

Figure 9.1

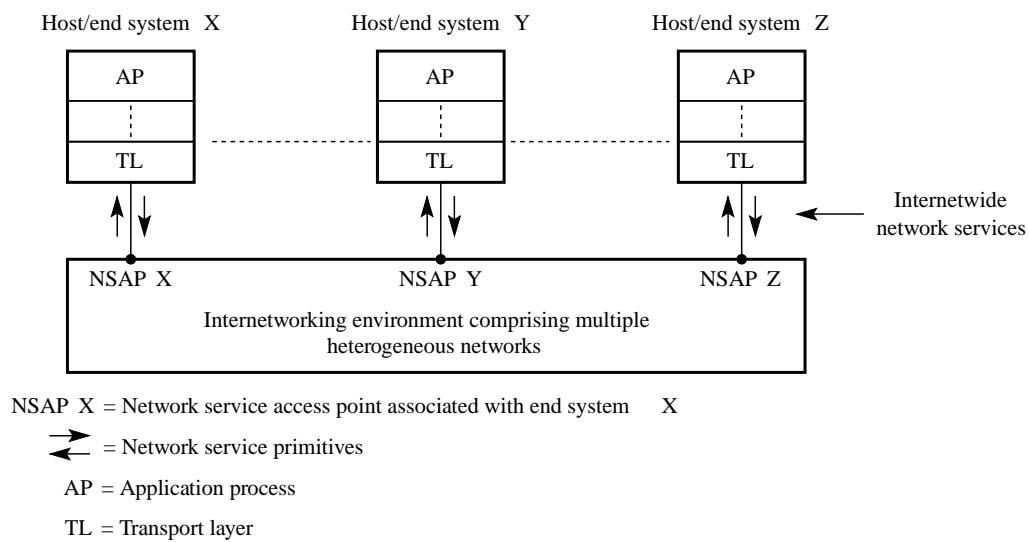
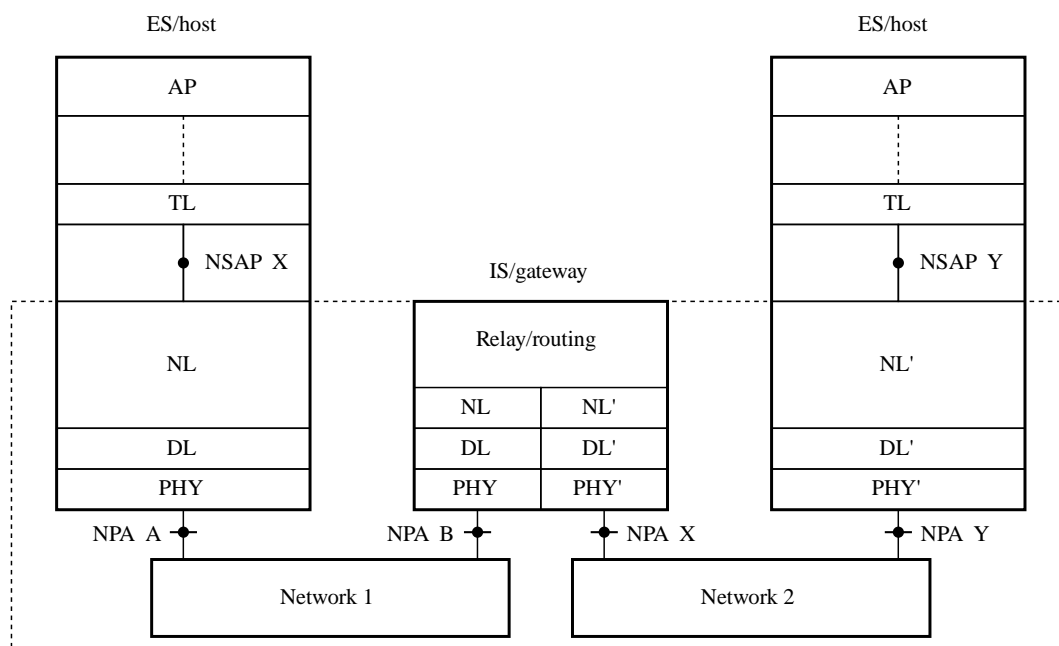


Figure 9.3



NSAP X/Y = Network services access point of NS_user

NPA = Network point of attachment address

(e.g., NPA A/B = LAN MAC addresses; NPA X/Y = X.25 WAN X.121 addresses)

