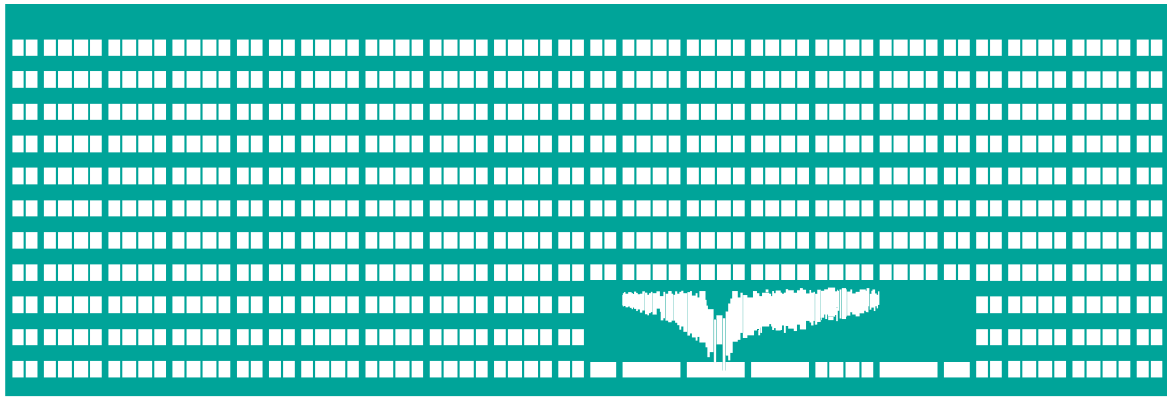
VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE | DEPARTMENT OF COMPUTER SCIENCE

Routing protocols RIP and OSPF



Computer networks Seminar 8

Routing table

	Type	Destination/mask	Next hop/Interface	Metrics
1.	R	10.0.0.0/16	172.16.10.1	2
2.	C	10.0.1.0/24	fa0/0	0
		…		
N.	S	0.0.0.0/0	172.16.2.2	0

Default route

Default gateway

Destination IP: 10.0.1.10 – matching lines 1., 2. & N.

Destination IP: 10.0.99.1 – matching lines 1. & N.

Destination IP: 158.196.149.9 – only default route → line N.

Routing table

	Type	Destination/mask	Next hop/Interface	Metrics
1.	R	10.0.0.0/16	172.16.10.1	2
2.	C	10.0.1.0/24	fa0/0	0
		…		
N.	S	0.0.0.0/0	172.16.2.2	0

Default route

Default gateway

Destination IP: 10.0.1.10 – matching lines 1., 2. & N.

→ Line 2 will win (longest match according to the mask)

Destination IP: 10.0.99.1 – matching lines 1. & N.

→ Line 1 will win (longest match according to the mask)

Destination IP: 158.196.149.9 – only default route → line N.

RIP

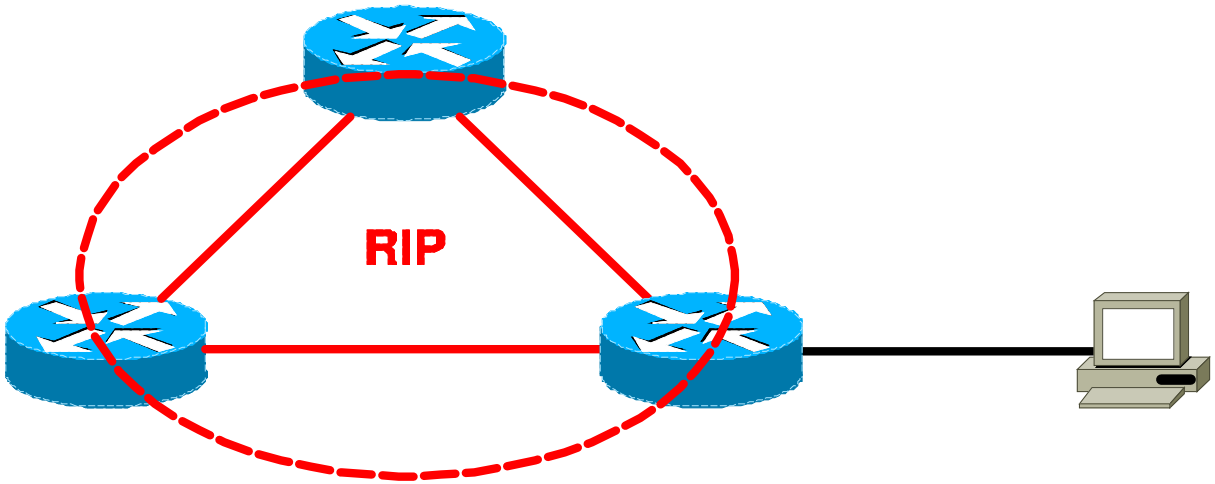
- RIP configuration:
  - **(config)# router rip**
    - **(config-router)# network** *<network address>*
      - enables RIP for given network
    - **(config-router)# passive-interface** *<interface>*
      - RIP is not distributed through this interface
    - **(config-router)# default-information originate**
      - Default gateway will be distributed over RIP, it is to be set only on one router
    - **(config-router)# version 2**
      - Enables RIPv2 which has ability to carry subnet information, thus supporting Classless Inter-Domain Routing (CIDR)
    - **(config-router)# no auto-summary**
      - Allows non-continuous subnets, disables classful n.
- **# sh ip route**
- **# debug ip rip**

