

Protocol Header					
4		8		12	16
IRPD		Packet Length			
Version/Protocol ID Extension		ID Length			
R	R	R	PDU Type		Version
Reserved		Maximum Area Addresses			
Type		Length			
Value ...					

NSAP Addressing					
Interdomain Part			Domain-Specific Part		
NSAP	AFI	IDI	HODSP	System ID	SEL
Condensed	Area		System ID	SEL	
Example	47	0005.80ff.f800.0000	0001	0000.0c00.1234	00

Interdomain Part (IDP)

Portion of the address used in routing between autonomous systems; assigned by ISO

Domain-Specific Part (DSP)

Portion of the address relevant only within the local AS

Authority and Format Identifier (AFI)

Identifies the authority which dictates the format of the address

Initial Domain Identifier (IDI)

An organization belonging to the AFI

High Order DSP (HODSP)

The area within the AS

System ID

Unique router identifier; 48 bits for Cisco devices (often taken from a MAC address)

NSAP Selector (SEL)

Identifies a network layer service; always 0x00 in a NET address

Network Types

	Broadcast	Point-to-Point
DIS Elected	Yes	No
Neighbor Discovery	Yes	Yes
Hello/Dead Timers	10/30	10/30

Troubleshooting

show ip route	show isis spf-log
show ip protocols	debug isis spf-events
show [clns isis] neighbor	debug isis adjacencies-packets
show [clns isis] interface	debug isis spf-statistics
show isis database	debug isis update-packets

Attributes

Type	Link-State
Algorithm	Dijkstra
Metric	Default (10)
AD	115
Standard	ISO 10589
Protocols	IP, CLNS
Transport	Layer 2
Authentication	Plaintext, MD5

Routing Levels

Level 0	Used to locate end systems
Level 1	Routing within an area
Level 2	Backbone between areas
Level 3	Inter-AS routing

Terminology

Type-Length-Value (TLV)

Variable-length modular datasets

Link State PDU (LSP)

Carry TLVs encompassing link state information

Sequence Number Packet (SNP)

Used to request and advertise LSPs; can be complete (CSNP) or partial (PSNP)

Hello Packet

Establishes and maintains neighbor adjacencies

Designated Intermediate System

A pseudonode responsible for emulating point-to-point links across a multi-access segment

Adjacency Requirements

- Interface MTUs must match
- Levels must match
- Areas must match (if level 1)
- System IDs must be unique
- Authentication must succeed

DIS Election

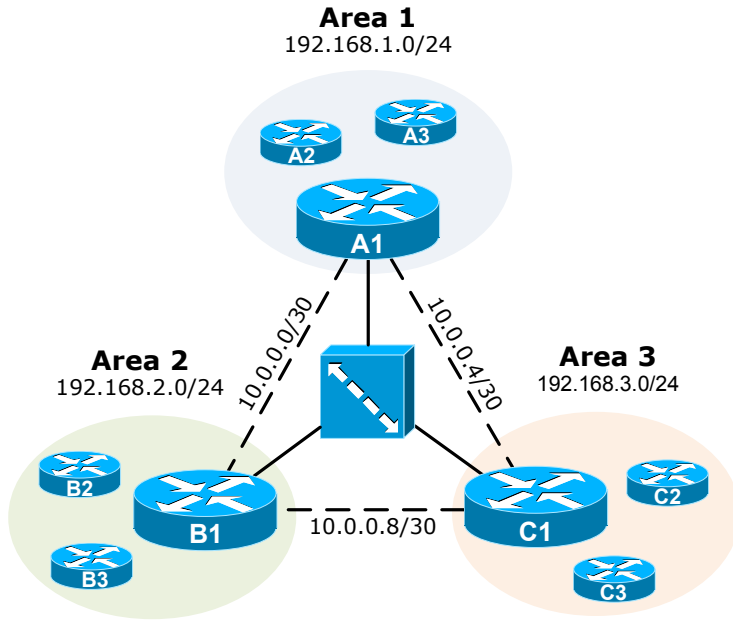
- Highest-priority interface elected
- Highest SNPA (MAC/DLCI) breaks tie
- Highest system ID breaks SNPA tie
- Default interface priority is 64
- Current DIS may be preempted

IS-IS · PART 2

TLV Types

Name	Use	Name	Use	Name	Use
1 Area Addresses	Hello, LSP	6 IS Neighbors	Hello, L2 LSP	128 IP Internal Reach.	LSP
2 IS Neighbors	LSP	8 Padding	Hello	129 Protocols Supported	Hello, LSP
3 ES Neighbors	L1 LSP	9 LSP Entries	SNP	131 IDRPI	SNP, L2 LSP
5 Prefix Neighbors	L2 LSP	10 Authentication	All	132 IP Interface Address	Hello, LSP

Configuration Example



Router A2

```
interface FastEthernet0/0
description Area 1
ip address 192.168.1.2 255.255.255.0
ip router isis
isis circuit-type level-1
!
router isis
net 49.0001.0000.0000.00a2.00
```

Router B2

```
interface FastEthernet0/0
description Area 2
ip address 192.168.2.2 255.255.255.0
ip router isis
isis circuit-type level-1
!
router isis
net 49.0002.0000.0000.00b2.00
```

Router A1

```
interface FastEthernet0/0
description Area 1
ip address 192.168.1.1 255.255.255.0
ip router isis
isis circuit-type level-1
!
interface Serial1/0
no ip address
encapsulation frame-relay
!
interface Serial1/0.1 point-to-point
description To Area 2
ip address 10.0.0.1 255.255.255.252
ip router isis
isis circuit-type level-2-only
! MD5 authentication (keychain not shown)
isis authentication mode md5
isis authentication key-chain <keychain>
frame-relay interface-dlci 101
!
interface Serial1/0.2 point-to-point
description To Area 3
ip address 10.0.0.5 255.255.255.252
ip router isis
isis circuit-type level-2-only
frame-relay interface-dlci 102
!
router isis
net 49.0001.0000.0000.00a1.00
```

Router B1

```
interface FastEthernet0/0
description Area 2
ip address 192.168.2.1 255.255.255.0
ip router isis
isis circuit-type level-1
!
interface Serial1/0
no ip address
encapsulation frame-relay
!
interface Serial1/0.1 point-to-point
description To Area 1
ip address 10.0.0.2 255.255.255.252
ip router isis
isis circuit-type level-2-only
! MD5 authentication (keychain not shown)
isis authentication mode md5
isis authentication key-chain <keychain>
frame-relay interface-dlci 101
!
interface Serial1/0.2 point-to-point
description To Area 3
ip address 10.0.0.9 255.255.255.252
ip router isis
isis circuit-type level-2-only
frame-relay interface-dlci 103
!
router isis
net 49.0002.0000.0000.00b1.00
```