Figure 9.4

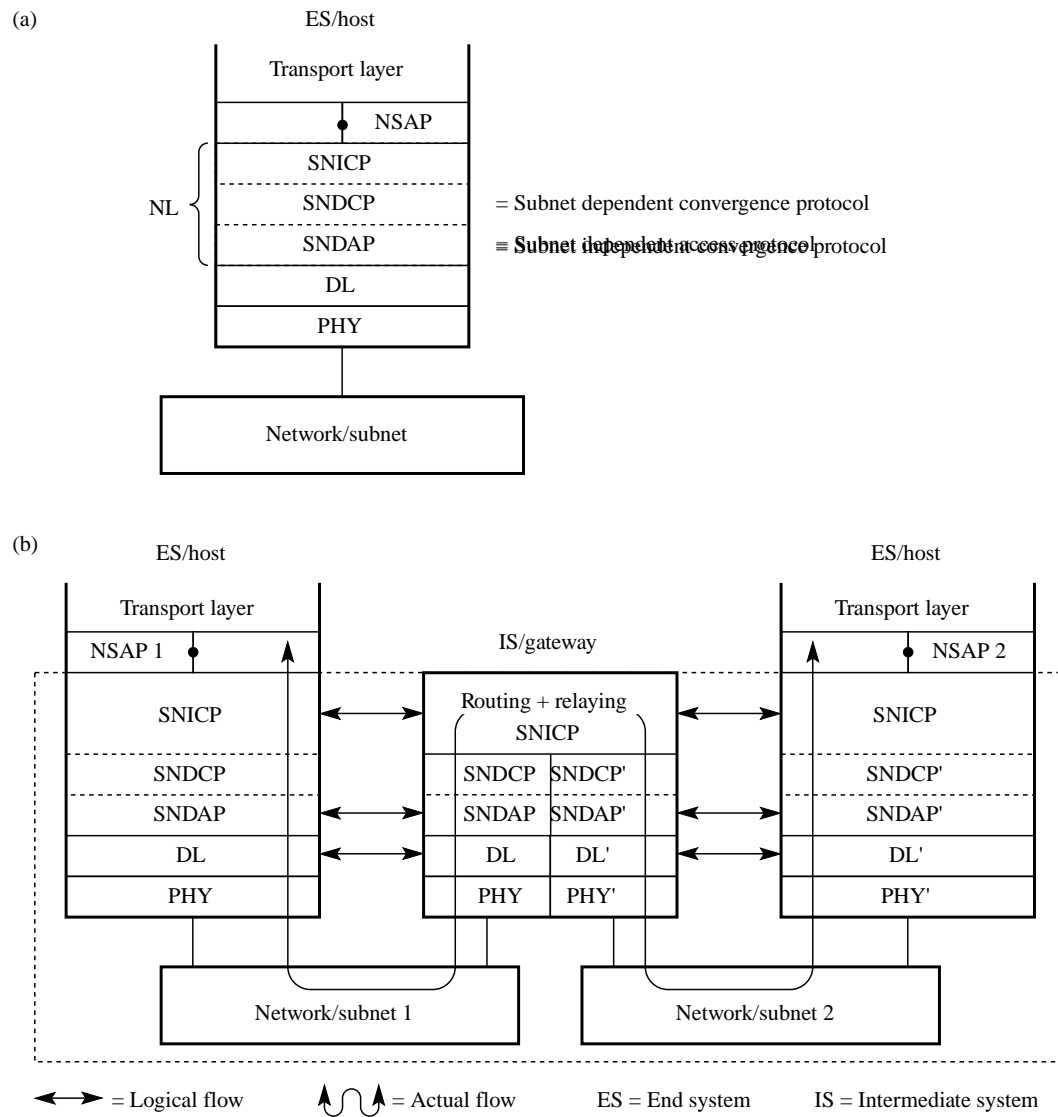


Figure 9.6

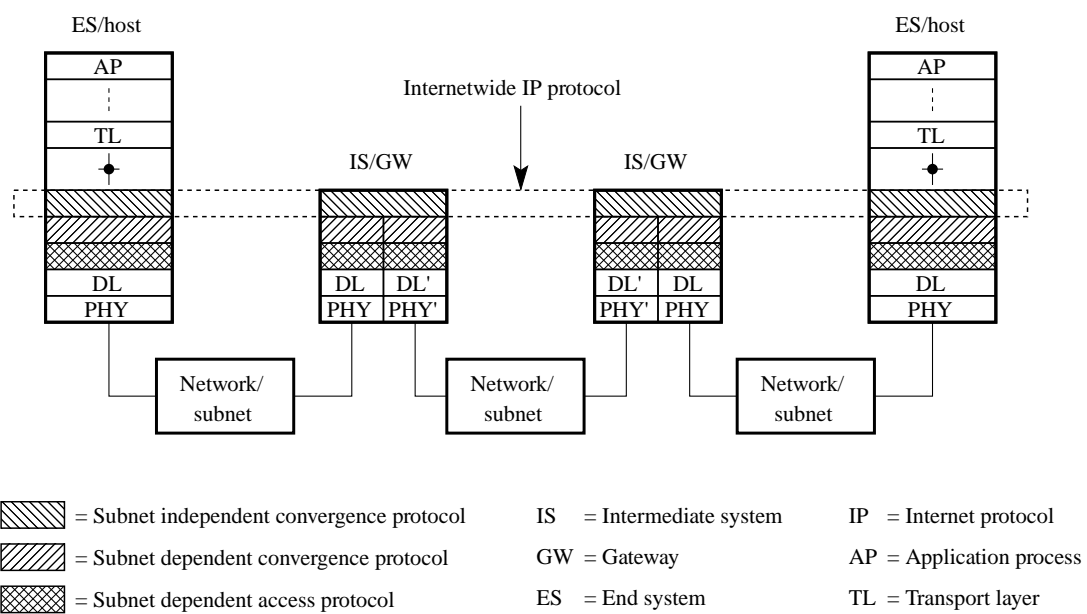


Figure 9.7

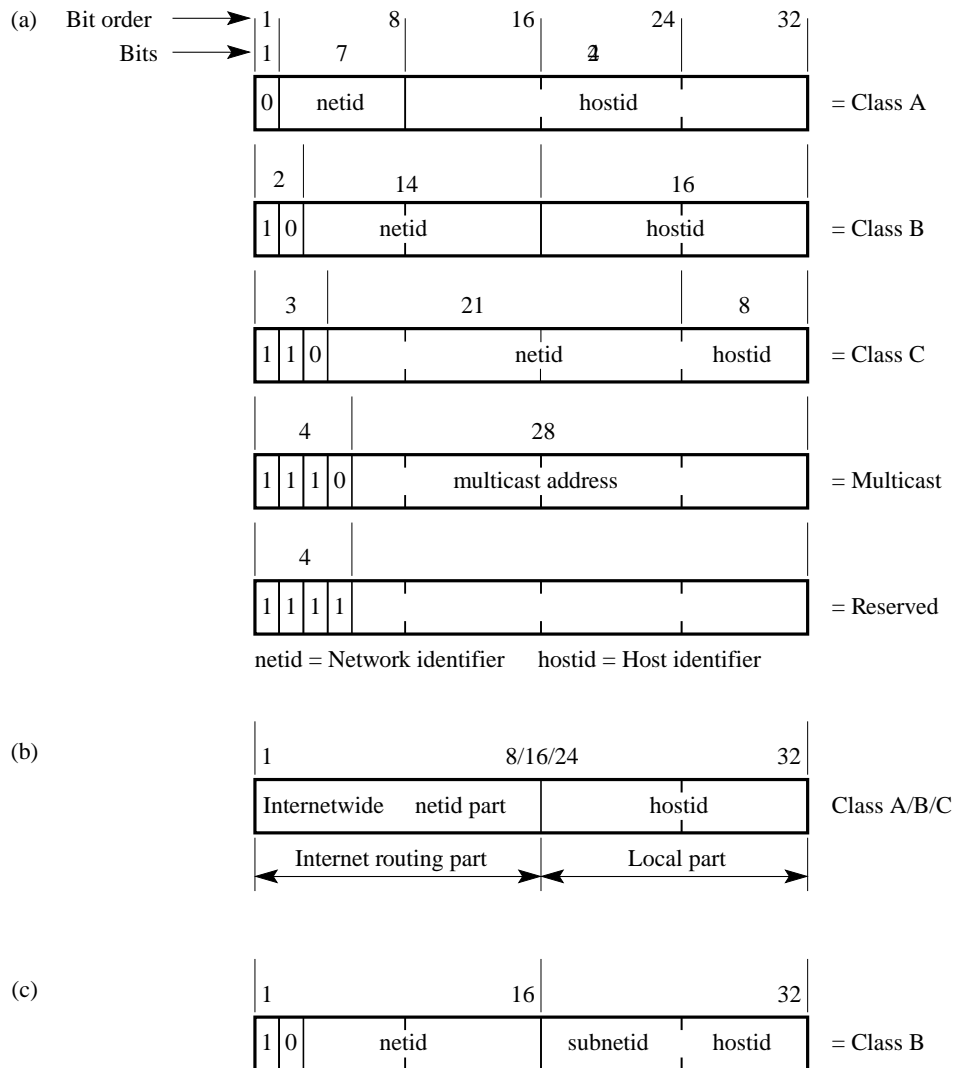


Figure 9.8

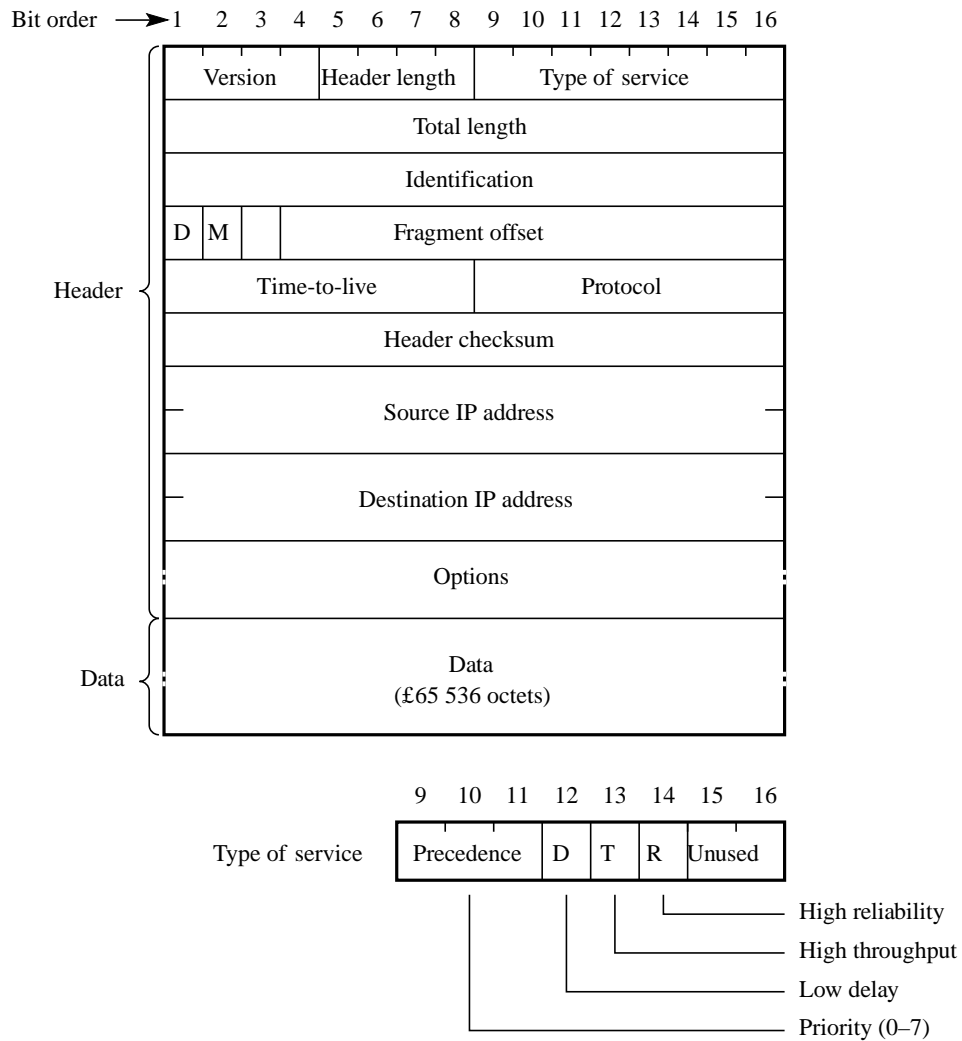


Figure 9.9.

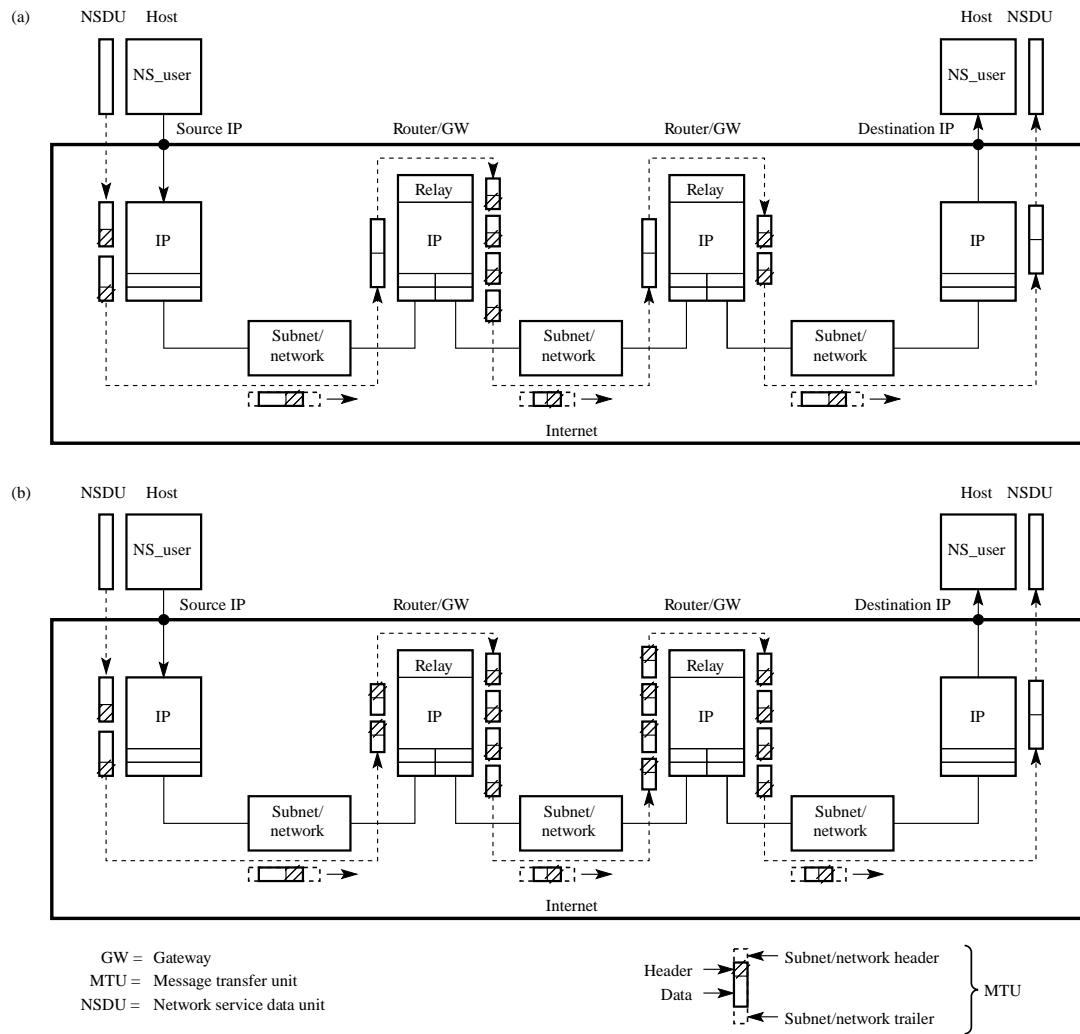
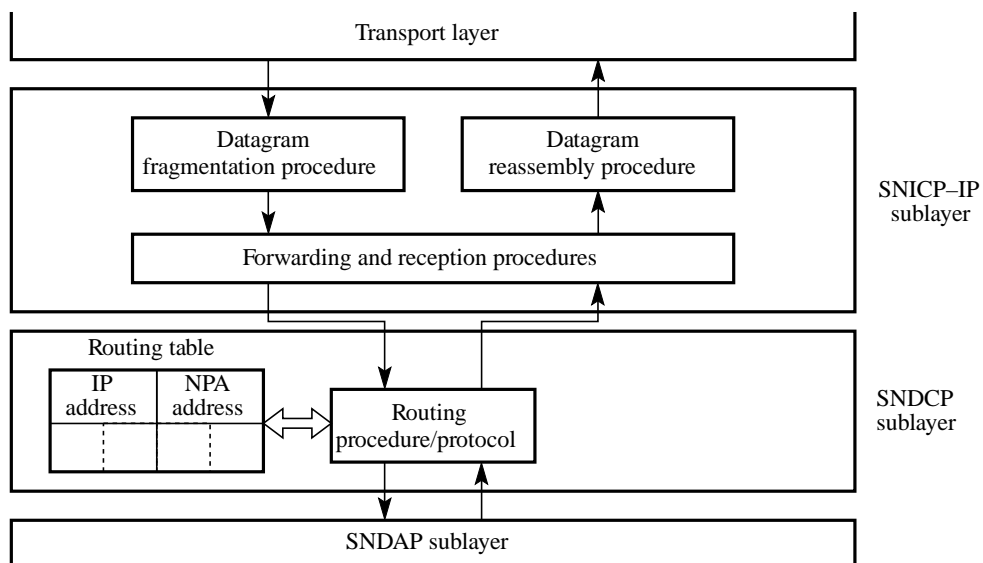


Figure 9.10



SNICP = Subnet independent convergence protocol
 SNDCP = Subnet dependent convergence protocol
 SNDAP = Subnet dependent access protocol
 NPA = (Sub)net point of attachment (address)

