

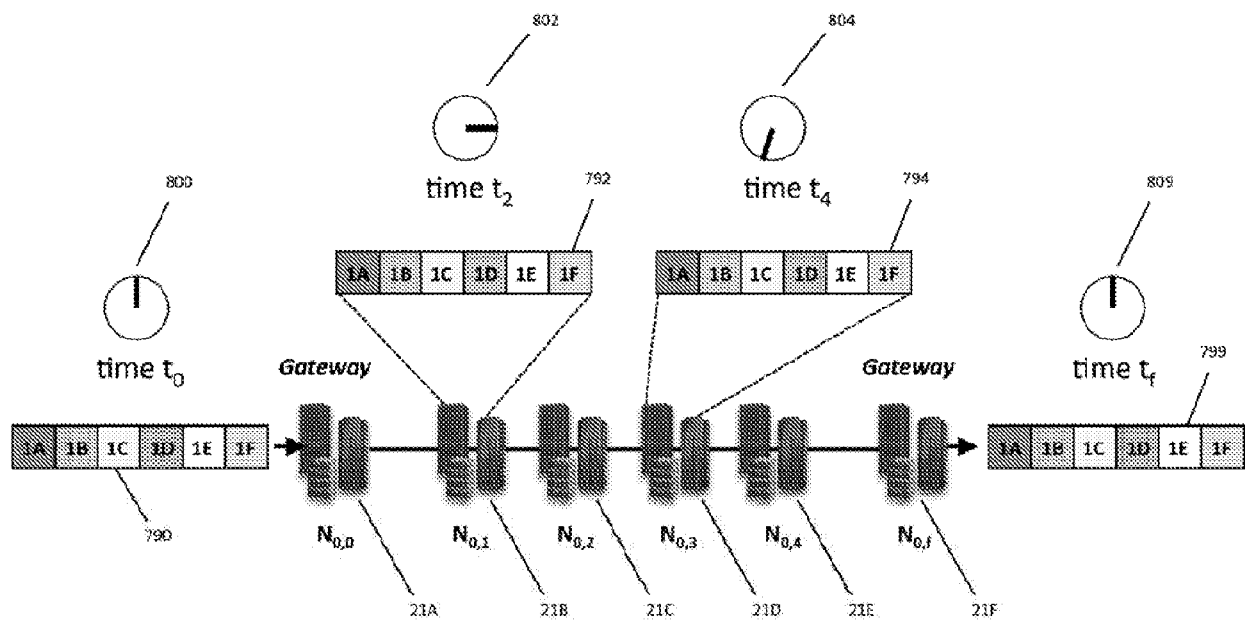


Figure 1

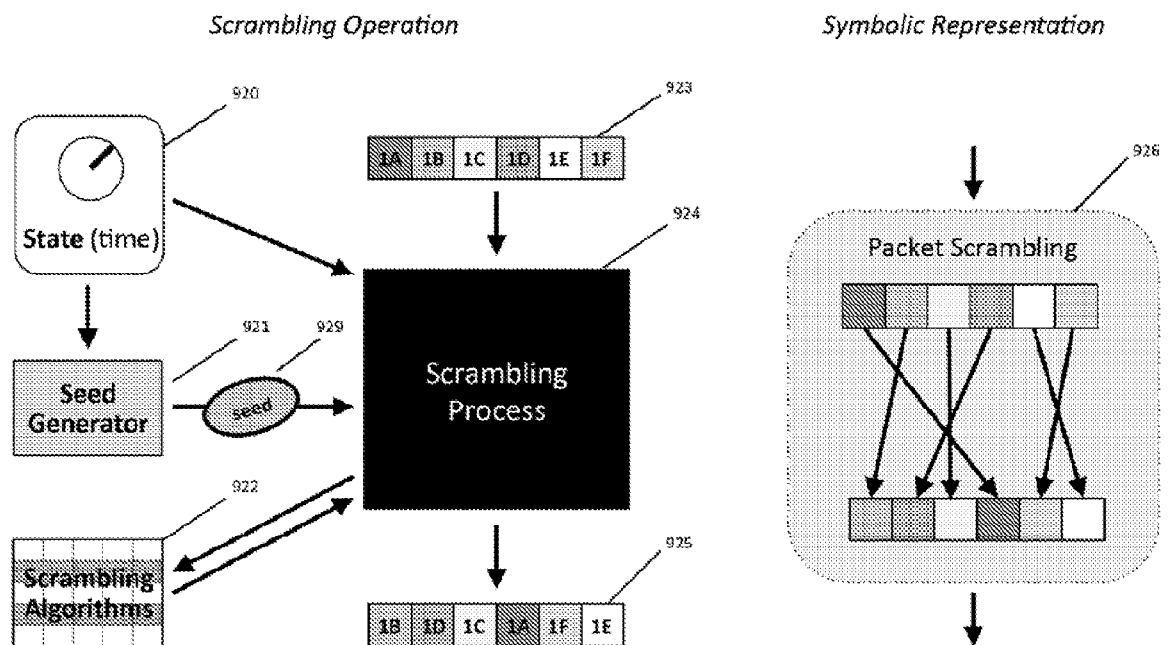


Figure 2A

### Packet Unscrambling

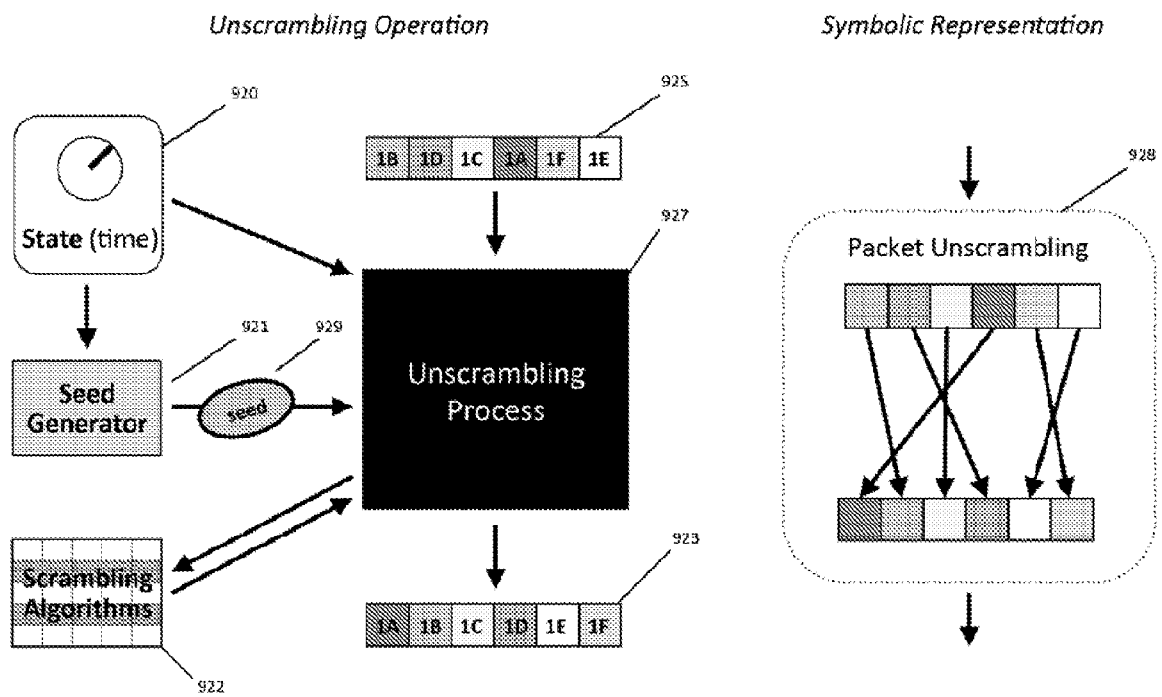


Figure 2B

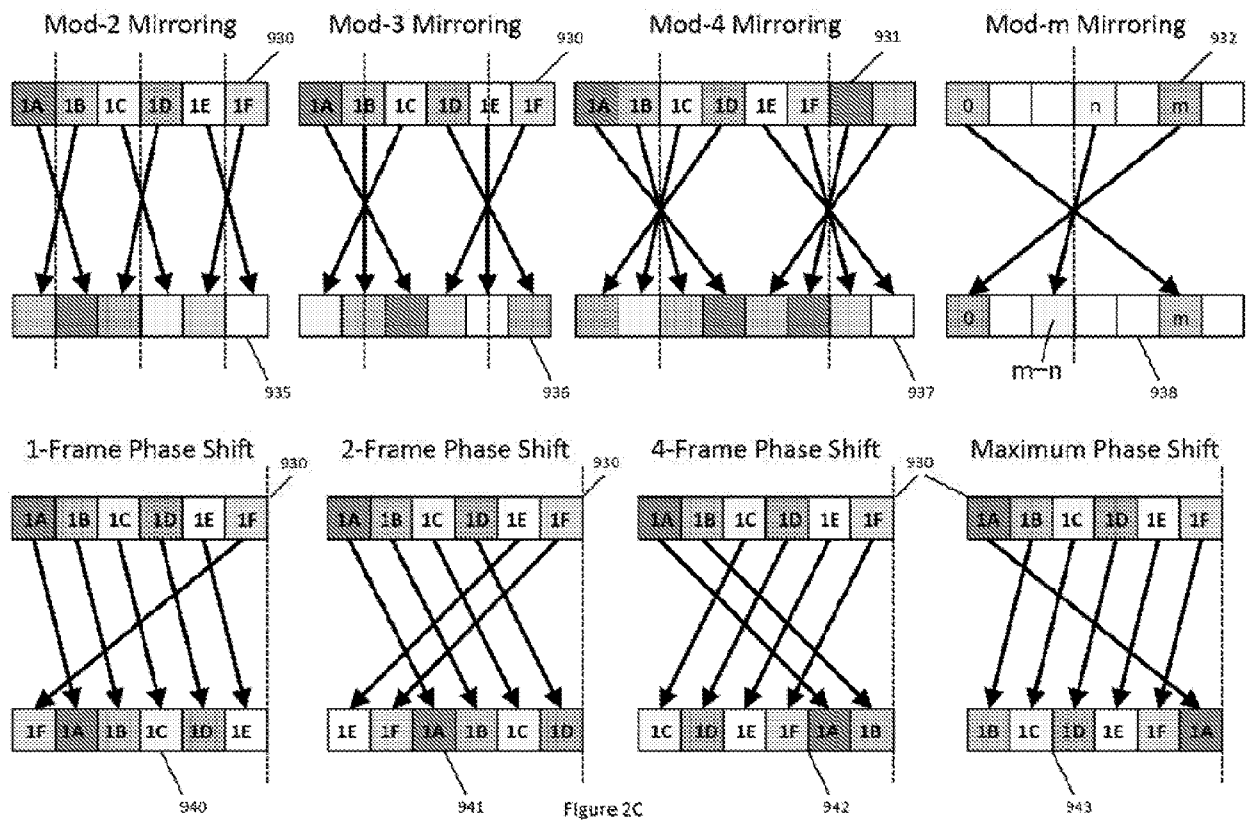


Figure 2C

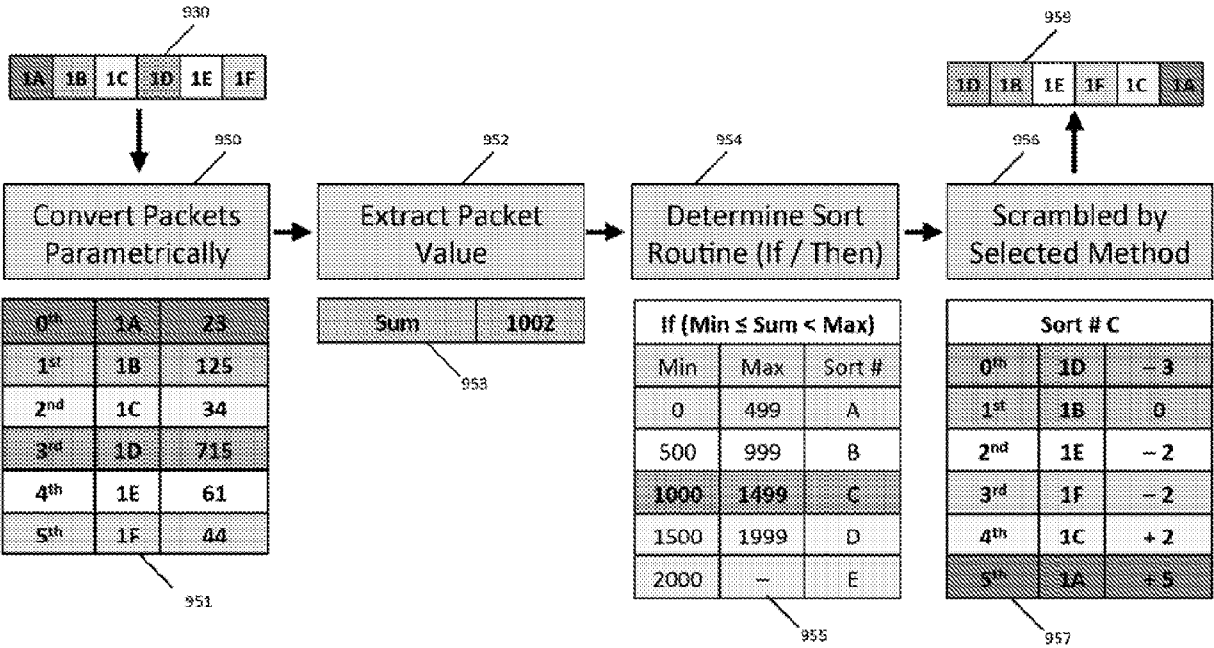


Figure 2D



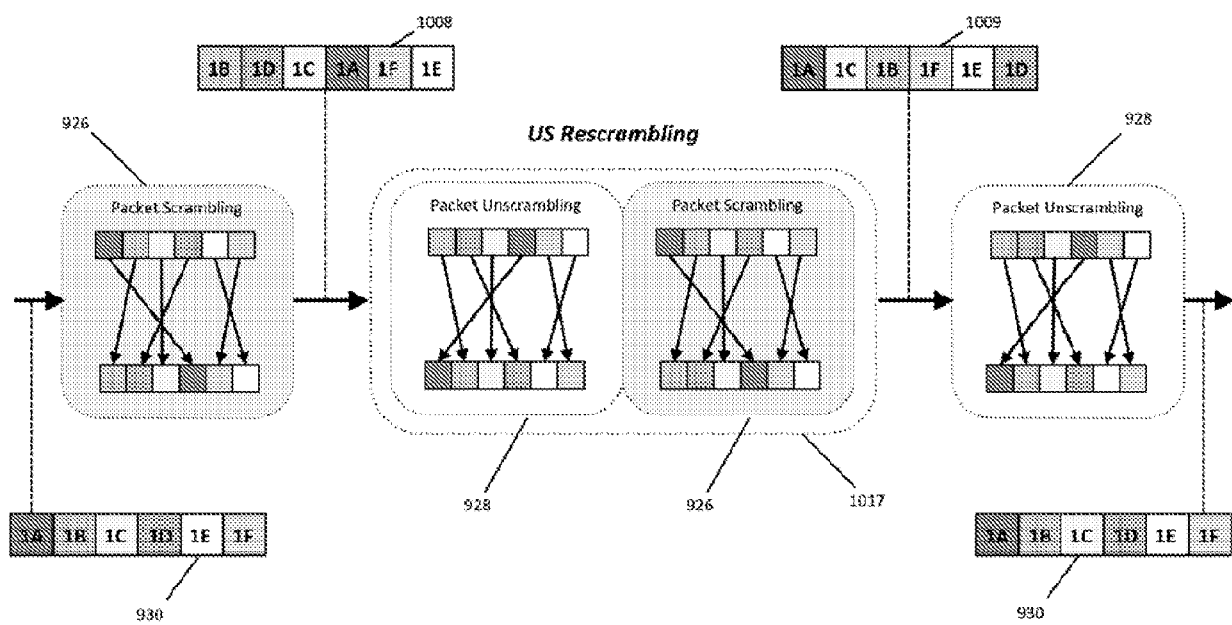


Figure 3

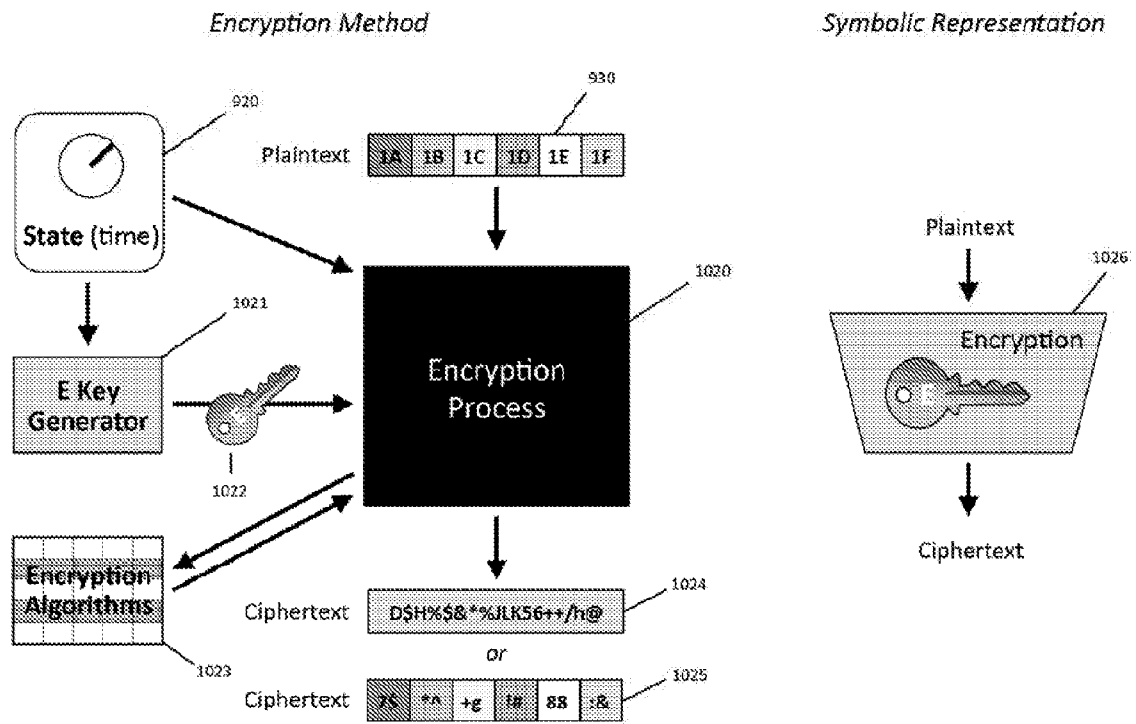


Figure 4A

Packet Decryption

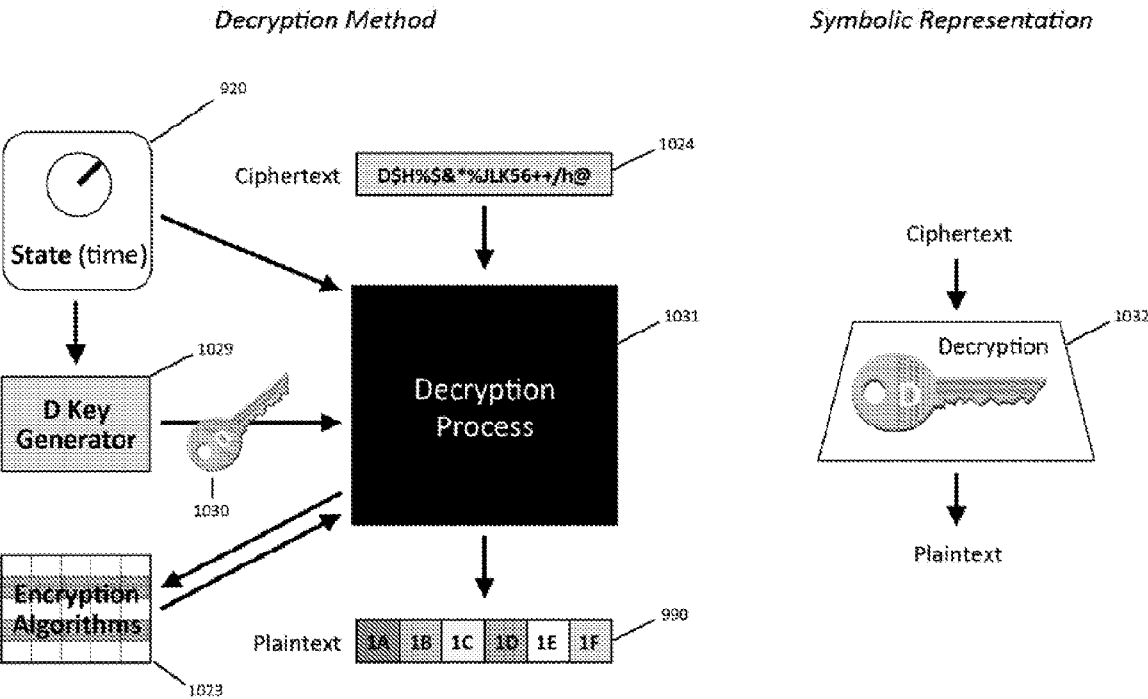


Figure 4B

### Encrypting Scrambled Packet

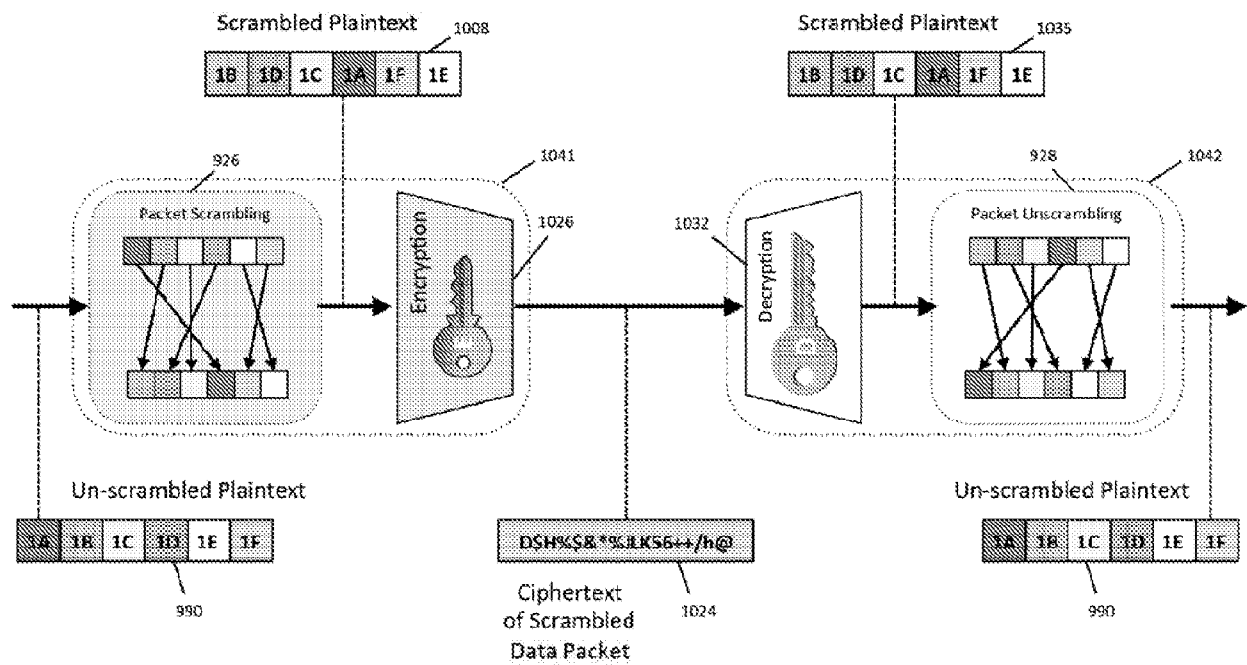


Figure 5

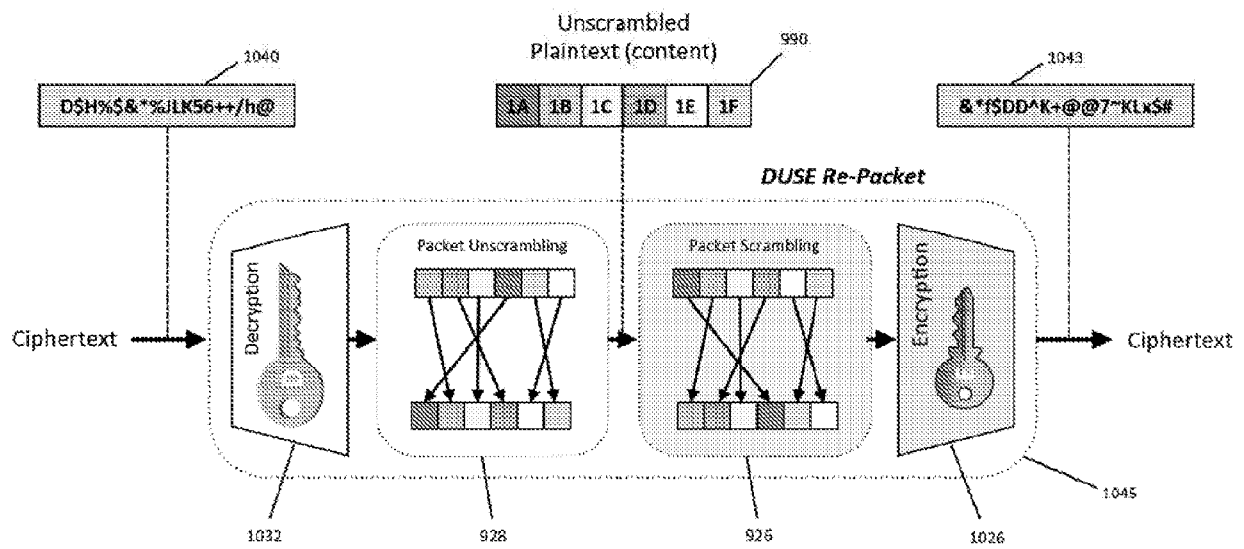


Figure 6

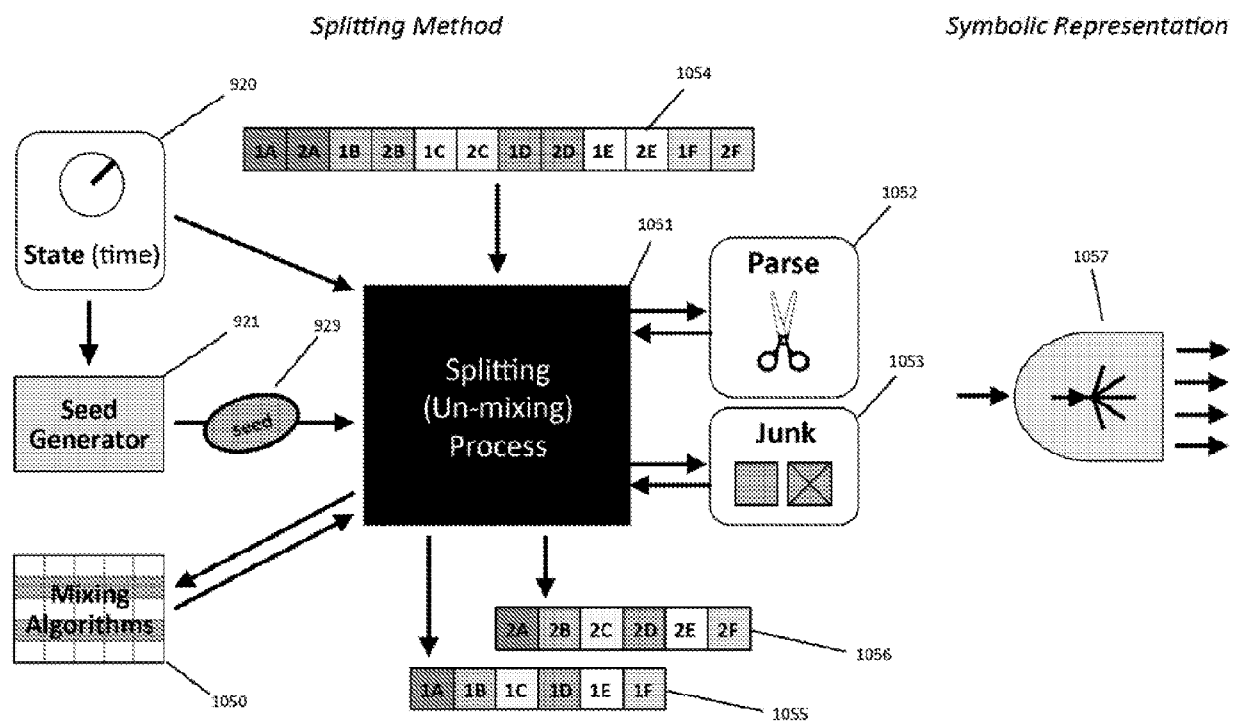


Figure 7A

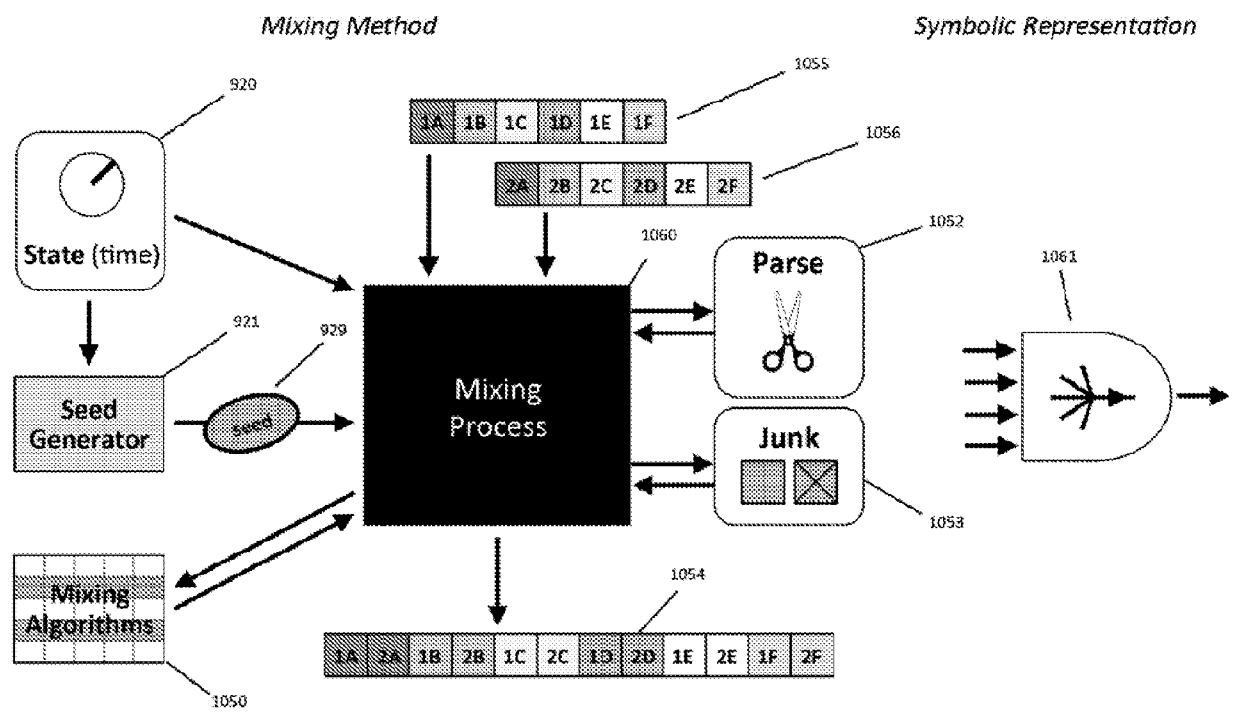


Figure 7B

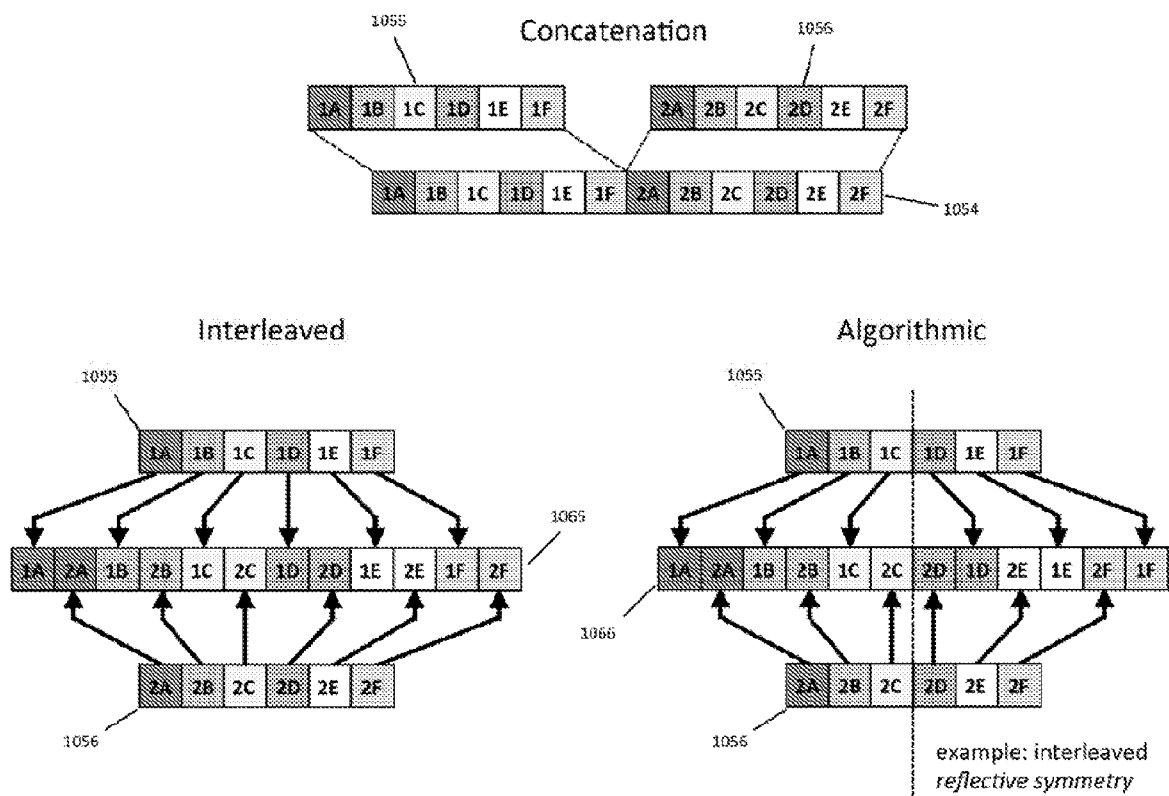


Figure 8

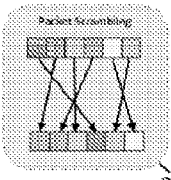
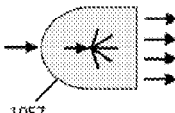
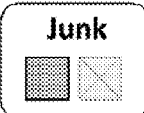
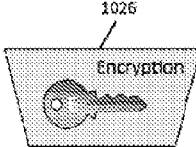
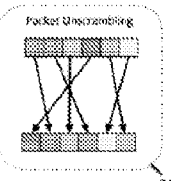
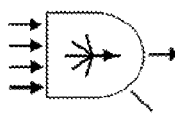
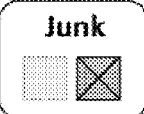
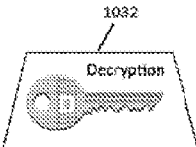
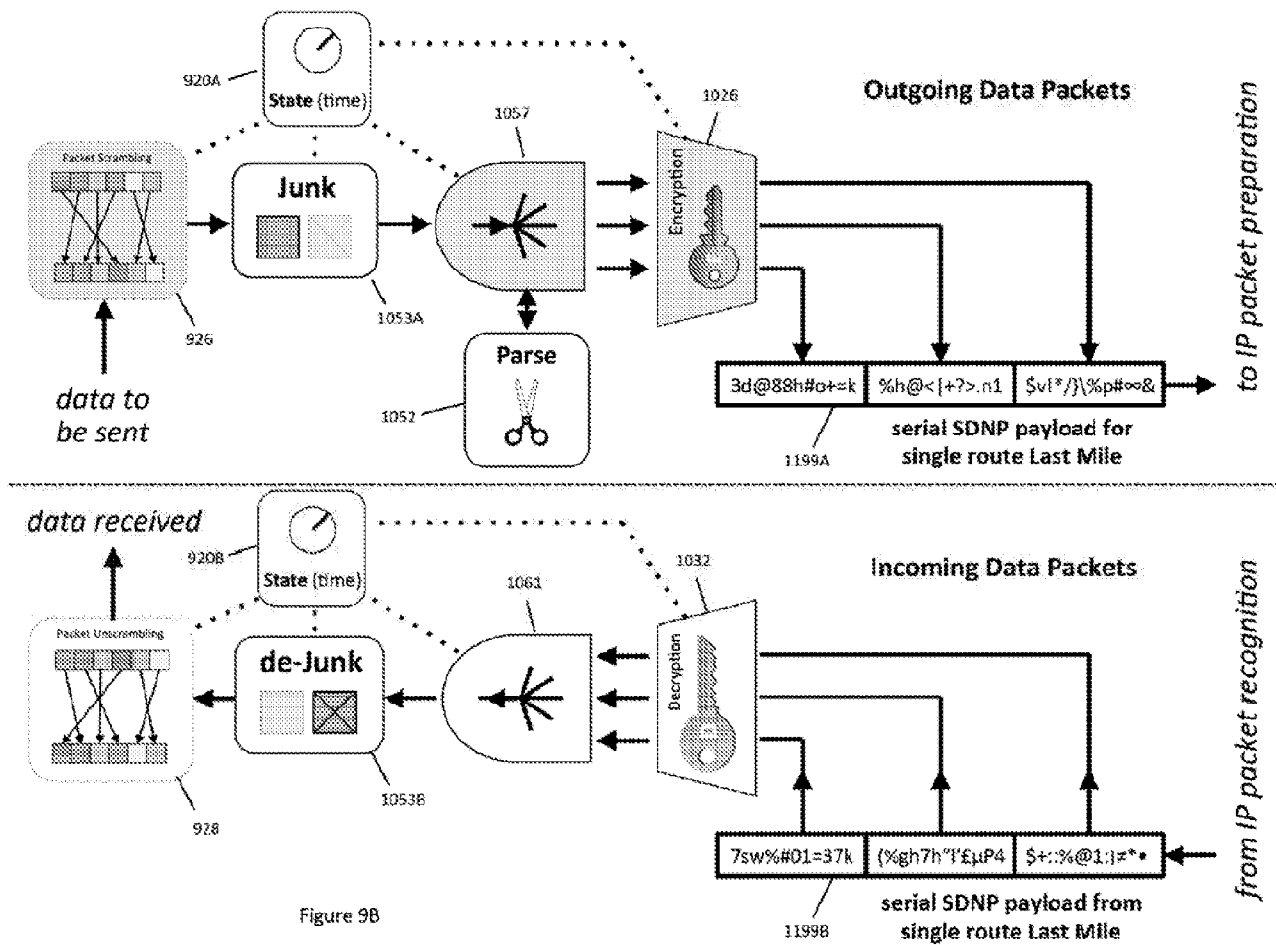
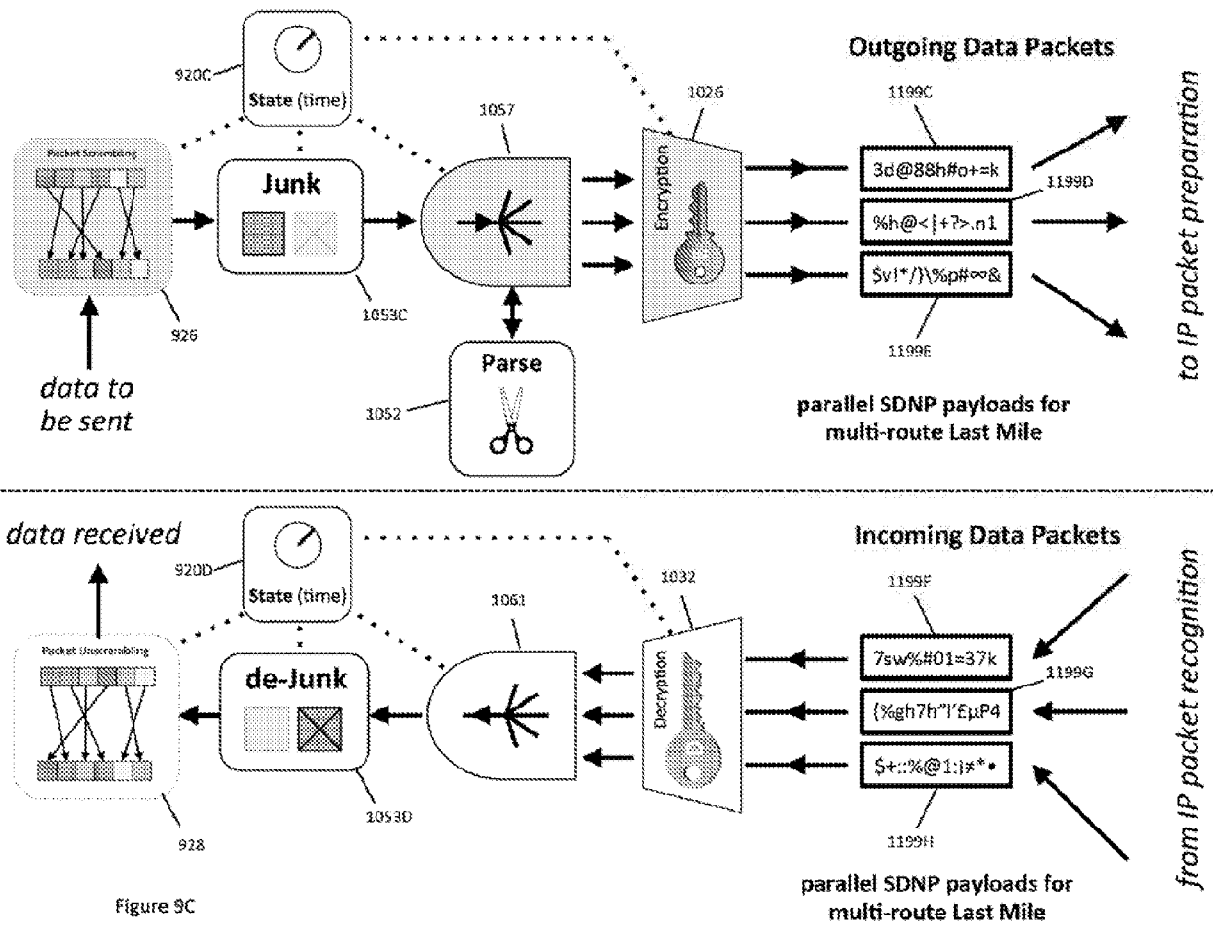
