

ACRC Notes

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Configuring Transparent Bridging

1. assign a bridge group and define a spanning tree protocol
router(config)#bridge 1 protocol ieee
2. assign each network interface to the bridge group
router(config)#interface ethernet 0
router(config-if)#bridge-group 1
3. (optional) set the bridge priority
router(config)#bridge 1 priority 10
4. (optional) set the interface path cost
router(config-if)#bridge-group 1 path-cost 10

Configuring Source Route Bridging

For Dual Port Bridge

1. Enable SRB on the appropriate Token Ring interface
source-bridge local-ring bridge-number target-ring
Router(config-if)#source-bridge 10 1 15

For Multiport Bridge

1. Define a ring group
source-bridge ring-group ring-number
router(config)#source-bridge ring-group 7
2. Enable SRB on the appropriate Token Ring interfaces
source-bridge local-ring bridge-group target-ring
Router(config-if)#source-bridge 10 1 7

Configuring SRT

1. enable both transparent and source route bridging on interfaces
router(config)#bridge 1 protocol ieee
router(config)#source-bridge ring-group 7
router(config)#interface tokenring 0
router(config-if)#bridge-group 4
router(config-if)#source-bridge 500 1 7
router(config)#interface tokenring 1
router(config-if)#bridge-group 4
router(config-if)#source-bridge 501 1 7

Configuring Source Route Translational Bridging

1. Router must be completely configured for Transparent and SRB routing
Router(config)#source-bridge ring-group 7
Router(config)#bridge 4 protocol ieee
Router(config)#interface tokenring 0
Router(config-if)#source-bridge 500 1 7
Router(config-if)#source-bridge spanning

- ```
Router(config)#interface tokenring 1
Router(config-if)#source-bridge 501 1 7
Router(config-if)#source-bridge spanning
Router(config)#interface ethernet 0
Router(config-if)#bridge-group 4
```
2. Establish bridging between transparent and SRB  
Source bridge transparent ring-group pseudo-ring bridge-number tp-group  
Router(config)#source-bridge transparent 7 13 1 4

### **Configuring Integrated Routing and Bridging**

1. enable irb  
router(config)#bridge irb
2. select a spanning tree protocol  
router(config)#bridge 10 protocol ieee
3. enable routing on routed protocols  
router(config)#bridge 10 route appletalk  
router(config)#bridge 10 route ip
4. disable bridging on routed protocols  
router(config)#no bridge 10 bridge ip
5. assign bridge groups to interfaces  
router(config)#interface ethernet 0  
router(config-if)#bridge-group 10
6. enable bvi  
router(config)#interface bvi 10

### **Configuring Priority Queuing**

1. create the list in global config mode  
router(config)#access-list 2 permit 131.108.0.0 0.0.255.255  
  
router(config)#priority-list 1 protocol ip high tcp 23  
router(config)#priority-list 1 protocol ip high list 2  
router(config)#priority-list 1 interface ethernet 0 medium  
router(config)#priority-list 1 protocol appletalk medium  
router(config)#priority-list 1 protocol ipx medium  
router(config)#priority-list 1 protocol ip normal  
router(config)#priority-list 1 default low  
router(config)#priority-list 1 queue-limit 15 20 20 20
2. apply the list in interface mode  
router(config)#interface serial 0  
router(config-if)#priority-group 1

### **Configuring Custom Queuing**

1. create the list in global config mode  
router(config)#queue-list 1 protocol ip 1 tcp 20  
router(config)#queue-list 1 interface ethernet 0 2  
router(config)#queue-list 1 protocol ip 3  
router(config)#queue-list 1 protocol ipx 4  
router(config)#queue-list 1 protocol appletalk 5  
router(config)#queue-list 1 default 6  
router(config)#queue-list 1 queue 1 byte-count 4500
2. apply the list to a specific interface  
router(config)#interface serial 3  
router(config)#custom-queue-list 1

### Limit Virtual Terminal Access

1. generate access list in global config mode  
router(config)#access-list 12 permit 192.89.55.0 0.0.0.255
2. apply access list in line interface mode  
router(config)#line vty 0 4  
router(config-line)#access-class 12 in

### Configure IP Standard Access List

1. generate access list in global config mode  
router(config)#access-list 1 permit 172.16.0.0 0.0.255.255
2. apply access list in interface mode  
router(config)#interface ethernet 0  
router(config-if)#ip access-group 1 in