Figure 9.11

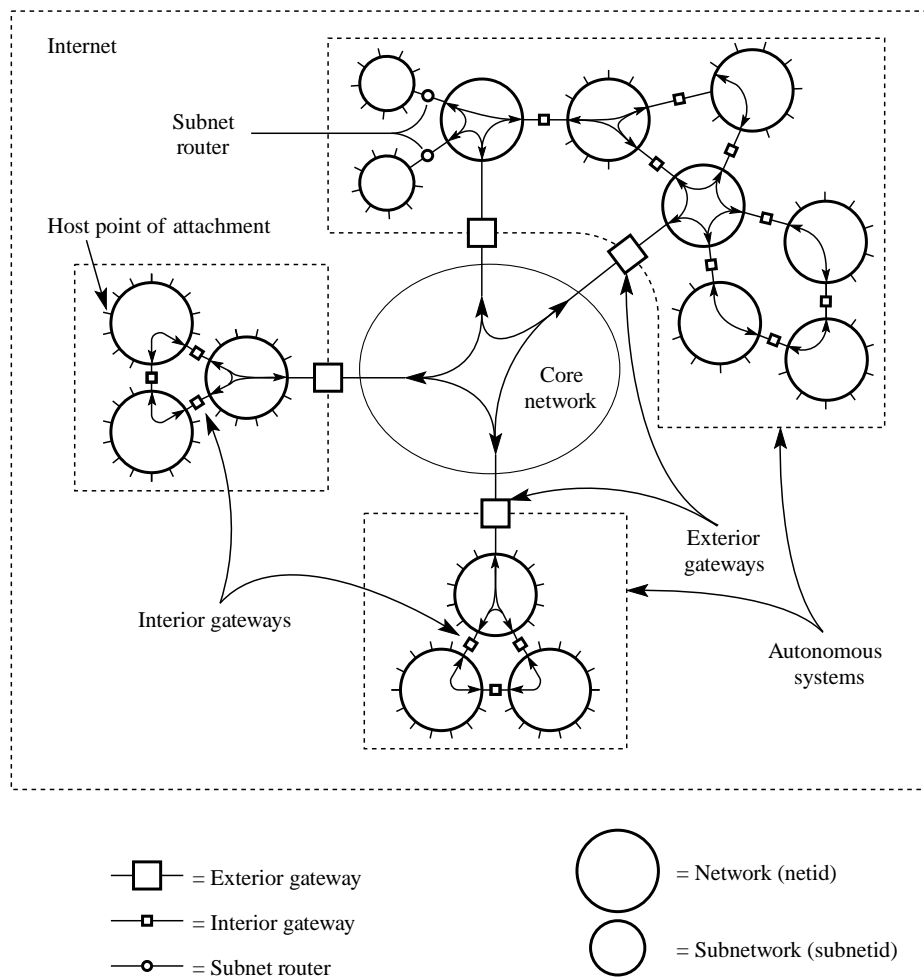


Figure 9.12

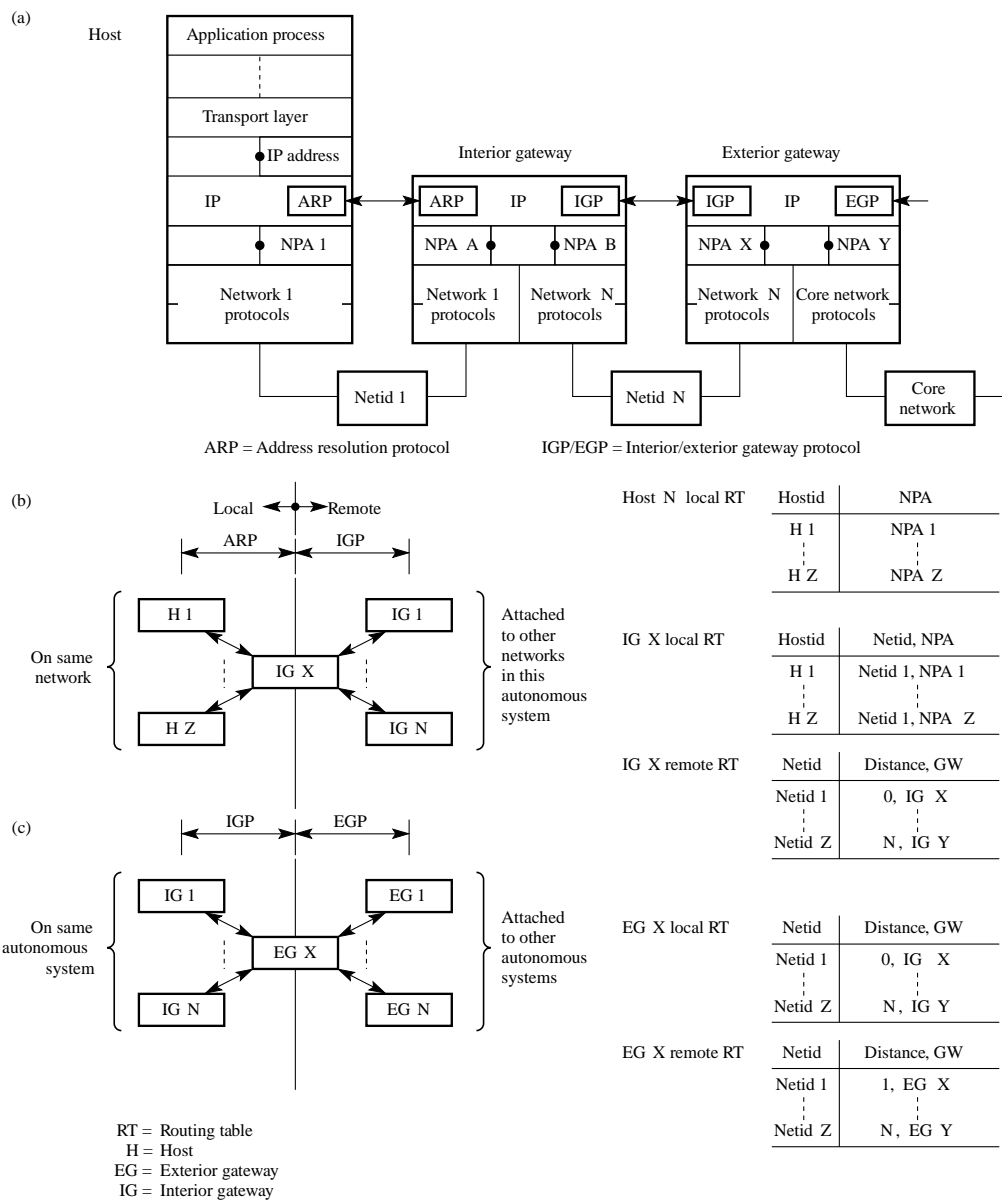


Figure 9.13

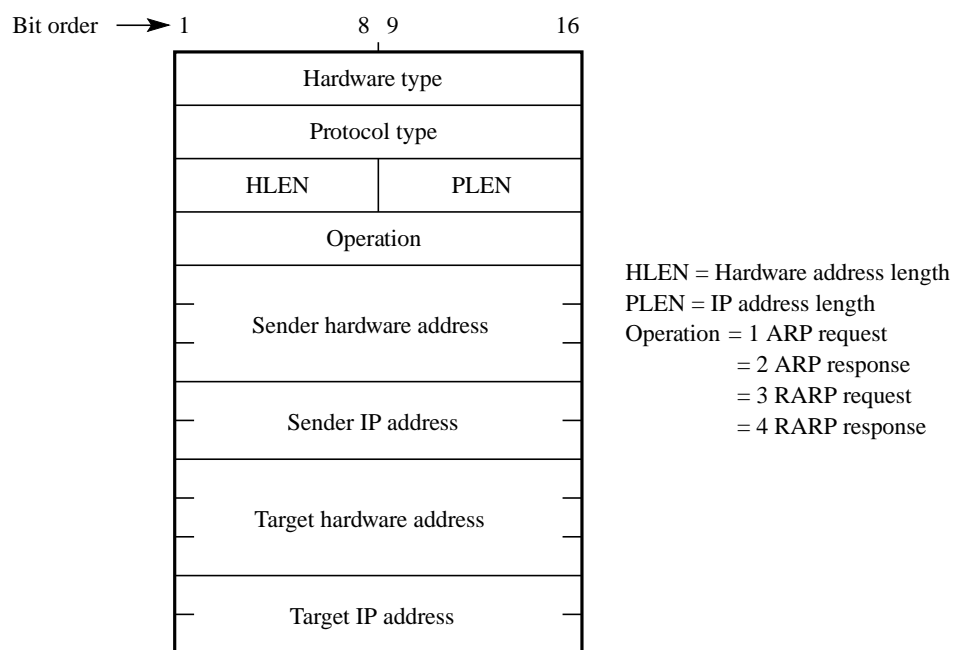


Figure 9.14

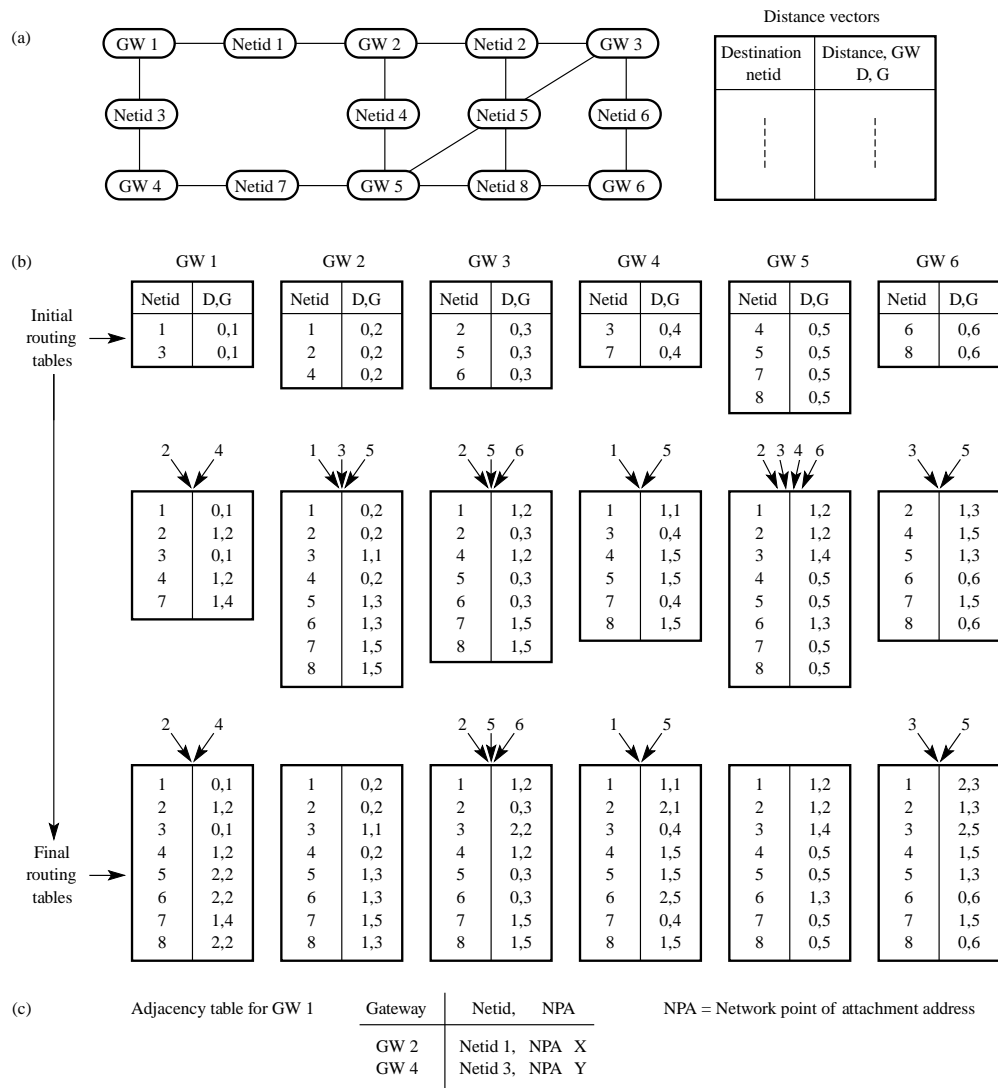


Figure 9.15

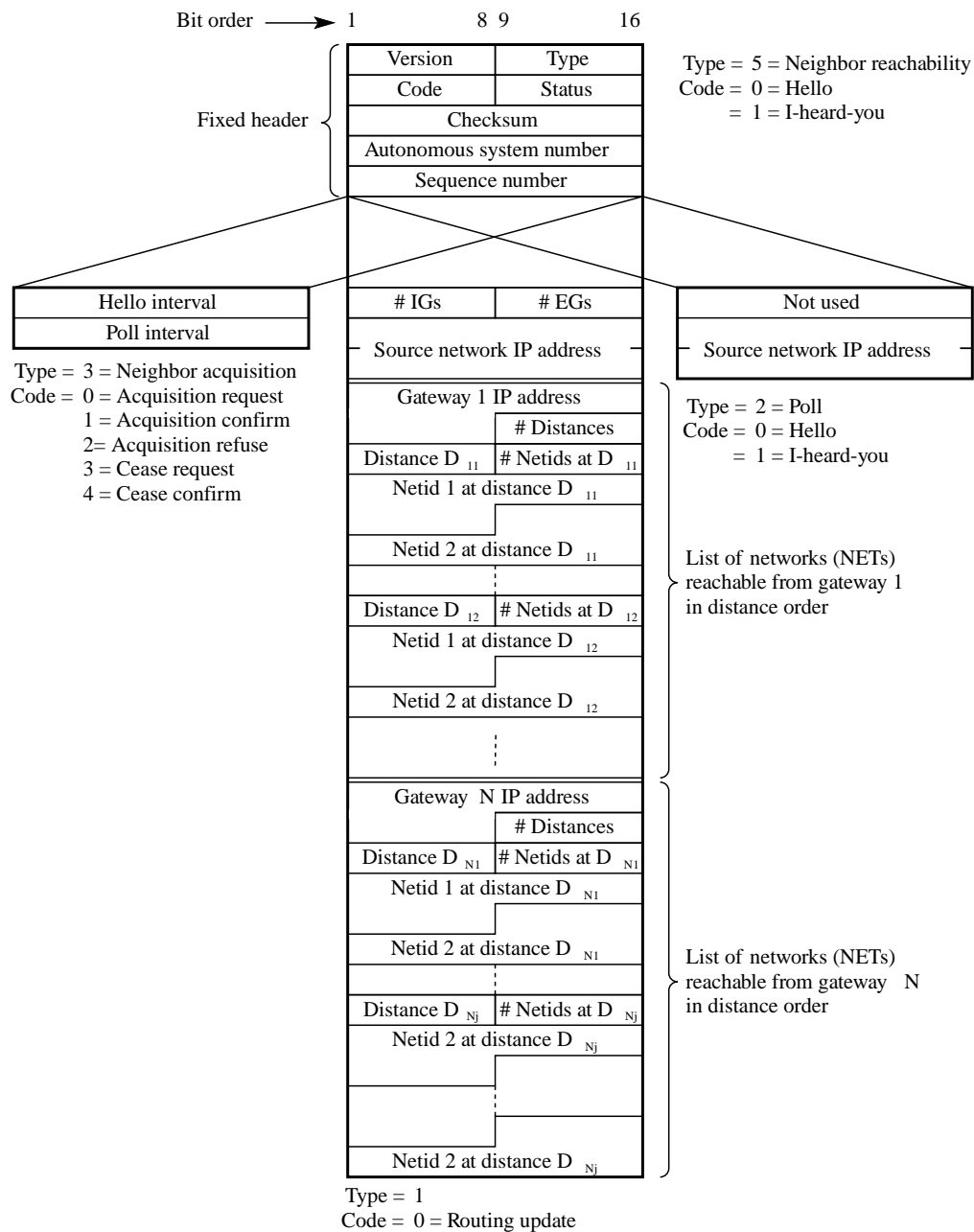


Figure 9.16

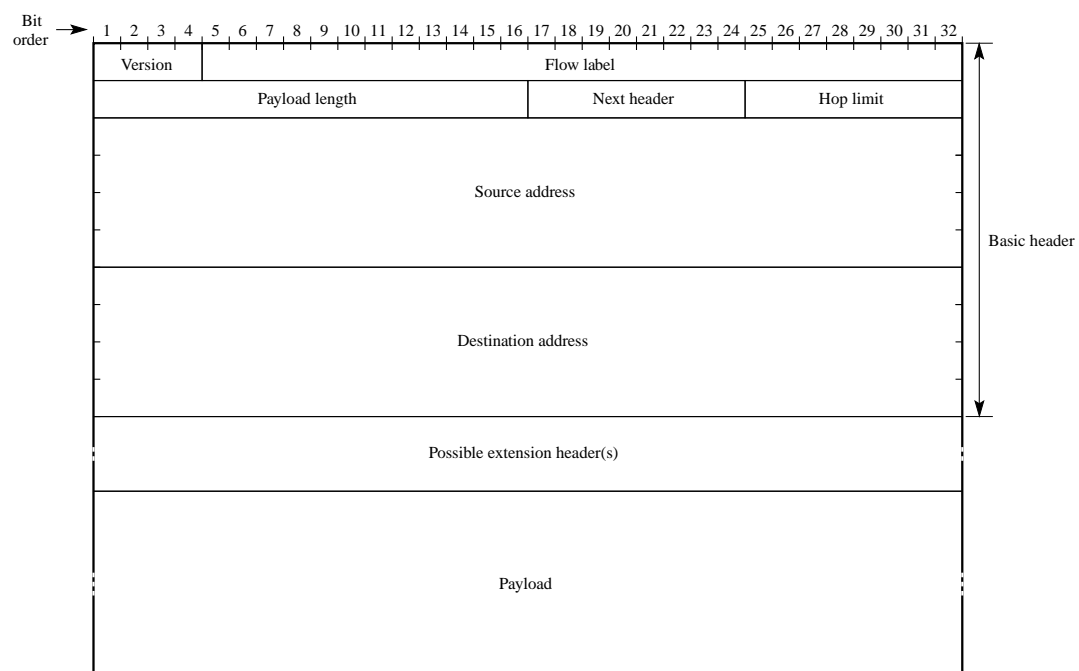
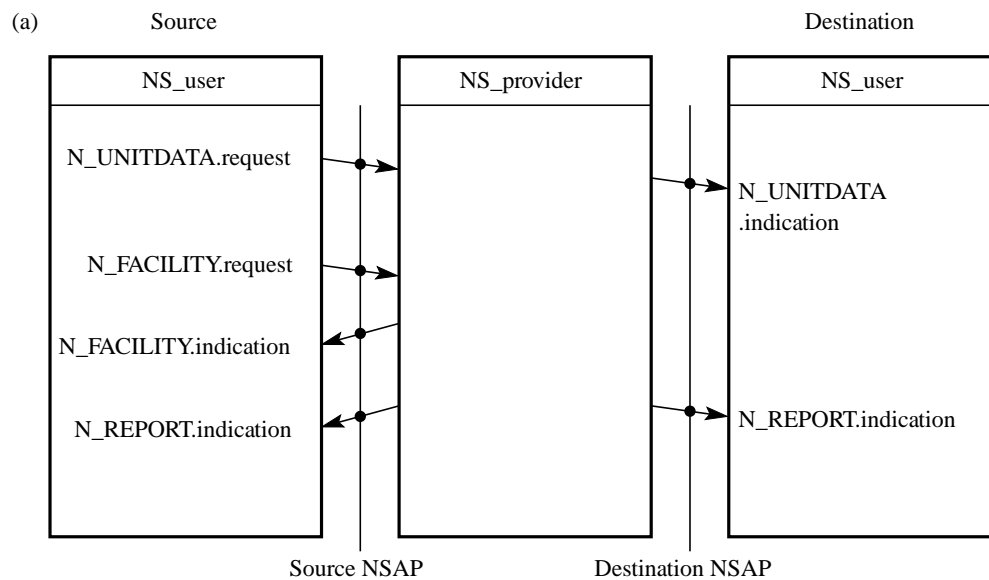


Figure 9.17



(b)

Primitive	Parameters
N_UNITDATA.request .indication	Destination address (NSAP) Source address (NSAP) QOS/service characteristics User data (NSDU)
N_FACILITY.request .indication	Destination address (NSAP) QOS/service characteristics
N_REPORT.indication	Destination address (NSAP) QOS/service characteristics Reason code