|               | Scrambling                                                                                                             | Fragmentation                                                                                                   | Deception                                                                                                               | Encryption                                                                                                       |
|---------------|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Function      |  <p>Packet Scrambling<br/>926</p>    |  <p>Splitting<br/>1057</p>    |  <p>Insertion<br/>Junk<br/>1053A</p>  |  <p>1026<br/>Encryption</p>   |
| Anti-Function |  <p>Packet Unscrambling<br/>928</p> |  <p>Mixing<br/>1061</p>      |  <p>Deletion<br/>Junk<br/>1053B</p> |  <p>1032<br/>Decryption</p> |
| Dynamic       |  <p>State (time)</p>                |  <p>State (time)<br/>920</p> |  <p>State (time)</p>                |  <p>State (time)</p>        |

Figure 9A





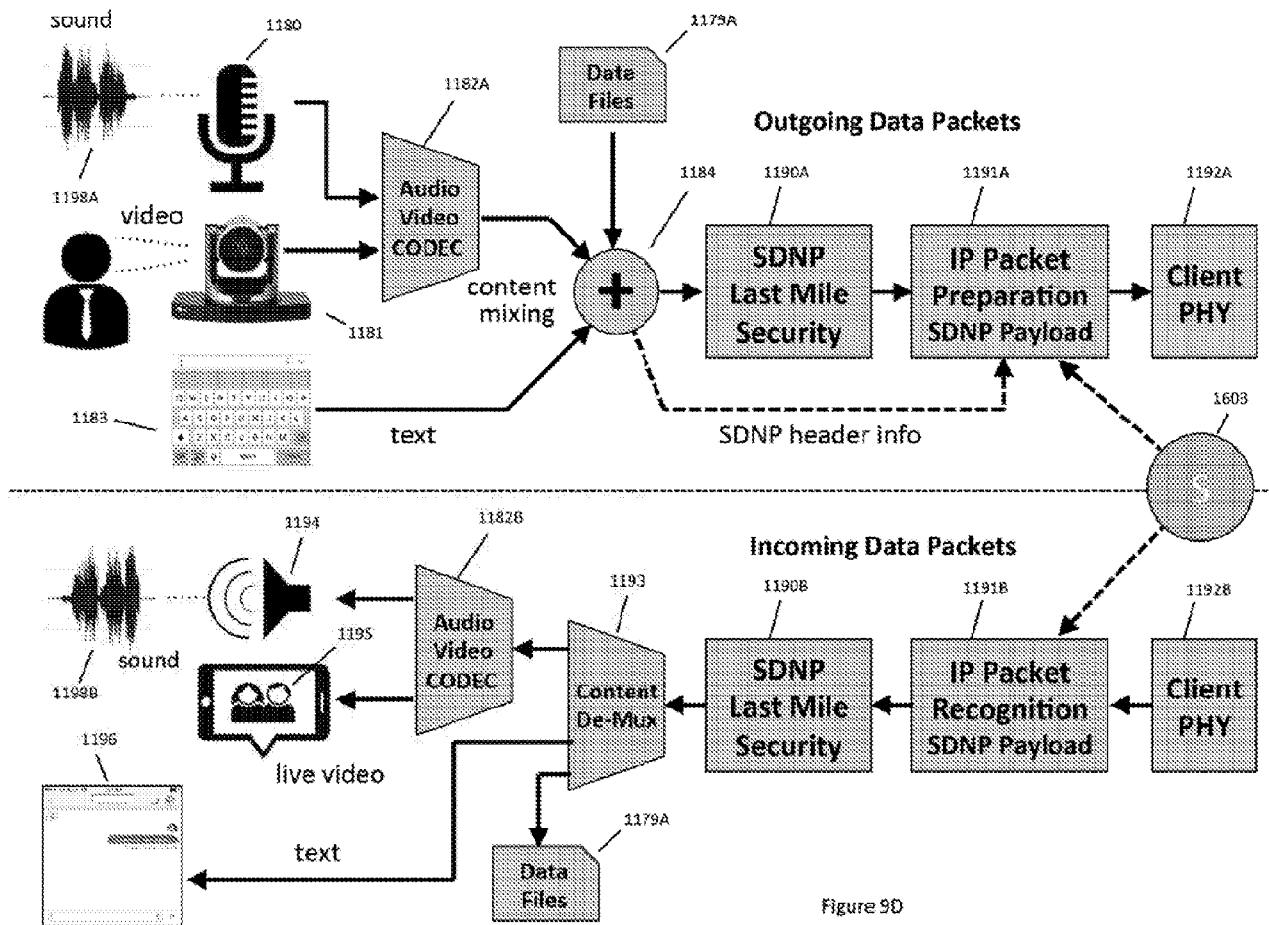


Figure 9D

## SDNP Data Packets from SDNP Client

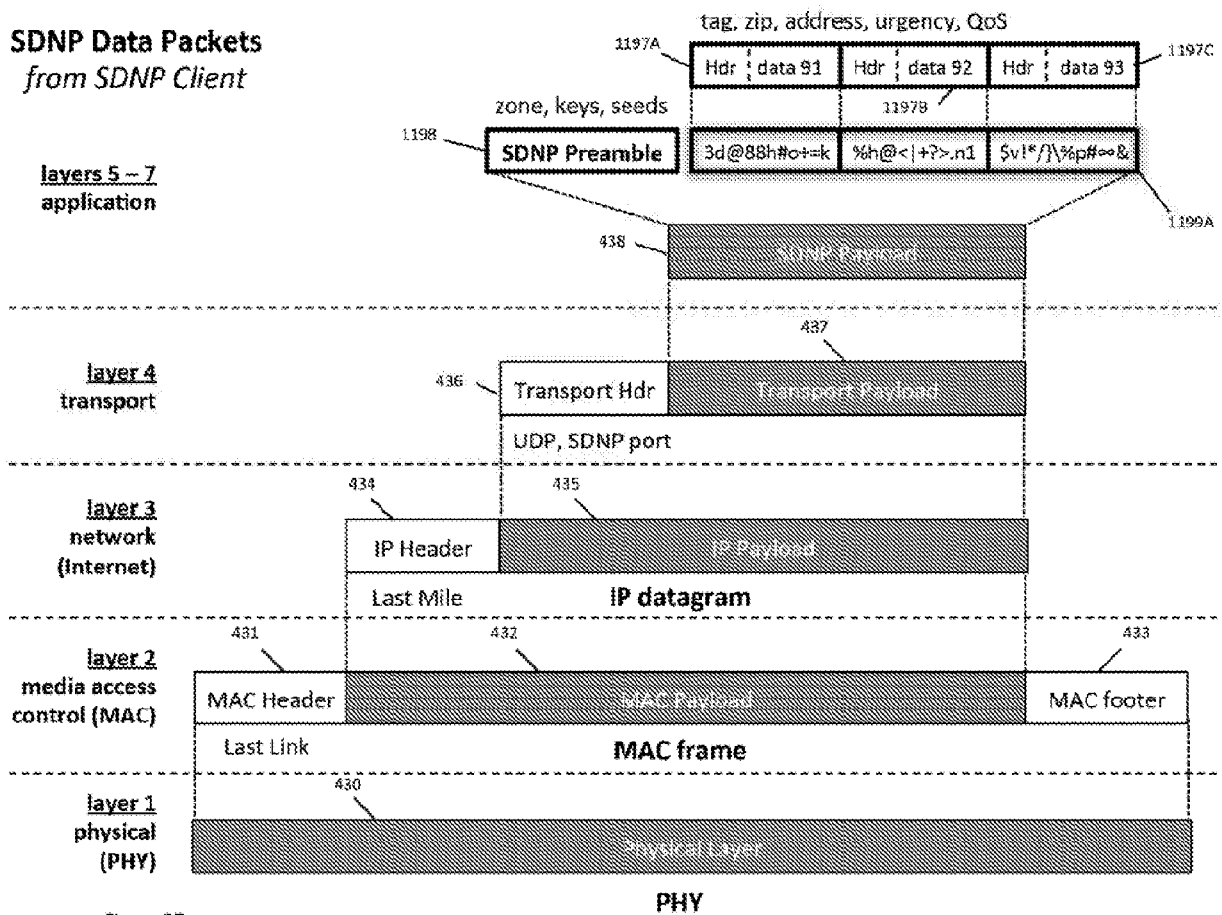


Figure 9E

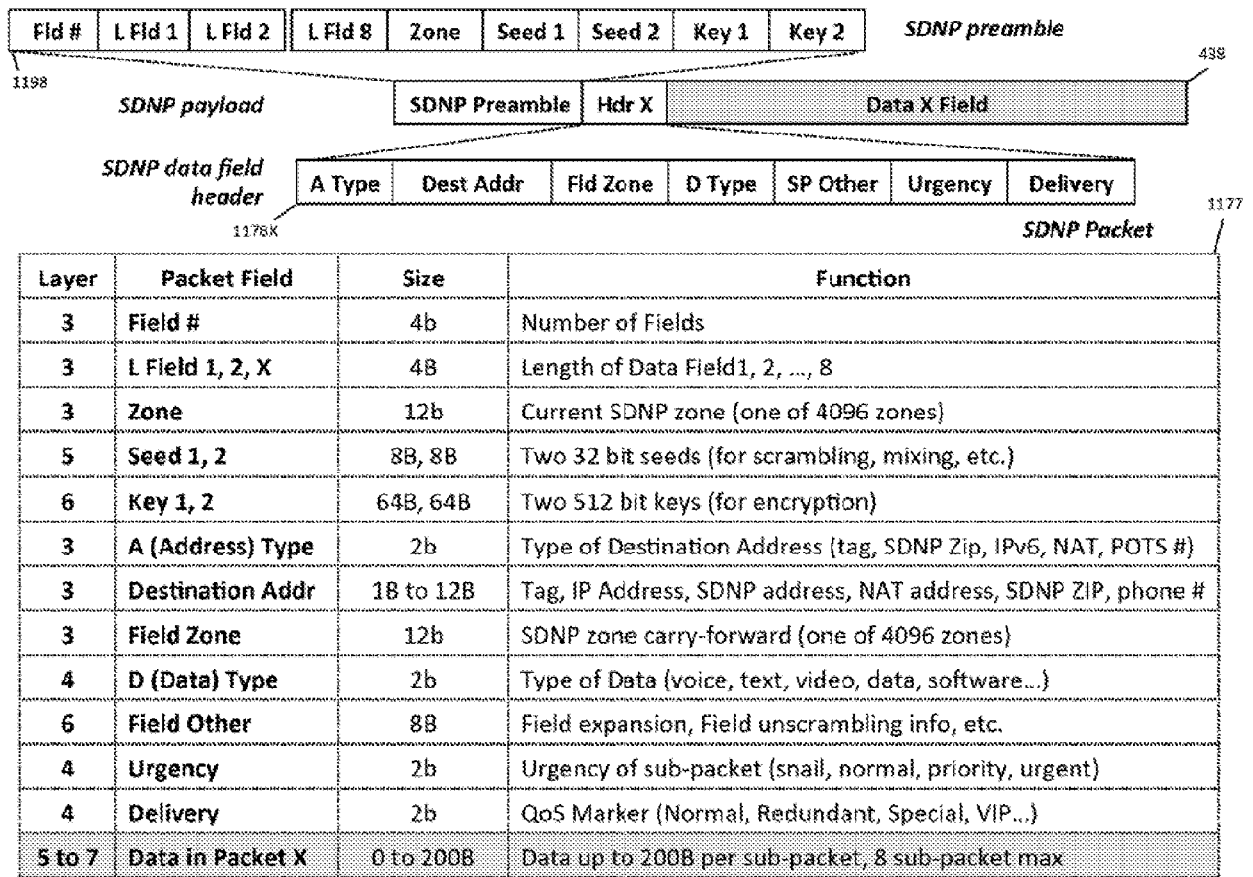
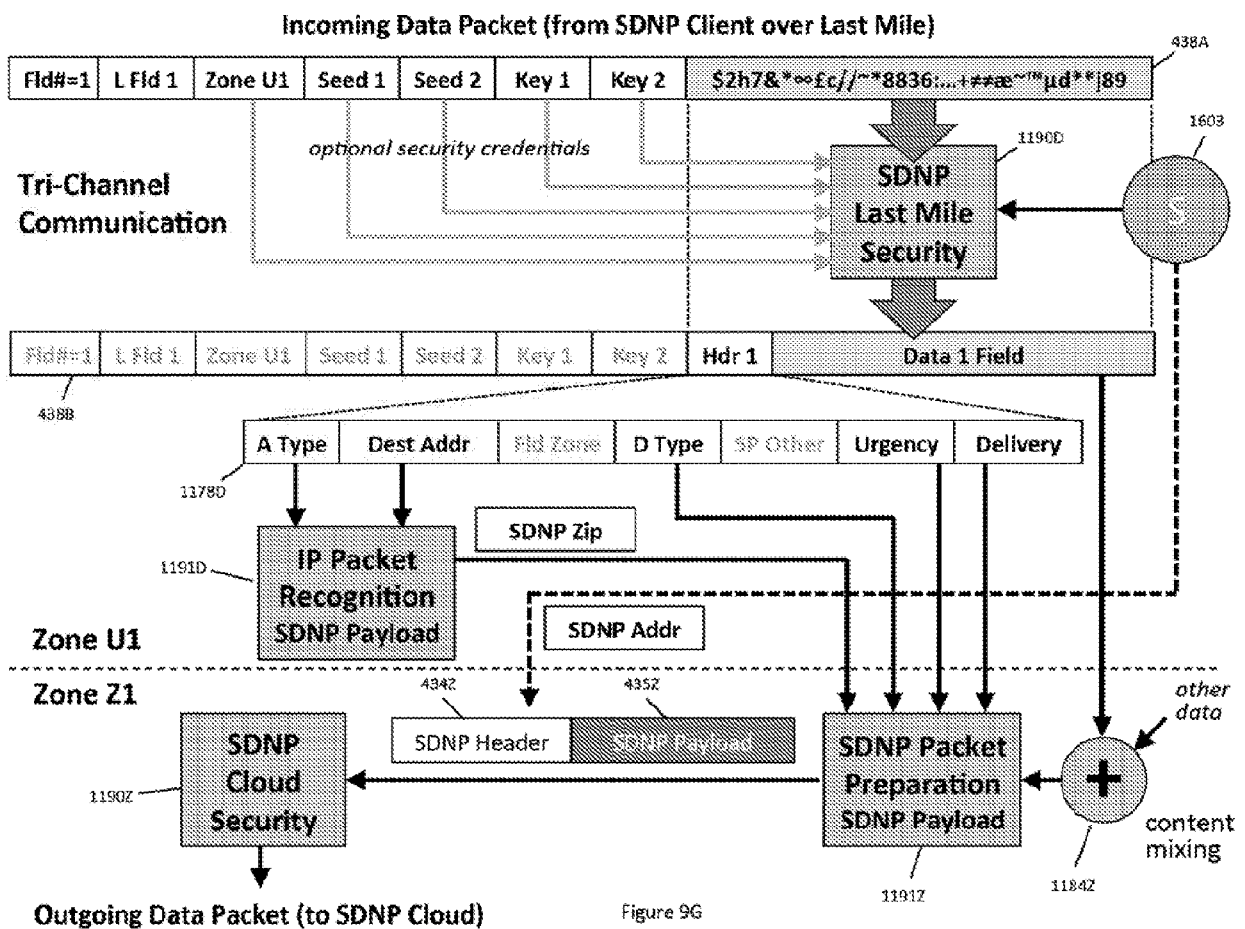


Figure 9F



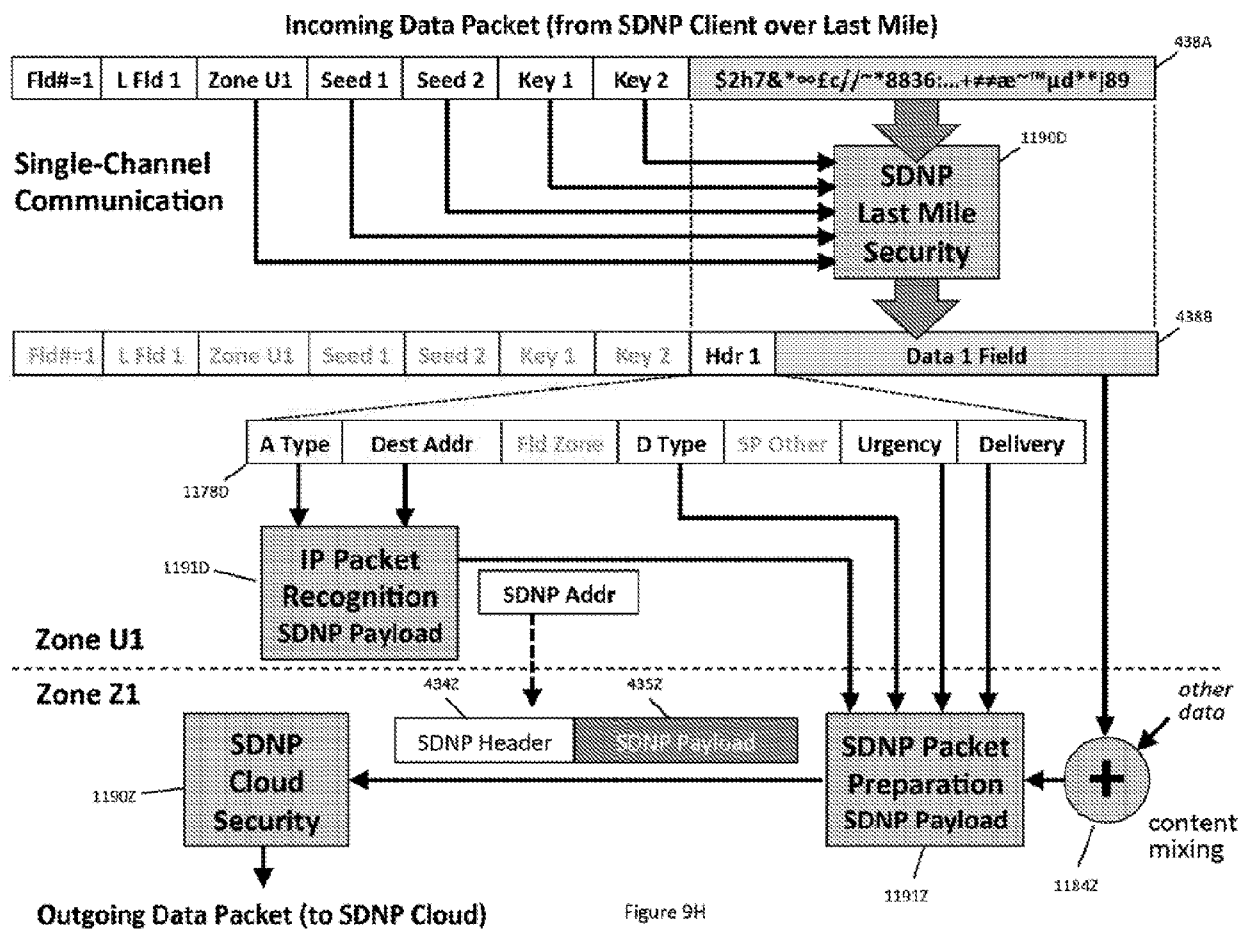
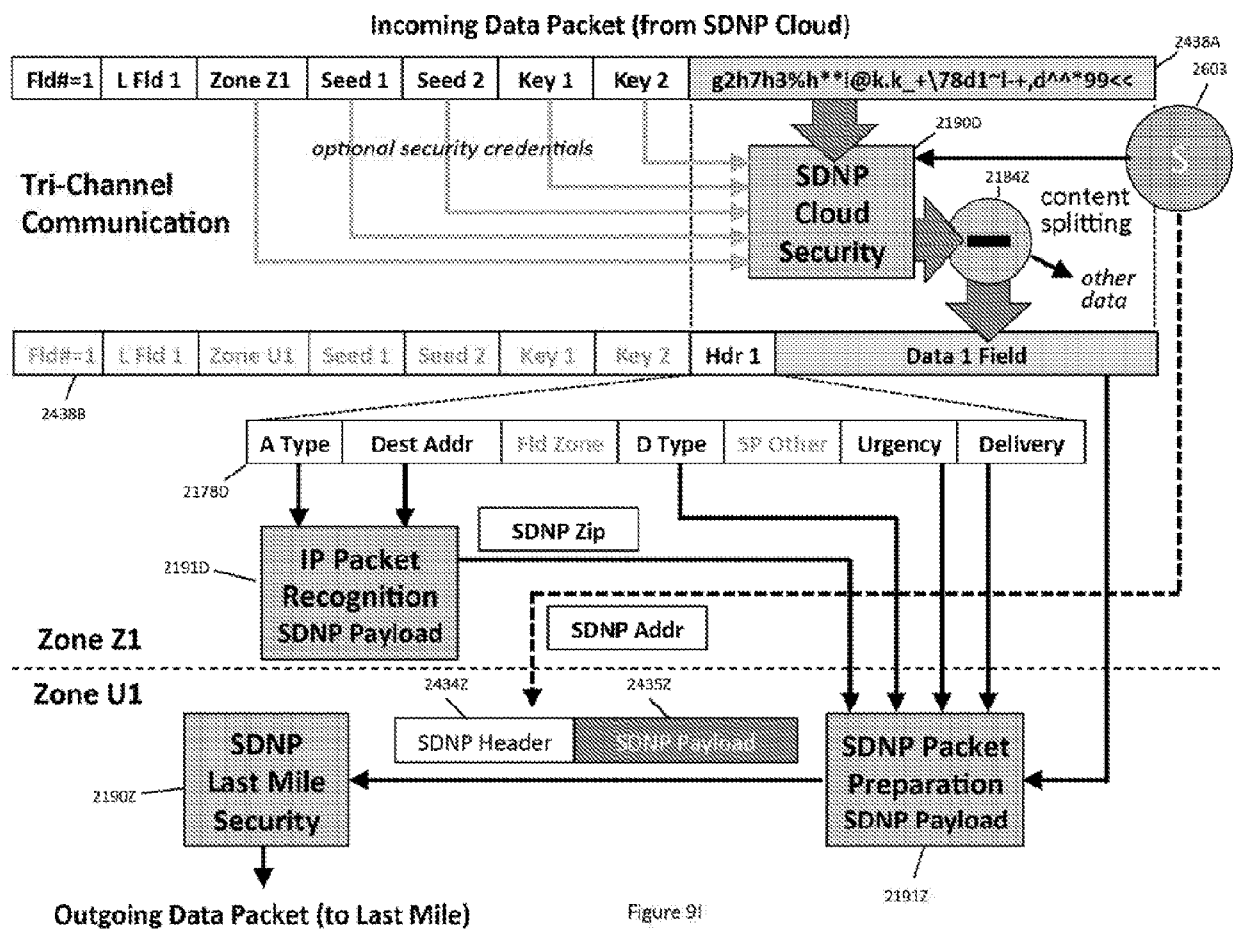


