

Protocolos de Ruteo

Generalidades

- **Routing Tables**
- **Static vs Dinamic Routing**
- **Vector-distance o Link-state (SPF) algorithms**
- **Internal / External Gateway Protocols**
- **Autonomous Systems (domains) (ASN)**
- **Métricas:** hops, delay, bandwidth, load, cost, reliability

Protocolos de ruteo

RIP

- Interior Gateway Protocol
- RFC 1058 (1988)
- 4BSD Unix
- **Vector distance** routing protocol
- **Slow convergence**, cuenta a infinito
- Hop Metric
- **Active & passive RIP systems**
- NO Propaga las **Netmasks** de las rutas
 - **NO** Soporta **VLSM** y **CIDR**

Protocolos de ruteo

RIP2

- Interior Gateway Protocol
- RFC 1723 (1994)
- Propaga las Netmasks de las rutas
 - Soporta VLSM y CIDR
- Soporta un mecanismo simple de autenticación
- Hop Metric
- Triggered Updates

RIP vs RIP v2

| 0 | 8 | 16 | 31 |
|---------------------------------|---------|----|----|
| Command | Version | 0 | |
| Address family | | 0 | |
| IP address 1 | | | |
| 0 | | | |
| 0 | | | |
| hop count metric for address 1 | | | |
| / / / / / | | | |
| Address family | | 0 | |
| IP address 25 | | | |
| 0 | | | |
| 0 | | | |
| hop count metric for address 25 | | | |

| 0 | 8 | 16 | 31 |
|-----------------------------------|---------|----------------|----|
| Command | Version | 0 | |
| X'FFFF' | | Authentic Type | |
| authentication data (16 bytes) | | | |
| Address family | | Route Tag 1 | |
| IP address 1 | | | |
| subnet mask 1 | | | |
| next hop 1 | | | |
| hop count metric for address 1 | | | |
| / / / / / | | | |
| Address family | | Route Tag 24 | |
| IP address 24 | | | |
| subnet mask 24 | | | |
| next hop 24 | | | |
| hop count metric for address 24 | | | |

Protocolos de ruteo

EIGRP

- Interior Gateway Protocol
- **IGRP** (Interior Gateway Routing Protocol) (Cisco 1980)
- **EIGRP** (Enhanced IGRP)
- DUAL (Diffusing Update Algorithm):
 - combina Distance vector y Link State
- Fast convergence
- Soporta VLSM y CIDR
- Metricas combinadas: delay, bandwidth, reliability, load, mtu
- Multipath routing con metricas diferentes
- Multiple network-layer support (IP, IPX, CLNP, etc)

Protocolos de ruteo

OSPF

- **Open Shortest Path First**
 - Propuesto por el IETF (RFC 1247)
- **Interior Gateway Protocol**
- **Link State (SPF) algorithm (Dijkstra's algorithm)**
- Soporta **VLSM** y **CIDR**
- **Esquema Jerárquico**
- Esquemas de **autenticación, multicasting**
- Soporta **host-specific routes** y **network-specific routes**.
- Permite **multipath routing** y **load balancing** (con paths de igual métrica)

Protocolos de ruteo

OSPF

| Field length, in bytes | 1 | 1 | 2 | 4 | 4 | 2 | 2 | 8 | Variable |
|---------------------------|------|---------------|-----------|---------|-----------|----------------------|----------------|------|----------|
| Version number | Type | Packet length | Router ID | Area ID | Check-sum | Authent-ication type | Authentication | Data | |

- **Version number**—Identifies the OSPF version used.
- **Type**—Identifies the OSPF packet type as one of the following:
 - **Hello**—Establishes and maintains neighbor relationships.
 - **Database description**—Describes the contents of the topological database. These messages are exchanged when an adjacency is initialized.
 - **Link-state request**—Requests pieces of the topological database from neighbor routers. These messages are exchanged after a router discovers (by examining database-description packets) that parts of its topological database are outdated.
 - **Link-state update**—Responds to a link-state request packet. These messages also are used for the regular dispersal of LSAs. Several LSAs can be included within a single link-state update packet.
 - **Link-state acknowledgment**—Acknowledges link-state update packets.
- **Packet length**—Specifies the packet length, including the OSPF header, in bytes.
- **Router ID**—Identifies the source of the packet.
- **Area ID**—Identifies the area to which the packet belongs. All OSPF packets are associated with a single area.
- **Checksum**—Checks the entire packet contents for any damage suffered in transit.
- **Authentication type**—Contains the authentication type. All OSPF protocol exchanges are authenticated. The authentication type is configurable on per-area basis.
- **Authentication**—Contains authentication information.
- **Data**—Contains encapsulated upper-layer information.

Protocolos de ruteo

BGP

- **Exterior Gateway Protocol**
- **Border Gateway Protocol (BGP)**
- BGP reemplaza y mejora al EGP
- Version actual: 4 ==> **BGP4** (RFC 1771)
- ASN: Autonomous System Number
- as-path