QOS = Quality of service

Figure 9.18

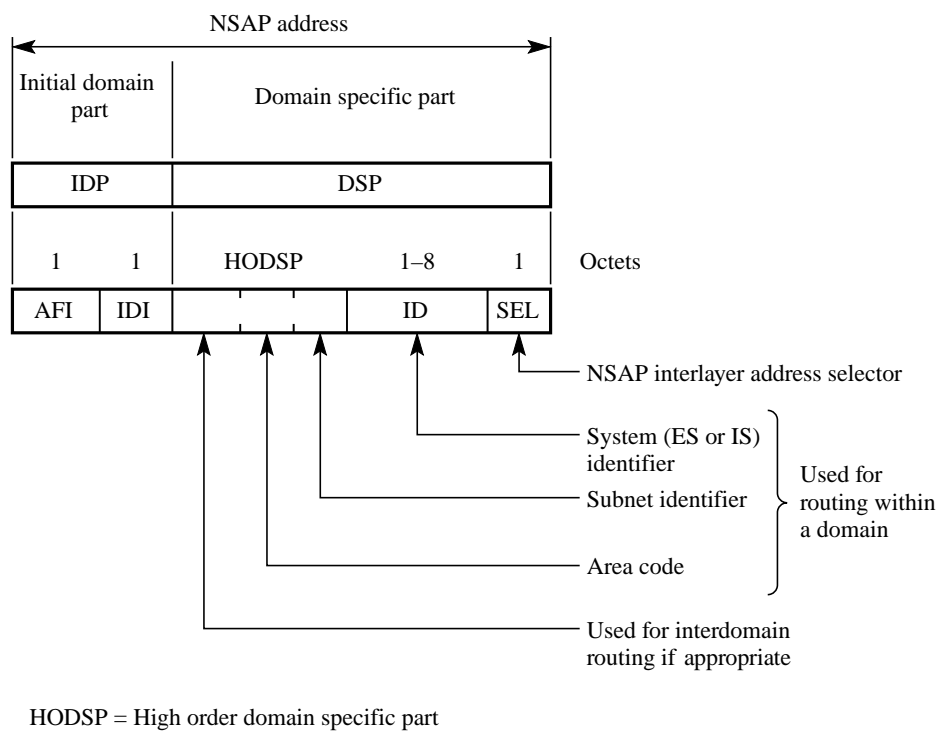


Figure 9.19

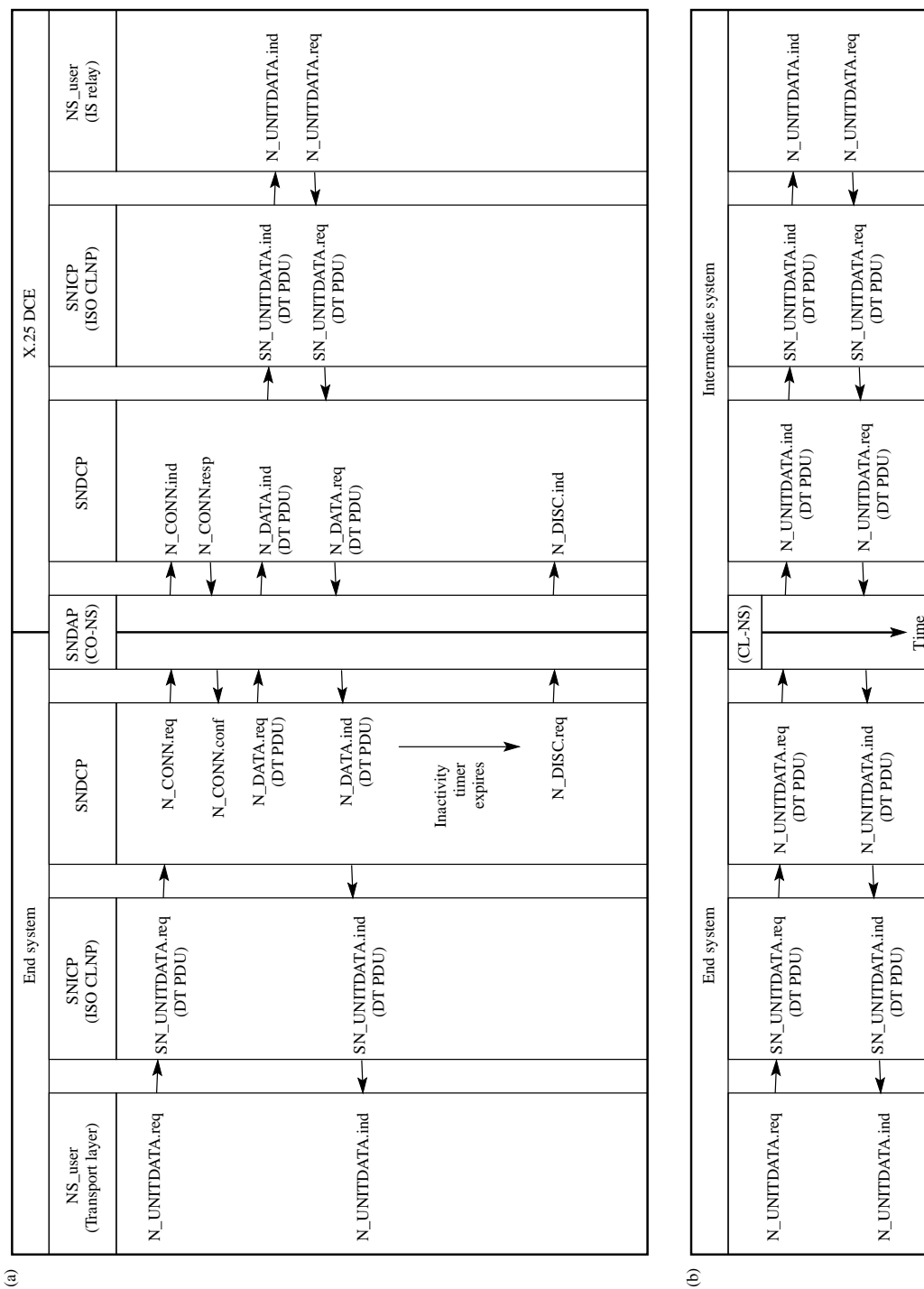


Figure 9.20

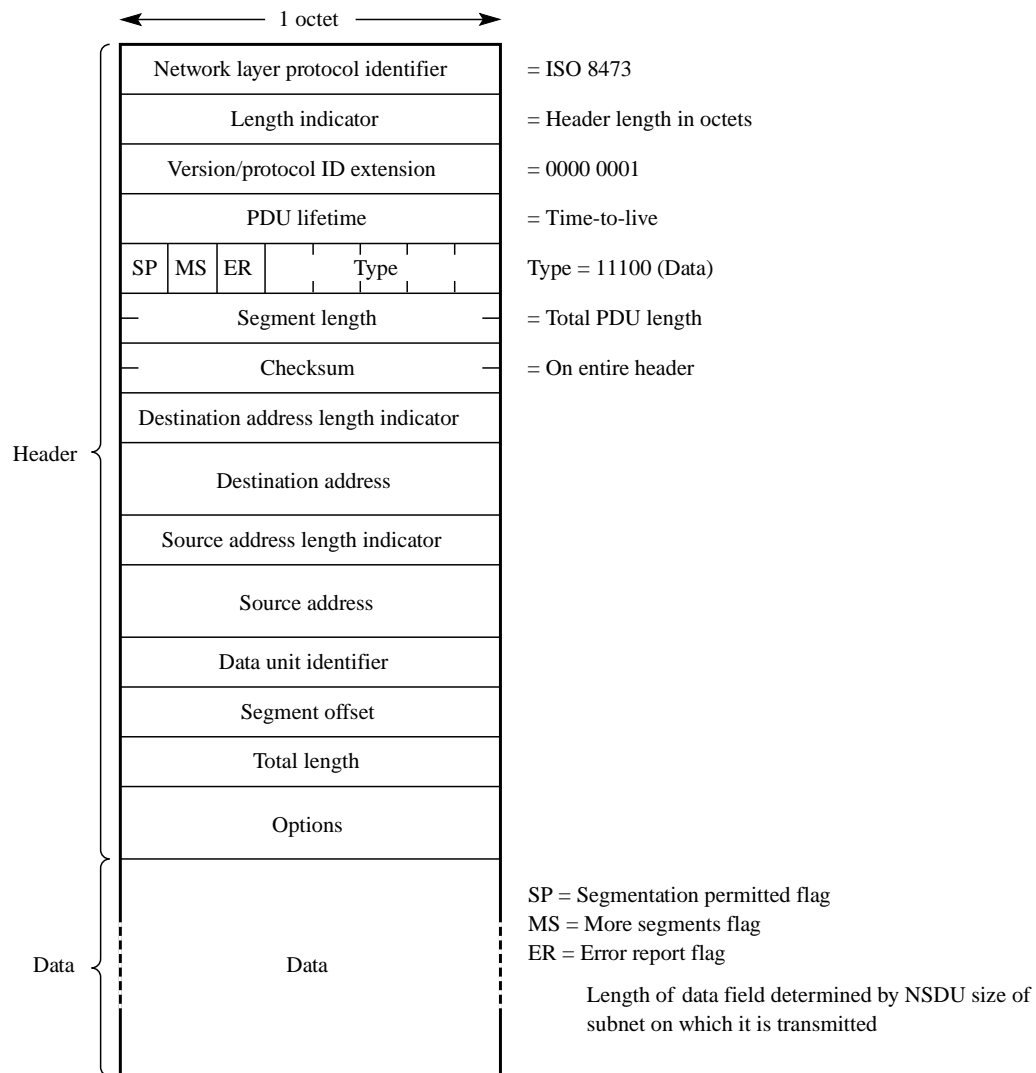


Figure 9.21

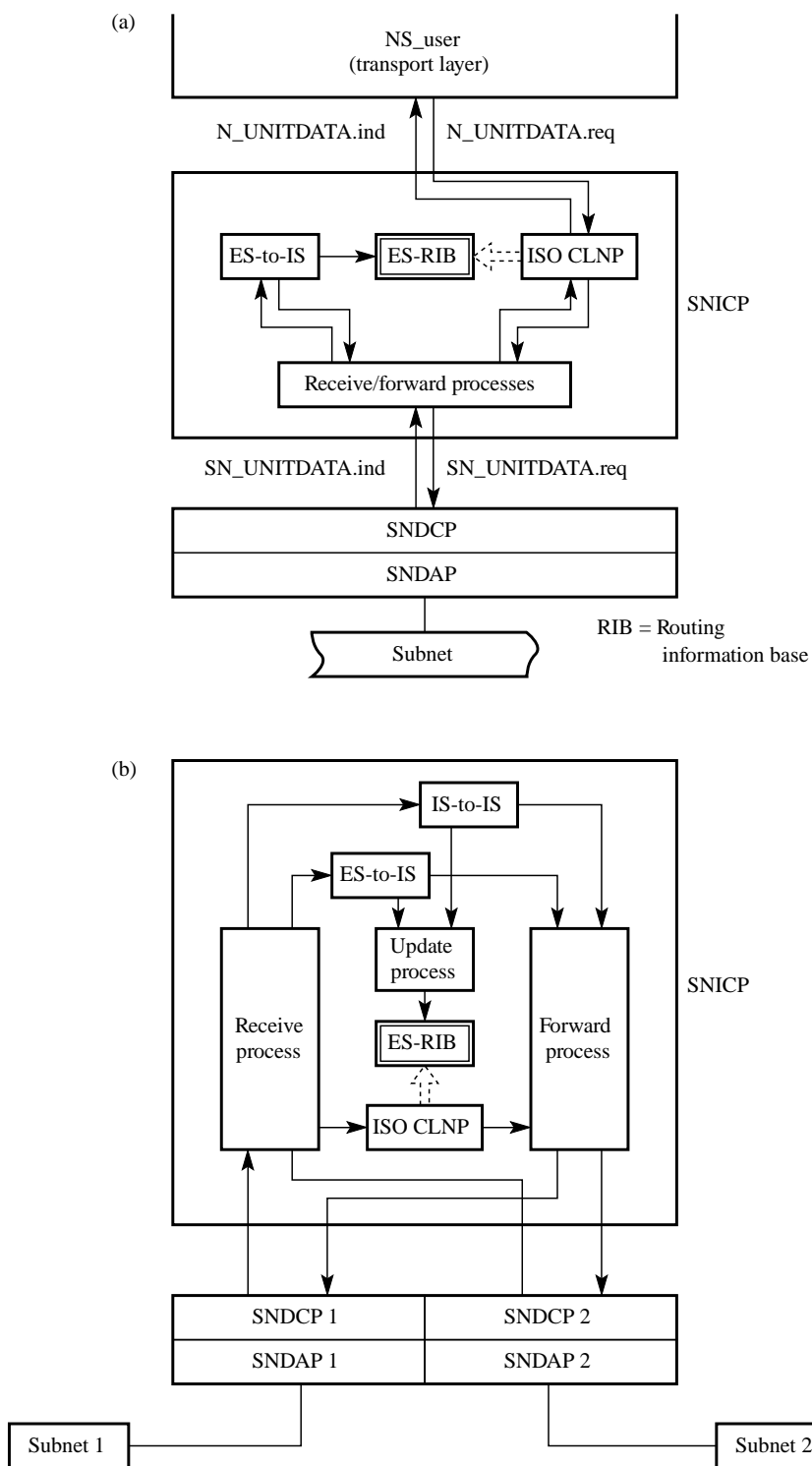
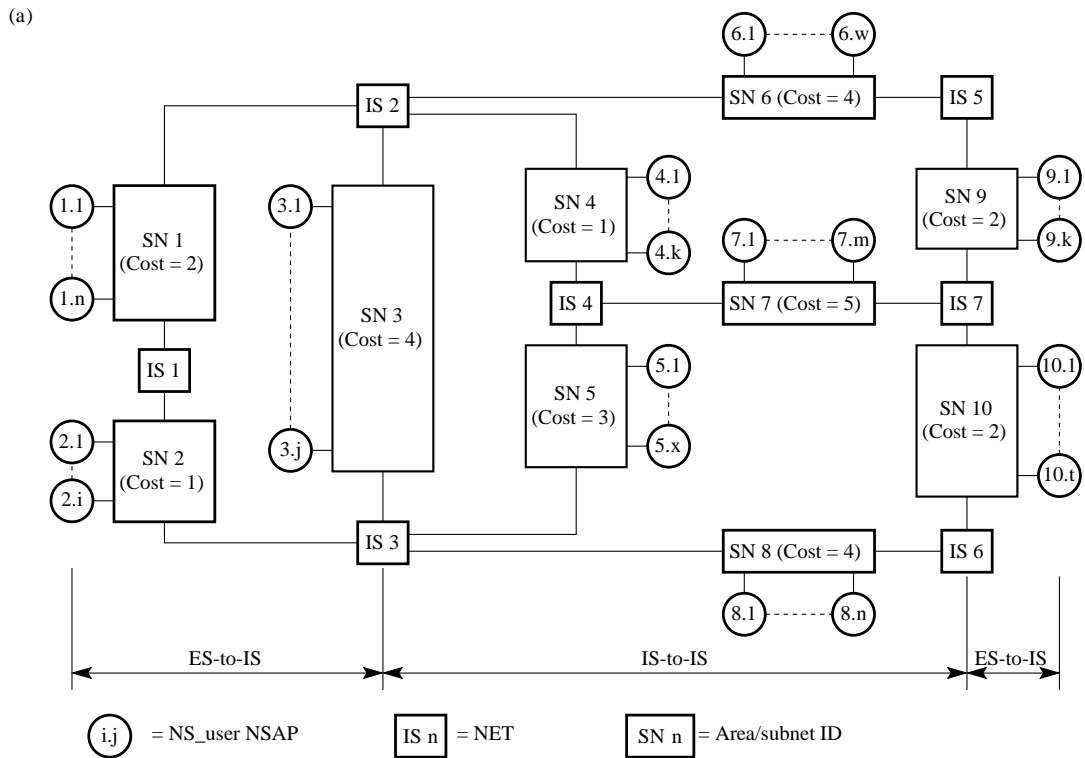


Figure 9.22



(b) ES-RIBs

ES1.1	NET	SNPA	NSAP	SNPA
	IS 1	SN 1.i	1.n	SN 1.n
	IS 2	SN 1.j	6.n	SN 1.j
ES10.t	NET	SNPA	NSAP	SNPA
	IS 6	SN 10.m	10.s	SN 10.s
	IS 7	SN 10.n	8.n	SN 10.n

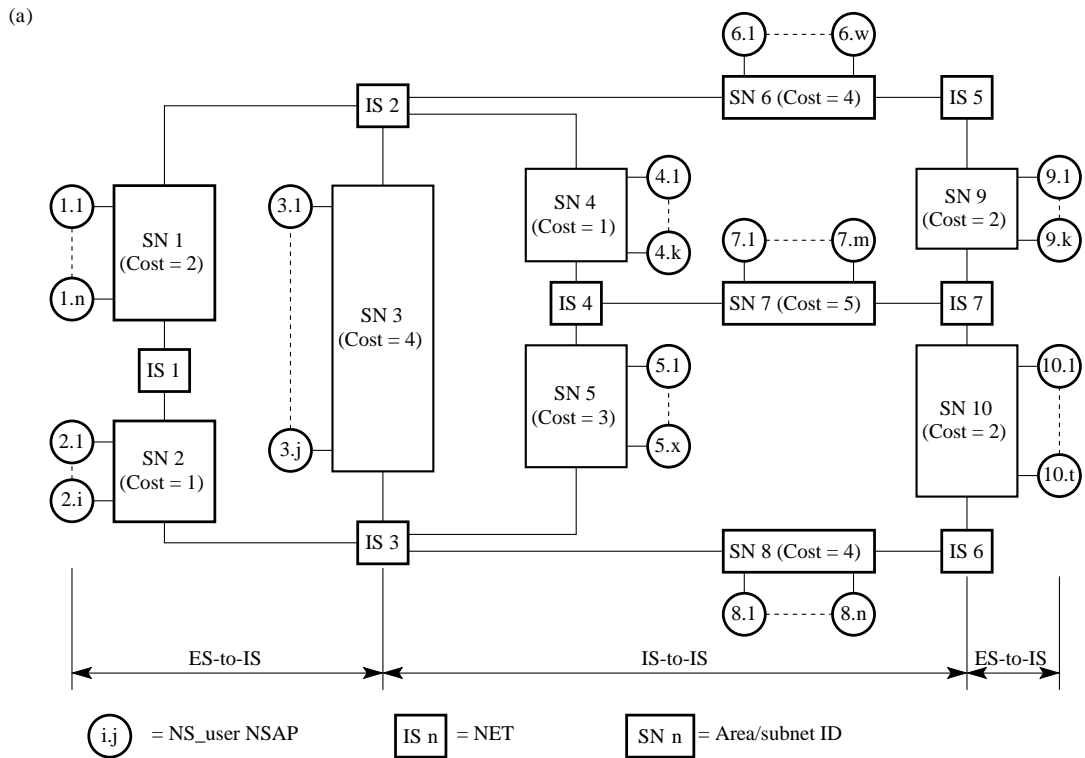
Derived using ES-to-IS protocol

(c) IS-RIB for IS 1

NSAP	SNPA
1.1	SN 1.1
1.n	SN 1.n
2.1	SN 2.1
2.i	SN 2.i

Derived using ES-to-IS protocol

Figure 9.23



(b) ES-RIBs

ES1.1	NET	SNPA	NSAP	SNPA
	IS 1	SN 1.i	1.n	SN 1.n
	IS 2	SN 1.j	6.n	SN 1.j
ES10.t	NET	SNPA	NSAP	SNPA
	IS 6	SN 10.m	10.s	SN 10.s
	IS 7	SN 10.n	8.n	SN 10.n