Figure 9H



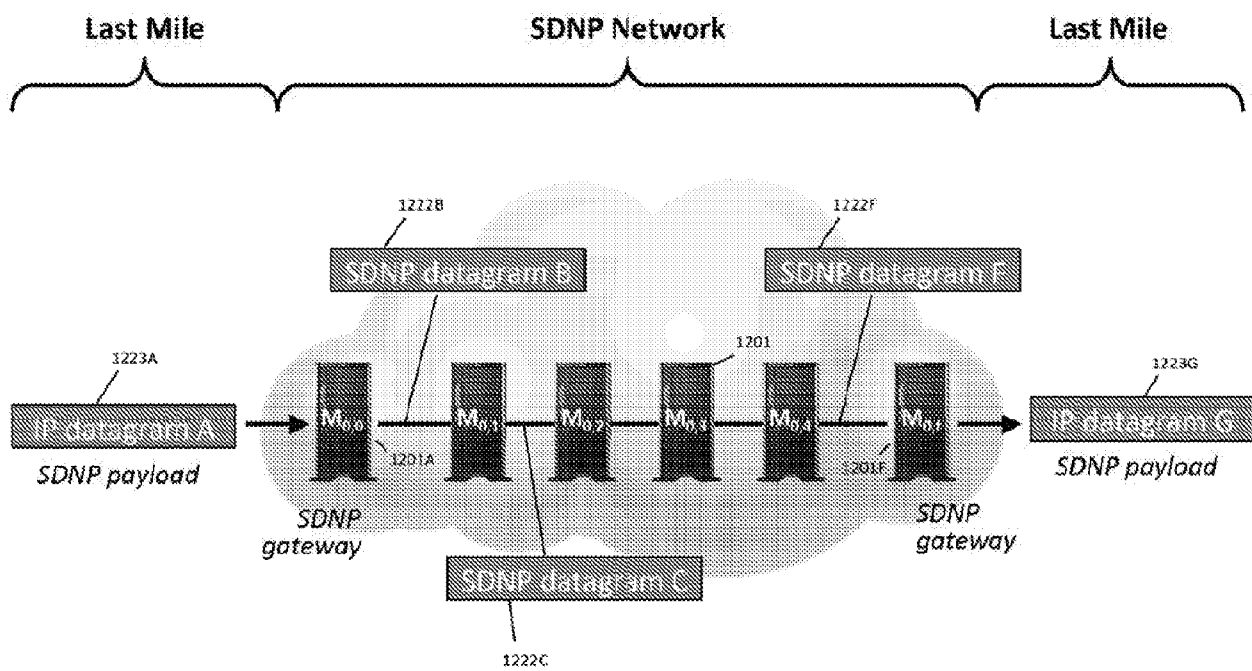


Figure 10

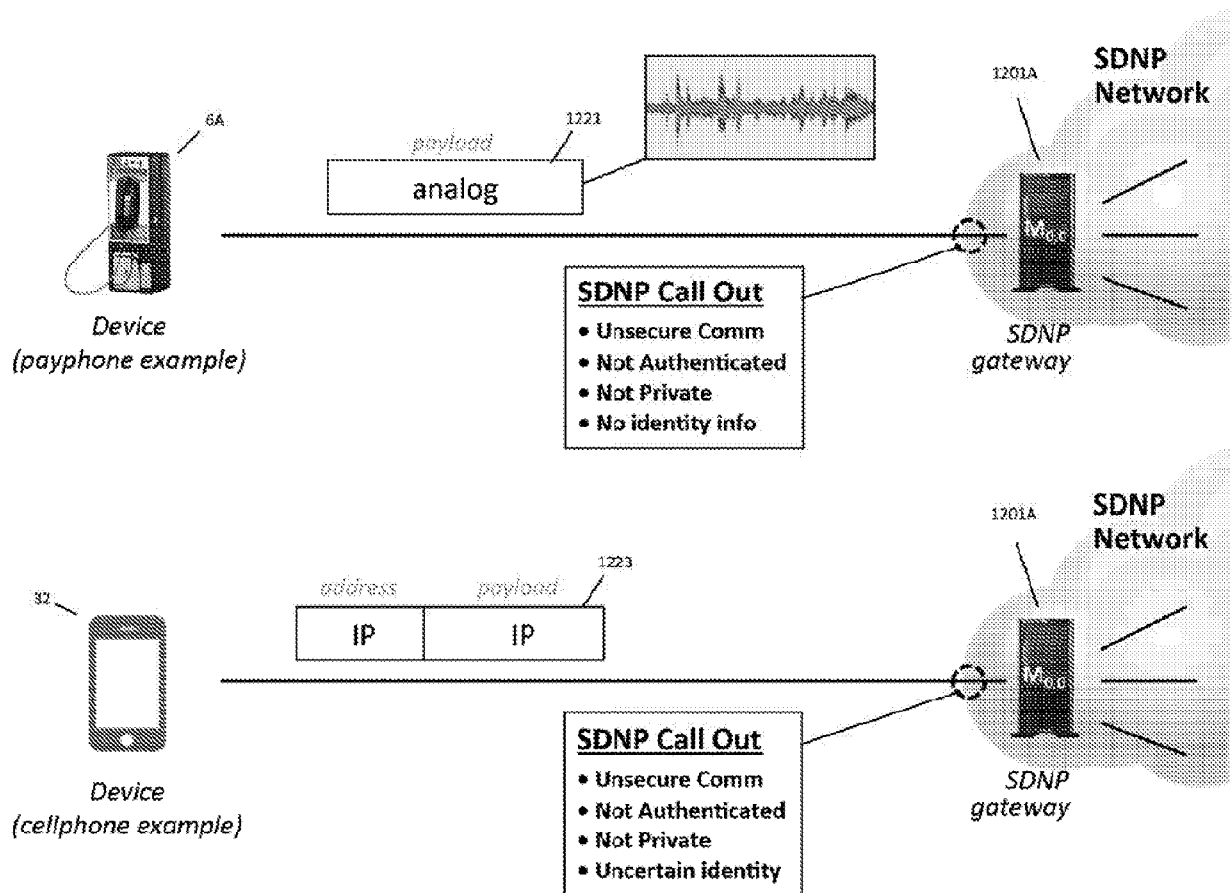


Figure 11

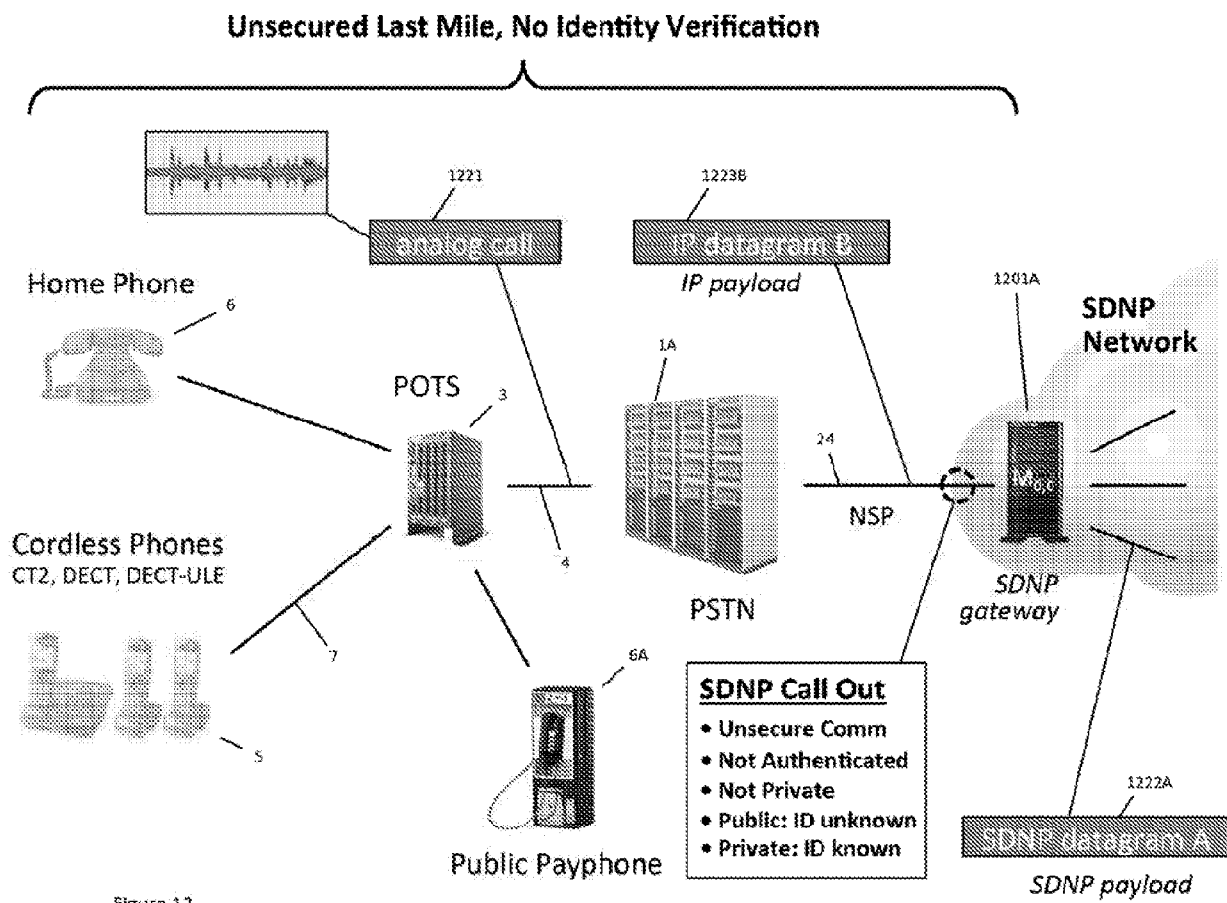


Figure 12

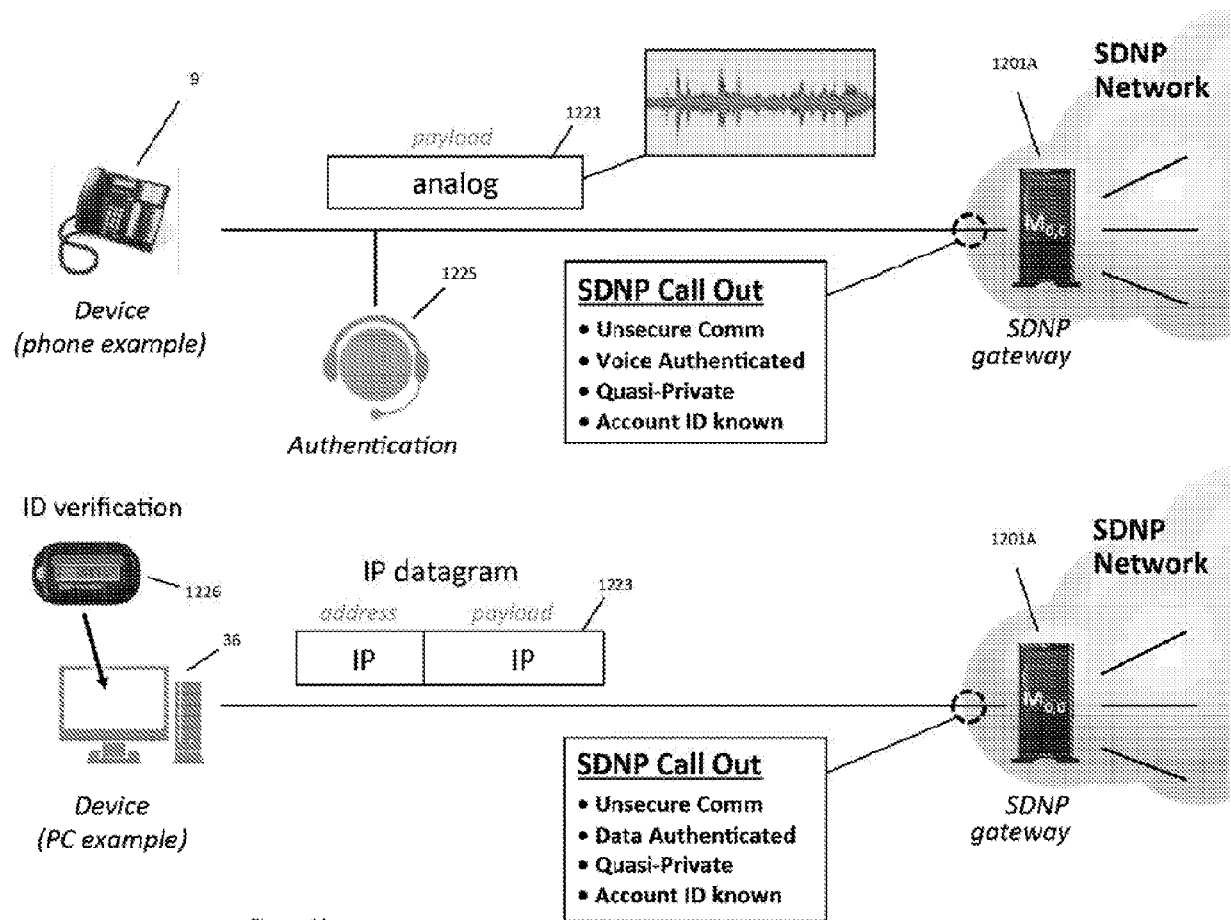


Figure 13

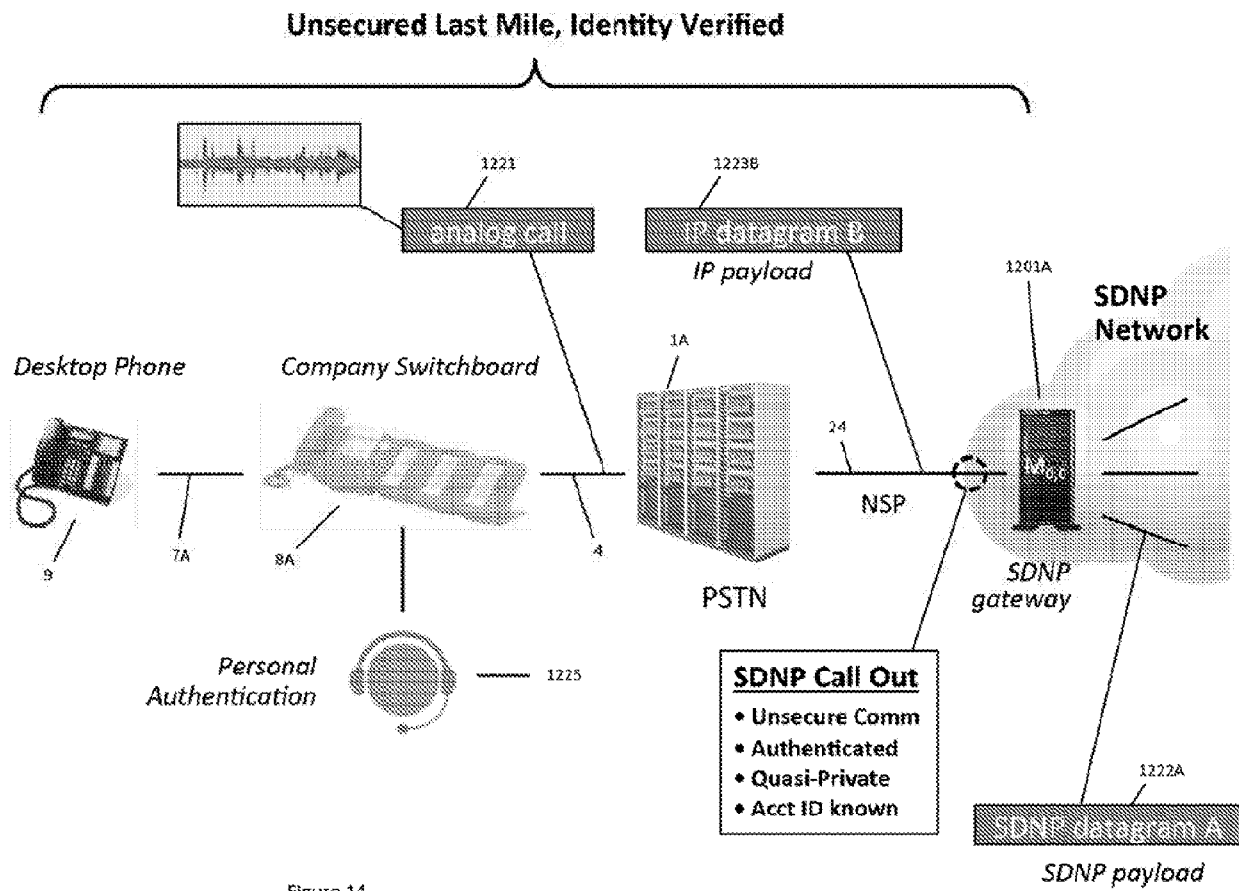


Figure 14

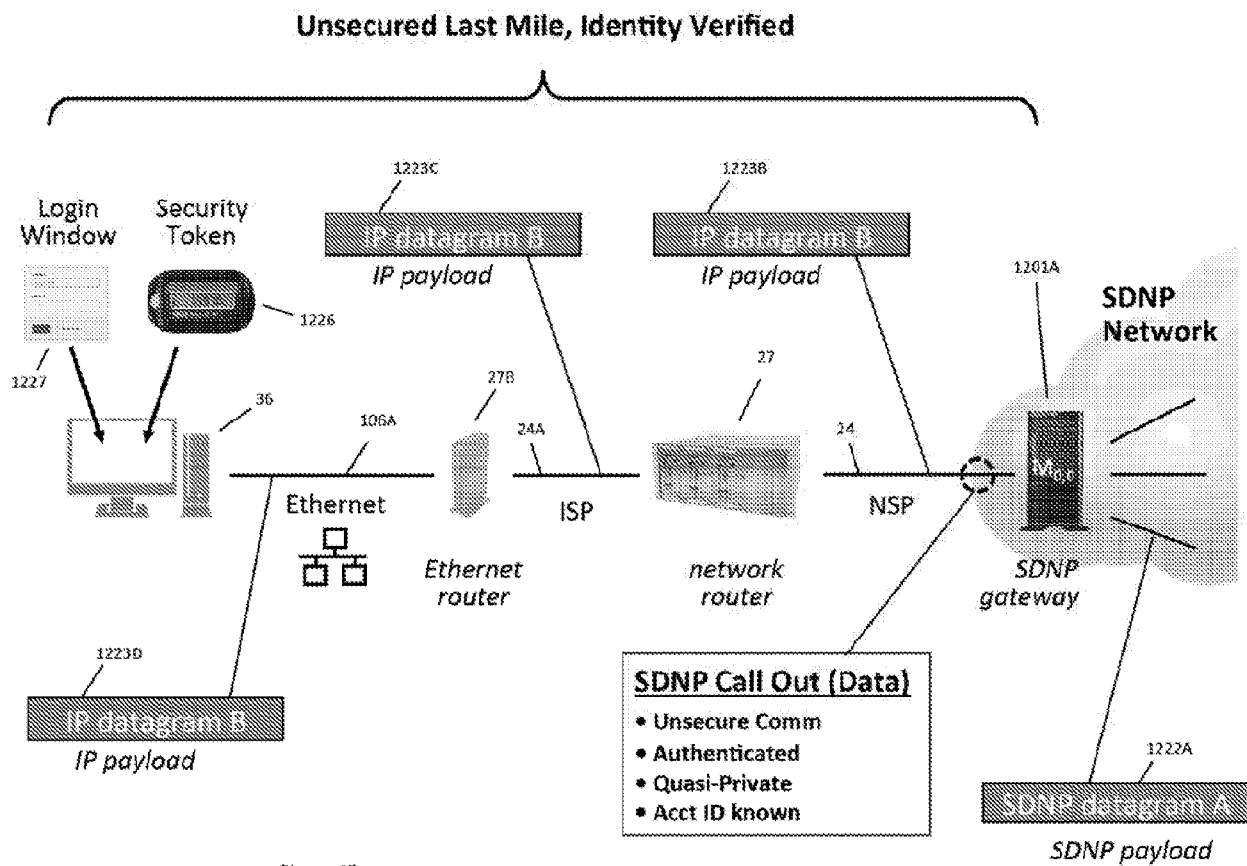


Figure 15

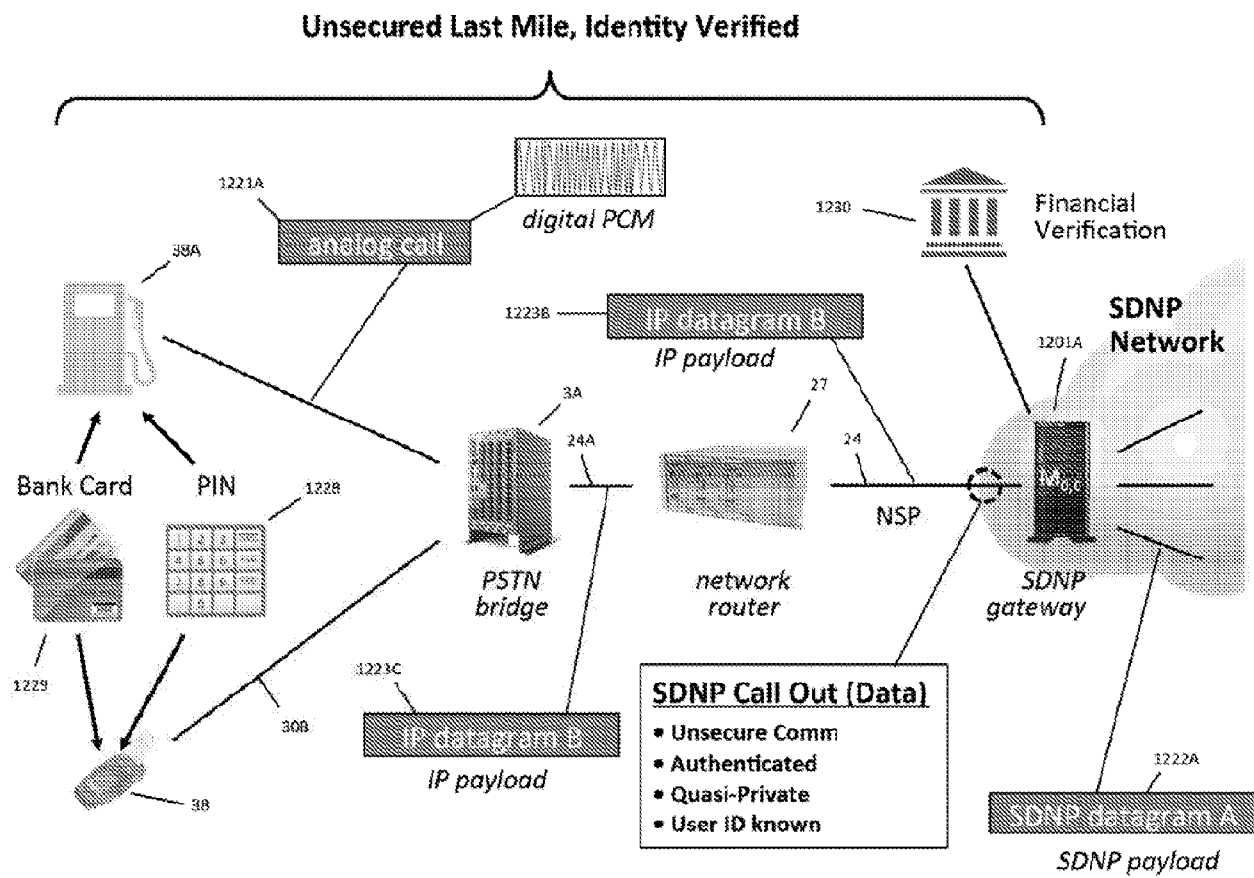


Figure 16

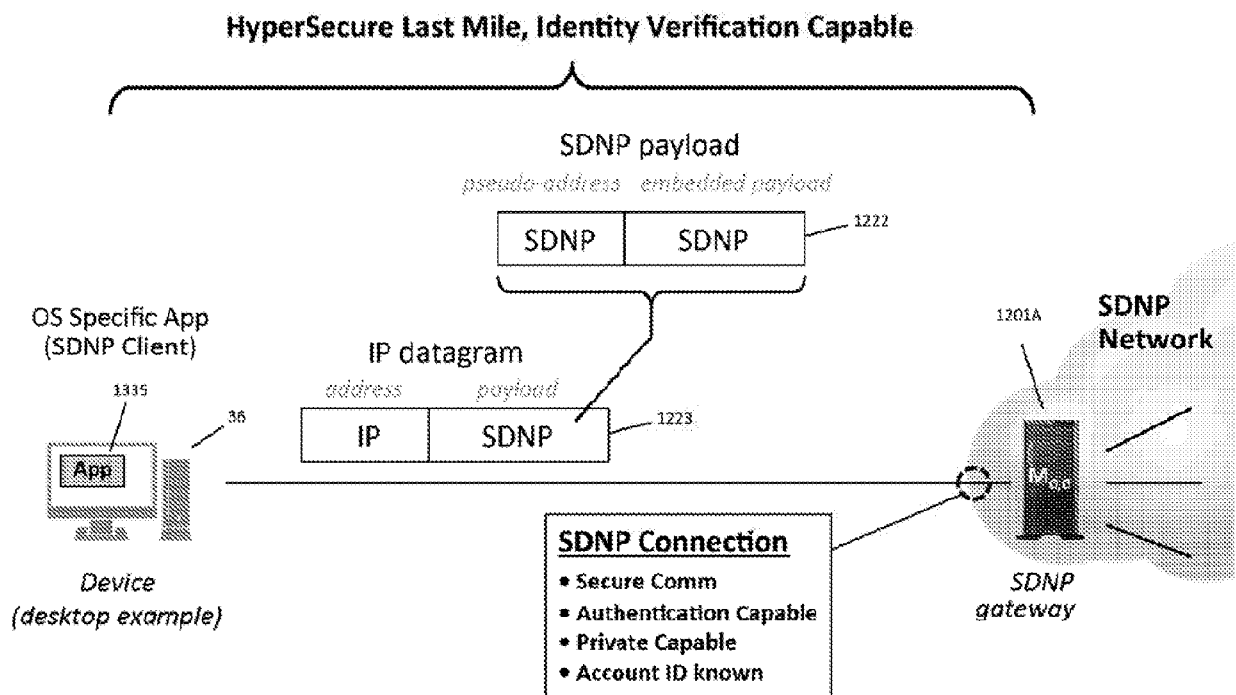


Figure 17

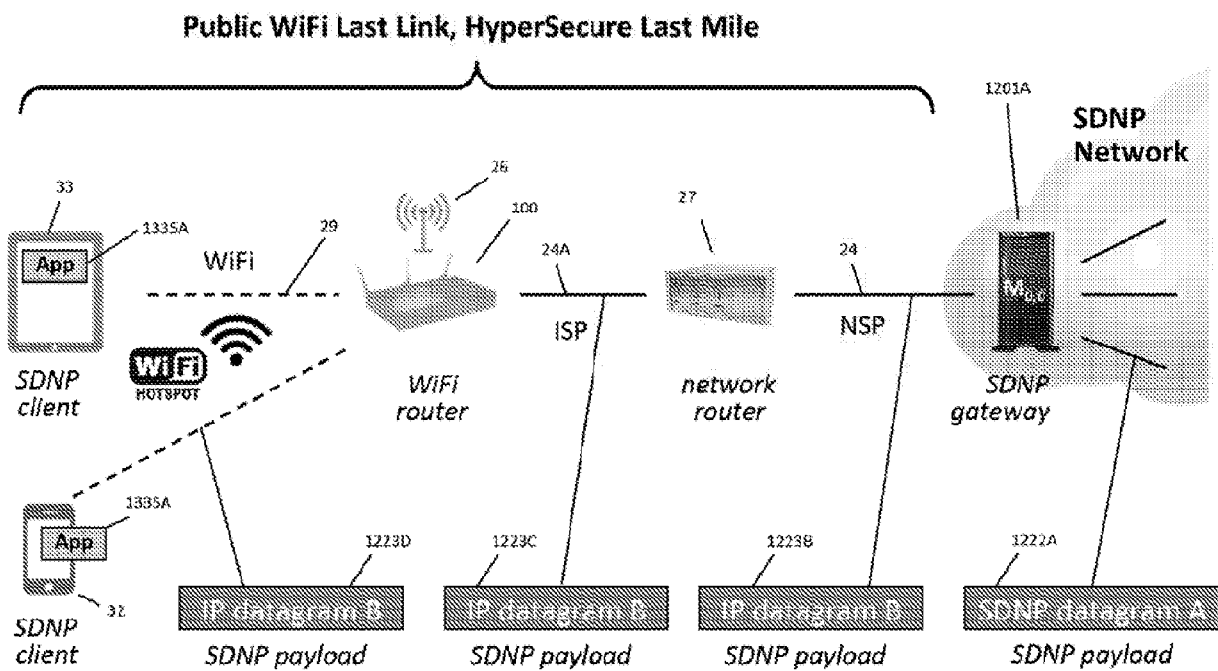


Figure 18

