个人觉得所有实验里最需要搞明白原理的是路由协议ospf和bgp（虽然bgp似乎考的很少），或者说路由协议都搞不懂做其他任何需要组网的实验肯定费劲。我是觉得这两个协议需要掌握到你甚至都不用dis rout就可以直接自己正确写出各台设备上的路由表的程度。以下给出了两个实验的设计性实验的指令和一点解析，其实也不难，但要想清楚。

Ospf设计1

sys

sysname S1

vlan 2

port Eth1/0/24

interf vlan 2

ip add 192.168.5.1 24

interf vlan 1

ip add 192.168.3.2 24

ospf

area 1

network 192.168.3.0 0.0.0.255

sys

sysname R1

interf Eth0/0

ip add 192.168.3.1 24

interf Se1/0

ip add 192.168.0.1 24

ospf

area 1

network 192.168.3.0 0.0.0.255

quit

area 0

network 192.168.0.0 0.0.0.255

sys

sysname R2

interf Se1/0

ip add 192.168.0.2 24

interf Eth0/0

ip add 192.168.4.1 24

ospf

area 0

network 192.168.0.0 0.0.0.255

area 1

network 192.168.4.0 0.0.0.255

sys

sysname S2

interf vlan 1

ip add 192.168.4.2 24

quit

vlan 2

port Eth1/0/24

ip add 192.168.6.1 24

ospf

area 2

network 192.168.4.0 0.0.0.255

配置PC1 PC2 ip 网关

目前为止S1 E1/0/1 到 S2 e1/0/1之间互联

R1 R2 S2无到192.168.5.0网段路由

S1 R1 R2无到192.168.6.0网段路由

方案一：

S1

ospf

area 1

import-route direct

S2

ospf

area 1

import-route direct

方案二

在S1 R1 R2上配到PC2静态路由

在R1 R2 S2上配到PC1静态路由

不将静态路由引入OSPF

[R1]ip route-static 192.168.5.2 255.255.255.0 192.168.3.2

[R2]ip route-static 192.168.5.2 255.255.255.0 192.168.0.1

[S2]ip route-static 192.168.5.2 255.255.255.0 192.168.4.1

[S1]ip route-static 192.168.6.2 255.255.255.0 192.168.3.1

[R1]ip route-static 192.168.6.2 255.255.255.0 192.168.0.2

[R2]ip route-static 192.168.6.2 255.255.255.0 192.168.4.2

方案三

在ASBR所在区域的ABR上配置到ASE的静态路由并引入OSPF

[R1]ip route-static 192.168.5.2 255.255.255.0 192.168.3.2

ospf

area 1

import-route static

[R2]ip route-static 192.168.6.2 255.255.255.0 192.168.4.2

ospf

area 2

import-route static

OSPF设计2

S1

sys

sysname S1

router id 2.2.2.2

interf vlan 1

ip add 192.168.3.2 24

ospf cost 100

vlan 2

port Eth1/0/23

interf vlan 2

ip add 192.168.5.1 24

vlan 3

port Eth1/0/2

interf vlan 3

ip add 192.168.4.2 24

vlan 4

port Eth1/0/24

interf vlan 4

ip add 192.168.6.1 24

ospf cost 200

ospf

area 0

network 192.168.3.0 0.0.0.255

network 192.168.4.0 0.0.0.255

R1

sys

sysname R1

router id 1.1.1.1

interf Eth0/1

ip add 192.168.3.1 24

ospf cost 100

interf Se0/0

ip add 192.168.0.1 24

ospf cost 200

interf Eth0/0

ip add 202.112.1.1 24

ospf

area 0

network 192.168.0.0 0.0.0.255

network 192.168.3.0 0.0.0.255

R2

sys

sysname R2

