

## What is FHRP?

FHRP stands for **First Hop Redundancy Protocol**.

It is a group of protocols that ensure **gateway (default router) availability** in a network — so if one router goes down, **another can take over automatically, without disrupting end-user connectivity**.

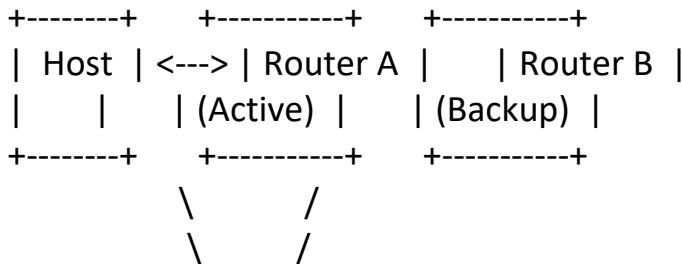
## Why is it called "First Hop"?

Because the **first hop** for any packet leaving a host (like your PC) is the **default gateway**.

If that gateway (router) fails, you lose external connectivity — **even if the internet is up!**

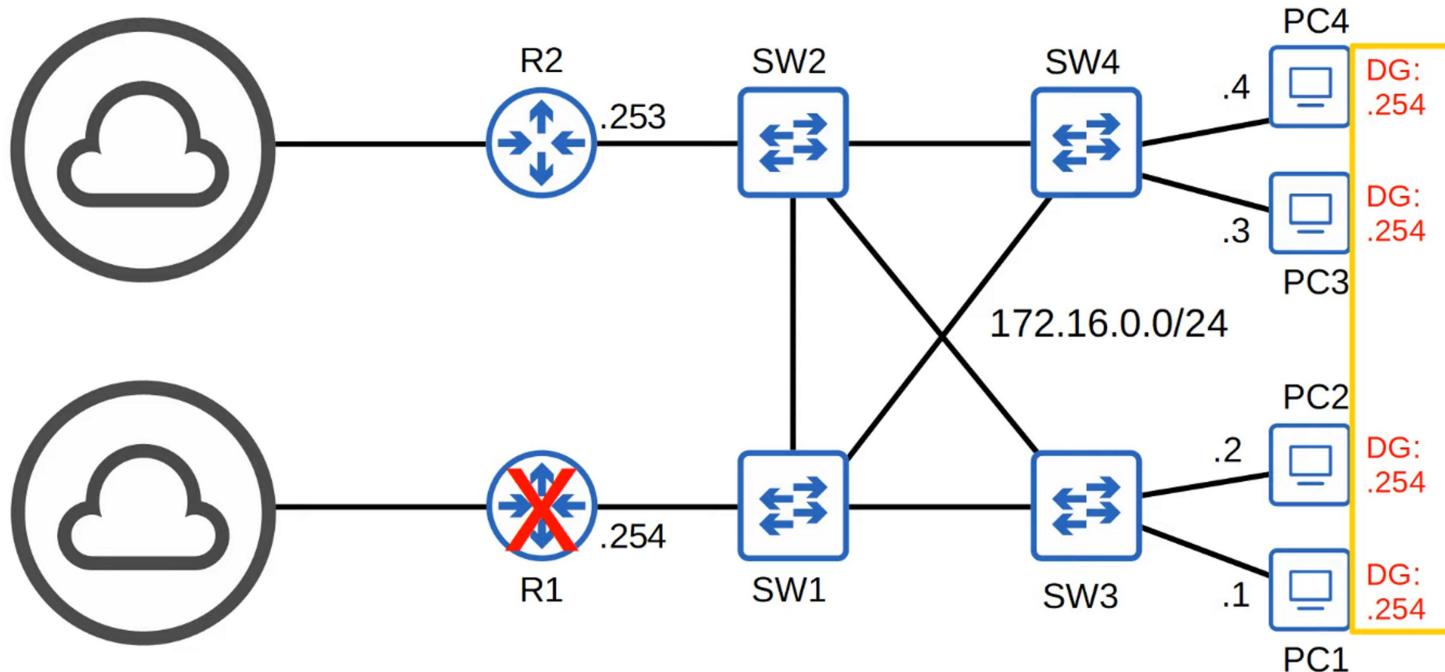
FHRP ensures the **first hop is always available**, by allowing **multiple routers to share a single virtual IP**.