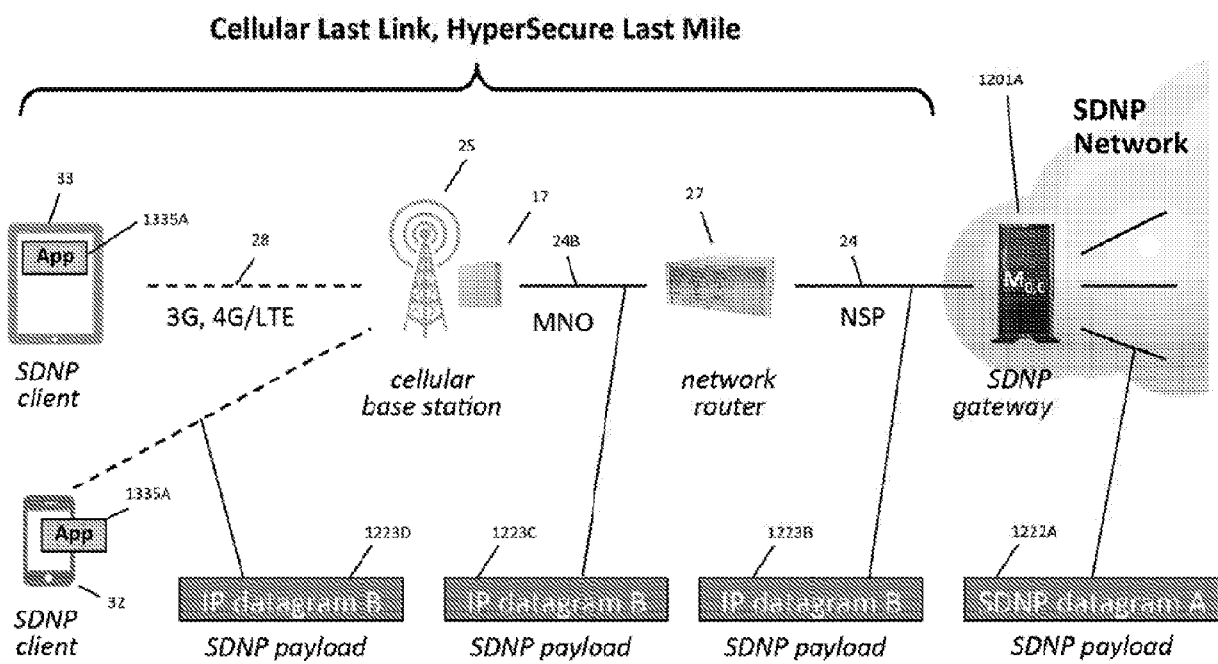


Figure 19

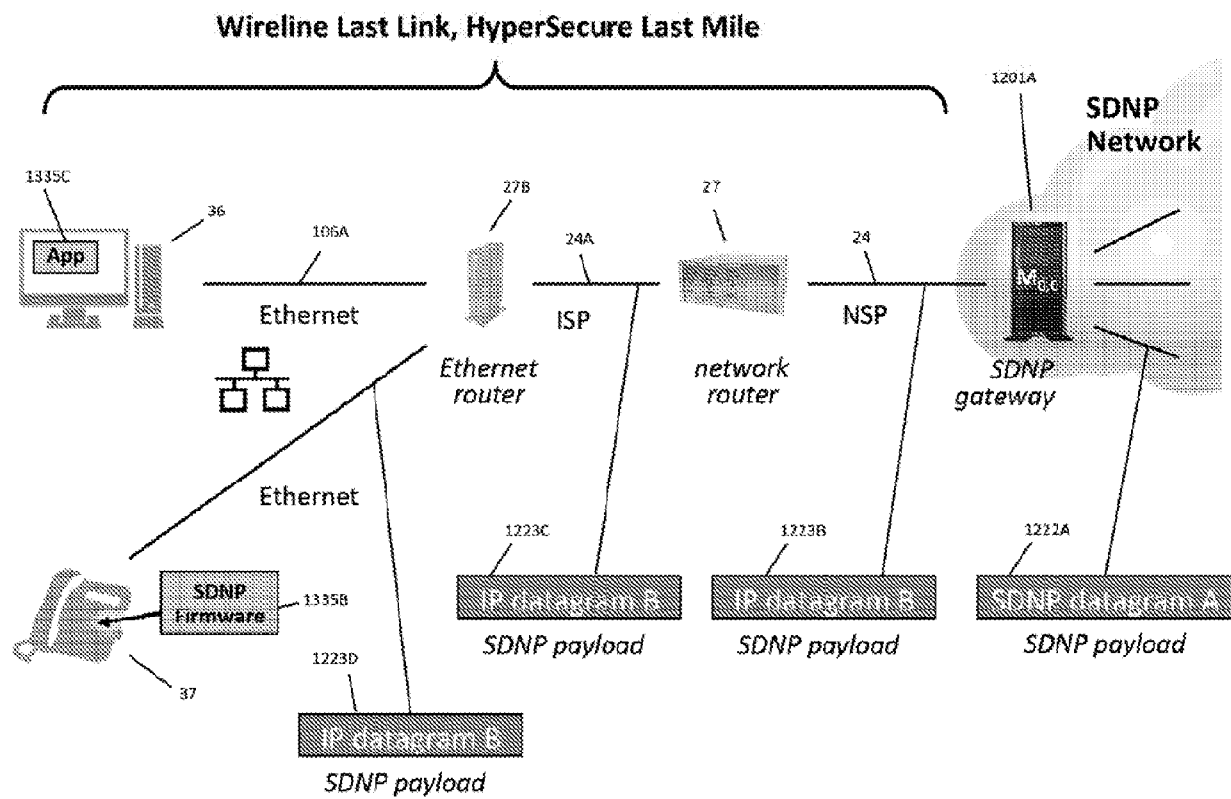


Figure 20

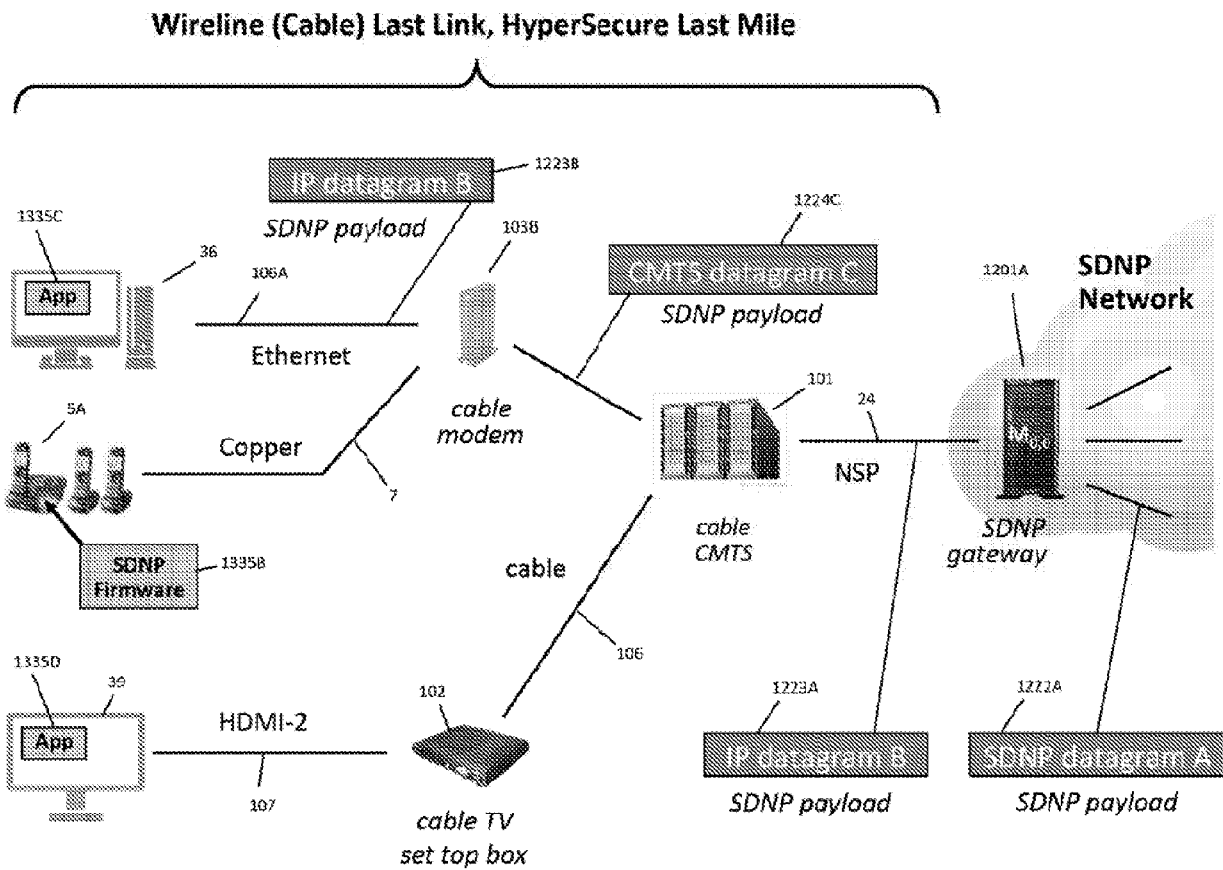
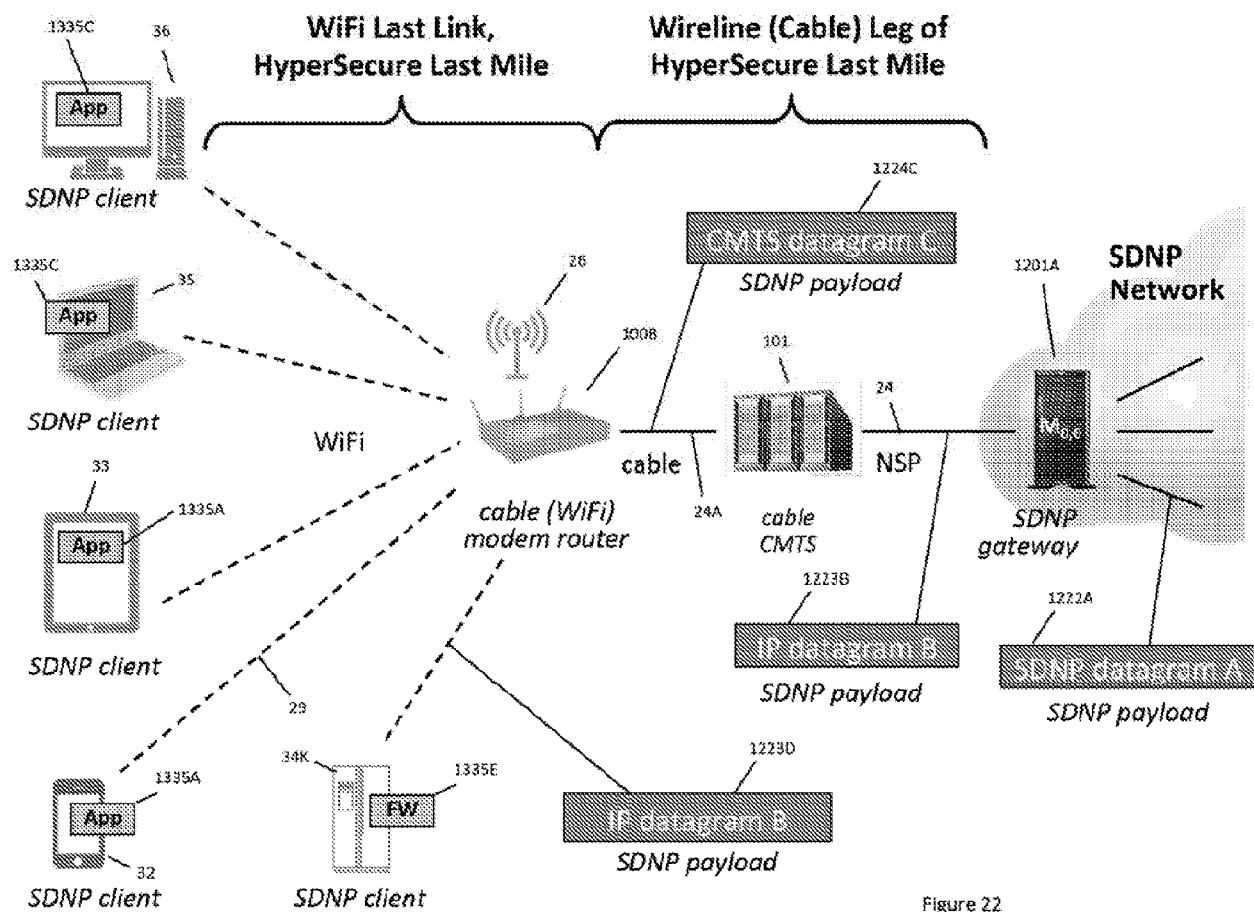


Figure 21



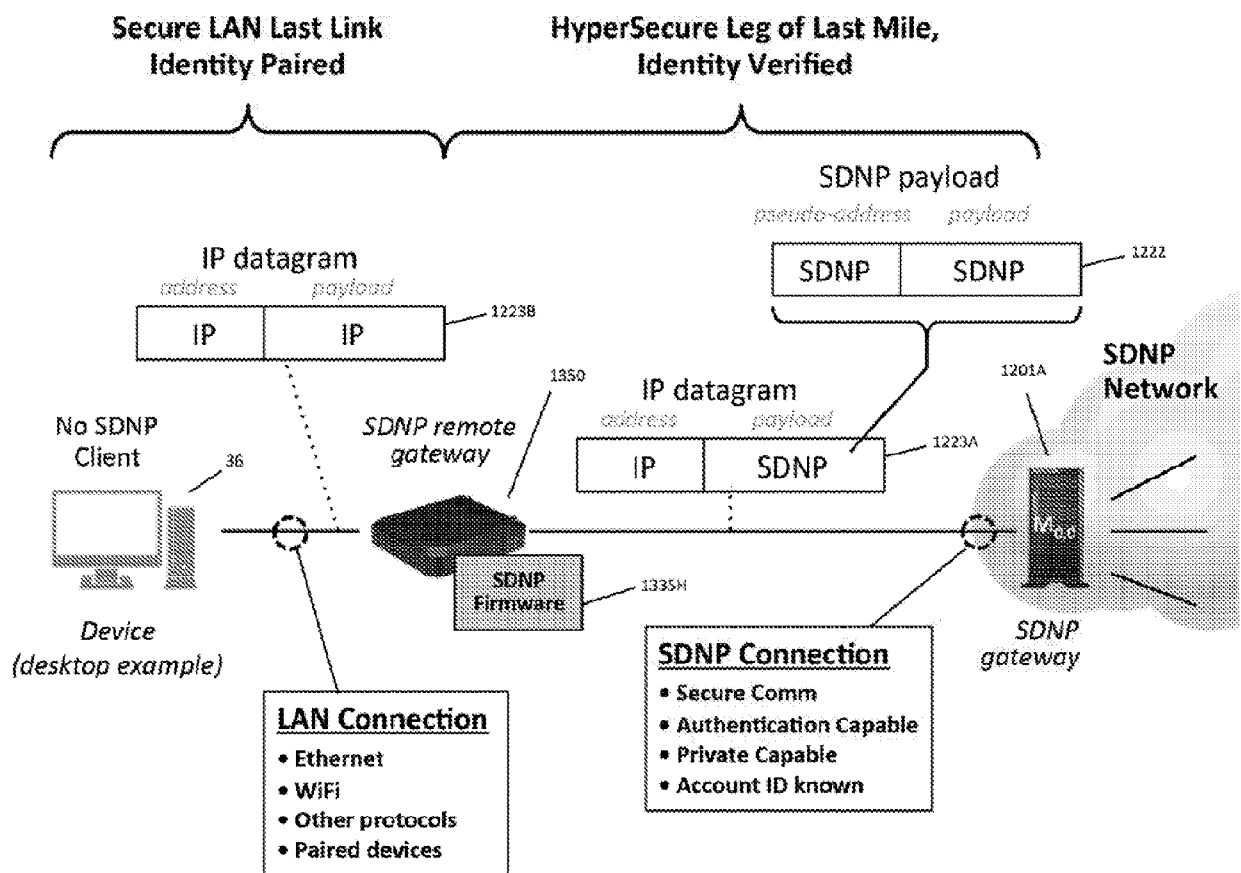


Figure 23

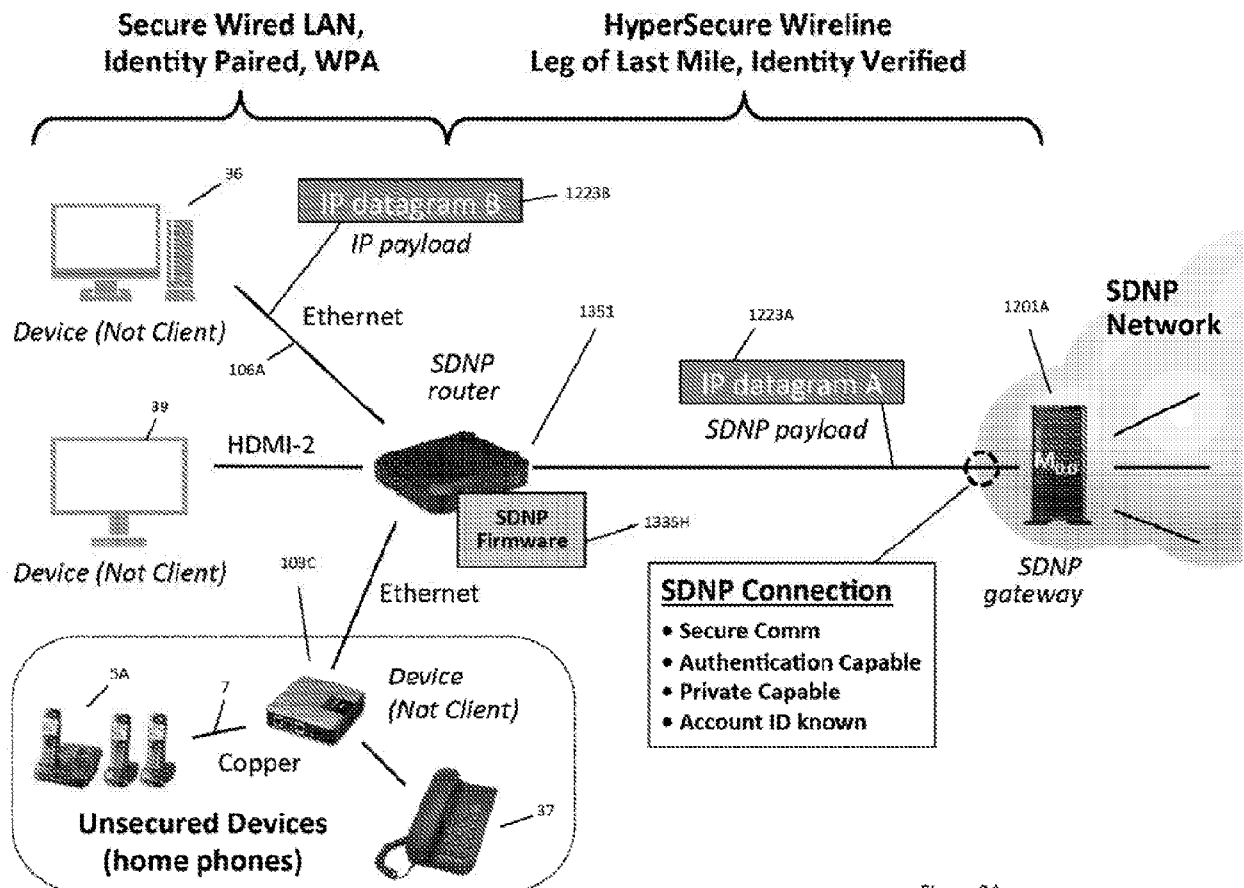


Figure 24

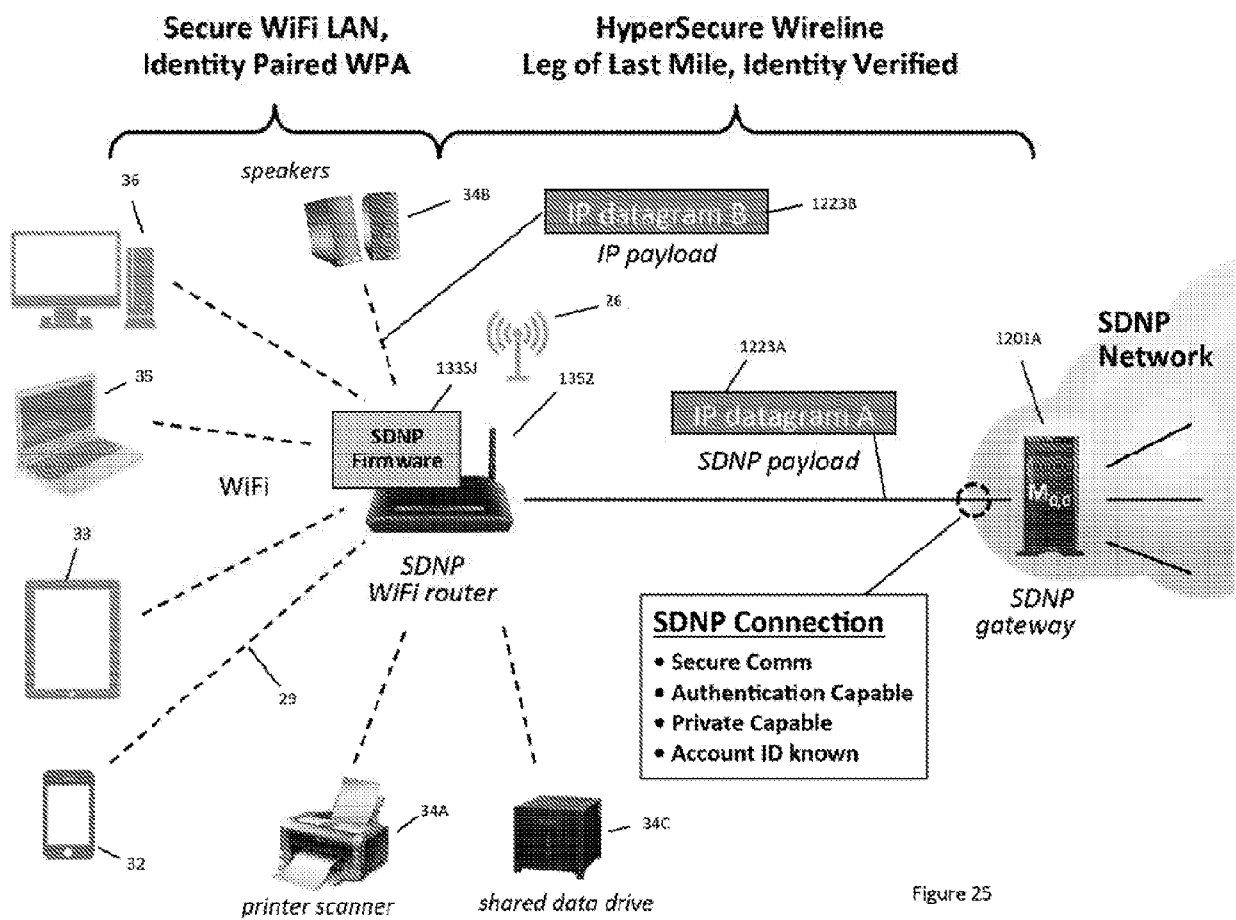


Figure 25

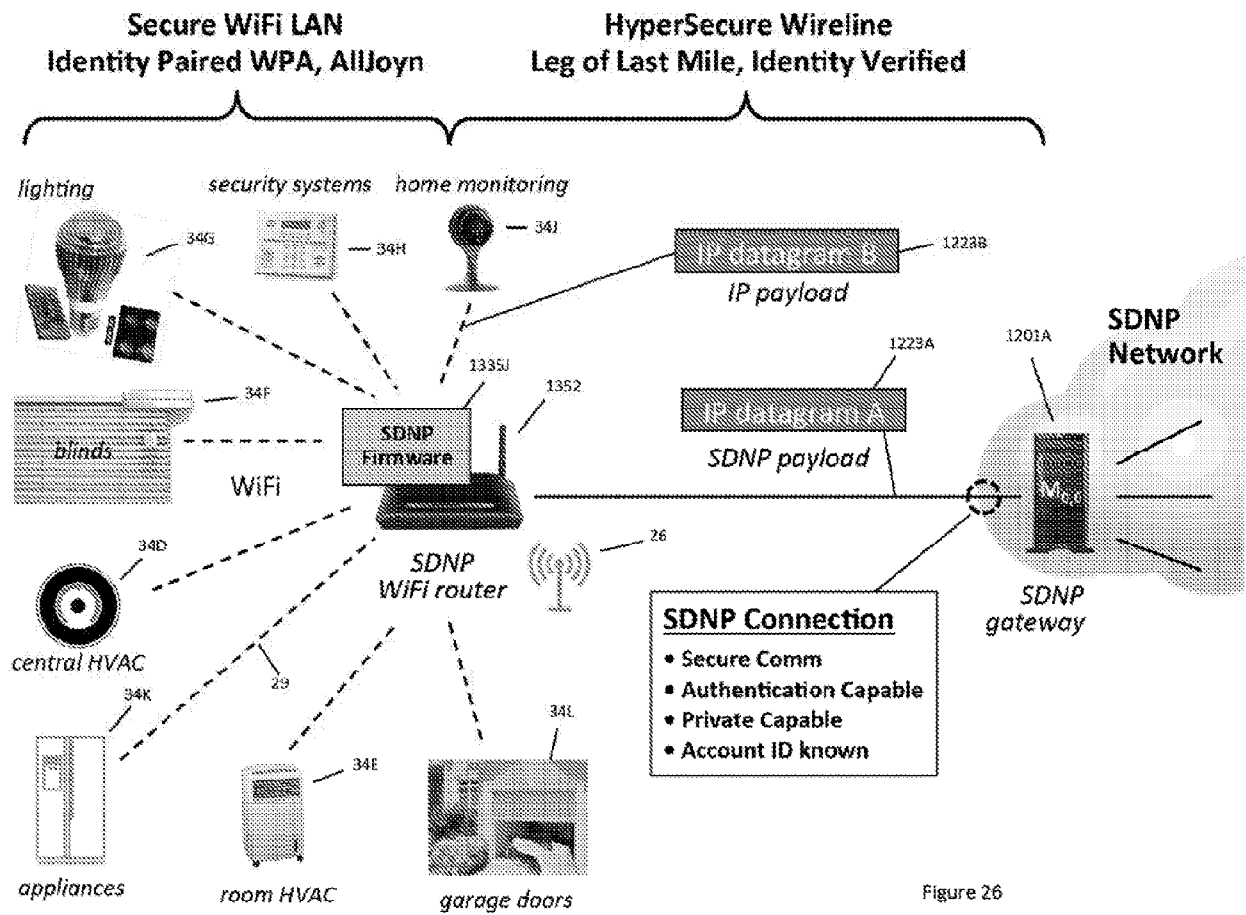


Figure 26

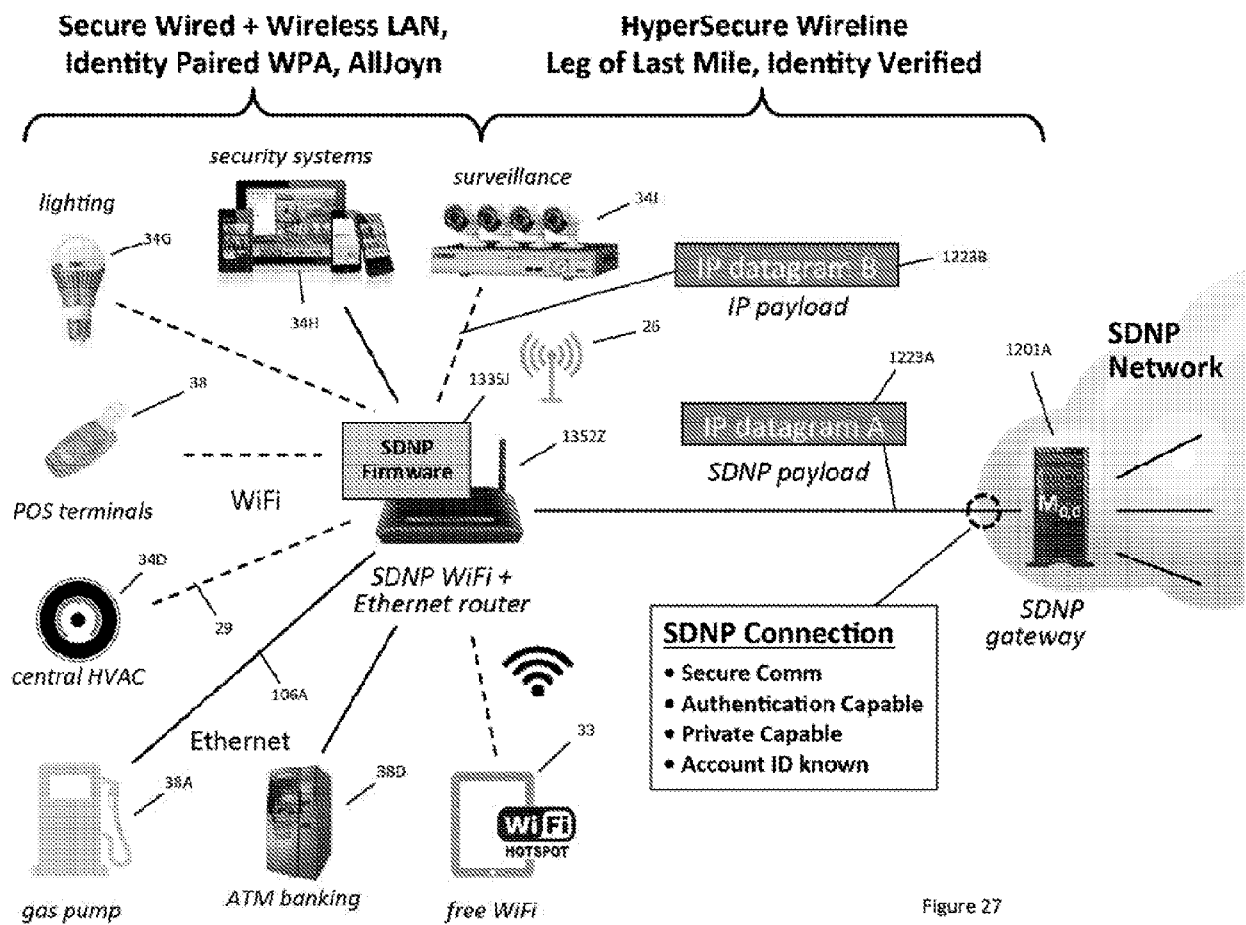
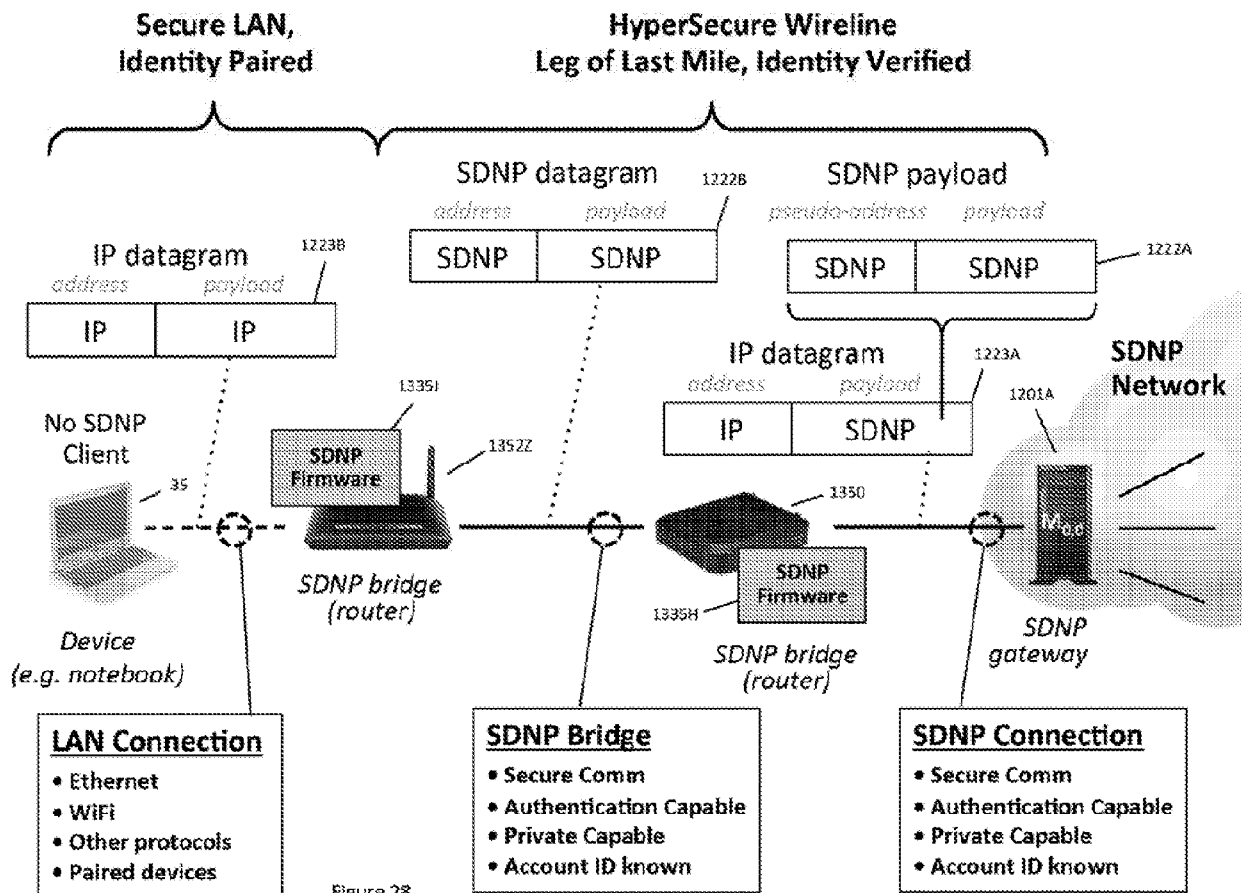


