

# Route Redistribution

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# Route redistribution

Using a routing protocol to advertise routes that were not learned by that routing protocol.



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**Route redistribution allows you to filter and manipulate routes**

# Module Overview



**Redistribute connected routes**

**Redistribute RIP routes**

**IP prefix lists and route maps**

**Summary and default routes**

# Redistributing Connected Routes

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# Redistributing Connected Routes



Provides an alternative to the  
network keyword

# Redistributing Connected Routes

## network keyword

Generates type 1 and 2 LSAs

Shows up as 0 or 0 IA route

Enables OSPF on the interface

## Redistributing connected route

Generates external route (Type 5 or 7 LSA)

Shows up as 0 E1 or 0 E2 route

Does not enable OSPF on the interface

## Customer Request

**Configure loopbacks on R1 as follows:**

- Loopback1 - 1.1.0.1/24
- Loopback2 - 1.2.0.1/24
- Loopback3 - 1.3.0.1/16
- Loopback4 - 1.4.0.1/16

**Redistribute subnets of all connected interfaces into OSPF**



# Redistributing RIP into OSPF

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Customer  
Request

**On R1, redistribute RIP learned subnets into  
OSPF as E1 routes**

# Route Maps and IP Prefix Lists

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# IP Prefix List

Like an access list  
for network  
prefixes



Processed  
sequentially

# IP Prefix List

```
R12(config)# ip prefix-list PL1 seq 10 permit 10.0.0.0/8
```

```
R12(config)# ip prefix-list PL1 seq 20 deny 172.16.0.0/16
```

An IP prefix list, like an access list, does nothing by itself!



IP prefix lists can be applied using  
route maps

# Route map

A set of sequentially processed rules that can match certain criteria and set attributes



```
R12(config)# route-map RM1 permit 10
```

```
R12(config-route-map)# match ip address prefix-list PL1
```

```
R12(config-route-map)# set metric-type type-1
```

## Route Map Referencing an IP Prefix List

# Permit and Deny Keywords

## Route map

Permit = advertise and apply  
set clauses

Deny = do not advertise

## IP prefix list

Permit = match

Deny = do not match

# IP Prefix List

```
R12(config)# ip prefix-list PL1 seq 10 permit 10.0.0.0/8
```

```
R12(config)# ip prefix-list PL1 seq 20 deny 172.16.0.0/16
```