## FHRP Concept Diagram:



Shared Virtual IP (e.g., 192.168.1.1)

Your PC only knows 192.168.1.1 — whichever router is active will respond!



### Types of FHRP Protocols:

Protocol	Full Form	Developed By	RFC / Standard	Notes
I				
HSRP	Hot Standby Router Protocol	Cisco	Cisco Proprietary	Primary Cisco FHRP
VRRP	Virtual Router Redundancy Prot.	IETF	RFC 5798	Open standard
GLBP	Gateway Load Balancing Protocol	Cisco	Cisco Proprietary	Load balancing + redundancy

### 1. HSRP – Hot Standby Router Protocol

- Cisco proprietary
- Uses **Active/Standby** model
- Routers elect one **Active** router (handles traffic)
- Others remain **Standby**
- Uses a **Virtual IP and MAC**

v1 : 224.0.0.2

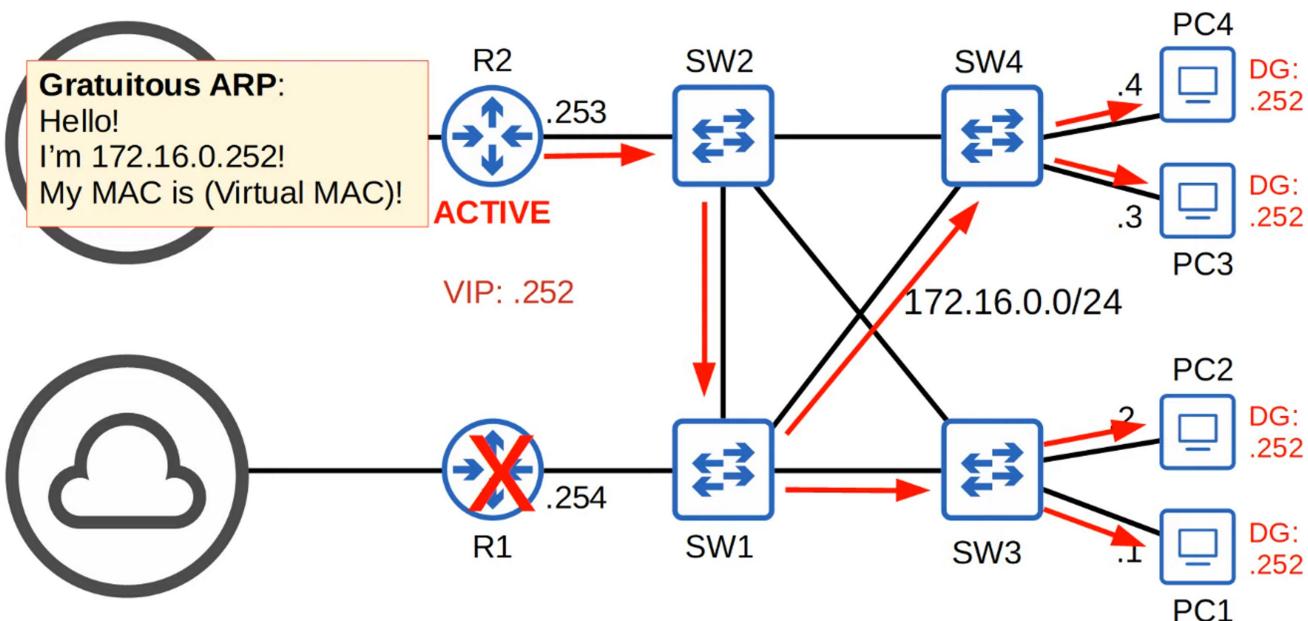
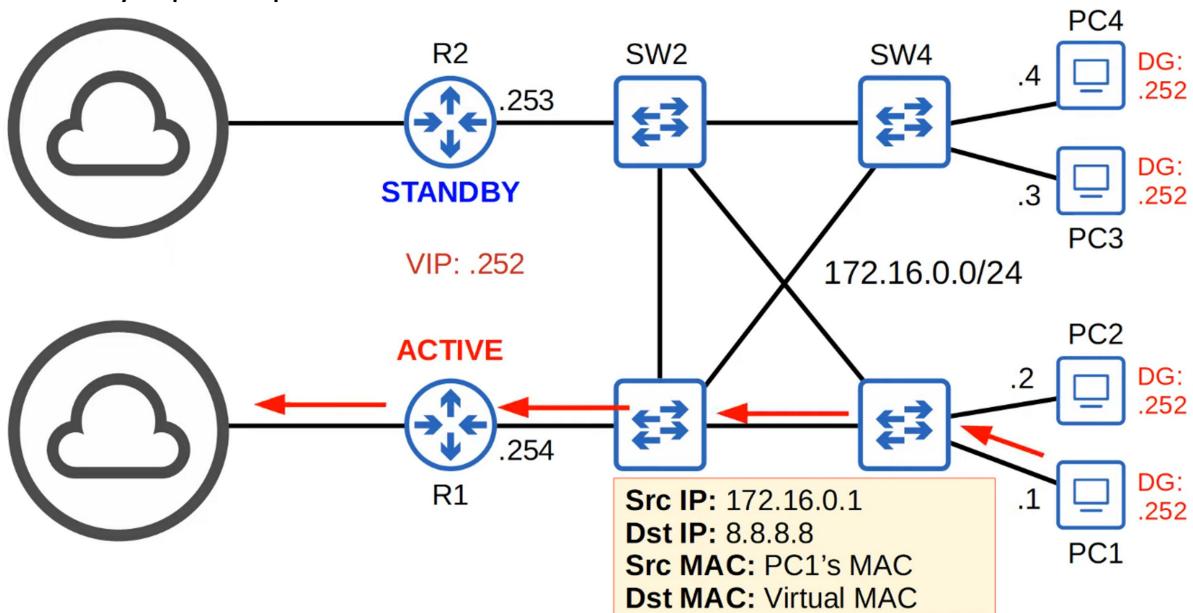
v2 : 224.0.0.102