router id 3.3.3.3

interf Eth0/0

ip add 202.112.2.1 24

interf Se0/0

ip add 192.168.0.2 24

ospf cost 200

interf Eth0/1

ip add 192.168.4.1 24

ospf cost 200

ospf

area 0

network 192.168.0.0 0.0.0.255

network 192.168.4.0 0.0.0.255

S2

sys

sysname S2

vlan 2

port Eth1/0/1

interf vlan 2

ip add 202.112.1.2 24

vlan 3

port Eth1/0/24

interf vlan 3

ip add 202.112.2.2 24

interf loop 1

ip add 211.100.2.1 24

此时

若从R1离开ospf area，R1有到202.112.1.0网段路由，无到202.112.2.0网段路由

若从R2离开ospf area, R2有到202.112.2.0网段路由，无到211.100.2.0网段路由

故网络全连接时，要同时提供给ospf从R1或R2到211.100.2.0网段的路由，需

[R1]ip route-static 211.100.2.0 0.0.0.255 202.112.1.2

此时ospf内无到202.112.1.2路由，故将此静态路由引入ospf的同时还需在R1上引入直连路由到ospf中

ospf

area 0

import-route direct

import-route static

此时ospf内可从R1到loop 1

[R2]ip route-static 211.100.2.0 0.0.0.255 202.112.2.2

ospf

area 0

import route-static

import route-direct

此时ospf内可从R2到loop 2

但还需解决S2到PC1和到PC2的路由，否则发不回来，故需在S2上配置到PC1 PC2的静态路由，各2条

更一般地，可以配置S2到192.168.0.0/16网段的路由

ip rou 192.168.0.0 255.255.0.0 202.112.1.1 pre 50

ip rou 192.168.0.0 255.255.0.0 202.112.2.1 pre 60

并在S1上引入直连路由将PC1 PC2引入ospf，保证R1 R2有到PC1 PC2的路由

ospf动态计算路由，选择cost最小的path，网络全连接时选择S1-R1-S2-loop1

R1-S1断开时，选择S1-R2-S2-loop1

R2-S2断开时，选择S1-R2-R1-S2-loop1

BGP7.5

[R1]

interf loop 1

ip add 5.5.5.5 32

interf Eth0/0

ip add 1.1.1.1 16

bgp 100

peer 1.1.1.2 as-num 300

network 5.5.5.5 255.255.255.255

[S1]

vlan 2

port Eth1/0/1

interf vlan 2

ip add 1.1.1.2 16

vlan 3

port Eth1/0/2

interf vlan 3

ip add 3.1.1.1 16

bgp 300

peer 1.1.1.1 as-num 100

peer 2.1.1.2 as-num 300

[S2]

vlan 2

port Eth1/0/1

interf vlan 2

ip add 3.1.1.2 16

vlan 3

port Eth1/0/2

interf vlan 3

ip add 2.1.1.1 16

[R2]

interf Eth0/0

ip add 2.1.1.2 16

interf loop 1

ip add 4.4.4.4 32

bgp 300

peer 3.1.1.1 as-num 300

network 4.4.4.4 255.255.255.255

此时S1上有5.5.5.5 bgp rout，下一跳为1.1.1.1；但由于无到R2路由，无法向R2通告

R2上有4.4.4.4 bgp rout，下一跳为2.1.1.2；但无法通告给S1，自然S1 R1上午4.4.4.4 bgp rou

在AS300内启动ospf，不将4.4.4.4引入ospf

此时，R2能将4.4.4.4 bgp rout通告给S1，下一跳为2.1.1.2，S1若ping4.4.4.4发给S2后由于S2不是bgp R S2不知道如何到4.4.4.4，故需在S2上配置到4.4.4.4的静态路由

[S2]ip route-static 4.4.4.4 255.255.255.255 2.1.1.2

于是此时S1 VLAN3可ping 4.4.4.4， S1进而将4.4.4.4 bgp rout通告给R1，下一跳为1.1.1.2

此时R1上ping 4.4.4.4单向可达

ospf配置后S1将5.5.5.5 bgp rou通告给R2，下一跳仍为1.1.1.1，R2和ospf路由均无到1.1.1.1的路由，故R2到5.5.5.5单向不可达，需在S1上将直连路由引入ospf