Figure 27



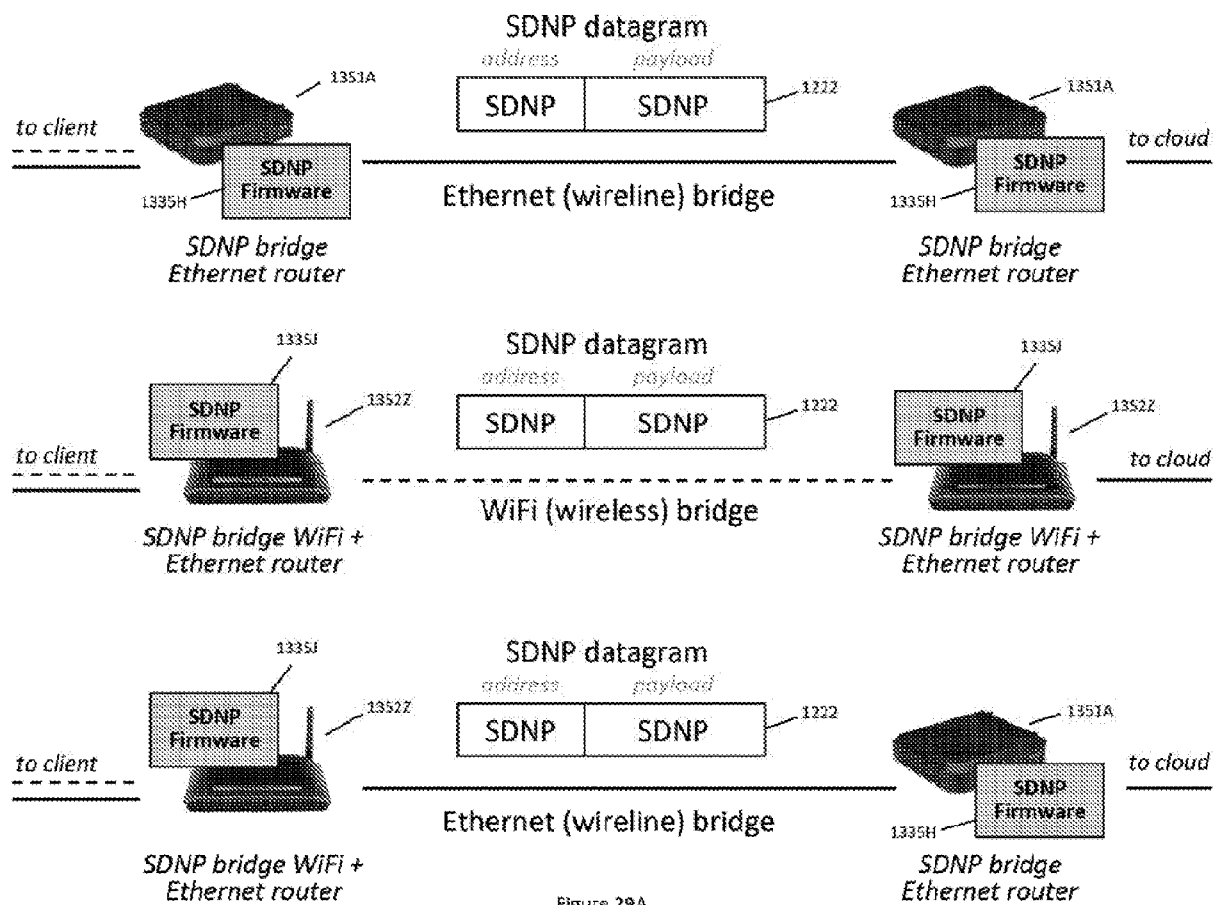


Figure 29A

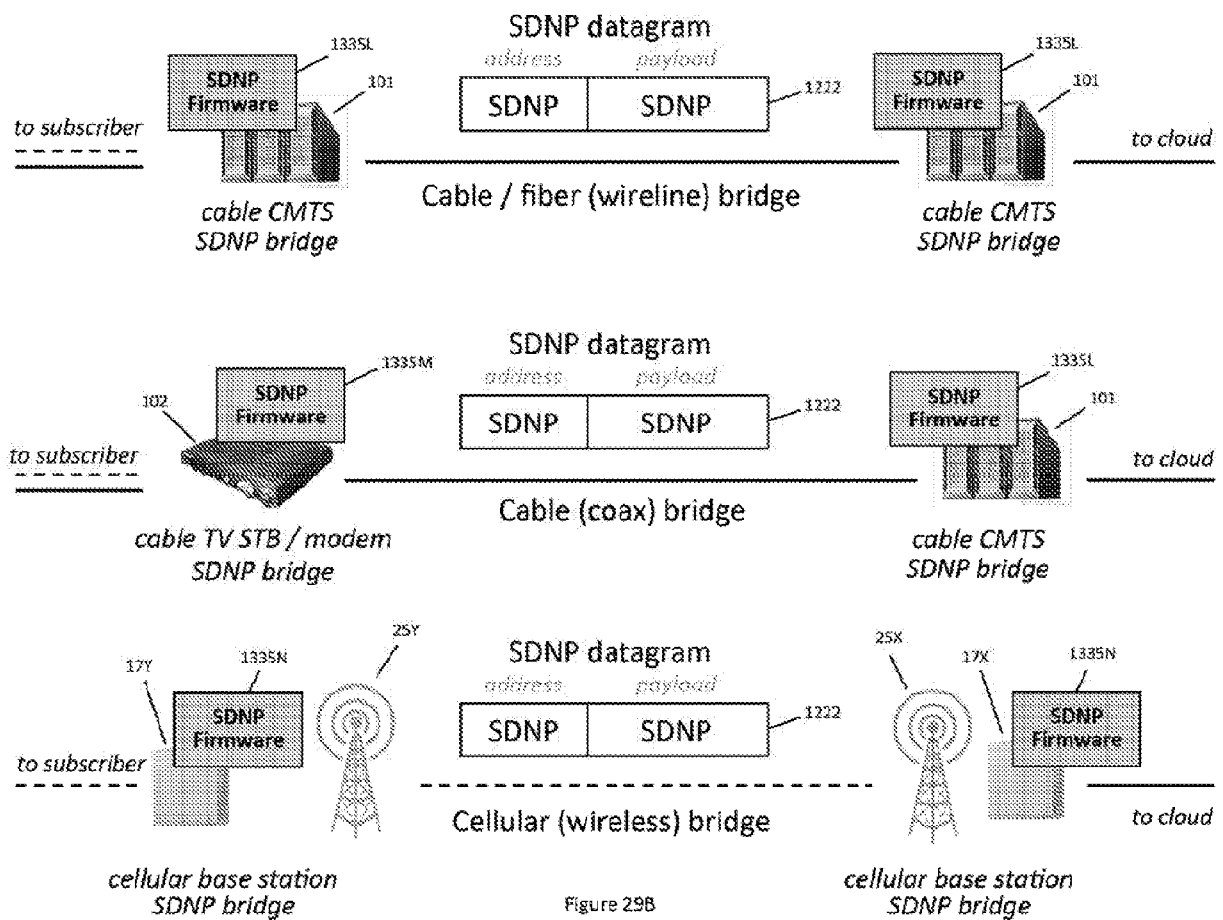


Figure 29B

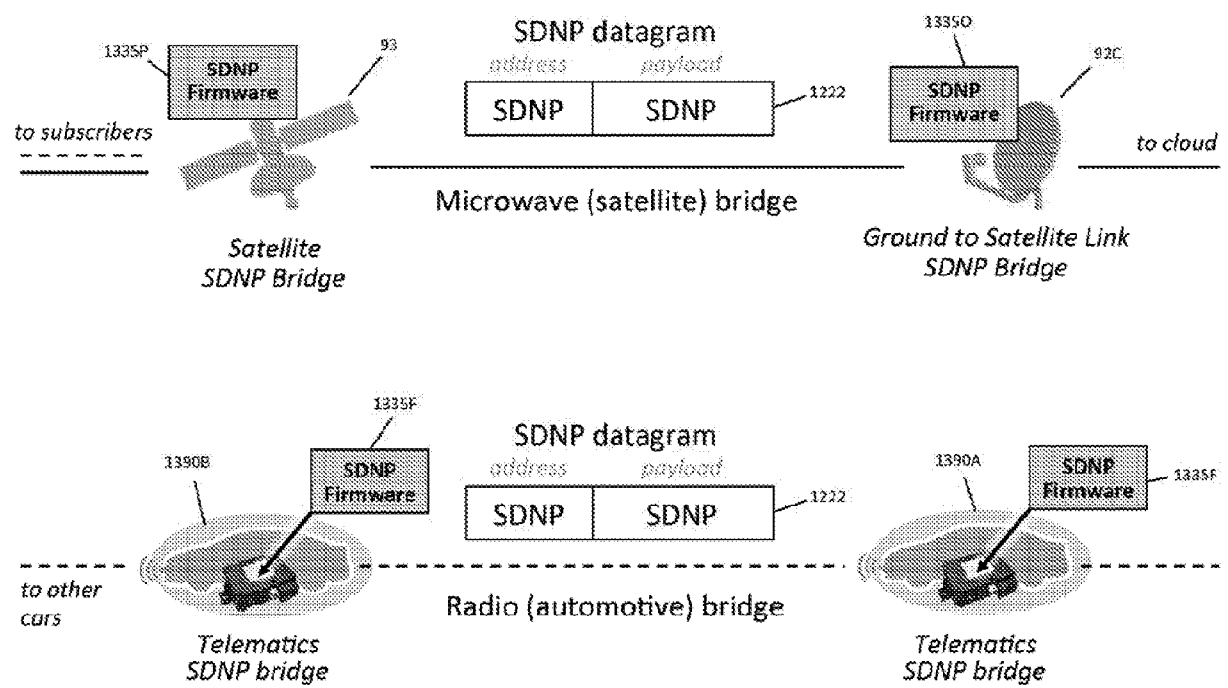


Figure 29C

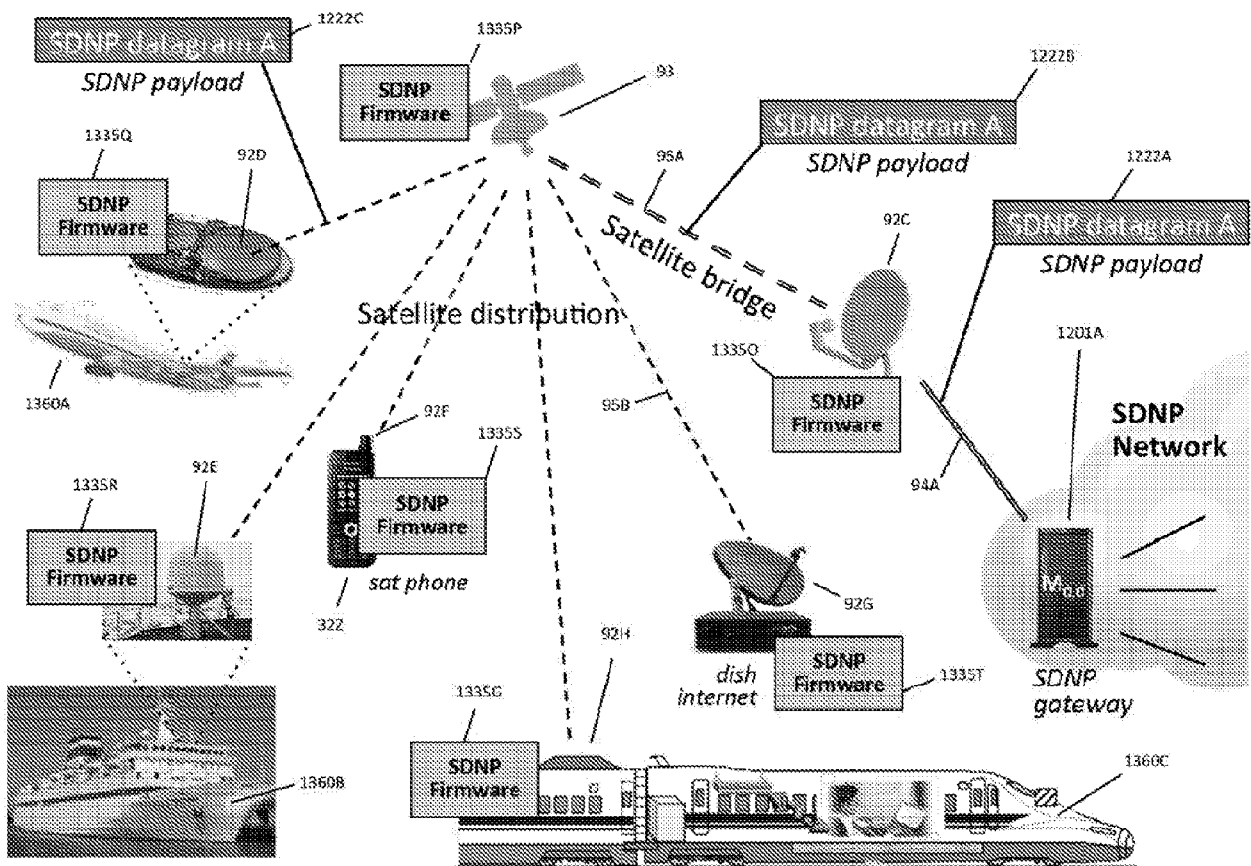


Figure 30

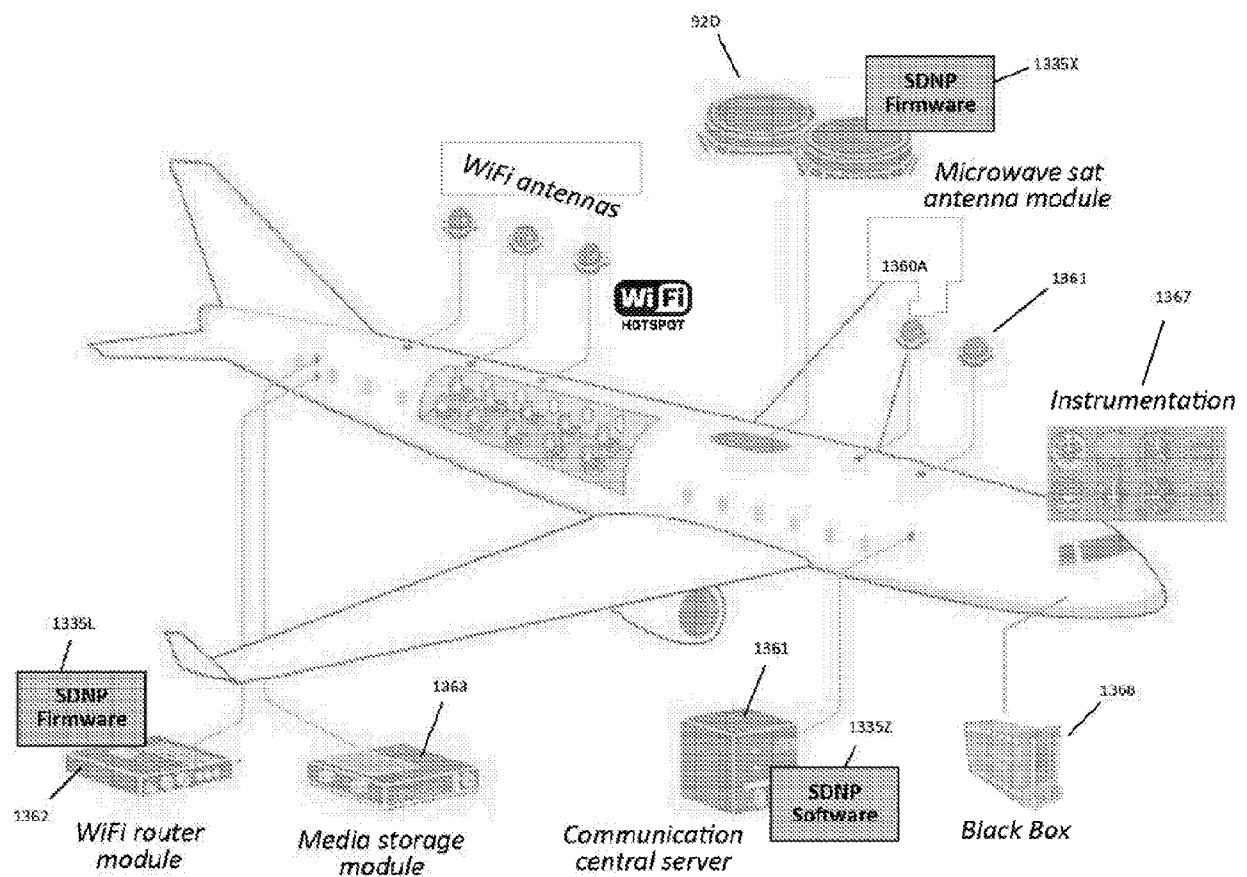


Figure 31A

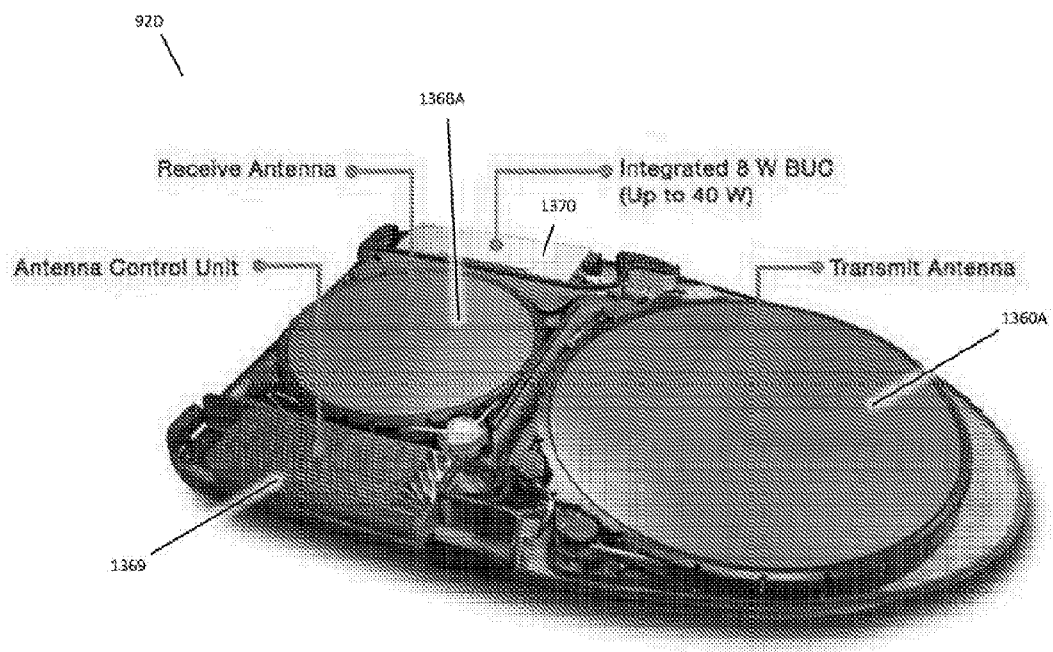
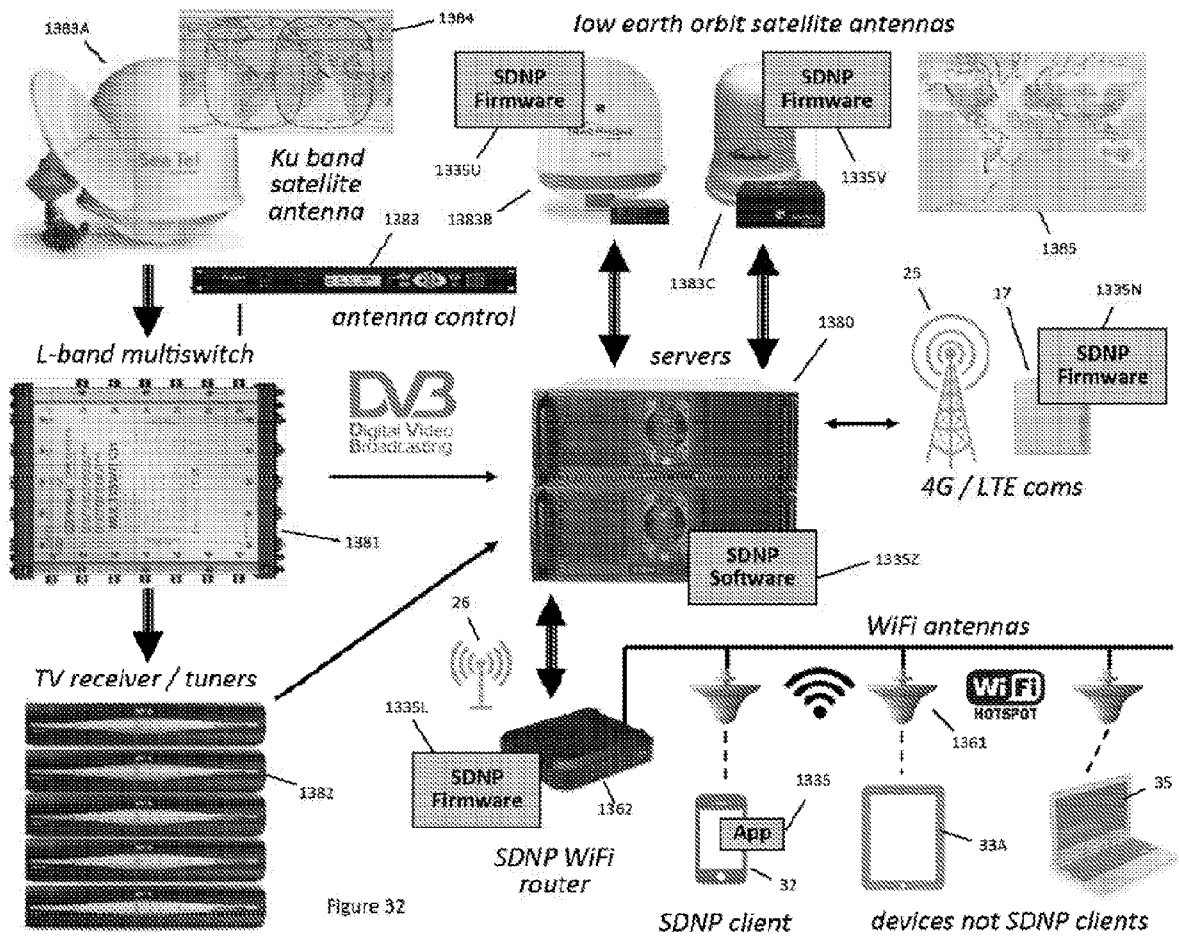
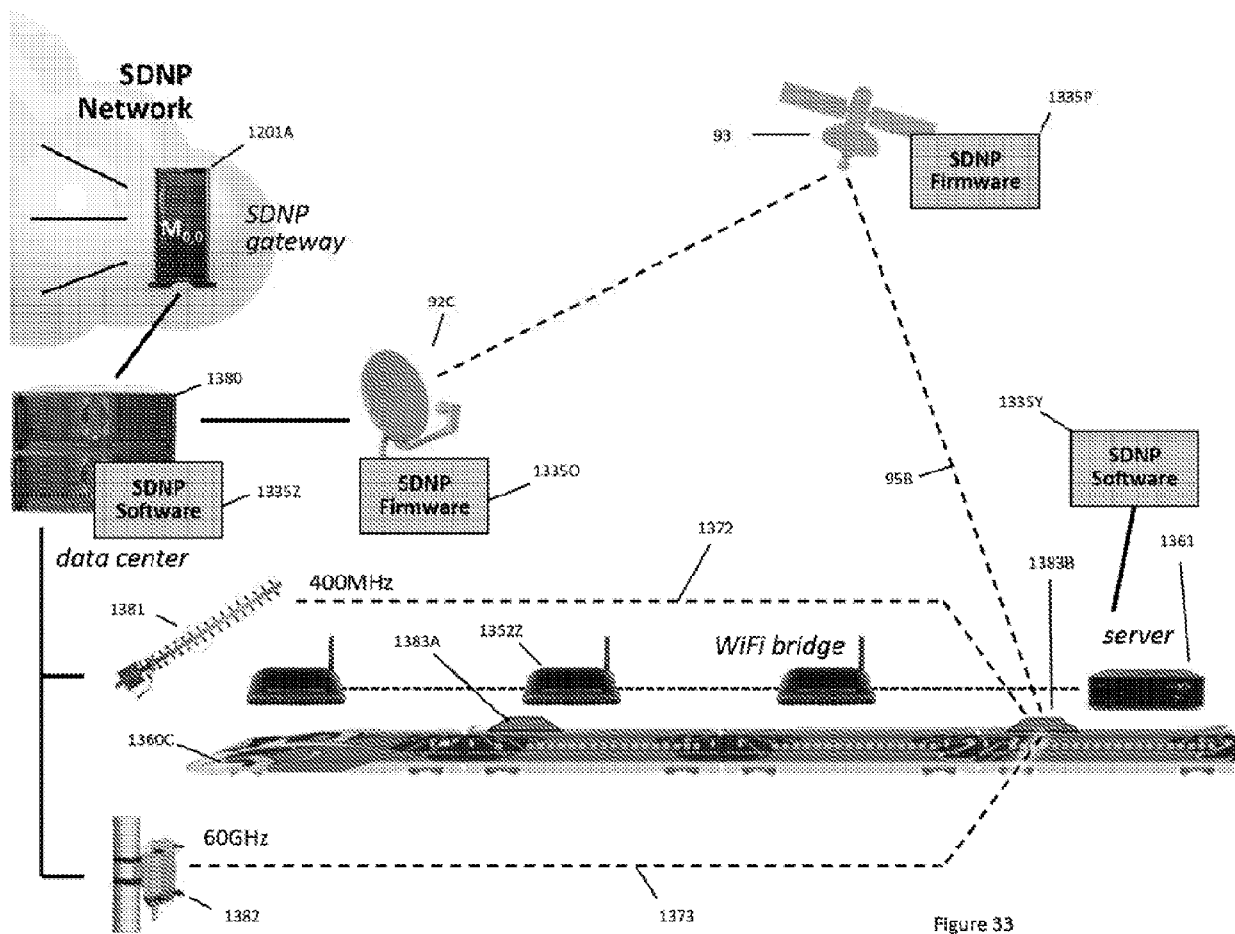


Figure 31B





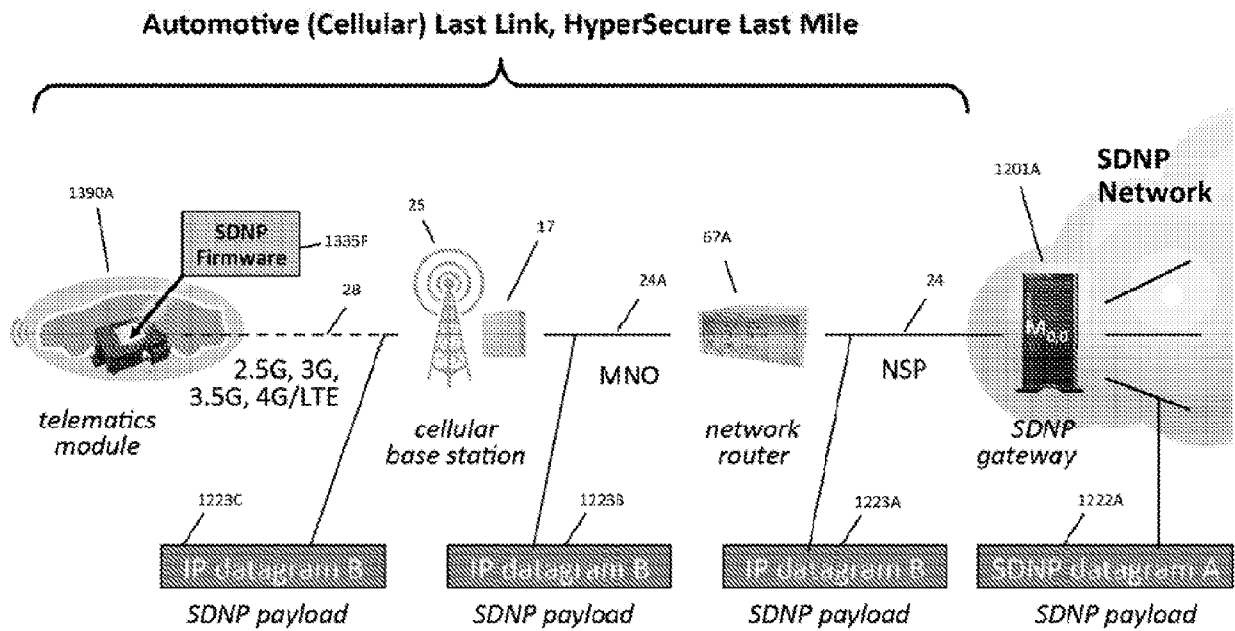


Figure 34

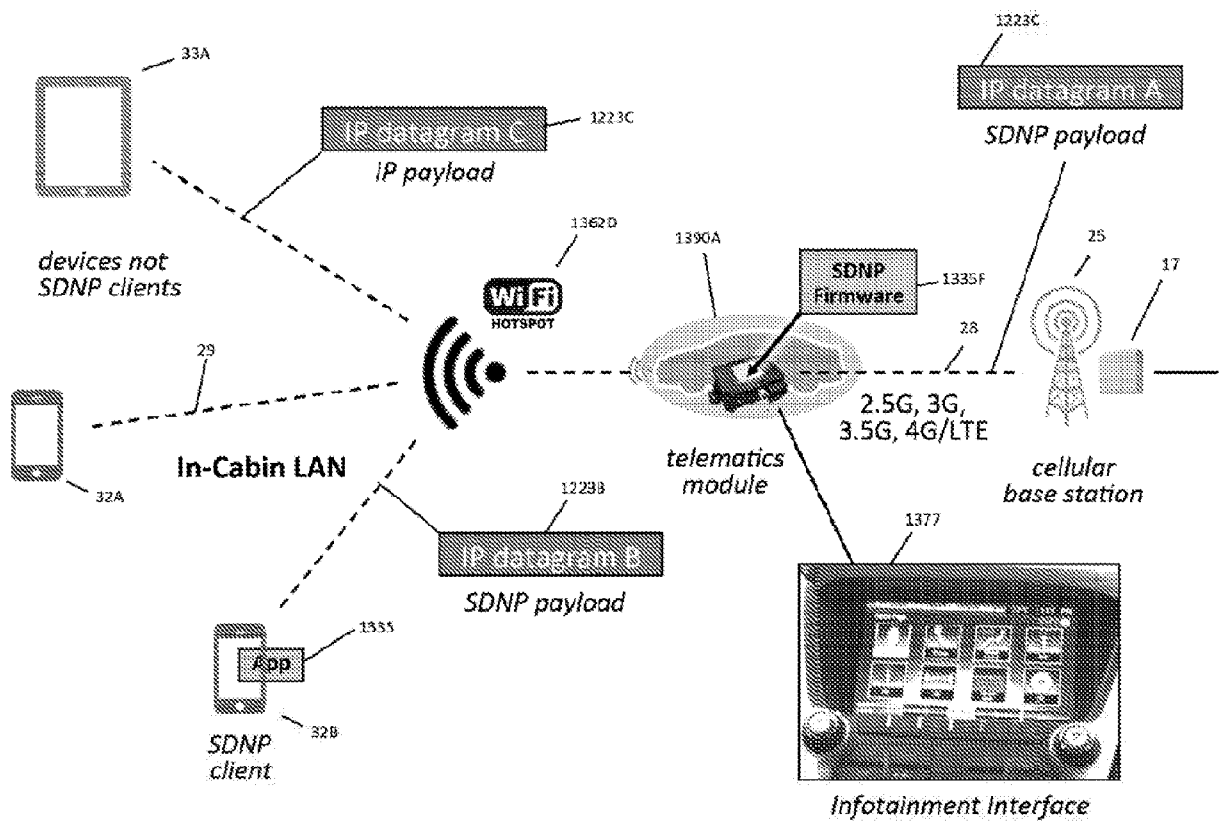


Figure 35

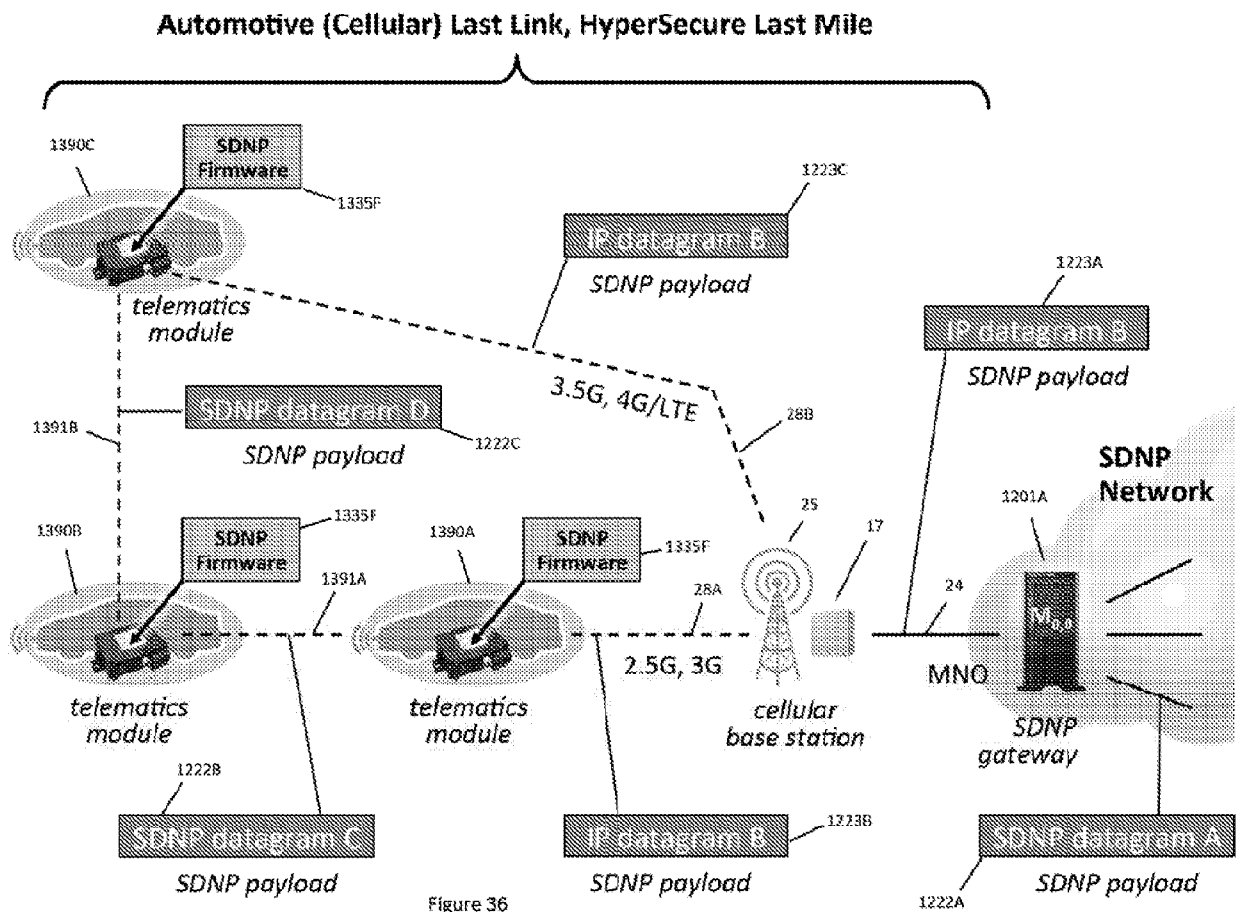


Figure 36

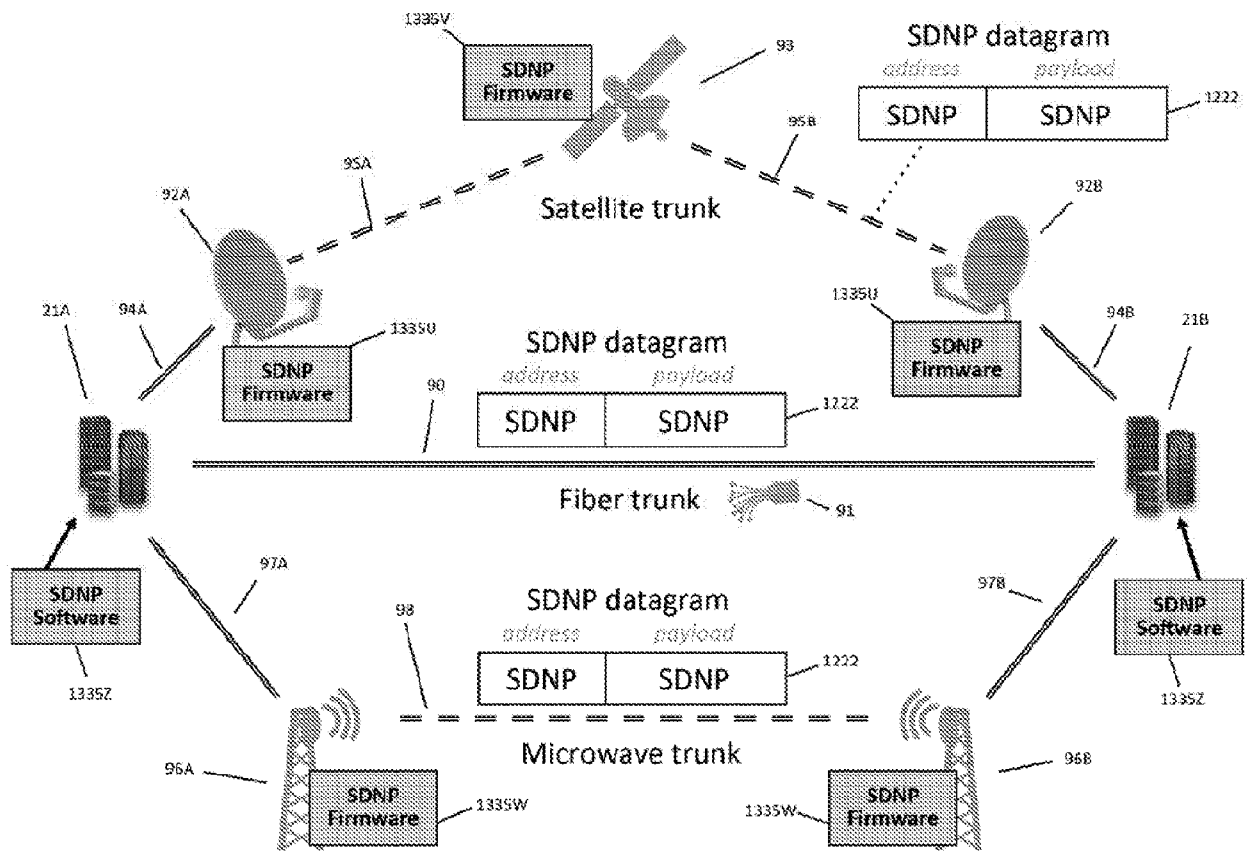
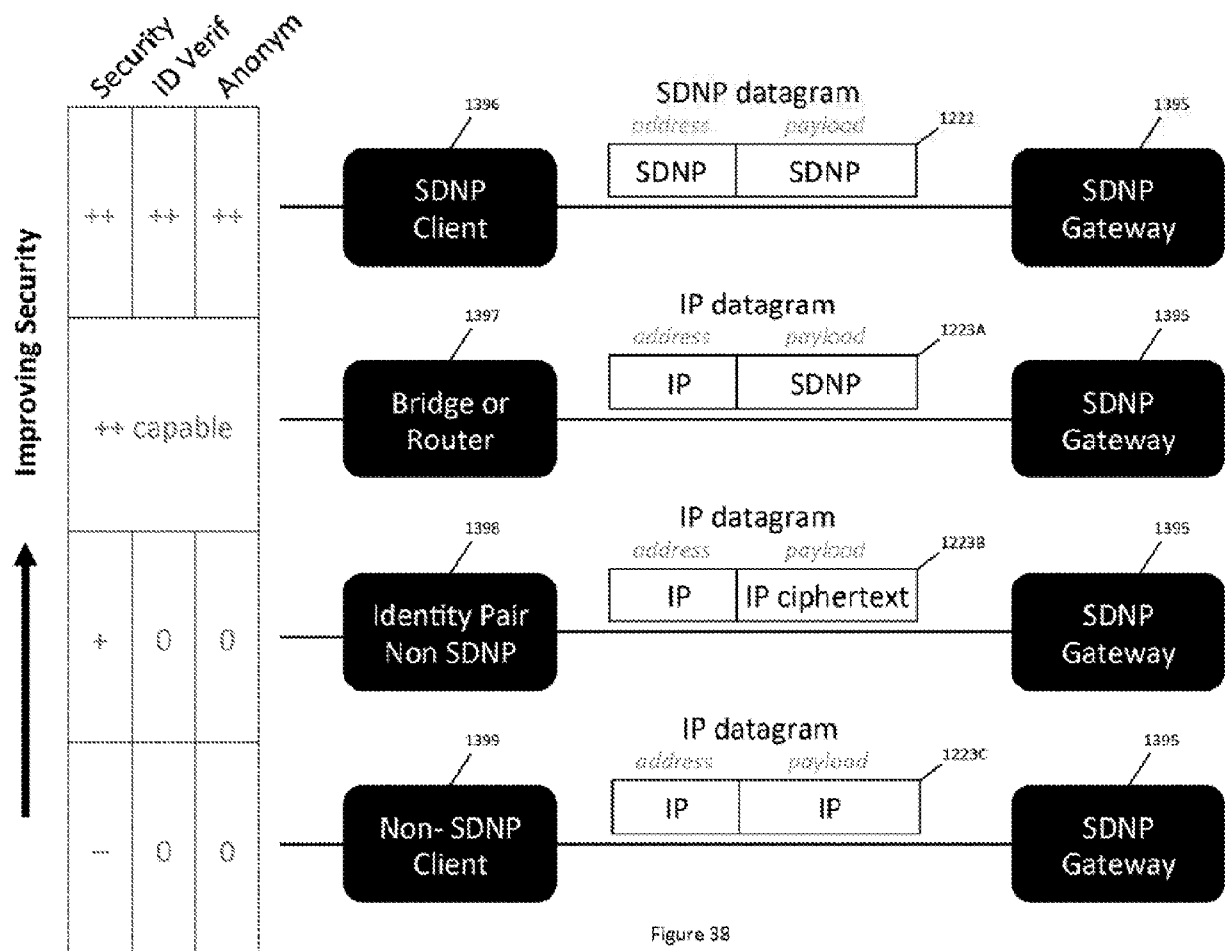