Static default route

- Implicit (default) route is entered like **0.0.0.0 0.0.0.0**
  - **(config)# ip route 0.0.0.0 0.0.0.0 <*nexthop*>**
- To propagate default route to RIP (OSPF)
  - **(config-router)# default-information originate**

RIP

- Triangle topology
  - Cancel static routing, establish RIP
  - Try
    - **ping**
    - **show ip route**
    - **debug ip rip**



OSPF

- Configurationg OSPF:

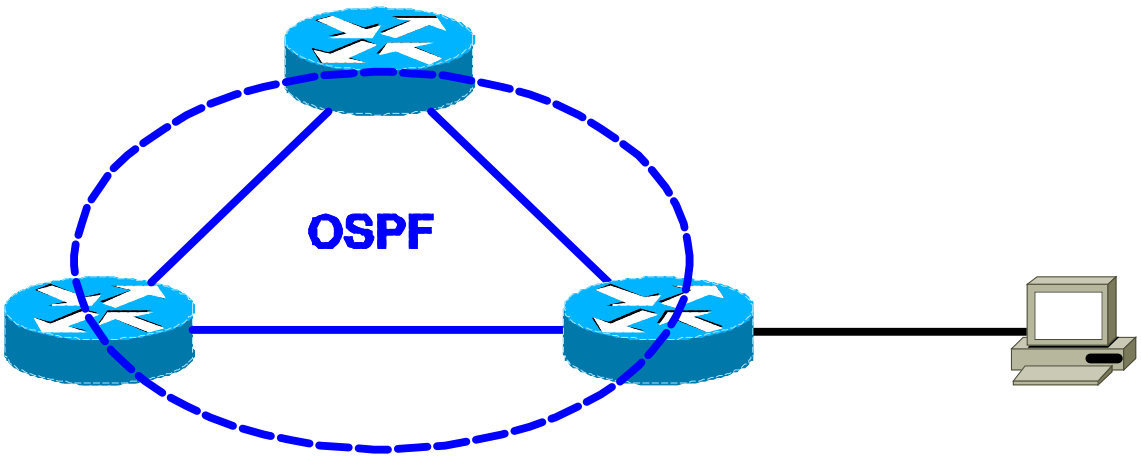
(config)# router ospf *<process number>*

- **(config-router)# network** *<network address>* *<wildcard m.>* **area 0**
  - enables OSPF for given network
  - wildcard mask – bit negation of network mask
- **(config-router)# passive-interface** *<interface>*
  - OSPF is not distributed through this interface
- **(config-router)# default-information originate**
  - Default gateway will be distributed over OSPF

- **# show ip ospf** [**database**| **neigh**]
  - To see ospf routing information
- **# debug ip ospf** [**packet** | **events**]
  - Debugging OSPF information