Derived using ES-to-IS protocol

(c) IS-RIB for IS 1

NSAP	SNPA
1.1	SN 1.1
1.n	SN 1.n
2.1	SN 2.1
2.i	SN 2.i

Derived using ES-to-IS protocol

Figure 9.23

Circuits database:	<table><tr><th>SN ID</th><th>Costs</th></tr><tr><td>SN 1</td><td>2, X, Y, Z</td></tr><tr><td>SN 2</td><td>1, X', Y', Z'</td></tr></table>	SN ID	Costs	SN 1	2, X, Y, Z	SN 2	1, X', Y', Z'	Entered by network management																																								
SN ID	Costs																																															
SN 1	2, X, Y, Z																																															
SN 2	1, X', Y', Z'																																															
Adjacency database:	<table><tr><th>NET</th><th>SNPA</th></tr><tr><td>IS 2</td><td>SN 1.j</td></tr><tr><td>IS 3</td><td>SN 2.i</td></tr></table>	NET	SNPA	IS 2	SN 1.j	IS 3	SN 2.i																																									
NET	SNPA																																															
IS 2	SN 1.j																																															
IS 3	SN 2.i																																															
Link state database:	IS 1: SN 1, 2/SN 2, 1 IS 2: SN 1, 2/SN 3, 4/SN 4, 1/SN 6, 4 IS 3: SN 2, 1/SN 3, 4/SN 5, 3/SN 8, 4 IS 4: SN 4, 1/SN 5, 3/SN 7, 5 IS 5: SN 6, 4/SN 9, 2 IS 6: SN 8, 4/SN 10, 2 IS 7: SN 7, 5/SN 9, 2/SN 10, 2																																															
Forwarding information base:	<table><tr><th>SN ID</th><th>Attached NETs</th></tr><tr><td>SN 1</td><td>IS 1, IS 2</td></tr><tr><td>SN 2</td><td>IS 1, IS 3</td></tr><tr><td>SN 3</td><td>IS 2, IS 3</td></tr><tr><td>SN 4</td><td>IS 2, IS 4</td></tr><tr><td>SN 5</td><td>IS 3, IS 4</td></tr><tr><td>SN 6</td><td>IS 2, IS 5</td></tr><tr><td>SN 7</td><td>IS 4, IS 7</td></tr><tr><td>SN 8</td><td>IS 3, IS 6</td></tr><tr><td>SN 9</td><td>IS 5, IS 7</td></tr><tr><td>SN 10</td><td>IS 6, IS 7</td></tr></table> <table><tr><th>NET</th><th>Path</th><th>Cost</th></tr><tr><td>IS 1</td><td>Local,</td><td>0</td></tr><tr><td>IS 2</td><td>IS 2,</td><td>2</td></tr><tr><td>IS 3</td><td>IS 3,</td><td>1</td></tr><tr><td>IS 4</td><td>IS 2,</td><td>3</td></tr><tr><td>IS 5</td><td>IS 2,</td><td>6</td></tr><tr><td>IS 6</td><td>IS 3,</td><td>5</td></tr><tr><td>IS 7</td><td>IS 3,</td><td>7</td></tr></table>	SN ID	Attached NETs	SN 1	IS 1, IS 2	SN 2	IS 1, IS 3	SN 3	IS 2, IS 3	SN 4	IS 2, IS 4	SN 5	IS 3, IS 4	SN 6	IS 2, IS 5	SN 7	IS 4, IS 7	SN 8	IS 3, IS 6	SN 9	IS 5, IS 7	SN 10	IS 6, IS 7	NET	Path	Cost	IS 1	Local,	0	IS 2	IS 2,	2	IS 3	IS 3,	1	IS 4	IS 2,	3	IS 5	IS 2,	6	IS 6	IS 3,	5	IS 7	IS 3,	7	Derived using IS-to-IS protocol
SN ID	Attached NETs																																															
SN 1	IS 1, IS 2																																															
SN 2	IS 1, IS 3																																															
SN 3	IS 2, IS 3																																															
SN 4	IS 2, IS 4																																															
SN 5	IS 3, IS 4																																															
SN 6	IS 2, IS 5																																															
SN 7	IS 4, IS 7																																															
SN 8	IS 3, IS 6																																															
SN 9	IS 5, IS 7																																															
SN 10	IS 6, IS 7																																															
NET	Path	Cost																																														
IS 1	Local,	0																																														
IS 2	IS 2,	2																																														
IS 3	IS 3,	1																																														
IS 4	IS 2,	3																																														
IS 5	IS 2,	6																																														
IS 6	IS 3,	5																																														
IS 7	IS 3,	7																																														

Figure 9.23(c)