### Configure IP Extended Access List

1. generate the access list in global config mode  
router(config)#access-list 100 permit tcp any 128.88.0.0 0.0.255.255 established  
router(config)#access-list 100 permit tcp any host 128.88.1.2 eq smtp  
router(config)#access-list 100 permit udp any eq domain any  
router(config)#access-list 100 permit icmp any any echo  
router(config)#access-list 100 permit icmp any any echo-reply
2. apply access list in interface mode  
router(config)#interface ethernet 0  
router(config-if)#ip access-group 100 in

### Verify Access List Operation

- show access-list
- show ip access-list list-number
- clear access-list counters list-number
- show line

### Configure an Alternative to Access Lists

1. assign a static route to a null interface, causing the packet to be discarded.  
Router(config)#ip route 172.16.1.0 255.255.255.0 null 0

### Configure an IP Helper Address

- ip helper-address – forwards 8 UDP ports automatically. TFTP (69), DNS (53), Time (37), NetBIOS name service (137), NetBIOS datagram service (138), BOOTP/DHCP server (67), BOOTP/DHCP client (68), and TACACS (49).
- ip forward-protocol – to specify which type of broadcast packet is forwarded. Used for individual ports as opposed to **ip helper-address** which does all 8. You must use **ip forward-protocol udp** [port] for the ports you want to forward and then specify **no ip forward-protocol udp** [port] for the default ports you do not want forwarded.

```
router(config)#interface ethernet 0
```

```
router(config-if)#ip address 144.253.1.100 255.255.255.0
router(config-if)#ip helper-address 144.253.2.2
router(config-if)#ip forward-protocol udp 3000
router(config-if)#no ip forward-protocol udp 69
```

### Configure IPX Standard Access List

1. generate the access list in global config mode  
router(config)#access-list 800 deny 6e  
router(config)#access-list 800 permit -1
2. apply the access list in interface mode  
router(config)#interface ethernet 0  
router(config-if)#ipx access-group 800 in

### Configure IPX Extended Access List

#### Configure SAP Access List

1. generate the sap access list in global config mode  
router(config)#access-list 1000 deny -1 47  
router(config)#access-list 1000 deny 2e.0000.0000.0001 4  
router(config)#access-list 1000 permit -1
2. apply the sap access list in interface mode  
router(config)#interface serial 0  
router(config-if)#ipx output-sap-filter 1000
3. (optional) configure the sap interval  
router(config-if)#ipx sap-interval 10

### Connecting IPX Networks using IP tunnels

1. configure the serial interface  
router(config)#interface serial 0  
router(config-if)#ip address 131.108.13.1 255.255.255.0
2. configure the tunnel interface  
router(config)#interface tunnel 0  
router(config-if)#ipx network 2130
3. tie the tunnel interface to the serial interface  
router(config-if)#tunnel source serial 0  
router(config-if)#tunnel destination 131.109.13.2

### Verify IPX Filter Operation

- **show ipx interface** – verify the status of the interfaces that are routing ipx traffic, displays information on the ipx address of the interface, ipxwan status, ipx helper information, and sap and access list filtering
- **show ipx route** – view the ipx routing table, displays information on the following types of routers: connected primary network, internal network, static, floating static, ipxwan, rip, eigrp, nlsp, and external, and aggregate.
- **show ipx cache** – verify the ipx fast switching cache
- **show ipx servers** – display the available ipx servers, displays the type of service, the name of the servers, the network address of the server, and the distance in hops and ticks to the server. Displays the routers sap table
- **show ipx traffic** – verify ipx traffic, shows the number of packets transmitted and received. Includes broadcast, sap, routing, and watchdog information.