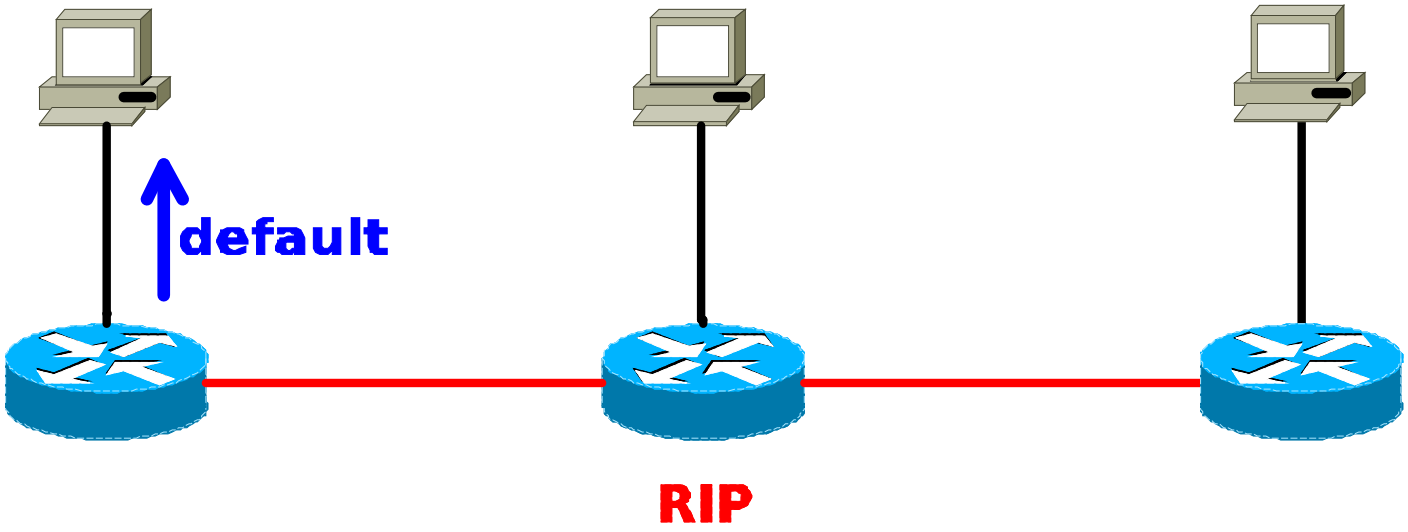
OSPF

- Triangle topology
  - Cancel RIP routing, establish OSPF
    - **`no router rip`**
  - Try
    - **`ping`**
    - **`show ip route`**
    - **`show ip ospf [database| neigh]`**
    - **`debug ip ospf [packet | events]`**



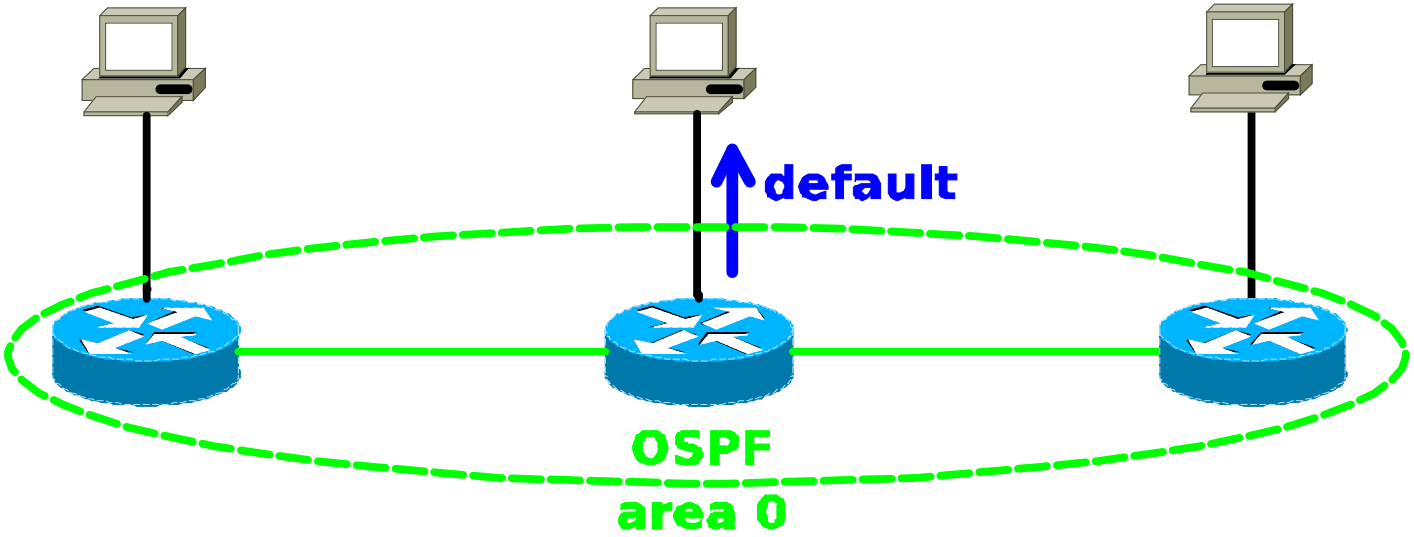
Assignment – RIP

- Linear topology of 3 routers
  - Establish RIP
  - Propagate default route
  - Try (ping + show ip route)



Assignment – OSPF

- Topology like in previous assignment
  - Cancel routing protocol RIP
  - Establish OSPF
  - Propagate default route
  - Try (ping + show ip route)



RIP-ng/OSPFv3 and IPv6

- RIP-ng configuration:
  - **(config)# ipv6 router rip** <ID>
    redistribute connected – will use directly c. nets
    redistribute static metric 1 – static routes (e.g. ::/0)
    exit
  - **(config-router)# interface XY/Z**
    (config-if)# ipv6 rip <ID> enable – enables RIP on XY/Z
    (config-if)# ipv6 rip <ID> default-information originate
- OSPF(v3) configuration:
  - **(config)# ipv6 router ospf** *<process #>*
    redistribute static metric 1 subnets
    router-id X.Y.Z.A – router ID for IPv6-only networks
    passive-interface AB/C
    exit
  - **(config-router)# interface XY/Z**
    (config-if)# ipv6 ospf <process #> area 0
- **# show ipv6 route**

Remote access to Router

- It can be realized by protocol **telnet**:
  - (config)# **enable password cisco**
    - Activates the password to privileged mode (enable) and allows its usage for remote access
  - (config)# **line vty 0 4**
    password cisco
    login
    - Enables remote access to router