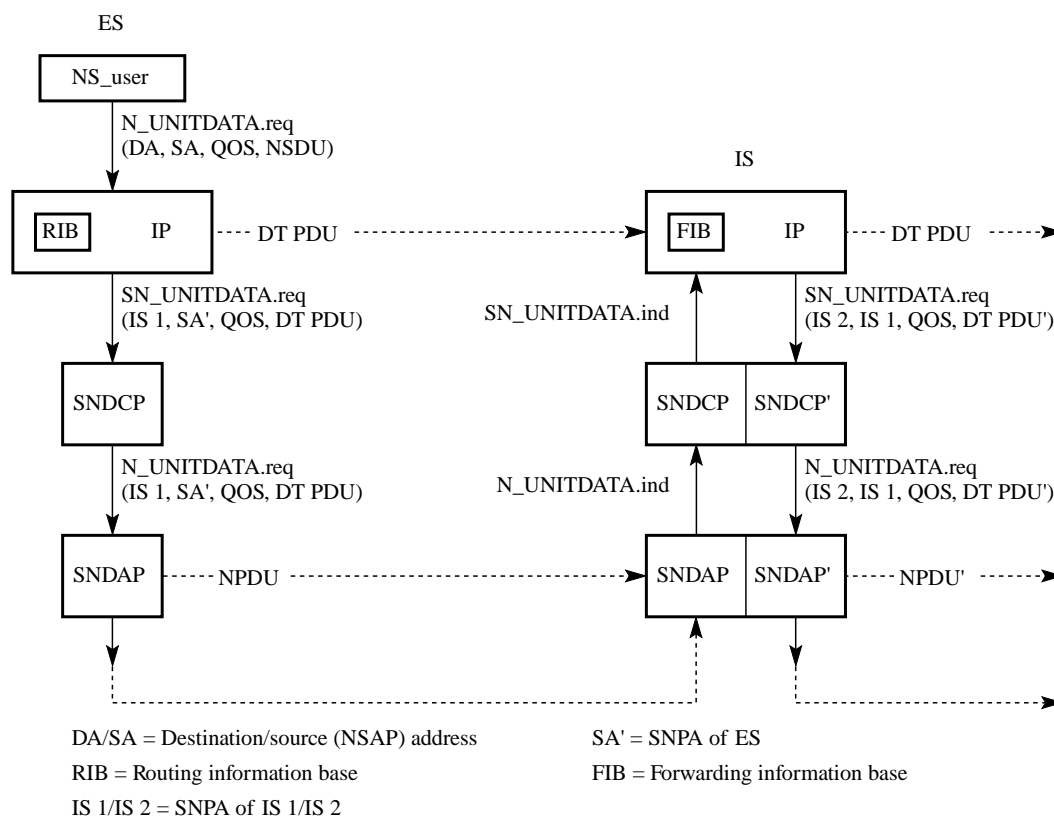


Figure 9.24

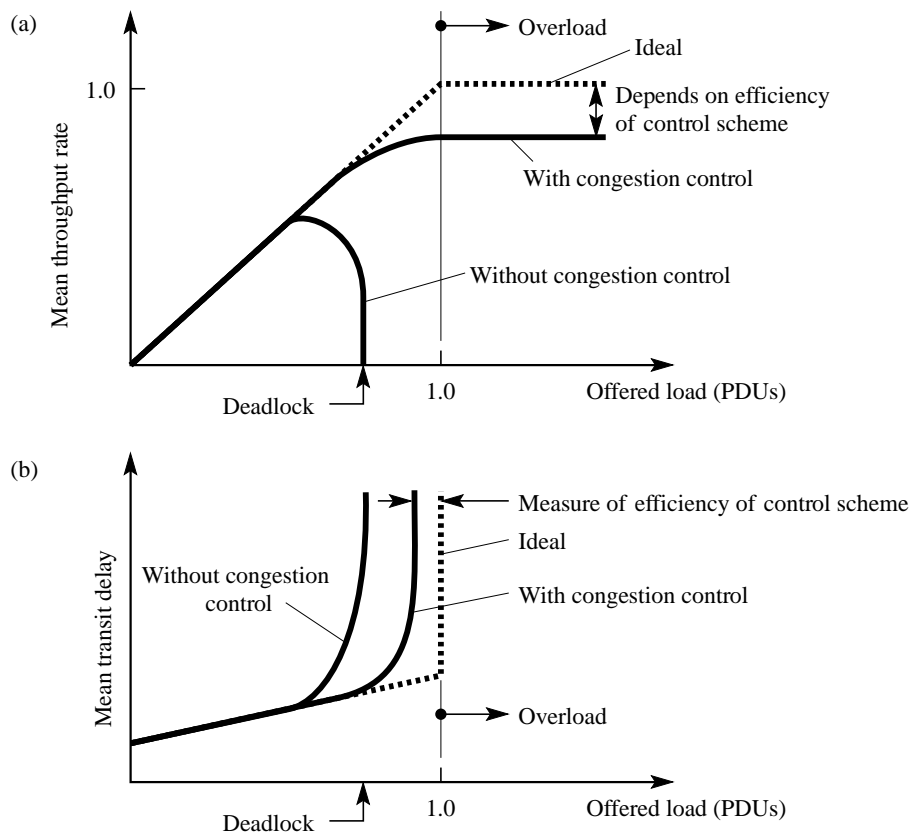


Figure 9.25

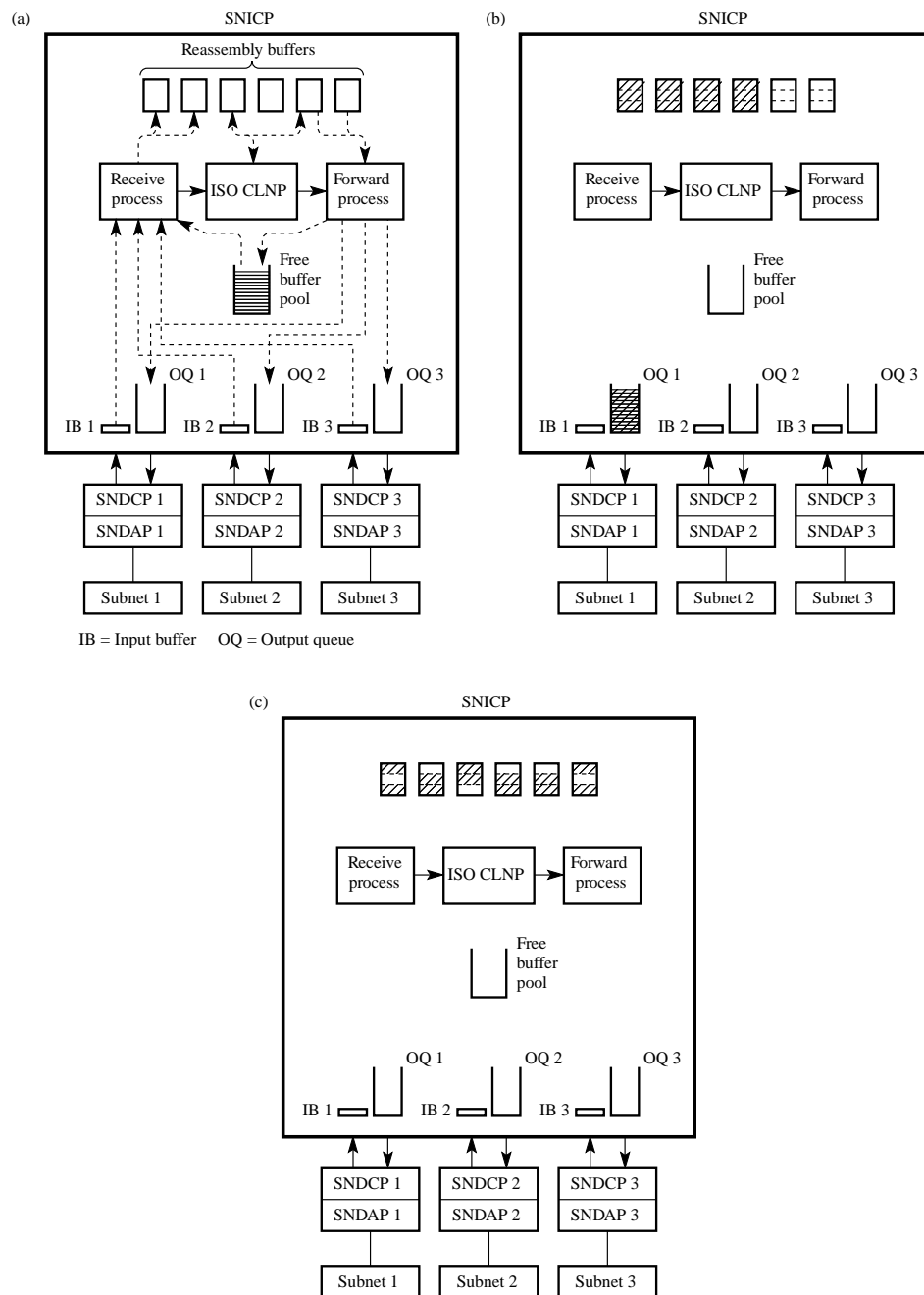


Figure 9.26

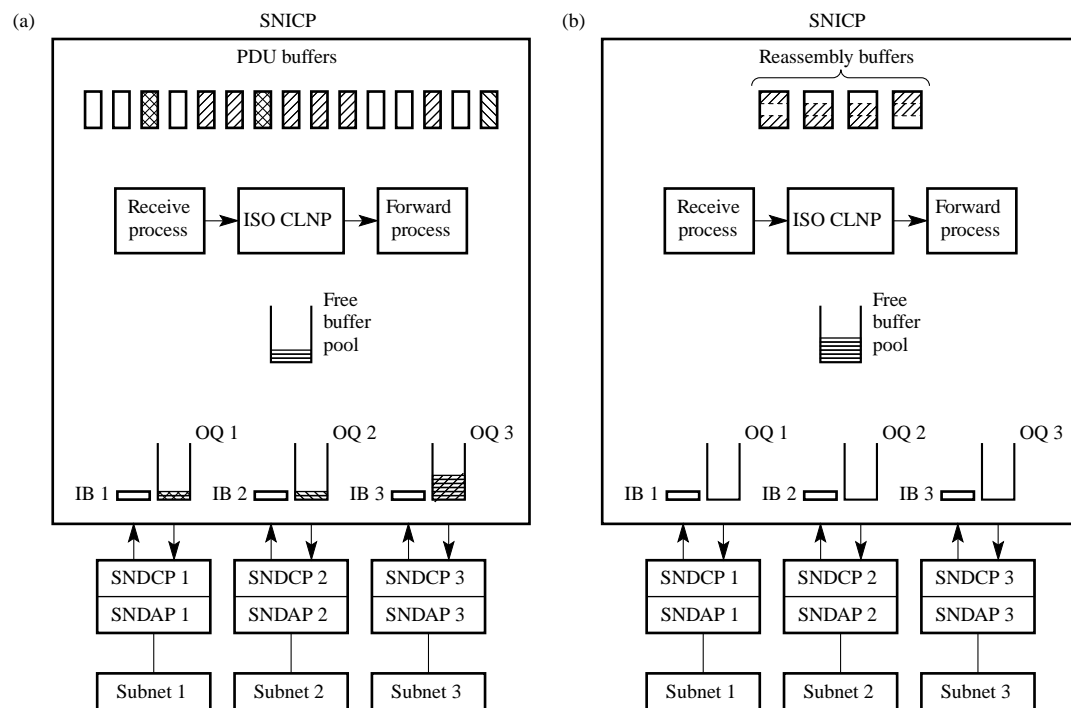


Figure 9.27

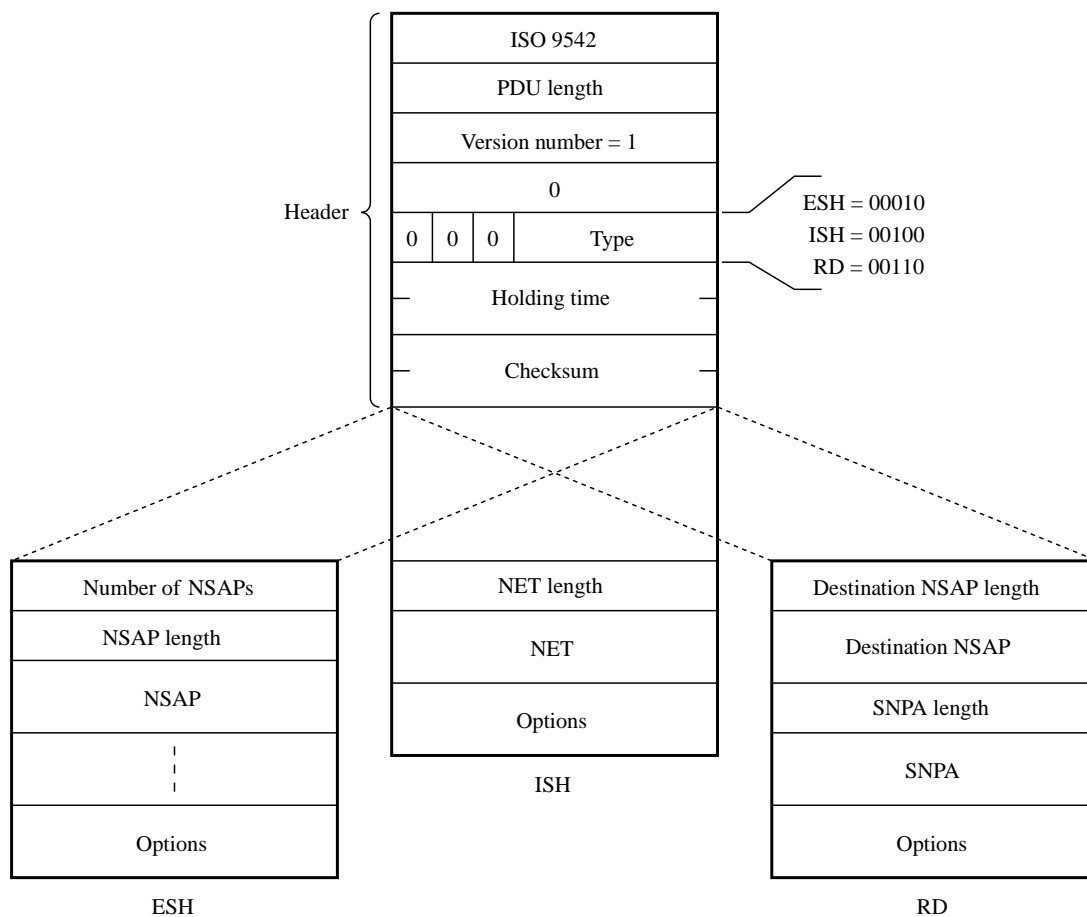
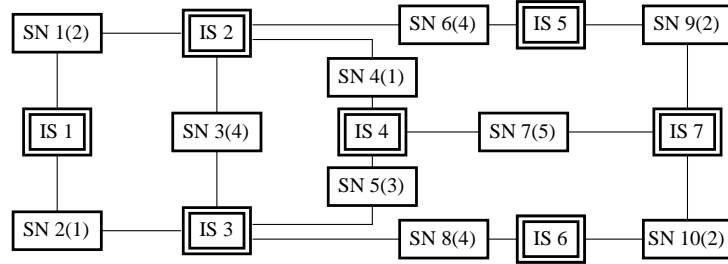
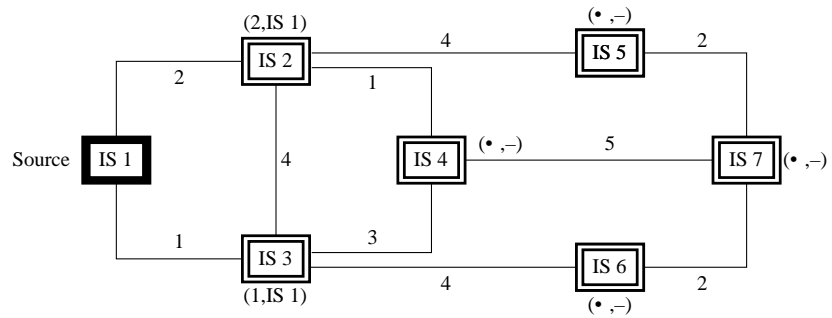


Figure 9.28

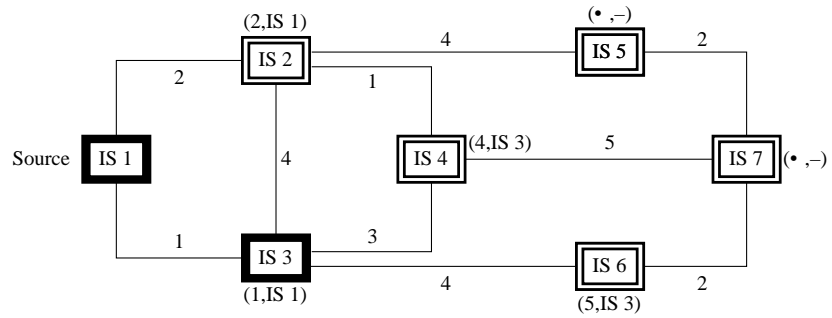
(a) Internet topology



(b) Initialization



(c) Step 1



(d) Step 2

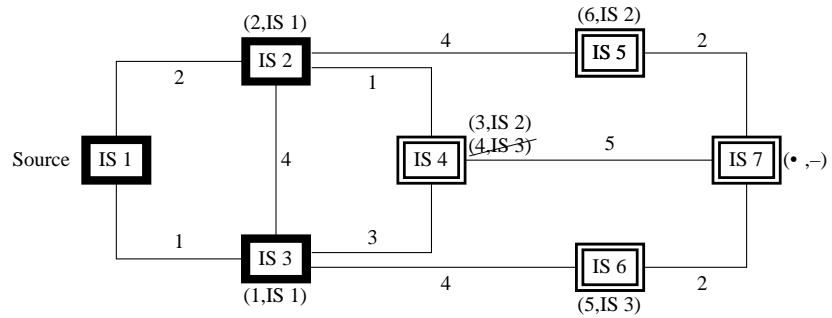
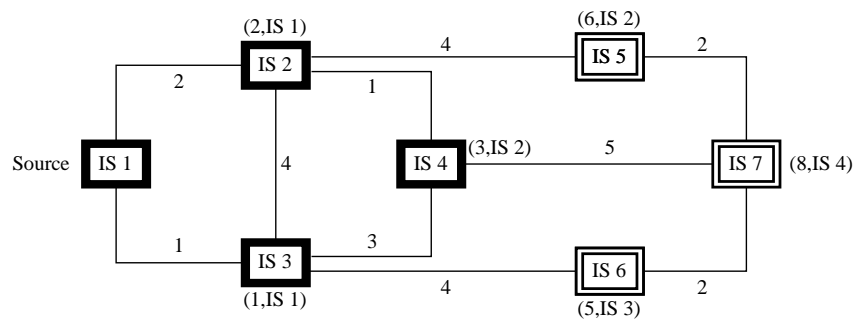
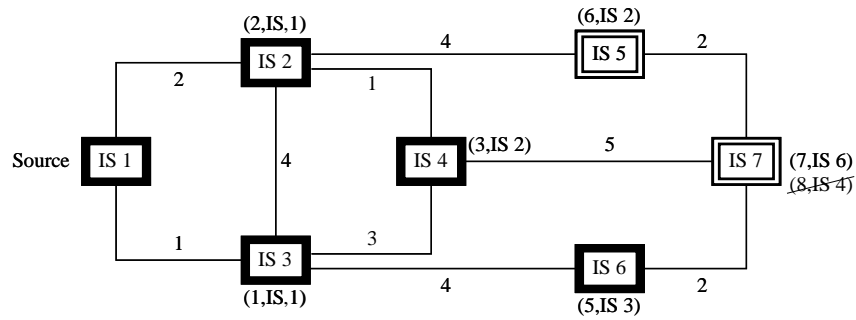