## Configure Single Area OSPF

1. enable ospf on the router  
router(config)#router ospf 1
2. assign the networks to ospf  
router(config-router)#network 10.2.1.2 0.0.0.0 area 0
3. set the priority of the router, 0 –can't be DR, DR is the highest number  
router(config-if)#ip ospf priority 0
4. modify the cost  
router(config-if)#ip ospf cost 10

## Verify Single Area OSPF

- show ip protocol – timers, filters, metrics, networks
- show ip route – routes known to router, one of best ways to determine connectivity
- show ip ospf interface – timer intervals, hello interval, neighbor adjacencies,
- show ip ospf – number of times spf algorithm has been run. Link-state update interval
- show ip ospf neighbor detail – detail list of neighbors, their priorities, their state(init, exstart, or full )
- show ip ospf database – display topological database

## Configure Multi Area OSPF

ABR's

1. enable ospf on the router  
router(config)#router ospf 1
2. assign the networks  
router(config-router)#network 10.2.1.2 0.0.0.0 area 1  
router(config-router)#network 10.64.0.2 0.0.0.0 area 0

### Configuring Route Summarization on ABR

1. follow the steps in ABR's as listed above
2. summarize the routes for a specific area before injecting them into different areas  
router(config-router)#area 0 range 172.16.96.0 255.255.224.0

### Configuring Route Summarization on ASBR

1. follow the steps in ABR's as listed above
2. instruct the ASBR to summarize external routes  
router(config-router)#summary-address 172.16.96.0 255.255.224.0

### Configuring Stub and Totally Stubby Areas

1. follow the steps in ABR's as listed above
2. define an area as stub or totally stubby: put no-summary at end of command for totally stubby  
router(config-router)#area 2 stub no-summary
3. (optional for ABR's only ) define a cost for the default route  
router(config-router)#area 2 default-cost 10

## Verify Multi Area OSPF

- show ip ospf border-routers – displays the internal ospf routing table

- show ip ospf virtual-links – displays parameters of virtual links
- show ip ospf process-id – displays information about each area to which the router is connected, and indicates whether routes is a ABR, ASBR, or both
- show ip ospf database –contents of topological database

## Configure Enhanced IGRP

1. enable eigrp  
router(config)#router eigrp 1
2. indicate which networks are part of the eigrp system  
router(config-router)#network 192.16.0.0
3. set the bandwidth on interface if different from T1  
router(config)#serial 0  
router(config-if)#bandwidth 56000

### Configuring for IPX support

1. enable ipx routing  
router(config)#ipx routing
2. define eigrp as the ipx routing protocol  
router(config-ipx-router)#ipx router eigrp 1
3. indicate which networks are part of the eigrp autonomous system  
router(config-router)#network 10
4. select the interface for sap incremental updates  
router(config-if)#ipx sap-incremental eigrp 1

## Verify Enhanced IGRP

- show ip eigrp neighbors – displays neighbors discovered by eigrp
- show ip eigrp topology – displays topology table, active/passive state or routes, number of successors, and the feasible distance to the destination
- show ip route eigrp – displays eigrp entries in routing table
- show ip protocols – shows eigrp as number, filtering and redistribution numbers, neighbors and distance
- show ip eigrp traffic – statistics on hello, updates, queries, replies, and ack's
- show ipx route – ipx routing table
- show ipx eigrp neighbors – ipx neighbors discovered by eigrp
- show ipx eigrp topology – topology table.

## Configure ways to control route update traffic

- passive interface : prevents all routing updates for a given routing protocol from being sent to or received from a network via a specific interface  
router(config)#router rip  
router(config-router)#passive-interface serial 0
- default routes  
router(config)#ip default-network 172.68.0.0  
router(config)#ipx advertised-default-route-only 123
- static routes  
router(config)#ip route 172.10.0.0 255.255.0.0  
router(config)#redistribute static
- route update filtering

```
router(config)#access list 800 permit 6c
router(config)#ipx router eigrp 100
router(config-router)#network 6c
router(config-router)#network 8e
router(config-router)#distribute-list 800 out serial 0
```

## **Configure Route Redistribution**

To redistribute igmp out rip:

```
Router(config)#router rip
Router(config-router)#redistribute igmp 1
Router(config-router)#passive-interface serial 0
Router(config-router)#network 172.16.0.0
Router(config-router)#default-metric 3
```

To redistribute rip out igmp:

```
Router(config)#router igmp 100
Router(config-router)#redistribute rip
Router(config-router)#passive-interface serial 0
Router(config-router)#network 172.16.0.0
Router(config-router)#default-metric 10 100 255 1 1500
```

## **Verify Route Redistribution**

1. know your network topology
2. show the routing table
3. perform a trace
4. use trace and debug

