# HSRP, principy, funkce, použití, konfigurace

## HSRP (Hot Standby Router Protocol) RFC 2281

Jedná se o Cisco proprietární redundantní ptorocol pro založení a fault-tolerance defaulr gateway. Verze 1 vznikl již v roce 1998 a byla popsaná v RFC 2281. Verze 2 protokolu obsahuje nějaká vylepšení a podoru IPv6, ovšem neexistuje pr ní korespondující RFC notace.

* Verze dava krom toho že podporuje ipv6 adresy navíc přínáší, stabilitu, škálovatelnost, a vylepšenou diagnostiku. Není kompatibilní s 1 verzí HSRP. Zvyšuje počet HSRP groups z 256 na 4096

Protokol založí spojení mezi reouterama. V případě že jedna z default gateway přestane fungovat nahradí její funkcionalitu druhá. HSRP gateway posílá multicast hello message ostatním gatewayím aby jim oznámila jejich prioritu (která gateway je preferovaná) a aktuálním stavu (active nebo standby).

### Princip

Primární router s nejvyší nastavenou prioritou se bude chovat jako virtuální router s předdefinouvanou gateway IP adresou a bude odpovídat ARP a ND requestům od strojů připojených k LAN s využitím své viruální MAC adresou (primární gatewaye). Pokud promární router by měl přestat odpovídat, router s druhou největší prioritou naž má primární router převezme na sebe funkcionalitu deafultní gateway a sám se stane primárním routrem. Na ARP a ND requesty bude stale odpovídat s využítím stejné virtuální MAC adresy.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **HSRP version** | **IP protocol** | **Group address** | [**UDP**](https://en.wikipedia.org/wiki/User_Datagram_Protocol)**port** | **Virtual MAC address range** |
| 1 | IPv4 | 224.0.0.2 (all routers)[[1]](https://en.wikipedia.org/wiki/Hot_Standby_Router_Protocol#cite_note-ciscov2-1) | 1985 | 00:00:0c:07:ac:XX |
| 2 | IPv4 | 224.0.0.102 (HSRP)[[1]](https://en.wikipedia.org/wiki/Hot_Standby_Router_Protocol#cite_note-ciscov2-1) | 1985 | 00:00:0c:9f:fX:XX |
| IPv6 | ff02::66 | 2029 | 00:05:73:a0:0X:XX |

Písmeno “X” v virtuální MAC adrese reprezentuje group ID v hexu. HSRP není routing protocol protože žádným způsobem nijak nemění nebo jinak neovlivňuje ip routing table.

HSRP je schopné vyvolat failover pokud jedno nebo výce zařízení na routru přestane fungovat.

#### Common HSRP problems

* HSRP routers not being on the same network segment.
* HSRP routers not configured with IP addresses from the same subnet.
* HSRP configuration issues like standby groups and virtual IPs not matching on the HSRP routers.

#### HSRP Communication

* **Hello** – The hello message is sent between the active and standby devices (by default, every 3 seconds). If the standby device does not hear from the active device (via a hello message) in about 10 seconds, it will take over the active role.
* **Resign** – The resign message is sent by the active HSRP device when it is getting ready to go offline or relinquish the active role for some other reason. This message tells the standby router to be ready and take over the active role.
* **Coup** – The coup message is used when a standby router wants to assume the active role (preemption).

#### HSRP States

* **Active** – This is the state of the device that is actively forwarding traffic.
* **Init or Disabled** – This is the state of a device that is not yet ready or able to participate in HSRP.
* **Learn** – This is the state of a device that has not yet determined the virtual IP address and has not yet seen a hello message from an active device.
* **Listen** – This is the state of a device that is receiving **hello** messages.
* **Speak** – This is the state of a device that is sending and receiving hello messages.
* **Standby** – This is the state of a device that is prepared to take over the traffic forwarding duties from the active device.

### Konfigurace

Defaultní priorita HSRP routeru je 100. Kdo má vyšší prioritu stane se aktivním routerem.

|  |  |  |
| --- | --- | --- |
| 1 | Enter privileged EXEC mode. | router>**enable** |
| 2 | Enter global configuration mode. | router#**configure terminal** |
| 3 | Enter interface configuration mode. | router(config)#**interface***interface* |
| 4 | Configure an IP address on the interface. | router(config-if)#**ip address***address netmask* |
| 5 | Configure an HSRP virtual IP address.  Note: If the *group-number*is not entered, then it will default to a group number of 0.  The *ip-address* parameter is not required but does need to be entered on at least one HSRP device. The other devices are able to learn the virtual IP address from this device. | router(config-if)#**standby**[*group-number*] **ip**[*ip-address*] |
| 6 | Configure the HSRP priority (optional).  Note: If the *group-number*is not entered, then it will default to a group number of 0.  The valid values for the *priority*are from 0 through 255. | router(config-if)#**standby**[*group-number*] **priority***priority* |
| 7 | Configure HSRP preemption (optional). Preempt forces a router to be active after recovering from a failure. | router(config-if)#**standby**[*group-number*] **preempt** |
| 8 | Associate a tracked object to the HSRP group (optional).  Note: If the *group-number*is not entered, then it will default to a group number of 0.  By default, the *decrement-value* is 10; what this means is that the HSRP priority will go down by 10 if the object is not ‘up’.  The **shutdown** parameter will disable the HSRP group if the tracked object goes down. | router(config-if)#**standby**[*group-number*] **track***object-number*[**decrement***decrement-value*][**shutdown**] |
| 9 | Create a tracked object (optional).  Note: The *object-number*can be any number between 1 and 1000.  The **line-protocol**parameter will track the protocol state of the configured interface. The **ip routing**parameter will track the IP routing capability of an interface (is it configured with an IP address and operational). | router(config)#**track***object-number***interface***interface*{**line-protocol**| **ip routing**} |

|  |  |
| --- | --- |
| Enter privileged EXEC mode. | R1>**enable** |
| 2 | Enter global configuration mode. | R1#**configure terminal** |
| 3 | Enter interface configuration mode. | R1(config)#**interface fa0/1** |
| 4 | Configure an IP address on the interface. | R1(config-if)#**ip address 10.10.20.1 255.255.255.252** |
| 5 | Enter interface configuration mode. | R1(config-if)#**interface fa0/0** |
| 6 | Configure an IP address on the interface. | R1(config-if)#**ip address 172.16.1.1 255.255.255.0** |
| 7 | Enter interface configuration mode. | R1(config-if)#**interface fa1/0** |
| 8 | Configure an IP address on the interface. | R1(config-if)#**ip address 10.10.10.1 255.255.255.0** |
| 9 | Configure the HSRP virtual IP address. | R1(config-if)#**standby ip 10.10.10.5** |
| 10 | Configure the use of HSRP version 2. | R1(config-if)#**standby version 2** |
| 11 | Configure the use of HSRP preemption. | R1(config-if)#**standby preempt** |
| 12 | Configure the HSRP priority. | R1(config-if)#**standby priority 140** |
| 13 | Configure HSRP object tracking. | R1(config-if)#**standby track 1 decrement 50** |
| 14 | Create a tracked object. | R1(config)#**track 1 interface fa0/0 line-protocol** |

#### Advanced HSRP Configuration – Load Balancing

Obsah obrázku text, snímek obrazovky, Písmo, diagram

Popis byl vytvořen automaticky