redistribute  
command



route-map



ip prefix-list

## Customer Request

**Redistribute all current and future prefixes matching 203.0.113.x/30 into OSPF as type E1**

**Your configuration must not affect any other prefixes**

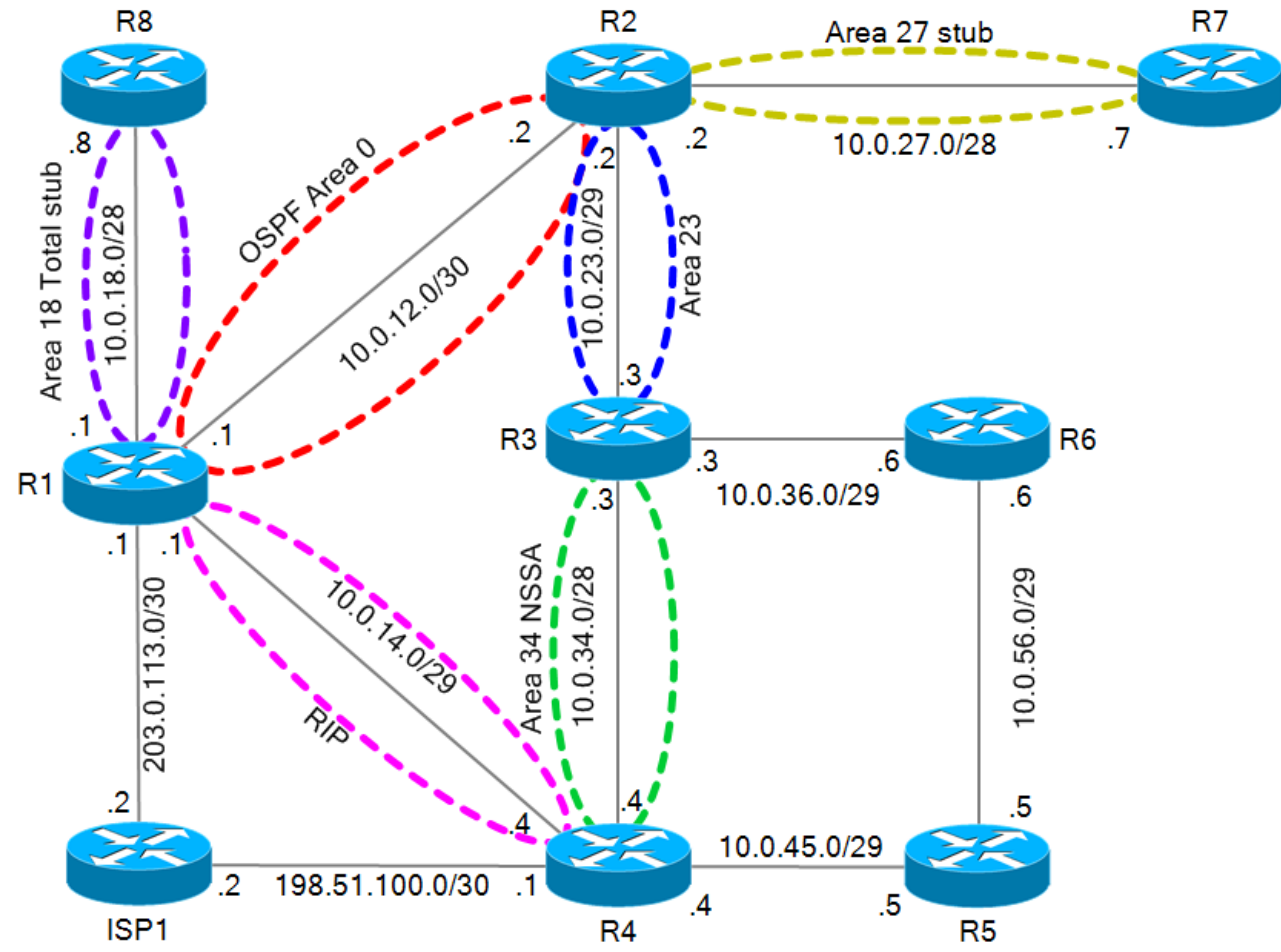
# Summarizing External Routes

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Customer  
Request

**Summarize all of R1's loopback addresses  
as a 1.0.0.0/8 summary route**

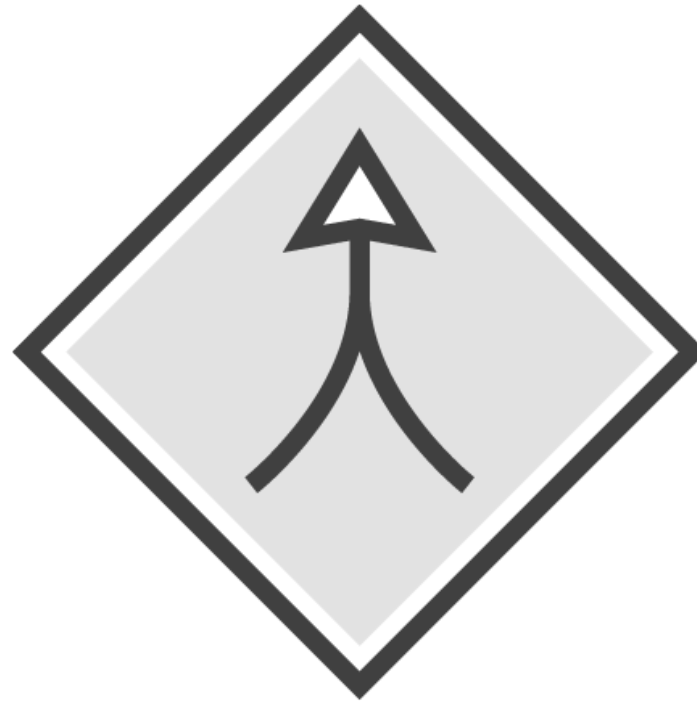
# OSPF IPv4 Topology





# Route Summarization

Inter-area routes  
are summarized  
at ABRs



External routes  
are summarized  
at ASBRs

# Injecting Default Routes

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How a default route is  
advertised depends on the  
area type.

Customer  
Request

On R4, inject a default route into OSPF using ISP1's 198.51.100.2 address as the next hop

Customer  
Request

**Use a single command on R1 to inject a default route into OSPF**

# Summary

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# Summary



**Redistributing routes makes a router  
an ASBR**

```
R1(config)# router ospf 1
```

```
R1(config-router)# redistribute connected subnets
```

## Redistributing Connected Routes

**All connected subnets will be advertised as external routes**



```
R1(config)# router ospf 1
```

```
R1(config-router)# redistribute rip subnets metric-type 1
```

## Redistributing RIP-learned Routes

**All RIP-learned subnets will be advertised as E1 routes**

# Summary



**Redistributing between routing protocols  
another allows you to merge networks**

```
R1(config)# ip prefix-list ISP1 seq 10 permit 203.0.113.0/24 ge 30 le 30
```

```
R1(config)# route-map CONN->OSPF permit
```

```
R1(config-route-map)# match ip address prefix-list ISP1
```

```
R1(config-route-map)# set metric-type type-1
```

## Configuring an IP Prefix List and Route Map

**Any connected /30 prefix starting with 203.0.113.x will be advertised as an E1 route**

```
R1(config)# ip prefix-list ISP1 seq 10 permit 203.0.113.0/24 ge 30 le 30
```

```
R1(config)# route-map CONN->OSPF permit
```

```
R1(config-route-map)# match ip address prefix-list ISP1
```

```
R1(config-route-map)# set metric-type type-1
```

