0/15]p l a

[Factory-GigabitEthernet0/0/16]p l a

[Factory-GigabitEthernet0/0/17]p l a

[Factory-GigabitEthernet0/0/18]p l a

[Factory-GigabitEthernet0/0/19]p l a

[Factory-GigabitEthernet0/0/20]p l a

[Factory-port-group]p d v 40

[Factory-GigabitEthernet0/0/1]p d v 40

[Factory-GigabitEthernet0/0/2]p d v 40

[Factory-GigabitEthernet0/0/3]p d v 40

[Factory-GigabitEthernet0/0/4]p d v 40

[Factory-GigabitEthernet0/0/5]p d v 40

[Factory-GigabitEthernet0/0/6]p d v 40

[Factory-GigabitEthernet0/0/7]p d v 40

[Factory-GigabitEthernet0/0/8]p d v 40

[Factory-GigabitEthernet0/0/9]p d v 40

[Factory-GigabitEthernet0/0/10]p d v 40

[Factory-GigabitEthernet0/0/11]p d v 40

[Factory-GigabitEthernet0/0/12]p d v 40

[Factory-GigabitEthernet0/0/13]p d v 40

[Factory-GigabitEthernet0/0/14]p d v 40

[Factory-GigabitEthernet0/0/15]p d v 40

[Factory-GigabitEthernet0/0/16]p d v 40

[Factory-GigabitEthernet0/0/17]p d v 40

[Factory-GigabitEthernet0/0/18]p d v 40

[Factory-GigabitEthernet0/0/19]p d v 40

[Factory-GigabitEthernet0/0/20]p d v 40

[Factory-port-group]q

[Factory]int g0/0/21

[Factory-GigabitEthernet0/0/21]p l t

[Factory-GigabitEthernet0/0/21]p t a v 40

[Factory-GigabitEthernet0/0/21]q

[Factory]q

<Factory>sa

The current configuration will be written to the device.

Are you sure to continue?[Y/N]y

Info: Please input the file name (*.cfg, *.zip) [vrpcfg.zip]:

Now saving the current configuration to the slot 0.

Save the configuration successfully.

四、 实验总结

1. 为了实现广播域的隔离，通过 VLAN 技术，根据所给的部门设备数量和需求，我们将每个部门划分为一个 VLAN。根据不同部门的主机数量和未来扩容需求，我们分配了相应的 VLAN 标识和 IP 地址，确保每个部门内的设备可以正常通信。
2. 我们使用私网地址 10.0.0.0/24 进行子网划分，根据部门设备数量进行了地址划分，为每个部门分配了相应的 IP 地址和网关，确保各个部门之间可以进行三层通信。

3. 使用了华为三层和二层交换机作为主要设备，配置交换机之间的链路为trunk,并允许相应的VLAN通过,确保各个交换机之间的信息可以正常传递，并根据主机连接情况在相应的交换机上面配置了端口为 access 并划归到相应部门的 VLAN 当中。
4. 在配置完成后进行了功能测试以验证网络的正常运行，使用不同的设备尝试与各个部门通信，通过测试，确认了内部网络配置的正确性和功能的可用性。
5. 通过本次实验，成功设计了一个大二层结构的企业网络，并通过 VLAN 技术实现了广播域的隔离和部门间的独立互通。通过合理的 IP 地址划分和设备的配置，确保了网络的正常通信。这样的网络架构和配置方案为企业提供了稳定、安全和高效的网络环境，满足了部门之间的协作需求，为企业提供了良好的网络服务。