## **Configure Connecting to an ISP with static, default, and BGP.**

Static:

```
router(config)#ip route 172.0.0.0 255.255.255 S0
```

Default:

```
router(config)#ip route 0.0.0.0 0.0.0.0 S0
```

BGP:

```
router(config)#router bgp 100
router(config-router)#network 19.0.0.0
router(config-router)#neighbor 15.1.1.2 remote-as 200
```

## **Configure ISDN BRI**

```
Router(config)#isdn switch-type basic-5ess
Router(config)#interface isdn bri 0
Router(config-if)#description "this is an isdn connection"
Router(config-if)#isdn spid1 5551212
Router(config-if)#isdn spid2 5551313
```

## **Configure DDR**

1. configure interesting traffic using access-lists  
router(config)#access-list 101 permit ip any any
2. place the access-list into a dialer group  
router(config)#dialer-list 1 protocol ip list 101
3. apply the dialer-group to an interface  
router(config-if)#dialer-group 1

## Configure Dialer Properties

## Configure Dialer Profiles

### Verify DDR operation

- Ping/telnet -
- Show dialer – general diag information
- Show isdn active – calls in progress
- Show isdn status – show stats of isdn connection
- Show ip route – displays ip routes

### Configure Dial Backup

Used for backup if the primary goes down.

```
Router(config)#interface serial 0
Router(config-if)#backup interface serial 1
Router(config-if)#backup delay 10 20
```

Used for backup if the primary becomes swamped.

```
Router(config)#interface serial 0
Router(config-if)#backup load 60 5
Router(config-if)#backup interface serial 1
```

### Configure MultiLink PPP

```
Router(config-if)#ppp mulilink
Router(config-if)#dialer load-threshold load [outbound|inbound|either]
```

### Configuring Snapshot routing

1. Configure the Client Router
  - a. specify a BRI interface  
router(config)#interface BRI 0
  - b. configure the client router  
snapshot client *active-time quiet-time* dialer  
router(config-if)#snapshot client 5 360 dialer
  - c. define a dialer map  
dialer map snapshot *sequence-number name name* dial-string  
router(config-if)#dialer map snapshot 1 name server-router 15554441211
2. Configure the Server Router
  - a. specify a serial interface  
router(config)#interface dialer 0
  - b. specify a dialer interface  
snapshot server *active-time* dialer  
router(config-if)#snapshot server 5 dialer
  - c. define a dialer map that includes the client routers  
dialer map snapshot *sequence-number name name* dial-string  
router(config-if)#dialer map snapshot 1 name client-router 17605651111

## Configure IPX Spoofing

1. enter configuration mode for ISDN interface  
router(config)#interface BRI 0
2. add a description of this interface (optional)  
router(config-if)#description ISDN connectivity
3. define the SPID number if applicable, not required on switch type basic-5ess  
router(config-if)#isdn spid1 555987601  
router(config-if)#isdn spid2 555987602
3. enable IPX routing on this interface  
router(config-if)#ipx network 123
4. disable IPX fast switching on this interface  
**router(config-if)#no ipx route-caching**
5. set the router to respond to local watchdog packets  
**router(config-if)#ipx watchdog-spoof**
6. configure the interface to call multiple sites and to authenticate calls from multiple site  
router(config-if)#dialer map ipx 123 name HQ broadcast 5552053
7. assign the dialer interface to a dialer group  
router(config-if)#dialer-group 1
8. disable weighted fair queuing  
router(config-if)#no fair-queue
9. set the encapsulation method  
router(config-if)#encapsulation ppp
10. enable chap or pap  
router(config-if)#ppp authentication chap
11. enable multilink ppp  
router(config-if)#ppp multilink
12. enable the interface  
router(config-if)#no shutdown

Extra stuff

```
interface dialer0
ip unnumbered loopback0
encapsulation ppp
dialer remote-name Remote0
dialer pool 1
dialer string 5551212
dialer-group 1
interface dialer1
ip unnumbered loopback0
encapsulation ppp
dialer remote-name Remote1
dialer pool 1
dialer string 5551234
dialer-group 1
interface bri 0
encapsulation PPP
dialer pool-member 1
ppp authentication chap
interface serial 0
ip unnumbered loopback0
backup interface dialer 0
backup delay 5 10
```

```
interface serial 1
ip unnumbered loopback0
backup interface dialer1
backup delay 5 10
```