**VIRTUAL MAC ADDRESSES :**

v1 : 0000.0c07.acXX (XX = HSRP GROUP NUMBER)  
v2 : 0000.0c9f.fXXX (XXX = HSRP GROUP NUMBER)

💡 HSRP Command Example (on Cisco):

```
interface g0/0
ip address 172.16.0.254 255.255.0.0
standby 1 ip 172.16.0.252
standby 1 priority 110
standby 1 preempt
```



## 🔧 2. VRRP – Virtual Router Redundancy Protocol

- Open standard (used on Cisco, Juniper, Mikrotik, etc.)
- Similar to HSRP
- Uses **Master/Backup model**

Multicast IPv4 ADDRESSES :

224.0.0.18

VIRTUAL MAC ADDRESSES :

0000.5e00.01XX (XX = VRRP GROUP NUMBER)

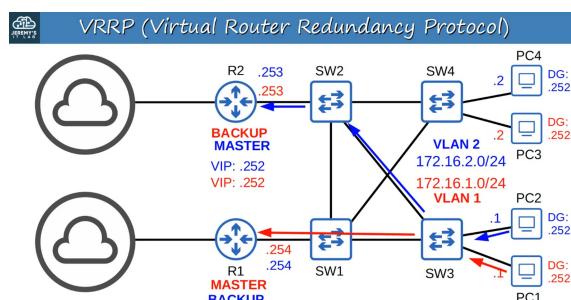
for GROUP NUMBERS > 99, you need to convert the number to HEX

Example: 200 = “c8” in Hex so the MAC would be 0000.5e00.01c8

- Virtual Router has an IP shared by multiple routers

### 💡 Basic VRRP config (Cisco):

```
interface g0/1
ip address 192.168.1.3 255.255.255.0
vrrp 1 ip 192.168.1.1
vrrp 1 priority 120
vrrp 1 preempt
```



## 🔧 3. GLBP – Gateway Load Balancing Protocol

- Cisco proprietary
- Supports **load balancing** and redundancy
- Multiple routers can forward traffic at the same time

- Shares a **virtual IP** but has multiple virtual MAC addresses

 Basic GLBP config:

```
interface g0/1
ip address 192.168.1.4 255.255.255.0
glbp 1 ip 192.168.1.1
glbp 1 priority 110
glbp 1 preempt
```

### Key Differences:

Feature	HSRP	VRPP	GLBP
Open Std	 Cisco only	 Yes	 Cisco only
Load Balance			 Yes
Terminology	Active/Standby	Master/Backup	Active/AVG/AVF
Virtual IP	Configured	May match real IP	Configured
Preempt	Manual	Enabled by default	Manual