Figure 37



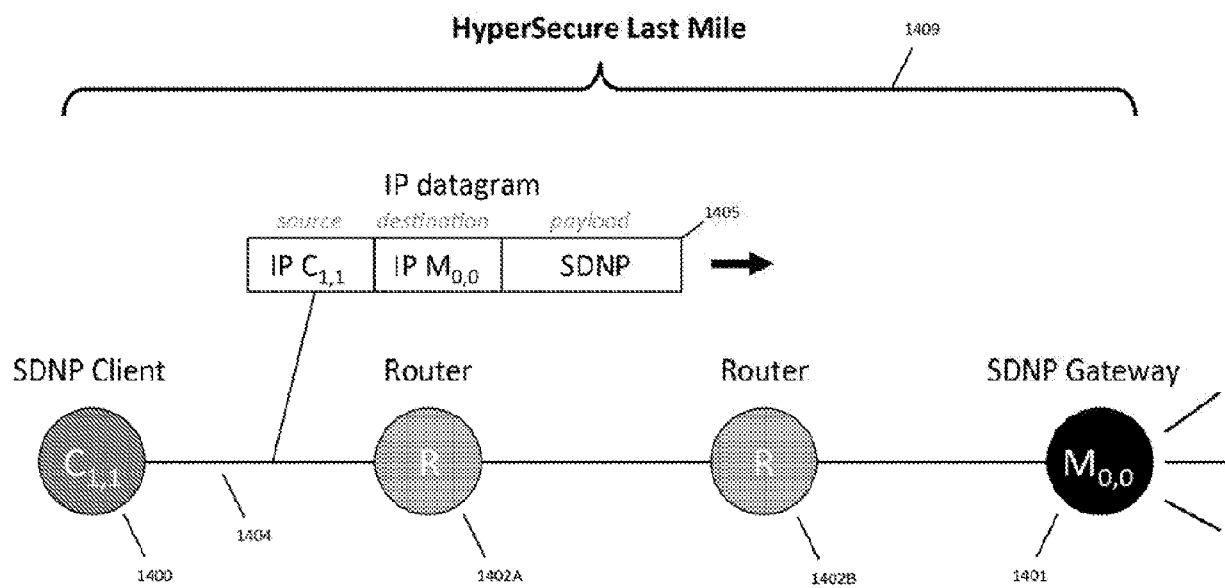


Figure 39

## SDNP Single Route Last Mile, Static Addressing

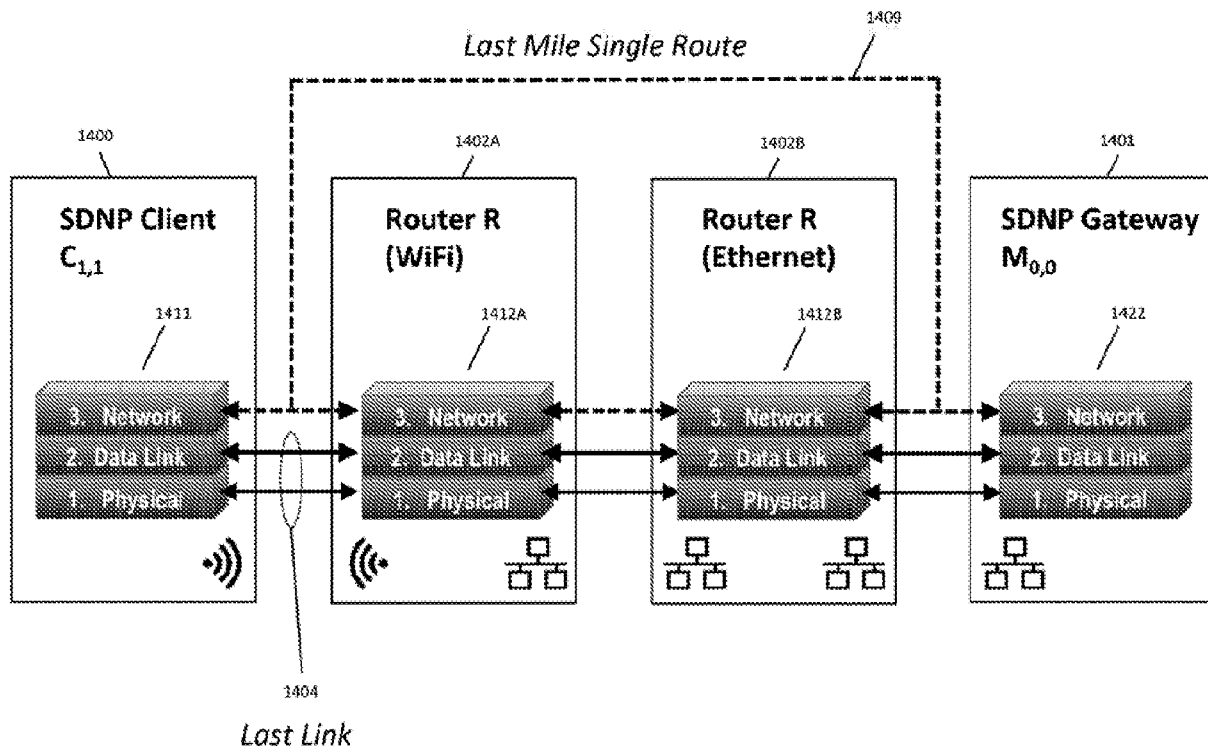


Figure 40A

## SDNP Single Route Last Mile, Static Addressing

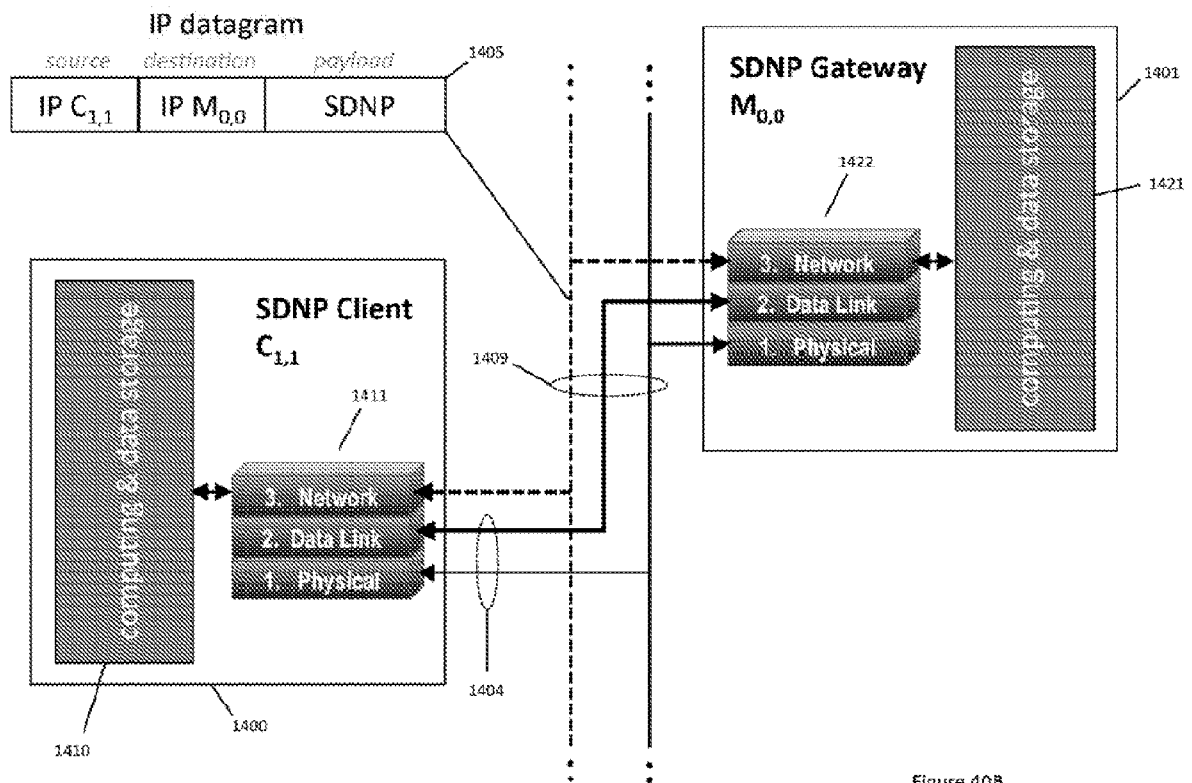


Figure 40B

## SDNP Single Route Last Mile, Dynamic Client Addressing

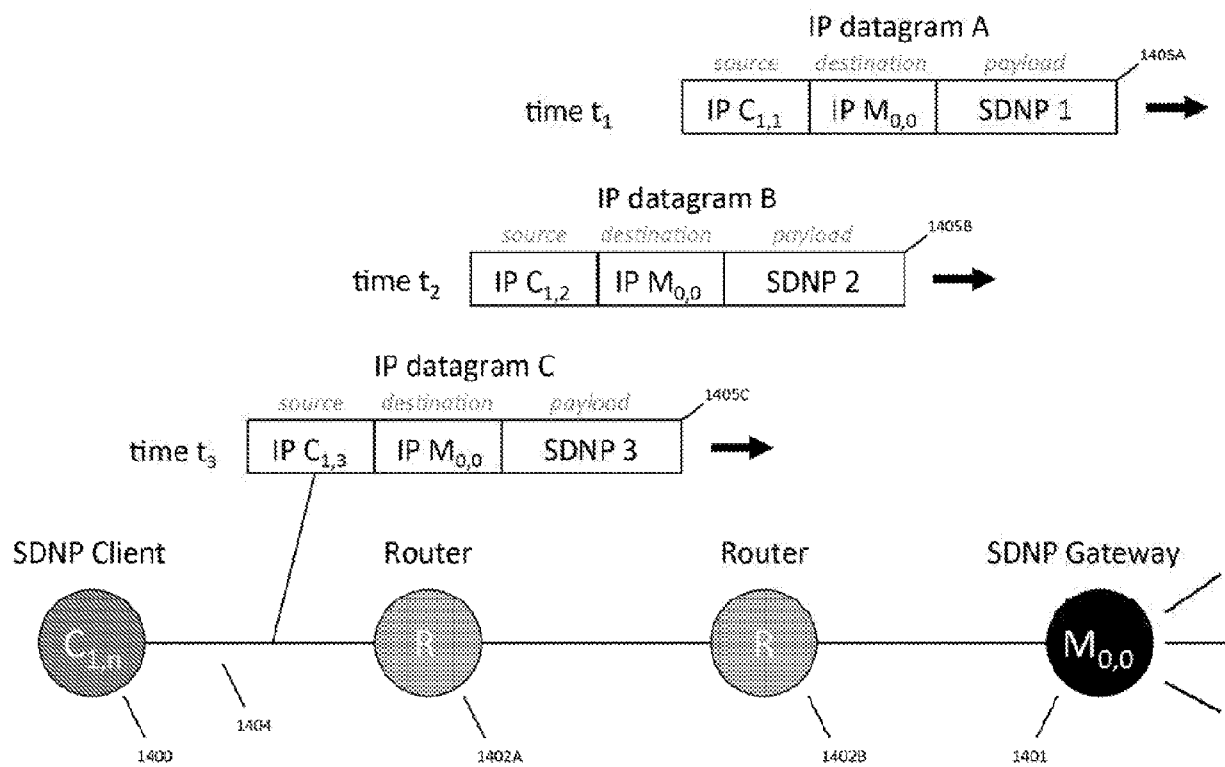


Figure 41

## SDNP Single Route Last Mile, Dynamic Client Addressing

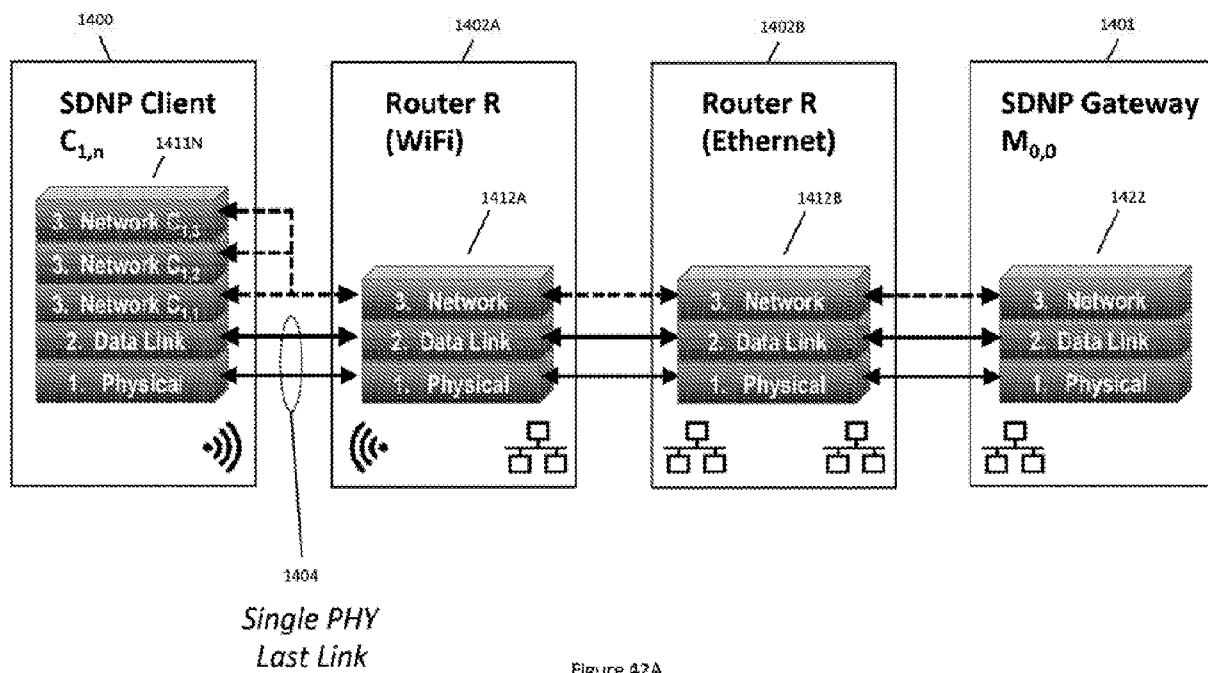


Figure 42A

## SDNP Single Route Last Mile, Dynamic Client Addressing

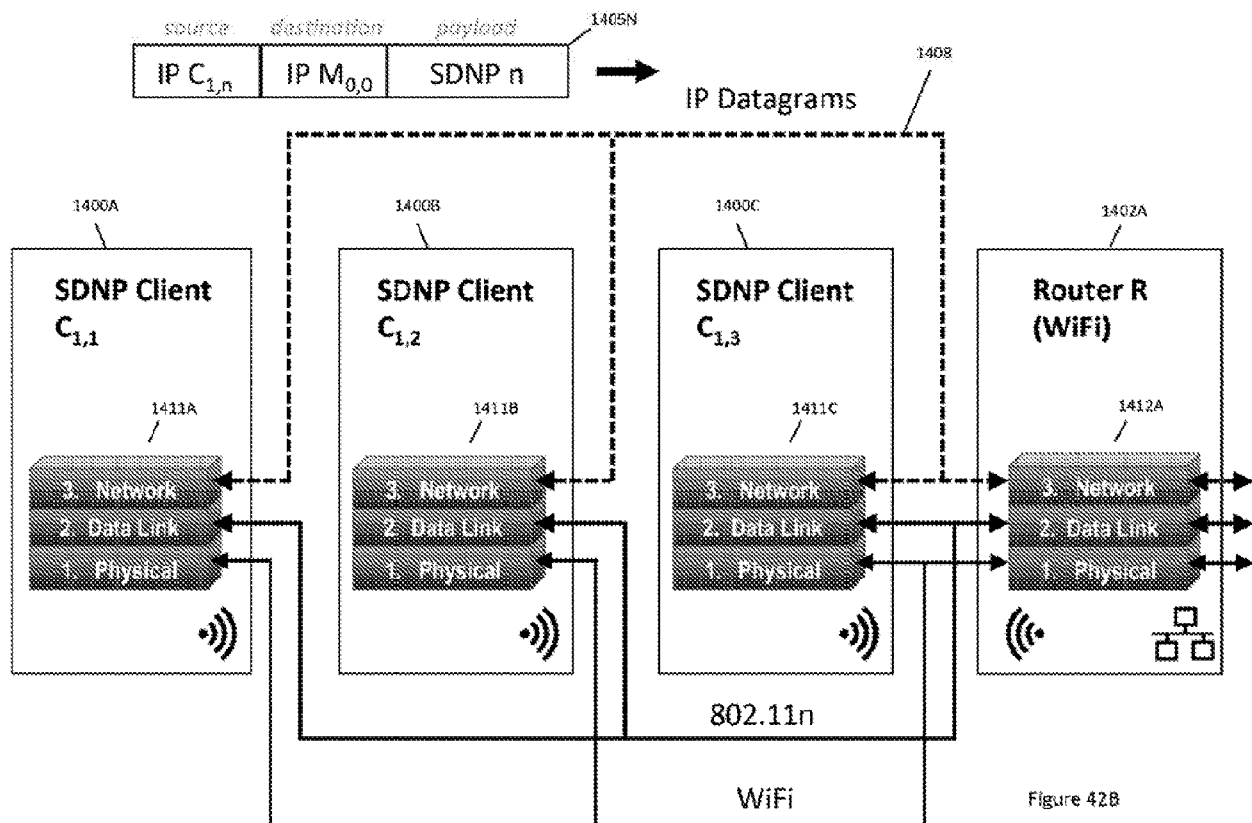


Figure 42B

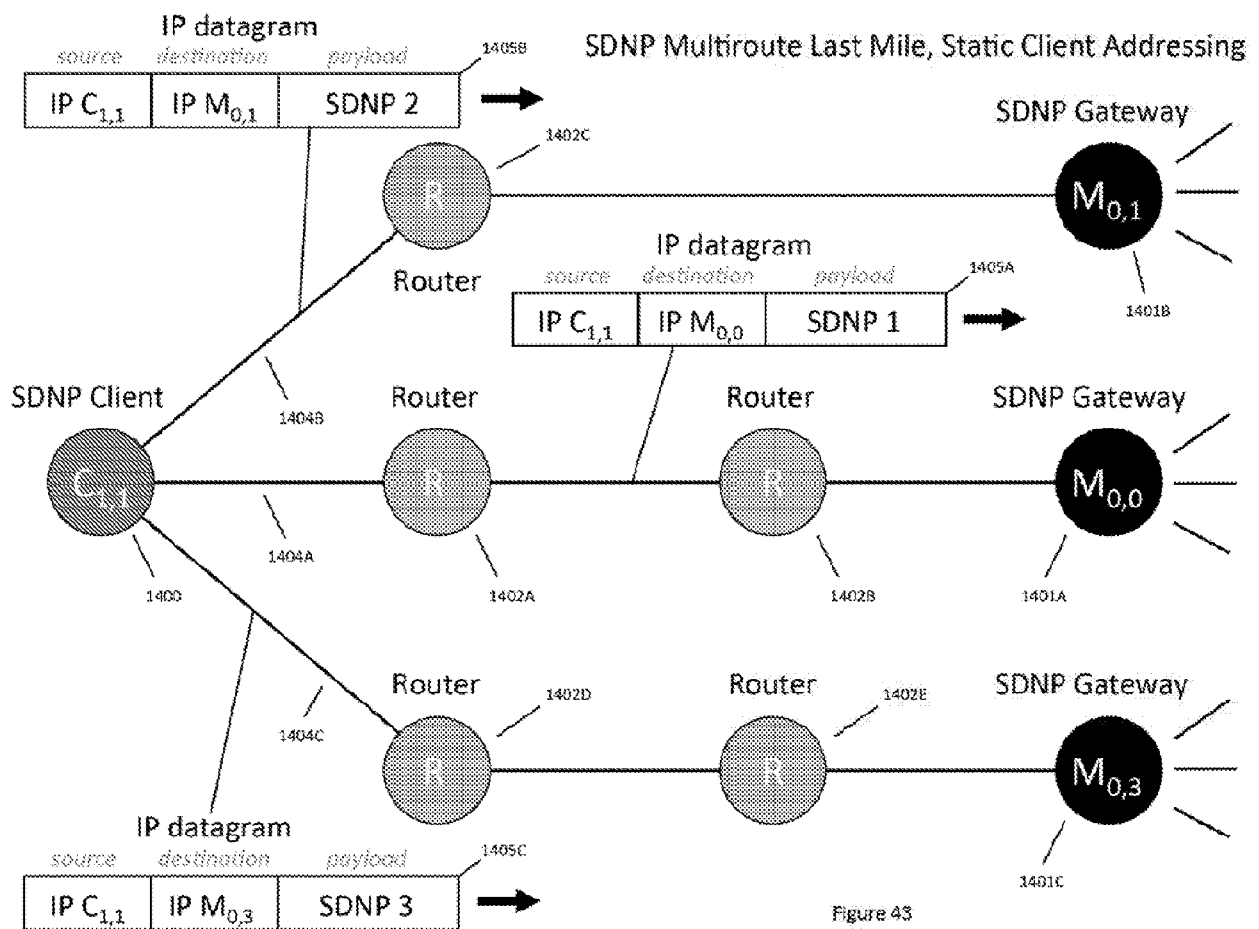


Figure 43

SDNP Multiroute Last Mile, Static Addressing, Expanded Single-PHY Last Link

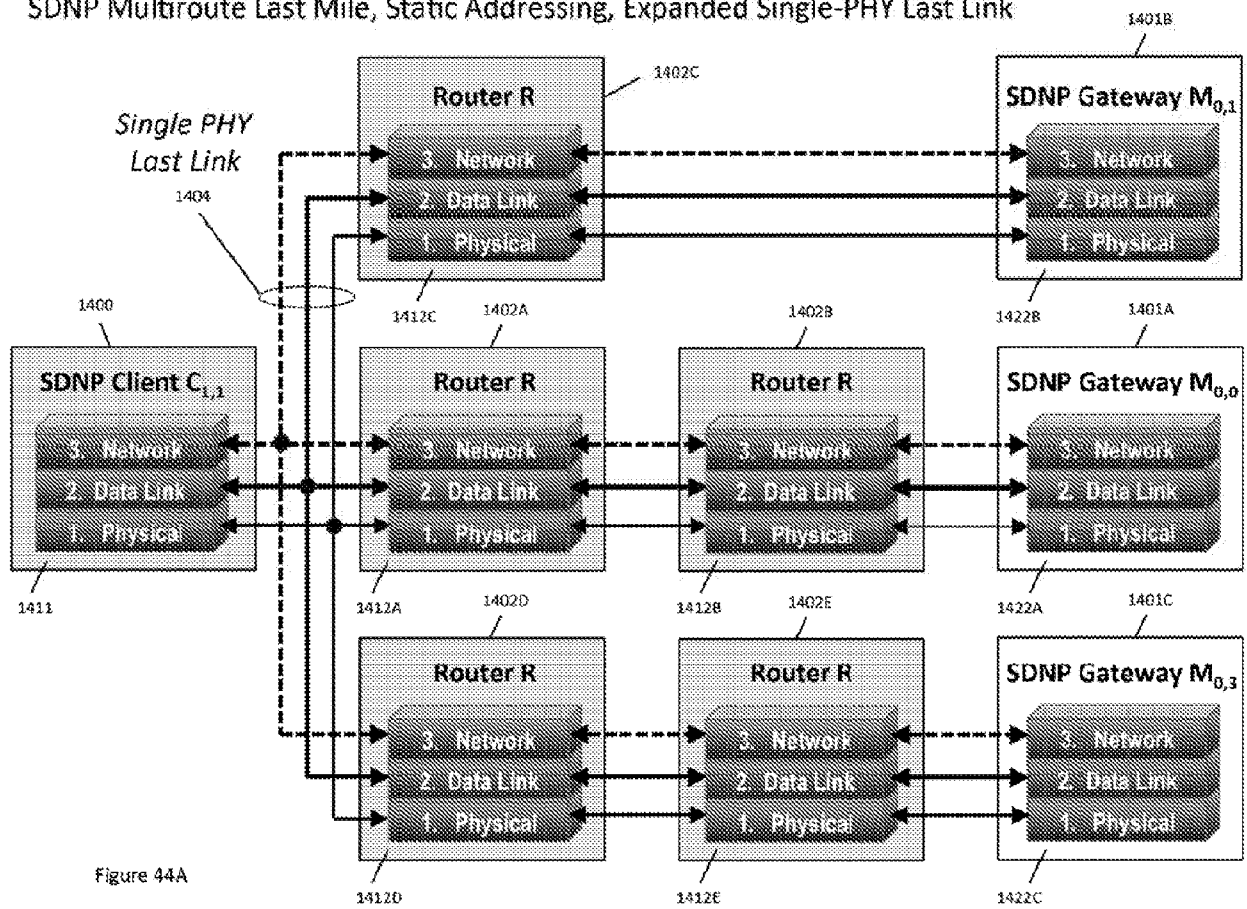
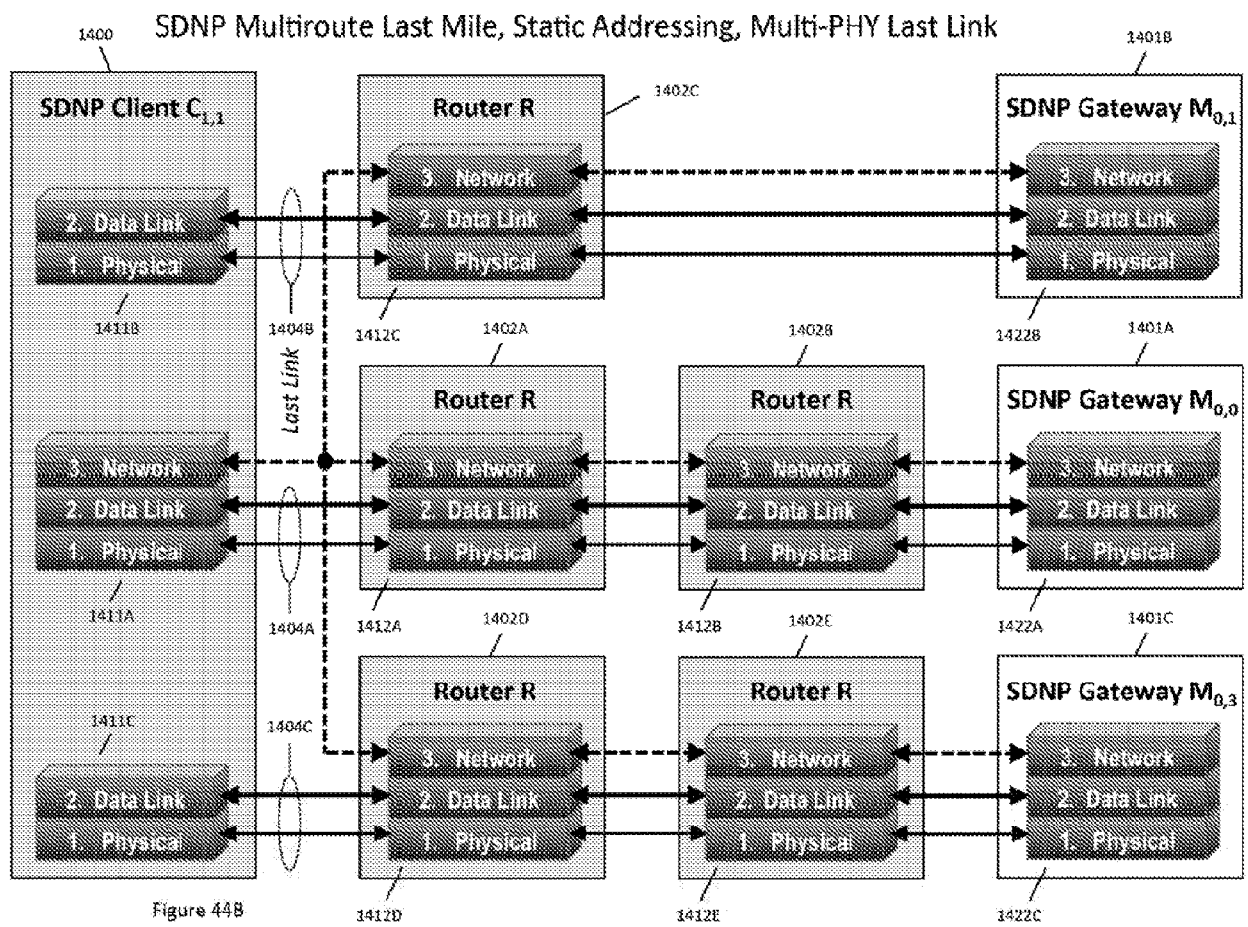
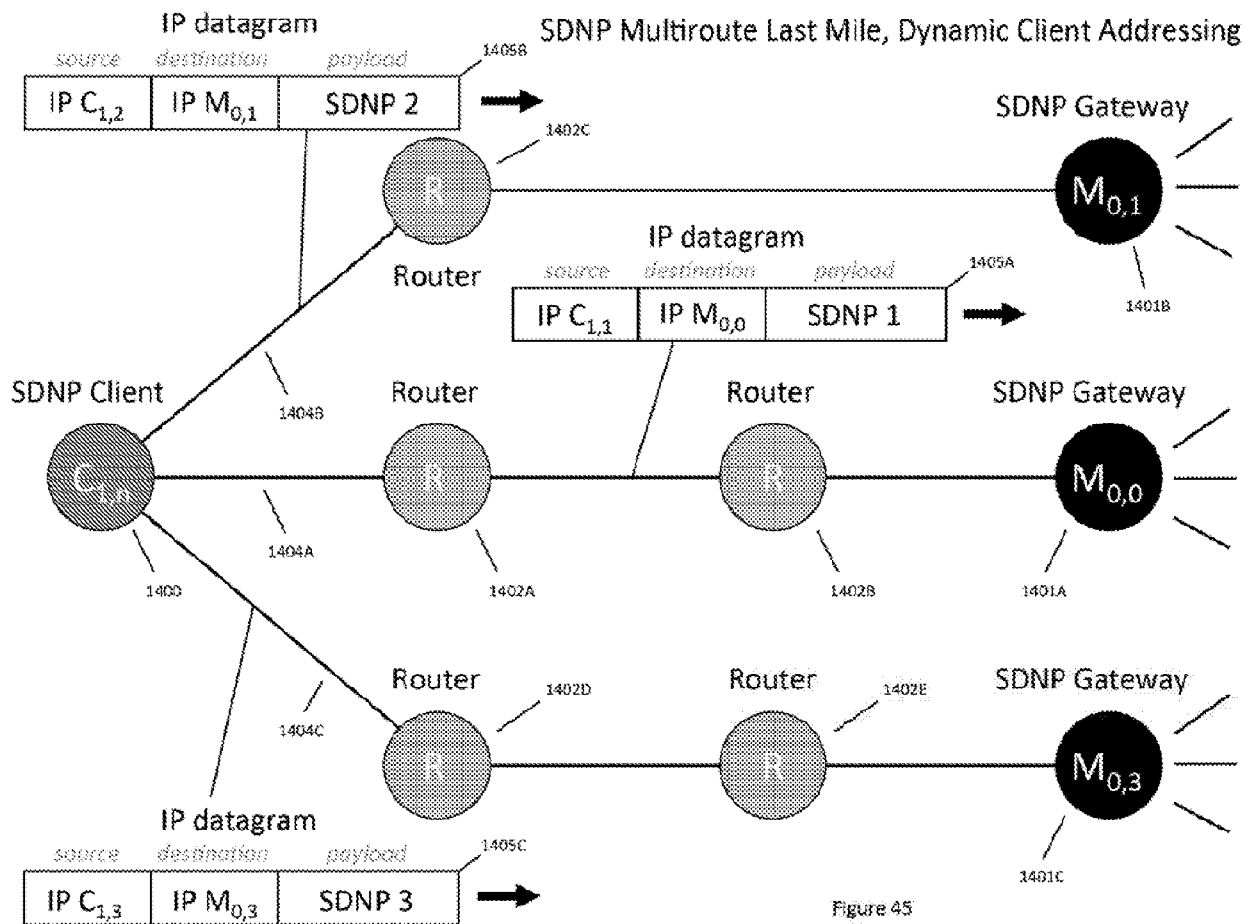
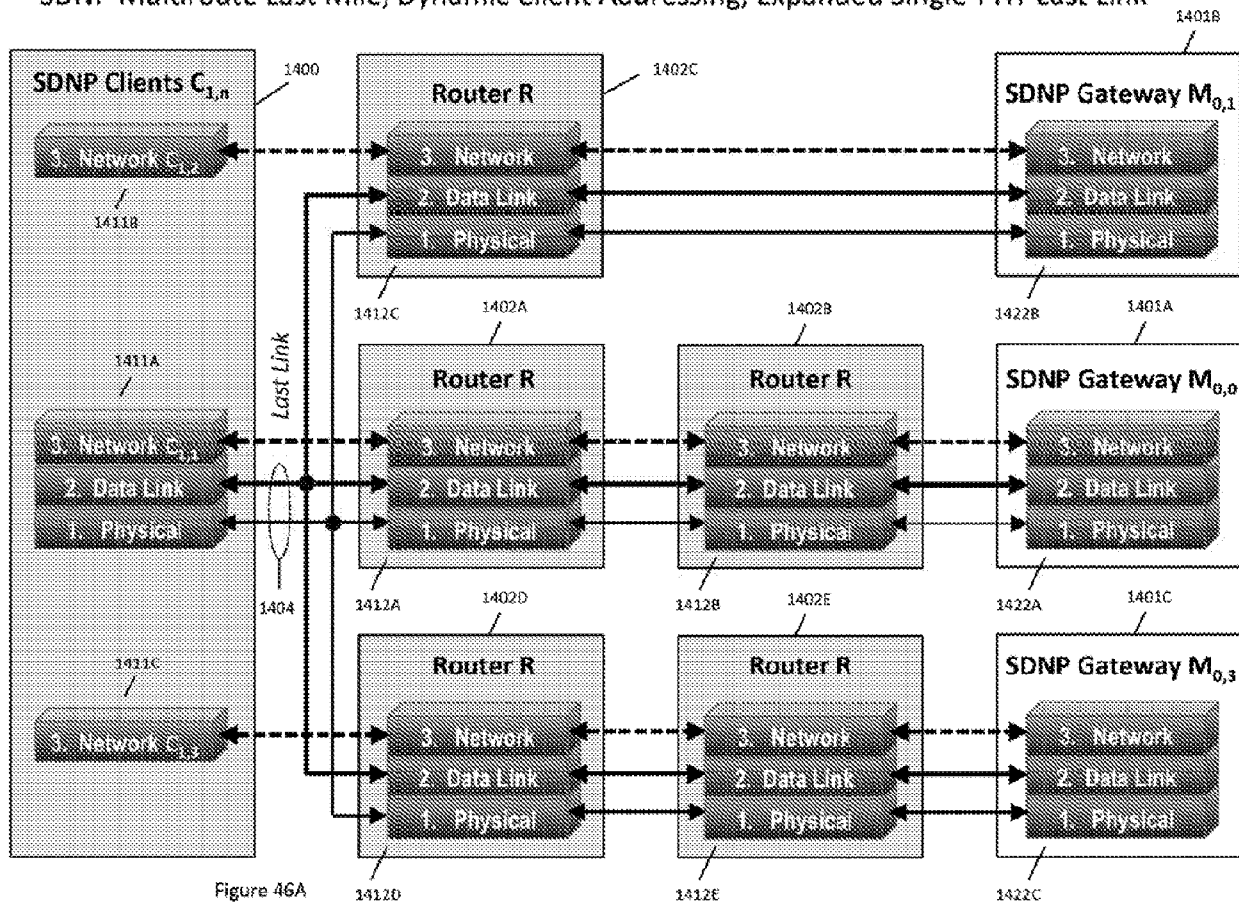


