HSRP & VRRP & GLBP | PPPoE & L2TP

GLBP

All routers "**Active Virtual Forwarders**".

One elected "**Active Virtual Gateway**" (**AVG**) (Highest Priority then highest IP).

It answers all ARP requests (with different macs, to balance traffic).

Algorithms:
- round robin
- weitghted (used w/ IF tracking)
- host-dependent (same mac to same host)

Hello def 3 sec.
No preemption default.
Standby AVG can exist.
AVFs backup eachother

VRRP v2

Virtual Router - router (gateway)
VRRP Router (all: master & backups)
Master Router - forwards packets
Backup Router - standby

IP Multicast 224.0.0.18, IP 112
Hello 1s (or fast-interval 100-999 msec)
TTL 255; identical config

Master:
- Priority (prefer higher) (def 100)
- router that owns virtual IP (prio255)
Preemption optional/Yes (unless ^^)

VirtualMAC: 00-00-5E-00-01-VRID

VRRP States:

Transition (switching, no fw)

Initialize (negotiate, no fw)
Backup (monitor, no fw, the others)
Master (respond to ARP, fw)

Auth: none, plaintext, md5

HSRP

Active (only 1**)**
Standby (only 1**)**

UDP Multicast 224.0.0.2 / UDP 1985
3 sec hello / 10 sec dead

Master:
- Piority (prefer higher) (def 100)
- on tie, highest IP configured.
- Preemption disabled default

Virtual MAC: 00.00.0c.07.AC.GROUP

HSRP States:

Initial (not running)
Learn (does not know VIP, waits)
Listen (knows VIP, *those not act/stby*)
Speak (participates in election)
Standby (monitor)
Active (fw)

Auth: none, plaintext, md5

Load balancing: with multiple groups balanced between 2 routers. **IF-tracking.**

PPPoE stages (each own ethtype):

- **DISCOVERY** stage (stateless until SESSION established)
- **SESSION** stage

Discovery stage steps:
1. Host broadcasts **Initiate** packet
2. Concentrators send **Offers**
3. Host sends unicast **Session-Request**
4. Concetrator sends **Session-Confirmation**

Packet:
- Version 1, Type 1
- Code (denotes payload)

9 - **PADI** - Active Discovery **Initiation** (contains 1 service_name)
7 - **PADO** - Active Discovery **Offer** (contains conc. name, service_name)
19 - **PADR** - Active Discovery **Request** (contains 1 service_name)
65 - **PADS** - Active Discovery **Session-confirm**. (contains 1 service_name)
(if Service_name requested not available, must answer with PADS with Service_name_error)
a7 - **PADT** - Active Discovery **Terminate** (can be sent by host or conc., no other packet after, normally ppp session termin. should be used)

PPP adds **multilink**, **authentication**, performs **dynamic config** of links, **compression**, tests **quality** of links, **error detection and correction**

1. LCP Link Establishment (Negotiation)

- Auth (PAP - plain text, CHAP - md5)
- Compression (Stacker or Predictor)
- Callback
- Multilink

2. LCP Authentication
3. NCP Negotiation for upper-layer protocols

L2TP uses UDP 1701. Generally PPP inside

Doesn't offer confid. or auth. IPSec can be used.
LAC - L2TP Access Concentrator (client)
LNS - L2TP Network Server

TunnelSetup (3packets)
Start-Control-Conn.-Request/Reply/Connected
SessionSetup (3packets)
IncomingCall- Request/Reply/Connected
Data transfer