[S1]import-route direct

此时R2ping 5.5.5.5发给S2，S2不是BGP R,无到5.5.5.5的路由，故需在S2上配置到5.5.5.5的静态路由

[S2]ip route-static 5.5.5.5 255.255.255.255 3.1.1.1

此时5.5.5.5便可ping 4.4.4.4

BGP设计2路由策略

R1

sys

sysname R1

interf loop 2

ip add 6.6.6.6 32

interf loop 1

ip add 1.1.1.1 32

interf Eth0/0

ip add 11.2.1.1 16

bgp 100

network 1.1.1.1 32

network 6.6.6.6 32

peer 11.2.1.2 as-num 200

S1

sys

sysname S1

interf vlan 1

ip add 11.2.1.2 16

interf loop 1

ip add 3.3.3.3 32

vlan 2

port Eth1/0/24

interf vlan 2

ip add 11.4.1.1 16

bgp 200

network 3.3.3.3 32

peer 11.2.1.1 as-num 100

peer 11.4.1.2 as-num 300

S2

sys

sysname S2

interf loop 2

ip add 5.5.5.5 32

interf loop 1

ip add 4.4.4.4 32

vlan 2

port Eth1/0/24

interf vlan 2

ip add 11.4.1.2 16

interf vlan 1

ip add 11.3.1.2 16

bgp 300

peer 11.4.1.1 as-num 200

peer 11.3.1.1 as-num 400

network 4.4.4.4 32

network 5.5.5.5 32

R2

sys

sysname R2

interf loop 1

ip add 2.2.2.2 32

interf Eth0/0

ip add 11.3.1.1 16

bgp 400

network 2.2.2.2 32

peer 11.3.1.2 as-num 300

S1不向R1通告AS300始发的路由但通告AS400始发的路由

ip as-path-acl 1 deny \b300$

ip as-path-acl permit ^$

ip as-path-acl permit \b400$

peer 11.2.1.1 as-path-acl 1 export

bgp设计3

S2

sys

sysname S2

interf loop 1

ip add 19.0.0.1 32

vlan 3

port Eth1/0/1

interf vlan 3

ip add 20.0.0.2 24

vlan 2

port Eth1/0/24

interf vlan 2

ip add 30.0.0.1 24

bgp 100

network 19.0.0.1 255.255.255.255

peer 20.0.0.1 as-num 100

peer 30.0.0.2 as-num 100

S1

sys

sysname S1

vlan 2

port Eth1/0/1

interf vlan 2

ip add 10.0.0.2 24

vlan 3

port Eth1/0/24

interf vlan 3

ip add 20.0.0.1 24

bgp 100

peer 20.0.0.2 as-num 100

peer 10.0.0.1 as-num 200

import-route direct

R2

sys

sysname R2

interf Eth0/1

ip add 40.0.0.1 24

interf Eth0/0

ip add 30.0.0.2 24

bgp 100

peer 30.0.0.1 as-num 100

peer 40.0.0.2 as-num 200

import-route direct

R1

sys

sysname R1

interf Eth0/0

ip add 10.0.0.1 24

interf Eth1/0

ip add 40.0.0.2 24

interf loop 1

ip add 18.0.0.1 32

bgp 200

network 18.0.0.1 255.255.255.255

peer 10.0.0.2 as-num 100

peer 40.0.0.1 as-num 100

import-route direct

配置local pref，选大，默认100，出口 ；S1配10即可

[S1]bgp 100

default local-pref 10

配置med，选小，默认0，入口；R2配10即可

[R2]bgp 100

default med 10

以下为个人整理的考试中需要记忆的命令

NAT

acl number 2001

rule permit source 10.0.0.0 0.0.0.255

rule deny source any

nat address-group 1 192.168.5.start 192.168.5.end

interface ex-port

ip add 192.168.5.out

ip route-static 0.0.0.0 0.0.0.0 192.168.5.1 到网关的默认路由！！

nat outbound 2001 address-group 1

[ospf]default-route-advertise cost 100

pim

[cmd] netsh interface ip show joins | ipnet

multicast routing-enable

[port/vlan]igmp enable 叶节点边缘R使能igmp

dis igmp interface | group

dis pim neigh | rout

pim dm

[所有涉及剪枝（从剪枝节点向上）的vlan/port]undo pim state-refresh-capable

[port/vlan]pim sm

[pim]c-bsr 10.3.1.2 hash-length 4 priority 1

[pim]c-rp 10.3.1.2

只在一台设备上配就直接是BR和RP，在多台设备上priority 不同选pri最大的做BR

spt-switch-thres infinity

spt-switch-thres immediacy

debugging pim join-prune

pap chap

debugging ppp pap all

debugging ppp chap all

ipv6

ipv6

[vlan/port]ipv6 address 2001::1/64

ipv6 route-static 2001:: 64 2003::1

undo ipv6 nd ra halt

dis ipv6 rout

dis ospfv3 lsdb

ospfv3 1

router-id 2.2.2.2

[每个口和vlan]ospfv3 1 area 0