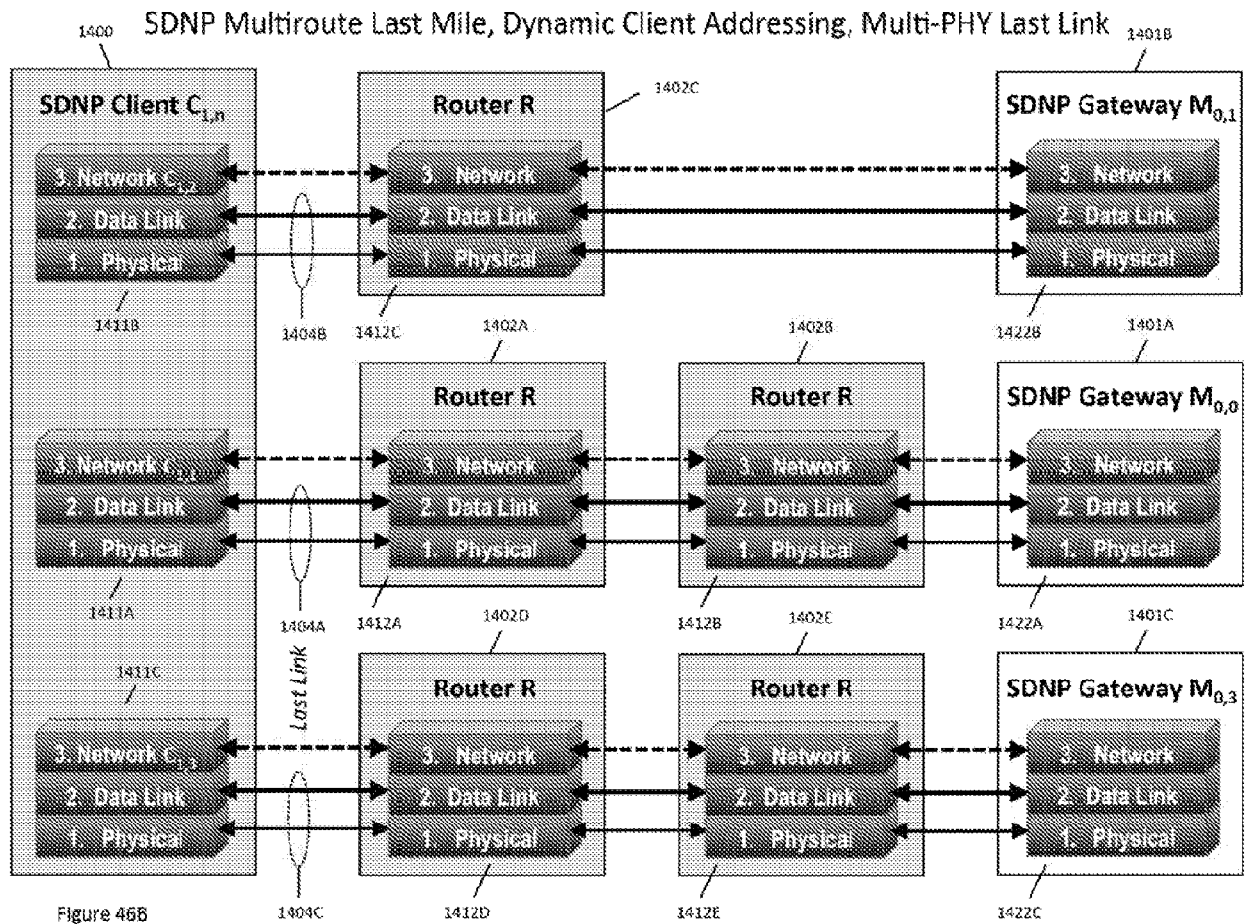
Figure 44A





SDNP Multiroute Last Mile, Dynamic Client Addressing, Expanded Single-PHY Last Link





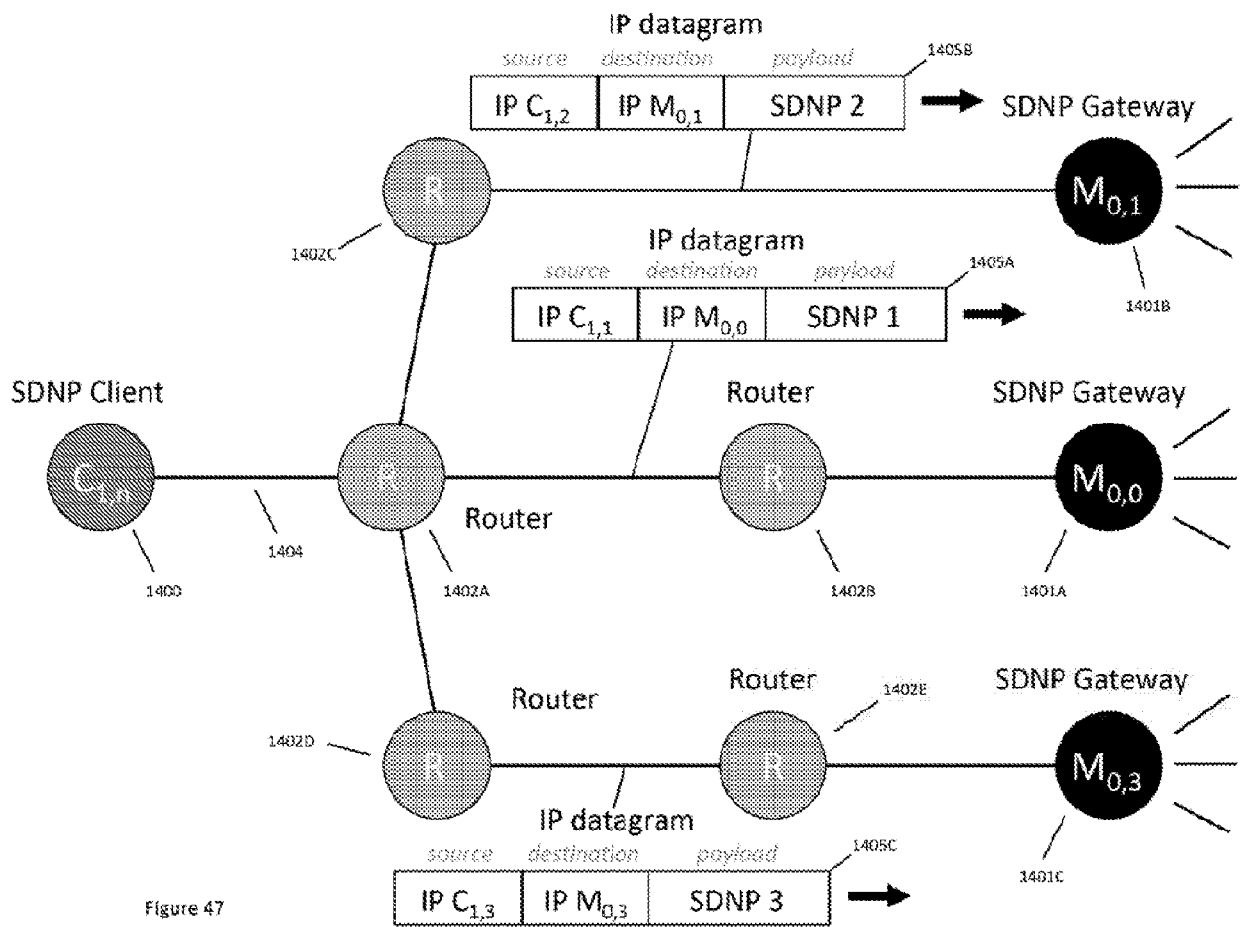


Figure 47



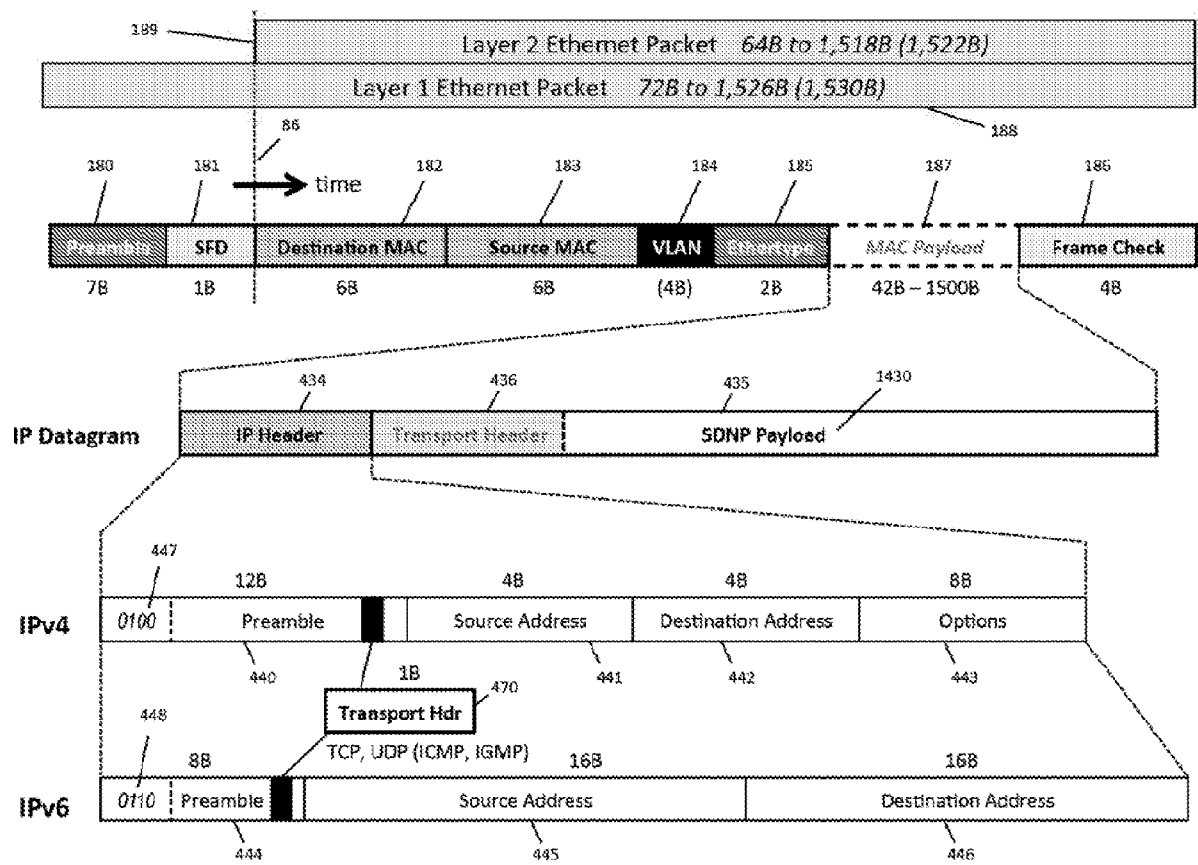
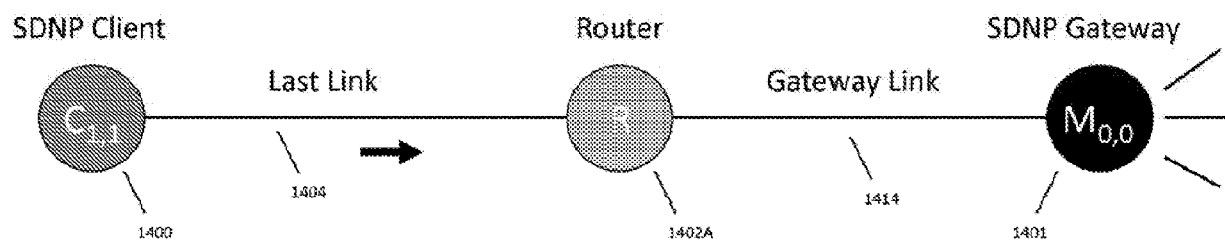


Figure 49



#### Last Link Ethernet Packet (Client to SDNP Cloud)

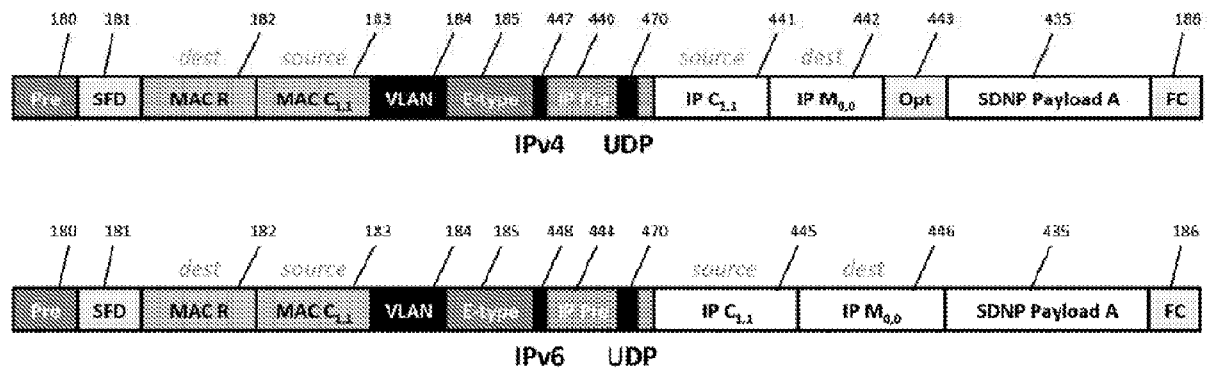
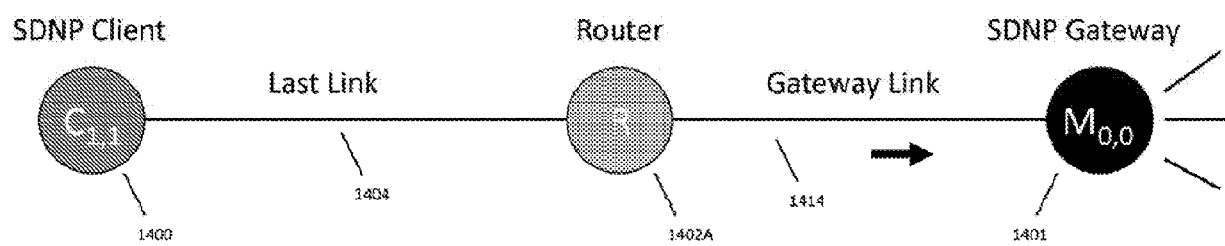


Figure 50A



#### Gateway Link Ethernet Packet (Client to SDNP Cloud)

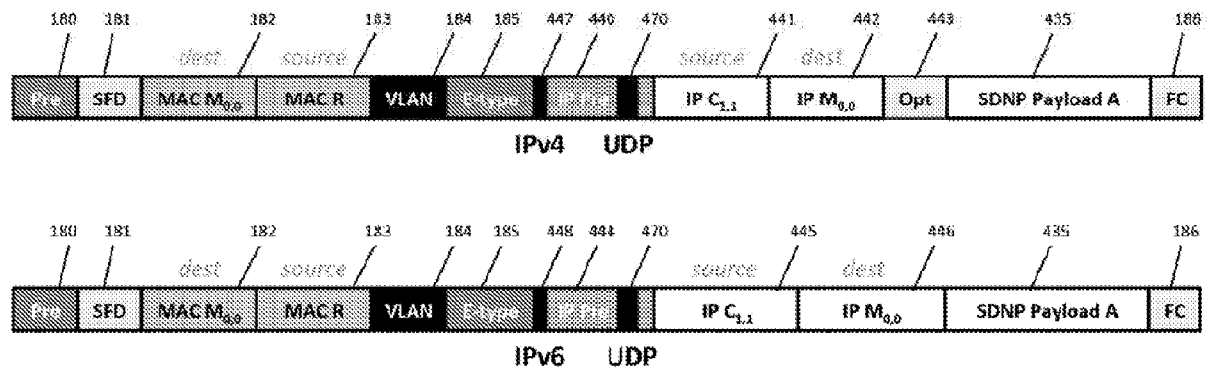
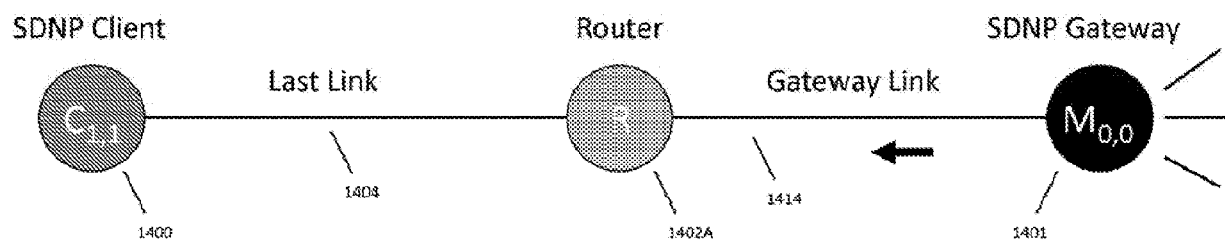


Figure 50B



### Gateway Link Ethernet Packet (SDNP Cloud to Client)

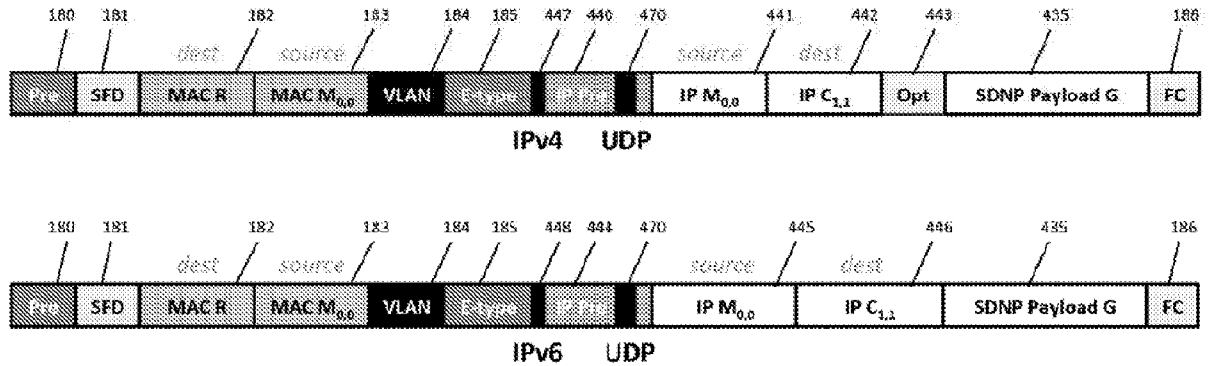
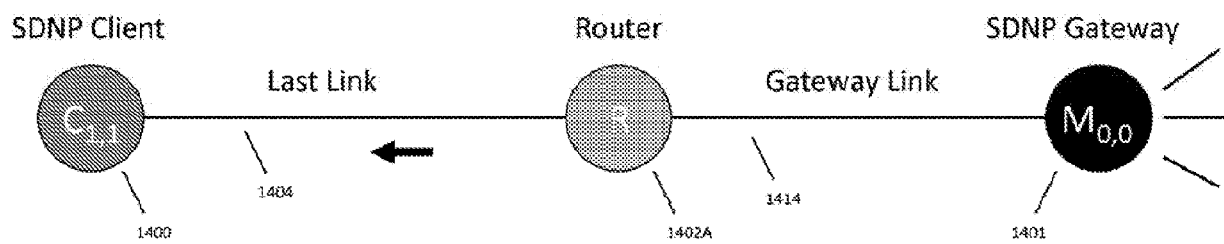


Figure 50C



#### Last Link Ethernet Packet (SDNP Cloud to Client)

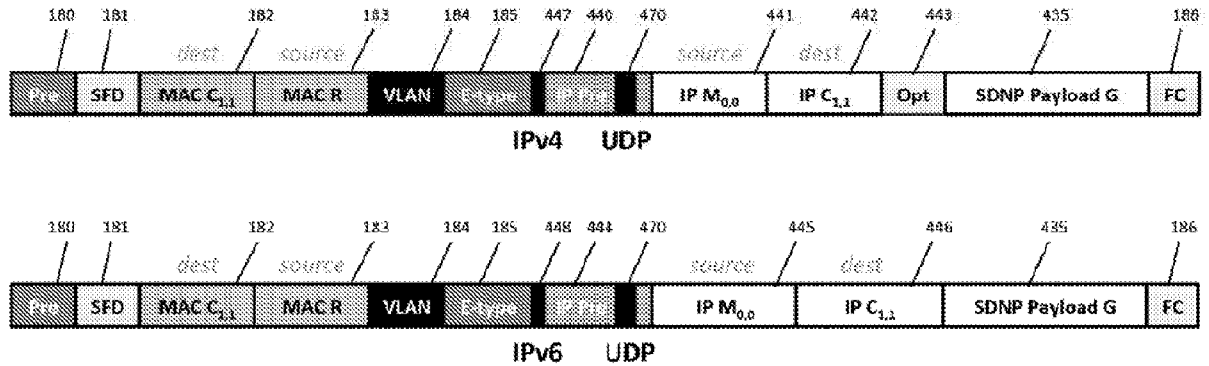
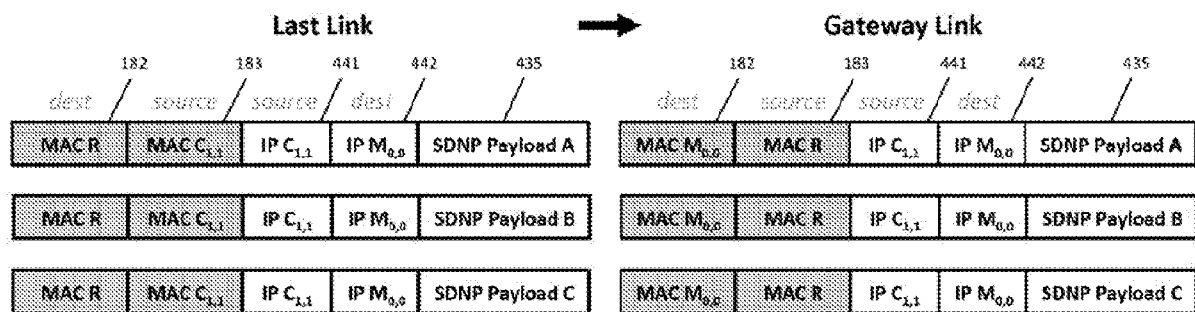


Figure 50D

## SDNP Single Route Last Mile, Static Client Addressing, Single-PHY Last Link



## SDNP Single Route Last Mile, Static Client Addressing, Multi-PHY Last Link

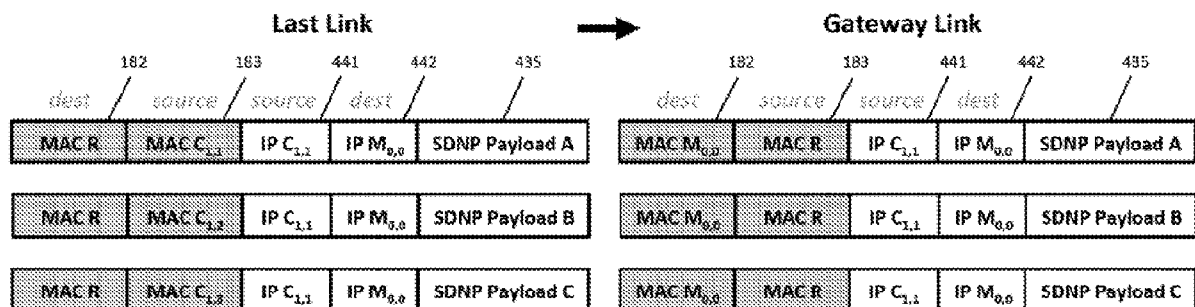
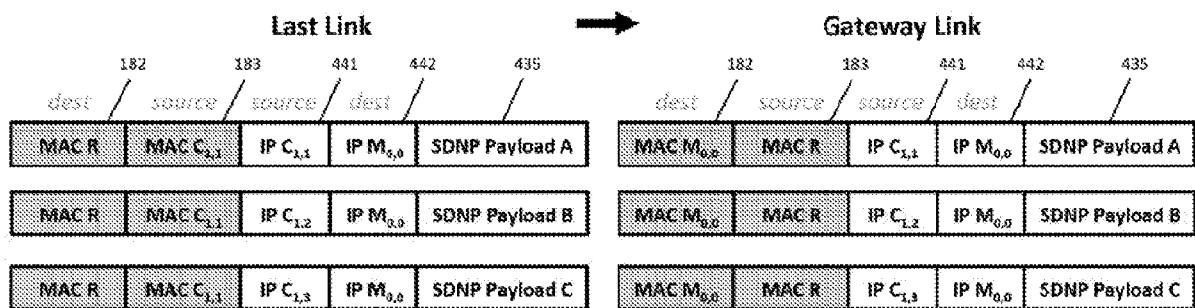


Figure 51A

## SDNP Single Route Last Mile, Dynamic Client Addressing, Single-PHY Last Link



## SDNP Single Route Last Mile, Dynamic Client Addressing, Multi-PHY Last Link

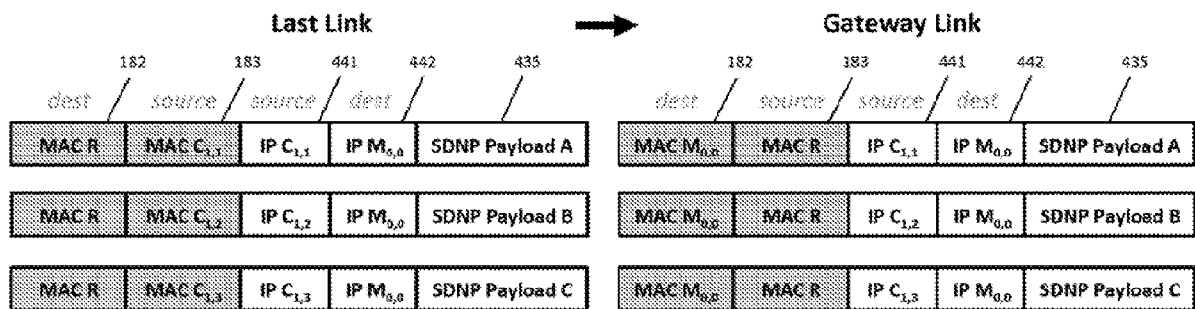
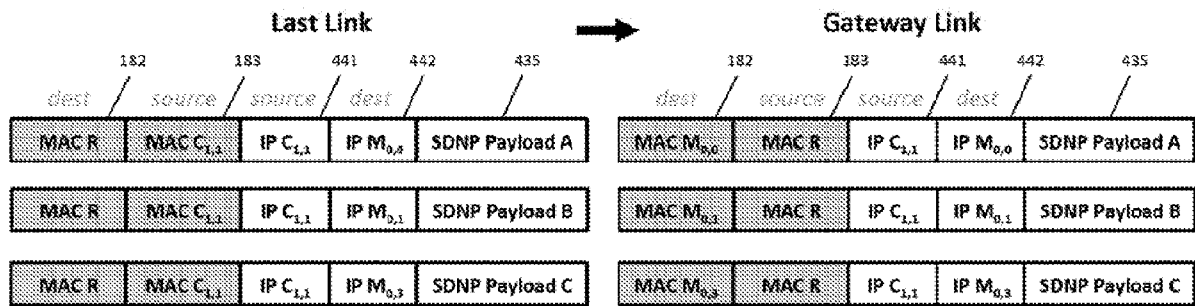


Figure 51B

## SDNP Multi-Route Last Mile, Static Client Addressing, Single-PHY Last Link



## SDNP Multi-Route Last Mile, Static Client Addressing, Multi-PHY Last Link

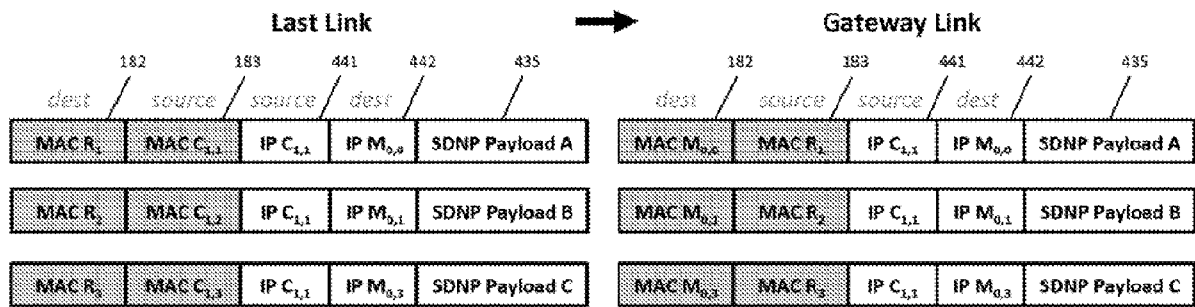
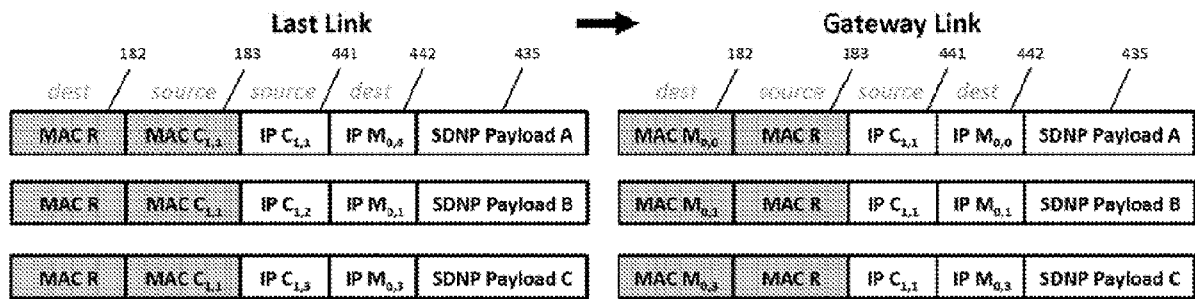