## Configuring an IP Prefix List and Route Map

Any connected /30 prefix starting with 203.0.113.x will be advertised as an E1 route

```
R1(config)# ip prefix-list ISP1 seq 10 permit 203.0.113.0/24 ge 30 le 30
```

```
R1(config)# route-map CONN->OSPF permit
```

```
R1(config-route-map)# match ip address prefix-list ISP1
```

```
R1(config-route-map)# set metric-type type-1
```

## Configuring an IP Prefix List and Route Map

Any connected /30 prefix starting with 203.0.113.x will be advertised as an E1 route

```
R1(config)# access-list 100 permit ip 203.0.113.0 0.0.0.255 host 255.255.255.252  
R1(config)# route-map CONN->OSPF permit  
R1(config-route-map)# match ip address 100  
R1(config-route-map)# set metric-type type-1
```

## Configuring an Access List and Route Map

Any connected /30 prefix starting with 203.0.113.x will be advertised as an E1 route

```
R1(config)# route-map CONN->OSPF 20
```

## Overcoming the Implicit Deny in a Redistribution Route Map

```
R1(config)# router ospf 1
```

```
R1(config-router)# redistribute connected route-map CONN->OSPF
```

## Redistributed Connected Routes with a Route Map



```
R4(config)# ip route 0.0.0.0 0.0.0.0 198.51.100.2
```

```
R4(config)# router ospf 1
```

```
R4(config-router)# area 34 nssa default-information-originate
```

## Injecting a Default Route into a Not-so-stubby Area

**Advertises the static default route as a type 7 LSA**

**The ABR converts type 7 LSAs to type 5**

```
R1(config)# router ospf 1
```

```
R1(config-router)# default-information originate always
```

## Injecting a Default Route into a Normal Area

**Advertises a default route as an external type 5 LSA without a static default route in the IP routing table**

# Summary



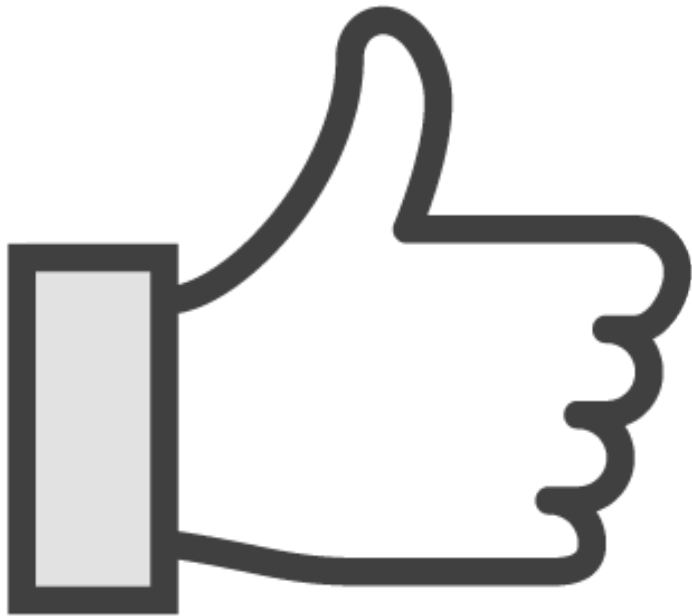
**With few exceptions, a router must have a route in its IP routing table in order to advertise it**

# Summary



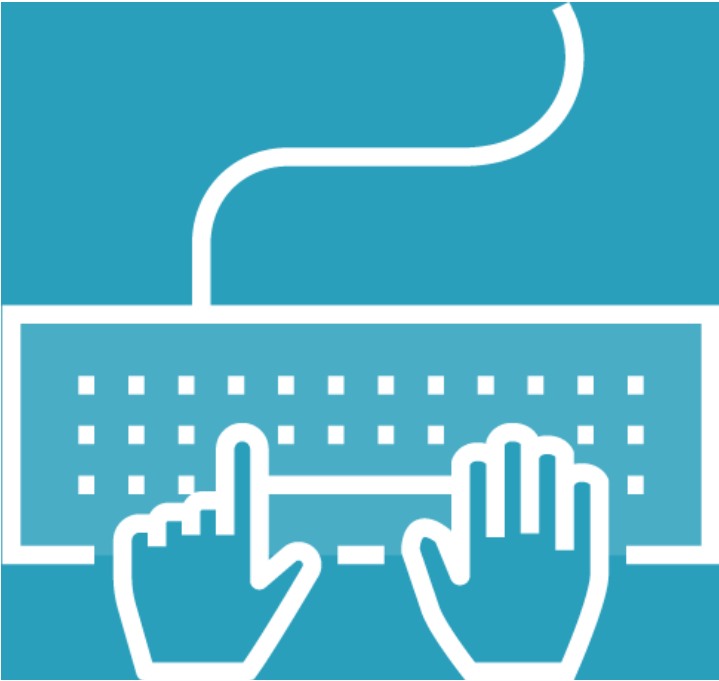
**R2 installed the default route from R1  
because of the lower cost**

# Summary



**E1 routes are always preferred over E2 routes, regardless of cost**

# Summary



**Practice, practice, practice!**

## In the Next Module



**We'll cover OSPFv3 for IPv6!**