Figure 9.29

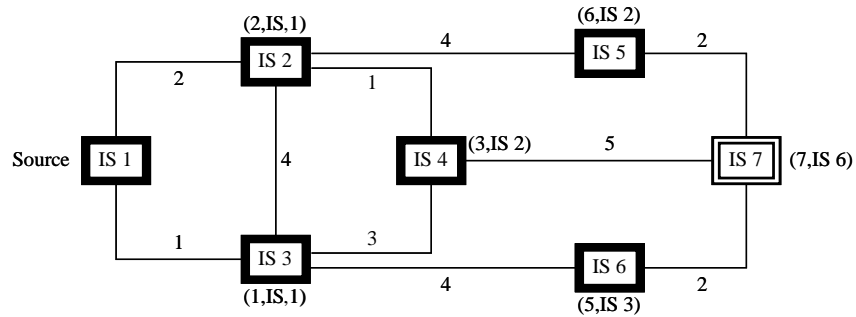
(e) Step 3



(f) Step 4



(g) Step 5



(h) Final path costs from IS 1

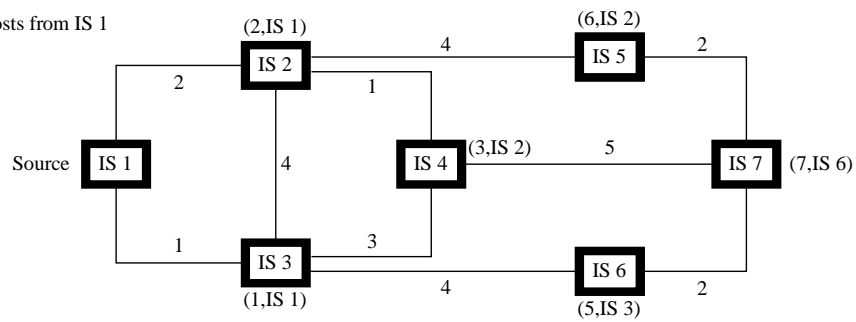
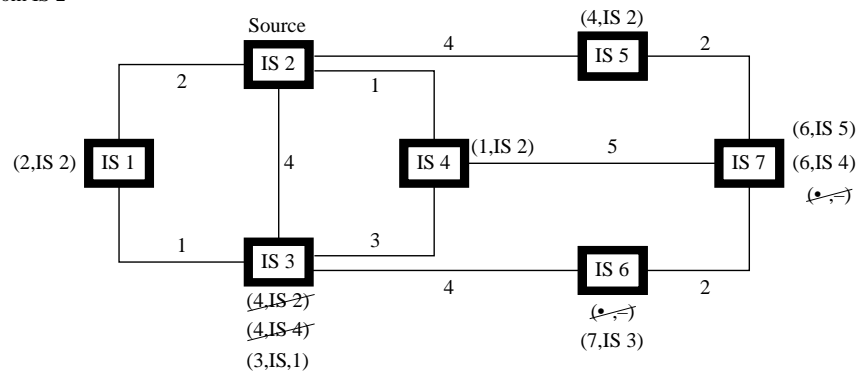


Figure 9.29(e)-(h)

(i) Shortest path cost routes from IS 1

IS 1 →
 IS 1 → IS 2 (Cost = 2)
 IS 1 → Source (Cost = 0)
 IS 1 → IS 2 → IS 4 (Cost = 3)
 IS 1 → IS 2 → IS 5 (Cost = 6)
 IS 1 → IS 3 → IS 6 (Cost = 5)
 IS 1 → IS 3 → IS 6 → IS 7 (Cost = 7)

(j) Path cost calculations from IS 2



(k) Shortest path cost routes from IS 2

IS 2 → IS 1 (Cost = 2)
 IS 2 → Source (Cost = 0)
 IS 2 → IS 3 (Cost = 3)
 IS 2 → IS 4 (Cost = 1)
 IS 2 → IS 5 (Cost = 4)
 IS 2 → IS 1 → IS 3 → IS 6 (Cost = 7)
 IS 2 → IS 4 → IS 7 (Cost = 6)
 IS 2 → IS 5 → IS 7 (Cost = 6)

(l) Path cost calculations from IS 3

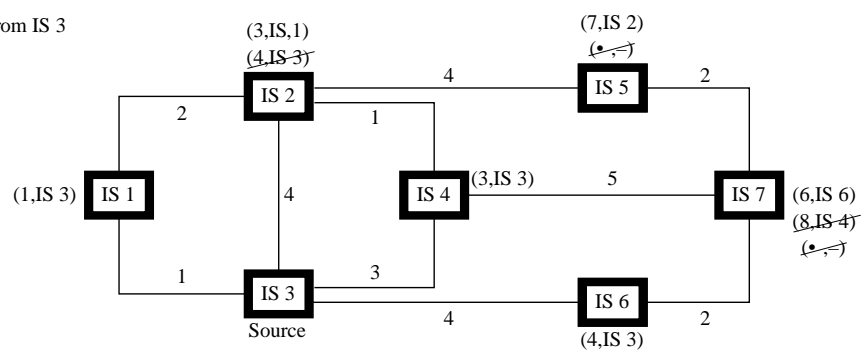


Figure 9.29(i)-(l)

(m) Shortest path cost routes from IS 3

```

IS 3 → IS 1 (Cost = 1)
IS 3 → IS 1 → IS 2 (Cost = 3)
IS 3 → Source (Cost = 0)
IS 3 → IS 4 (Cost = 3)
IS 3 → IS 1 → IS 2 IS 5 (Cost = 7)
IS 3 → IS 6 (Cost = 4)
IS 3 → IS 6 → IS 7 (Cost = 6)

```

(n) Routing table examples

IS 1:			IS 2:			IS 3:		
Destination	Path	Cost	Destination	Path	Cost	Destination	Path	Cost
IS 1	-	-	IS 1	IS 1	2	IS 1	IS 1	1
IS 2	IS 2	2	IS 2	-	-	IS 2	IS 1	3
IS 3	IS 3	1	IS 3	IS 1	3	IS 3	-	-
IS 4	IS 2	3	IS 4	IS 4	1	IS 4	IS 4	3
IS 5	IS 2	6	IS 5	IS 5	4	IS 5	IS 1	7
IS 6	IS 3	5	IS 6	IS 1	7	IS 6	IS 6	4
IS 7	IS 3	7	IS 7	IS 4/IS 6	6	IS 7	IS 6	6

Figure 9.29(m), (n)

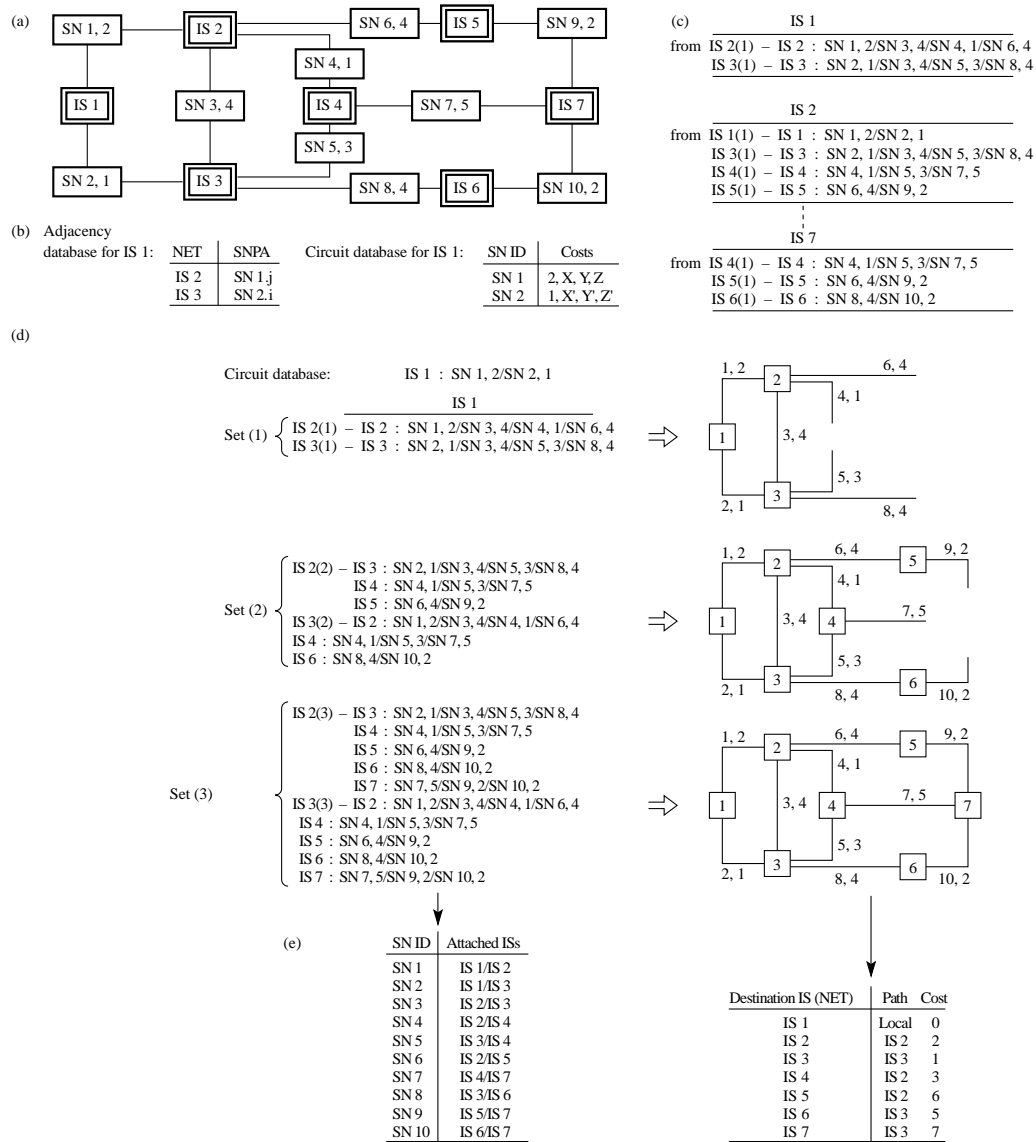


Figure 9.30

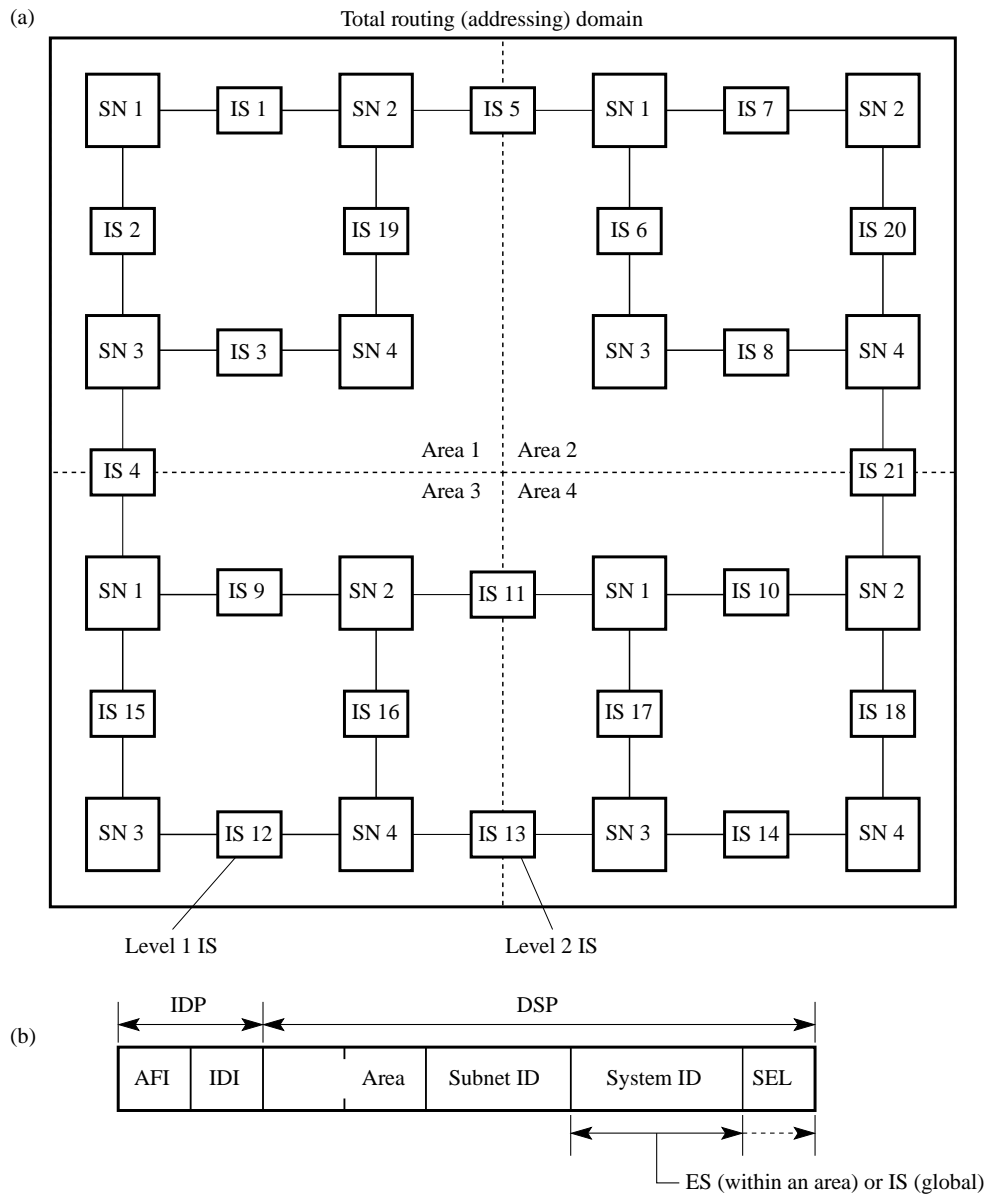


Figure 9.31