Figure 51C

## SDNP Multi-Route Last Mile, Dynamic Addressing, Single-PHY Last Link



## SDNP Multi-Route Last Mile, Dynamic Client Addressing, Multi-PHY Last Link

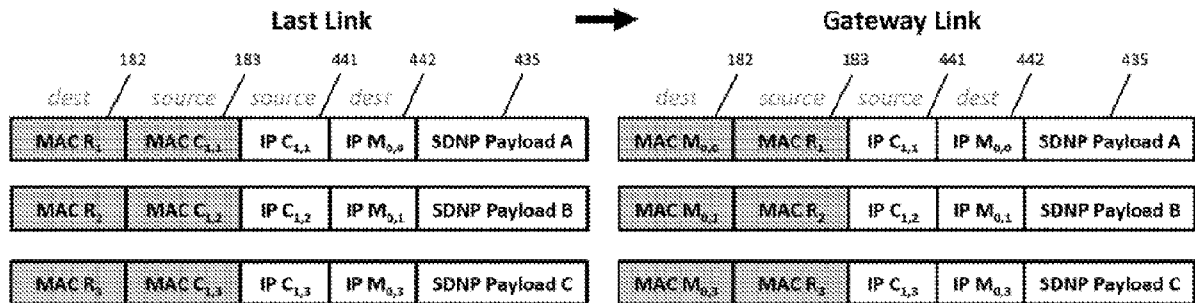
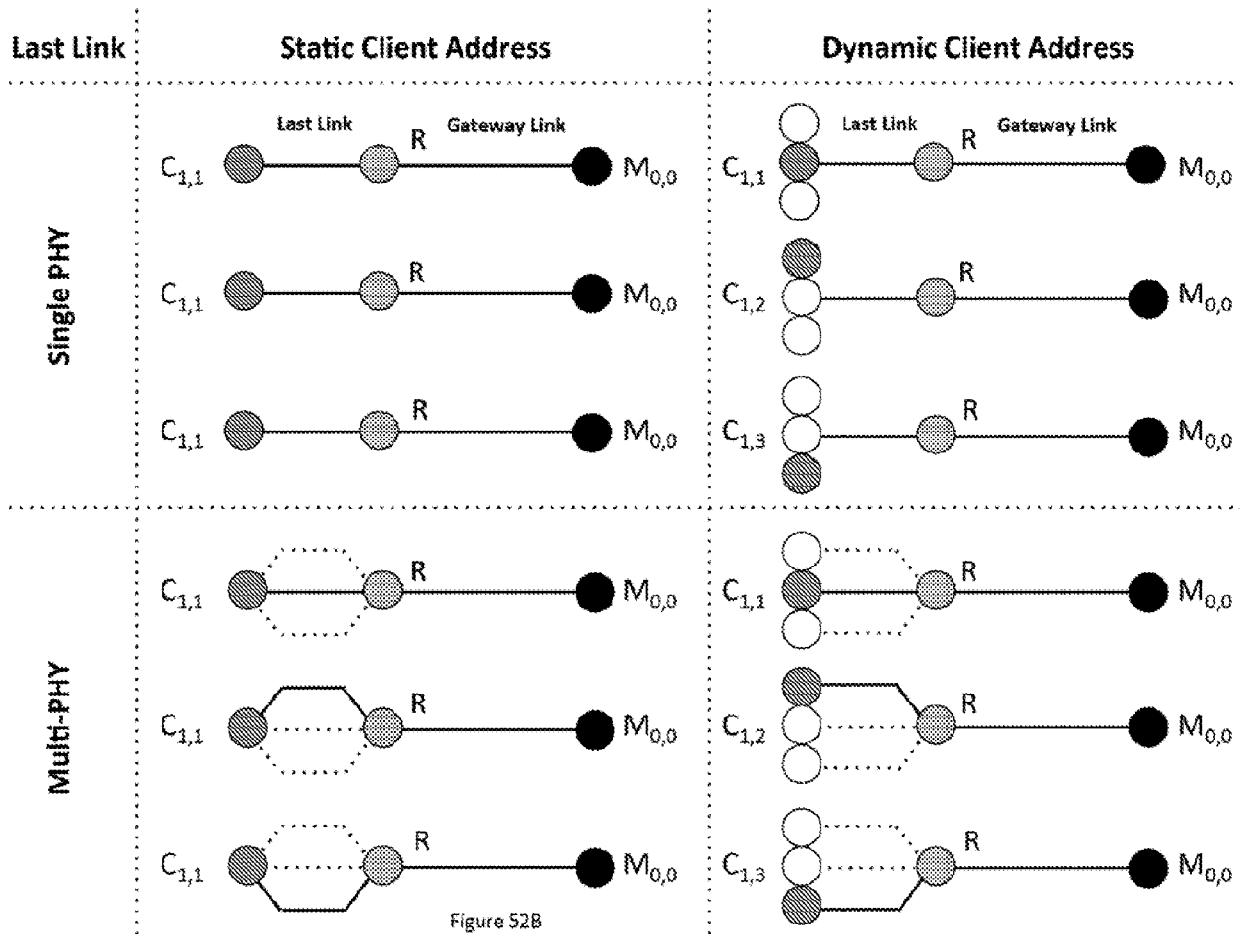


Figure 51D

## SDNP Last Mile Routing Over Ethernet

| #  | Route  | Client Address | Last Link  | IP Source          | IP Destination                 | MAC Client             |
|----|--------|----------------|------------|--------------------|--------------------------------|------------------------|
| 1  | Multi  | Dynamic        | Multi-PHY  | Variable $C_{1,n}$ | Multiple Gateways<br>$M_{0,n}$ | MAC $C_{1,n}$ to $R_n$ |
| 2  | Multi  | Dynamic        | Multi-PHY  | Variable $C_{1,n}$ |                                | MAC $C_{1,n}$ to R     |
| 3  | Multi  | Dynamic        | Single-PHY | Variable $C_{1,n}$ |                                | MAC $C_{1,1}$ to R     |
| 4  | Multi  | Static         | Multi-PHY  | Fixed $C_{1,1}$    |                                | MAC $C_{1,n}$ to $R_n$ |
| 5  | Multi  | Static         | Multi-PHY  | Fixed $C_{1,1}$    |                                | MAC $C_{1,n}$ to R     |
| 6  | Multi  | Static         | Single PHY | Fixed $C_{1,1}$    |                                | MAC $C_{1,1}$ to R     |
| 7  | Single | Dynamic        | Multi-PHY  | Variable $C_{1,n}$ | Single Gateway<br>$M_{0,0}$    | MAC $C_{1,n}$ to R     |
| 8  | Single | Dynamic        | Single PHY | Variable $C_{1,n}$ |                                | MAC $C_{1,1}$ to R     |
| 9  | Single | Static         | Multi-PHY  | Fixed $C_{1,1}$    |                                | MAC $C_{1,n}$ to R     |
| 10 | Single | Static         | Single PHY | Fixed $C_{1,1}$    |                                | MAC $C_{1,1}$ to R     |

Figure 52A



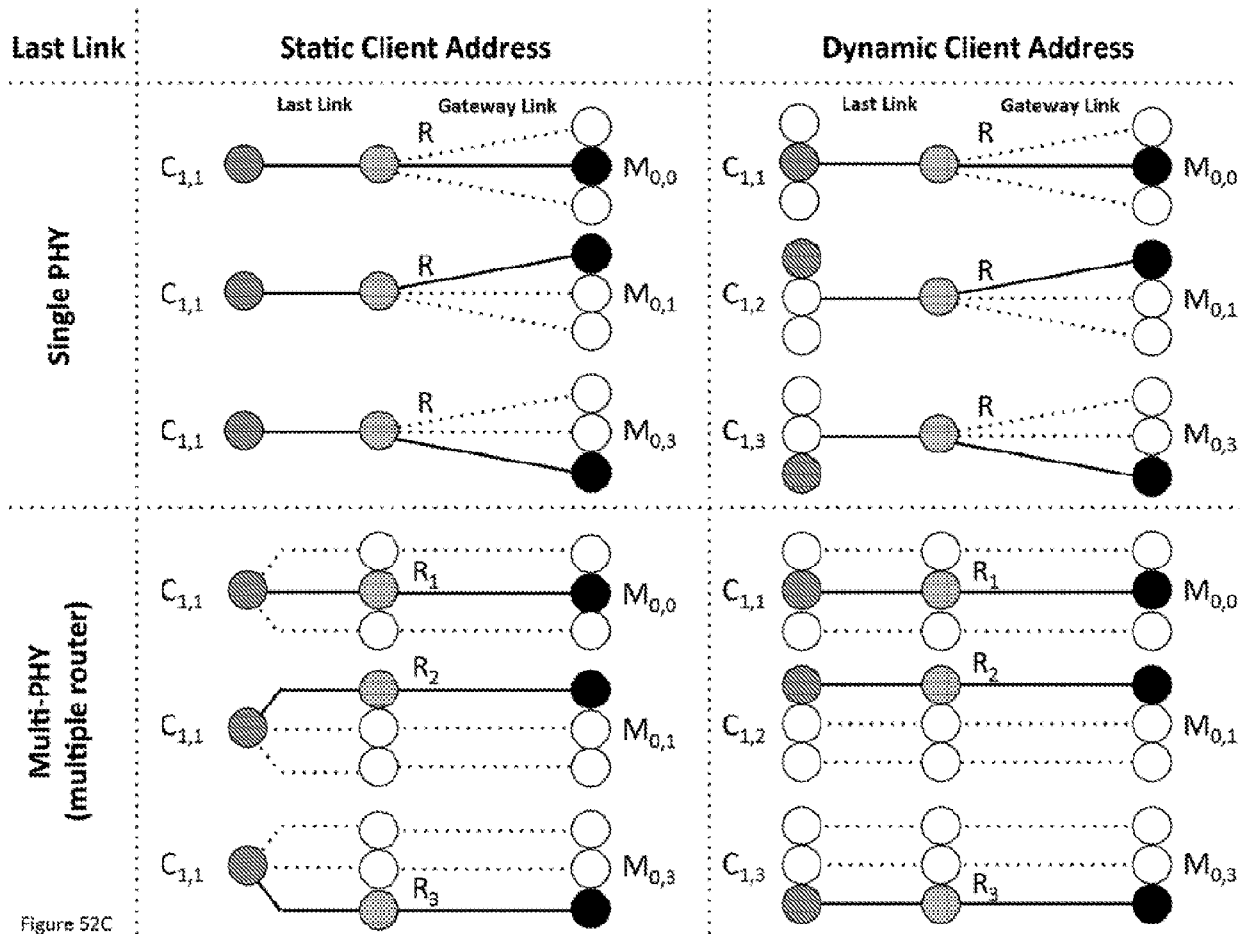


Figure 52C

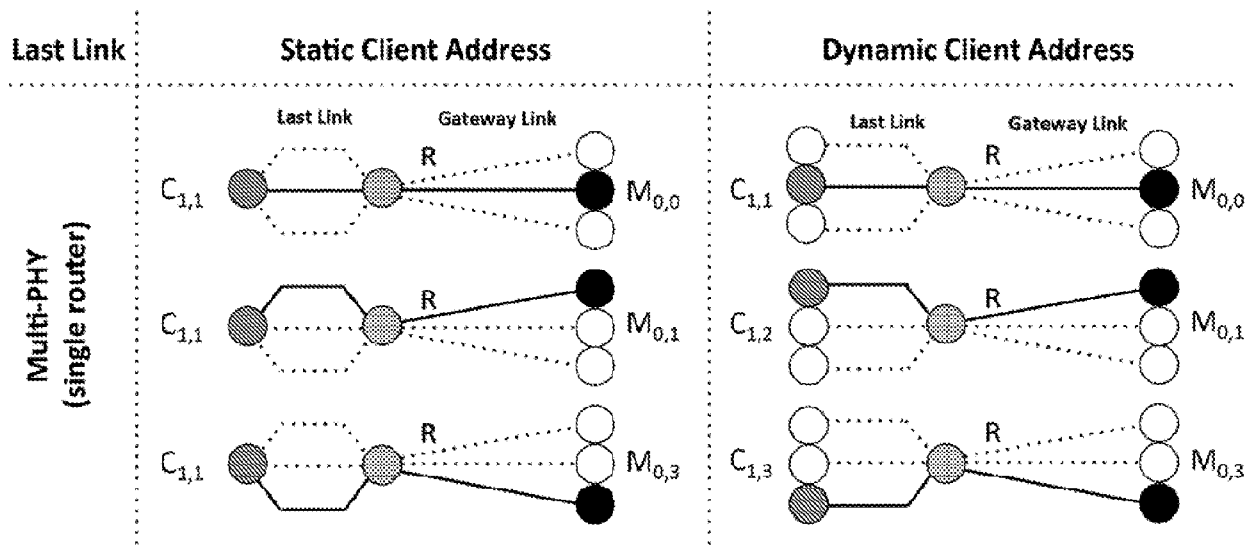


Figure 52D

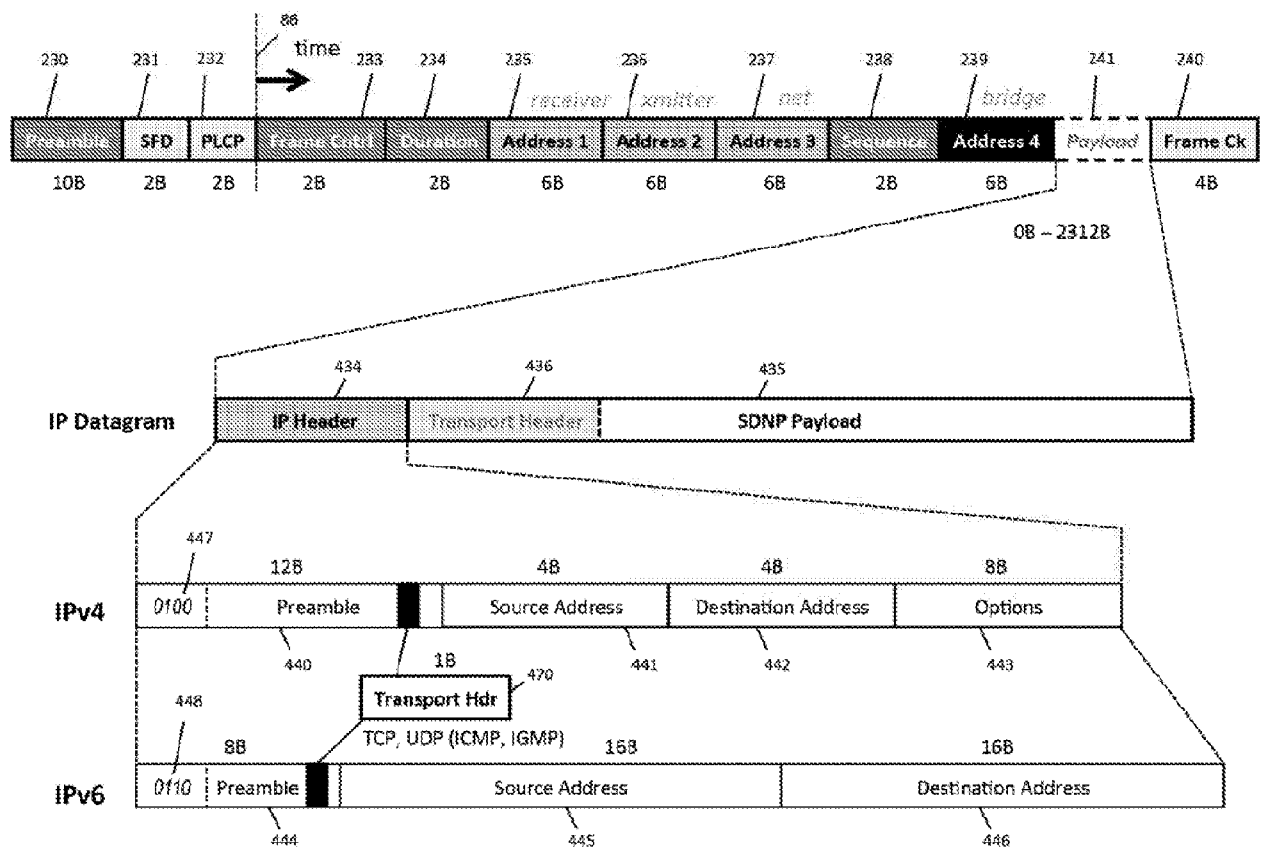
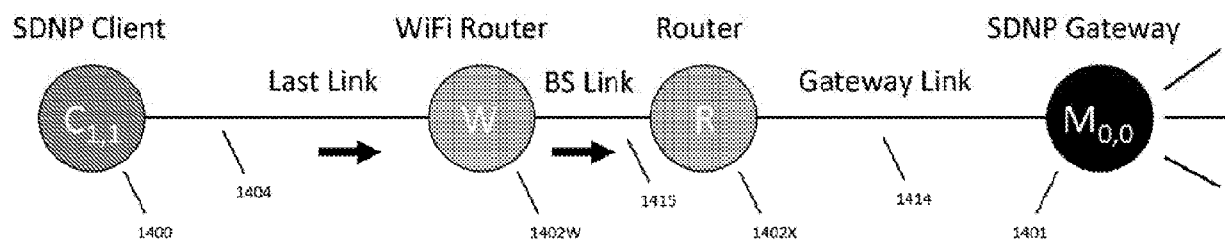


Figure 53



#### Last Link / BS Link WiFi Packet (Client to SDNP Cloud)

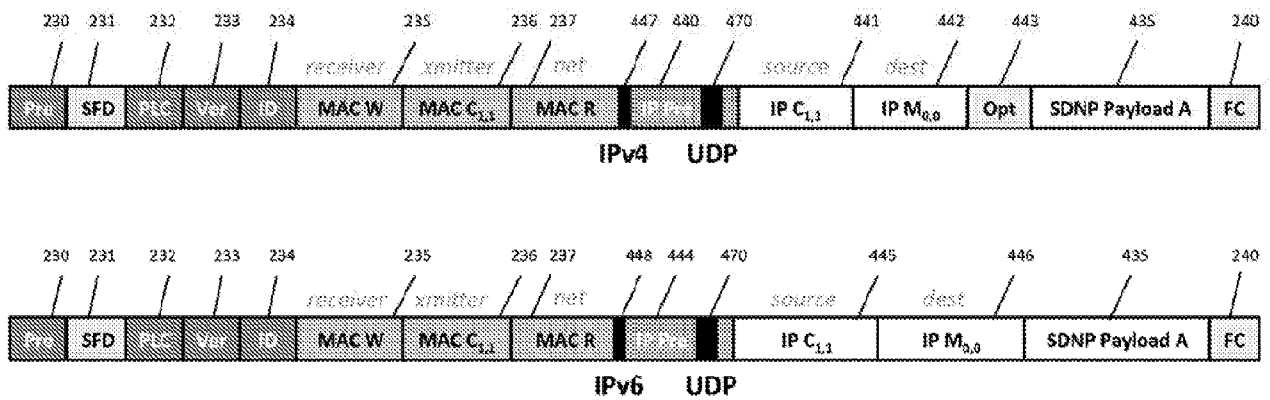
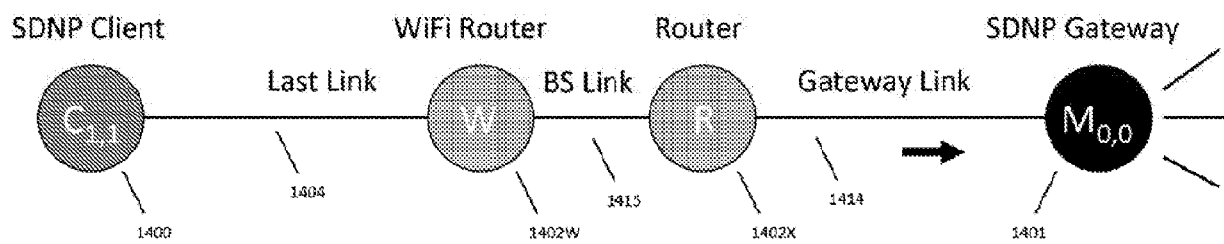


Figure 54A



#### Gateway Link Ethernet Packet (Client to SDNP Cloud)

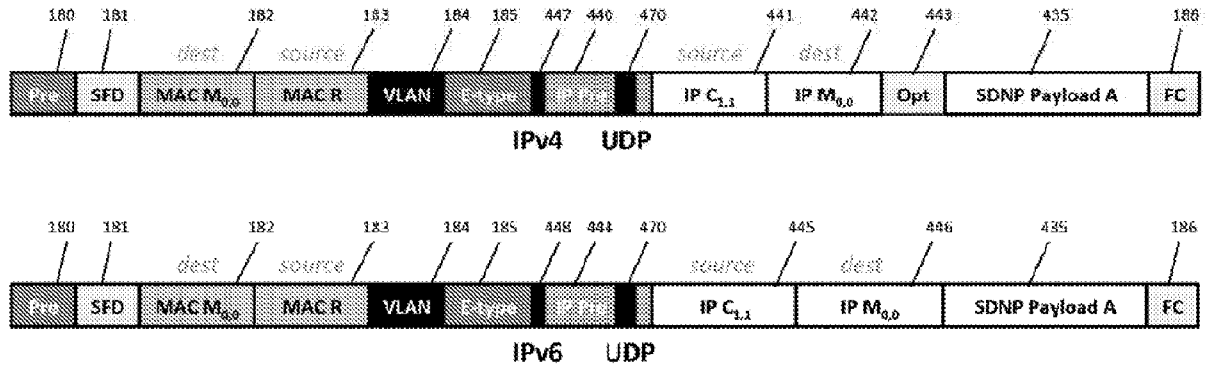
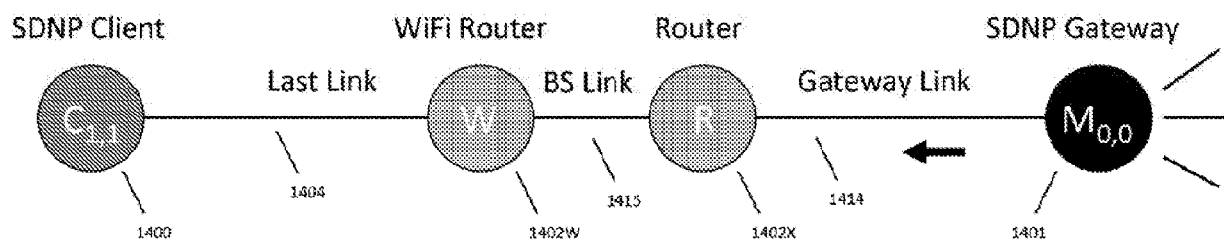


Figure 54B



#### Gateway Link Ethernet Packet (SDNP Cloud to Client)

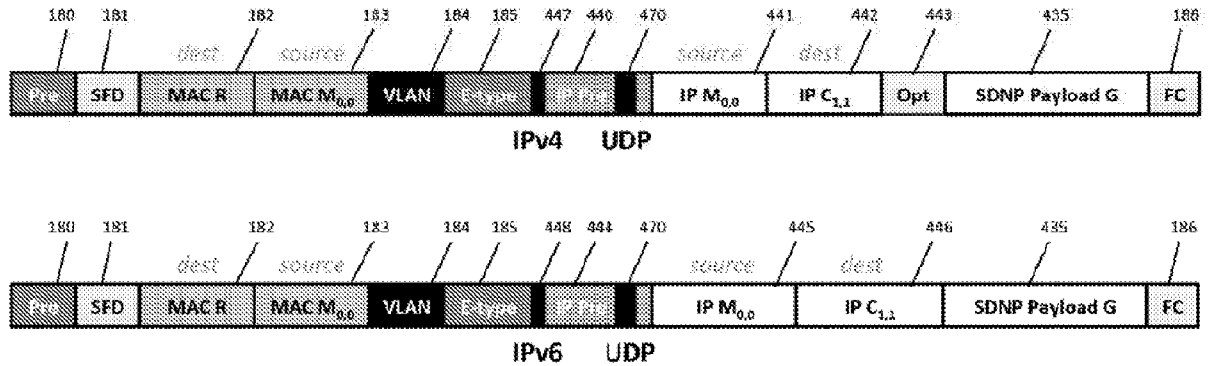
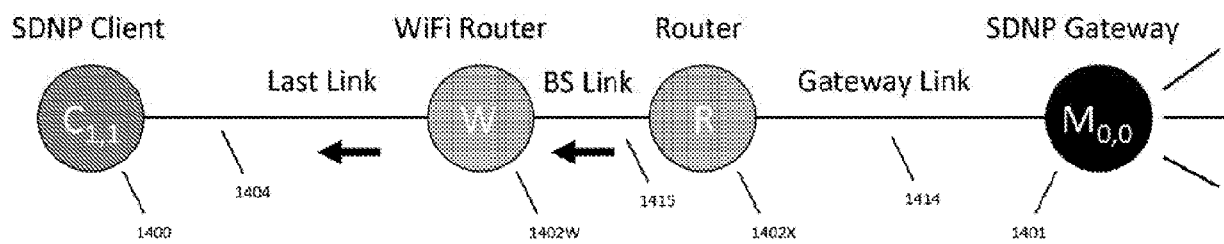


Figure 54C



### BS Link / Last Link WiFi Packet (SDNP Cloud to Client)

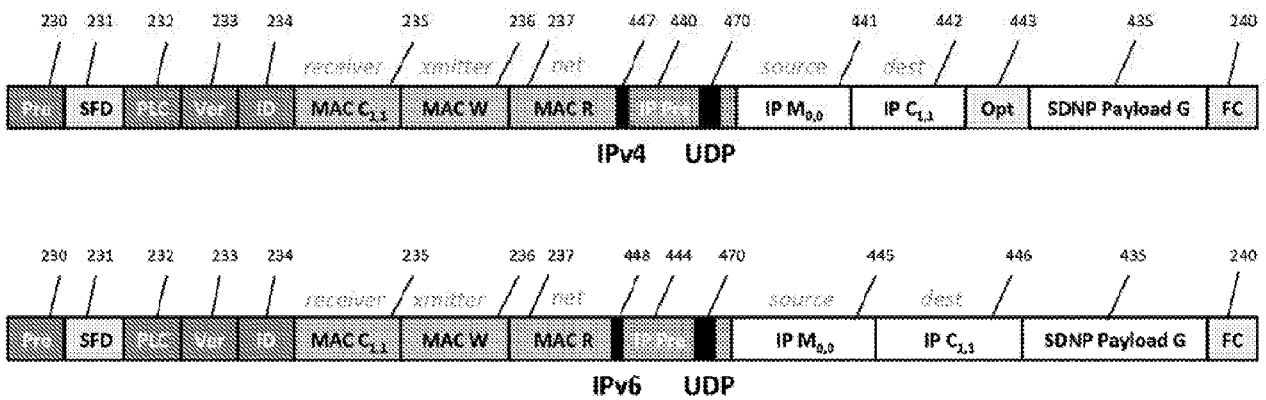


Figure 54D

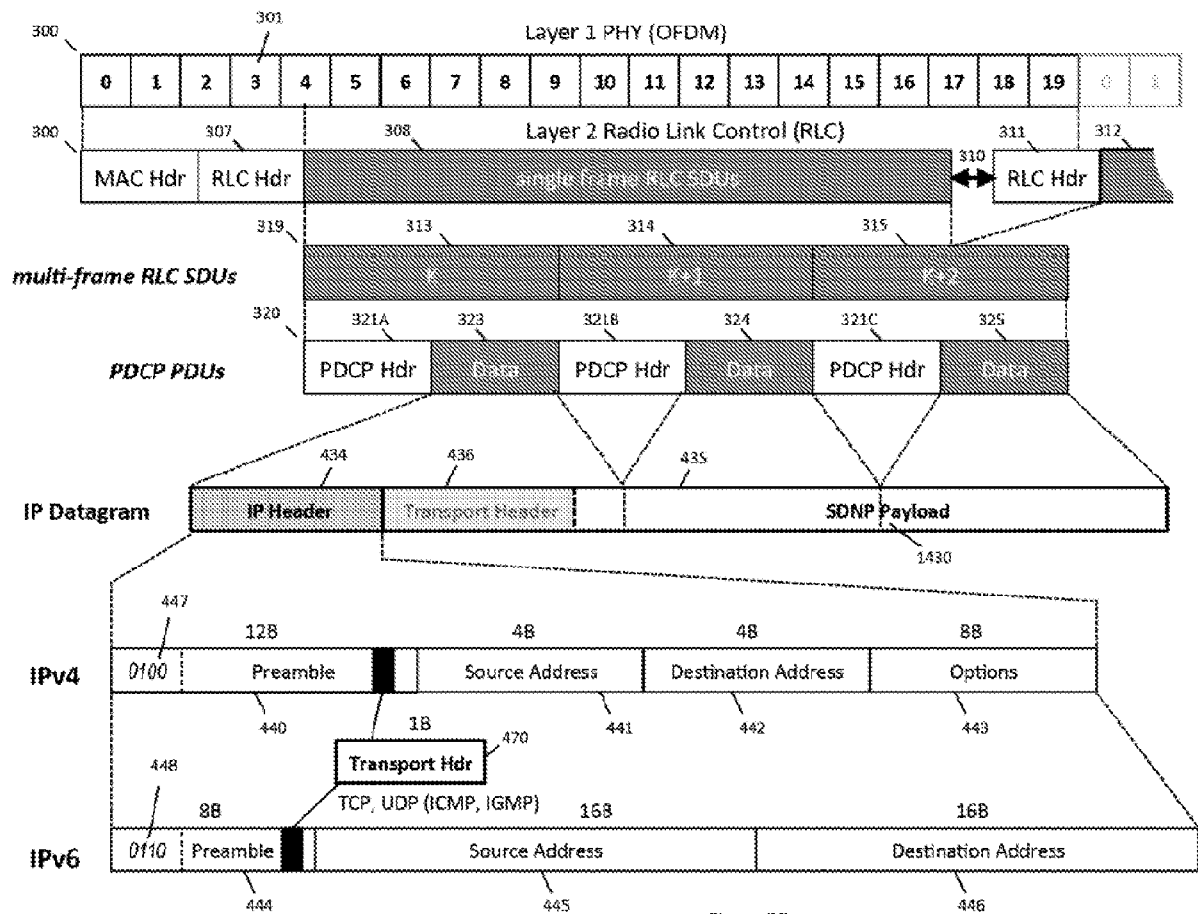
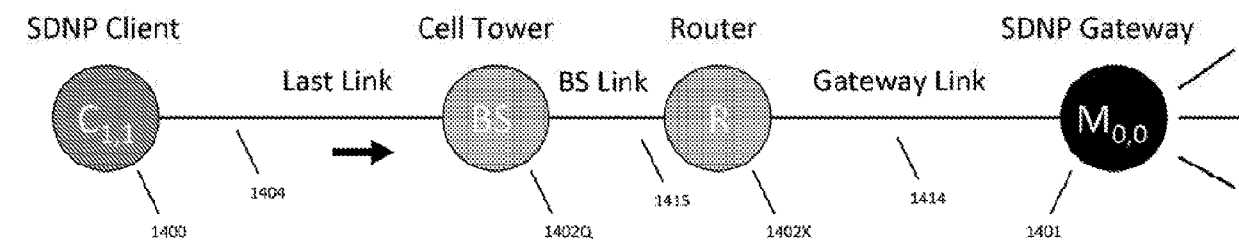


Figure 55



### Last Link / BS Link Cellular 4G Packet (Client to SDNP Cloud)

#### RLC PDUs

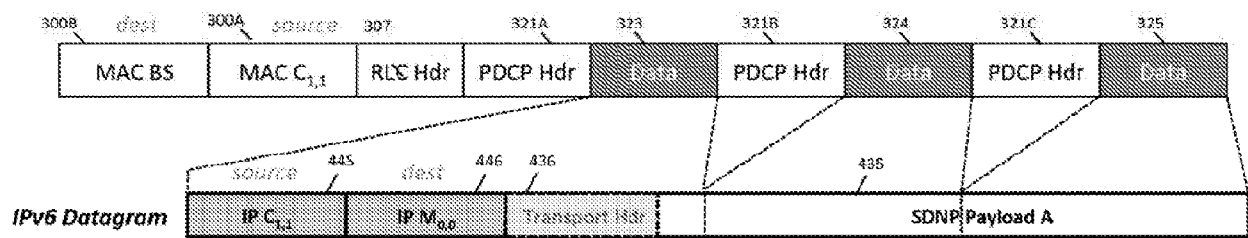
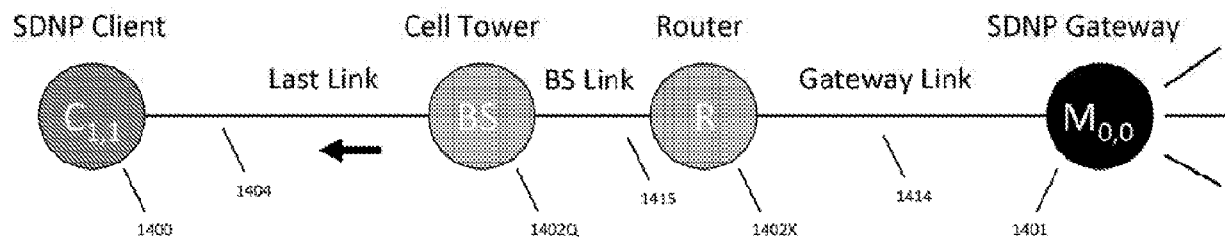


Figure 56A



### Last Link / BS Link Cellular 4G Packet (Client to SDNP Cloud)

#### RLC PDUs

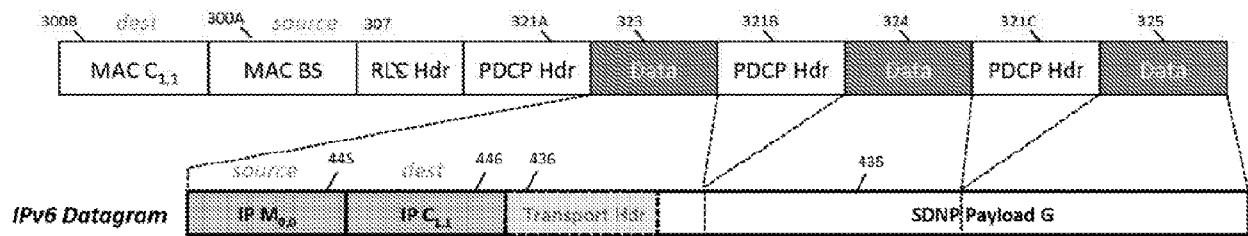


Figure 568

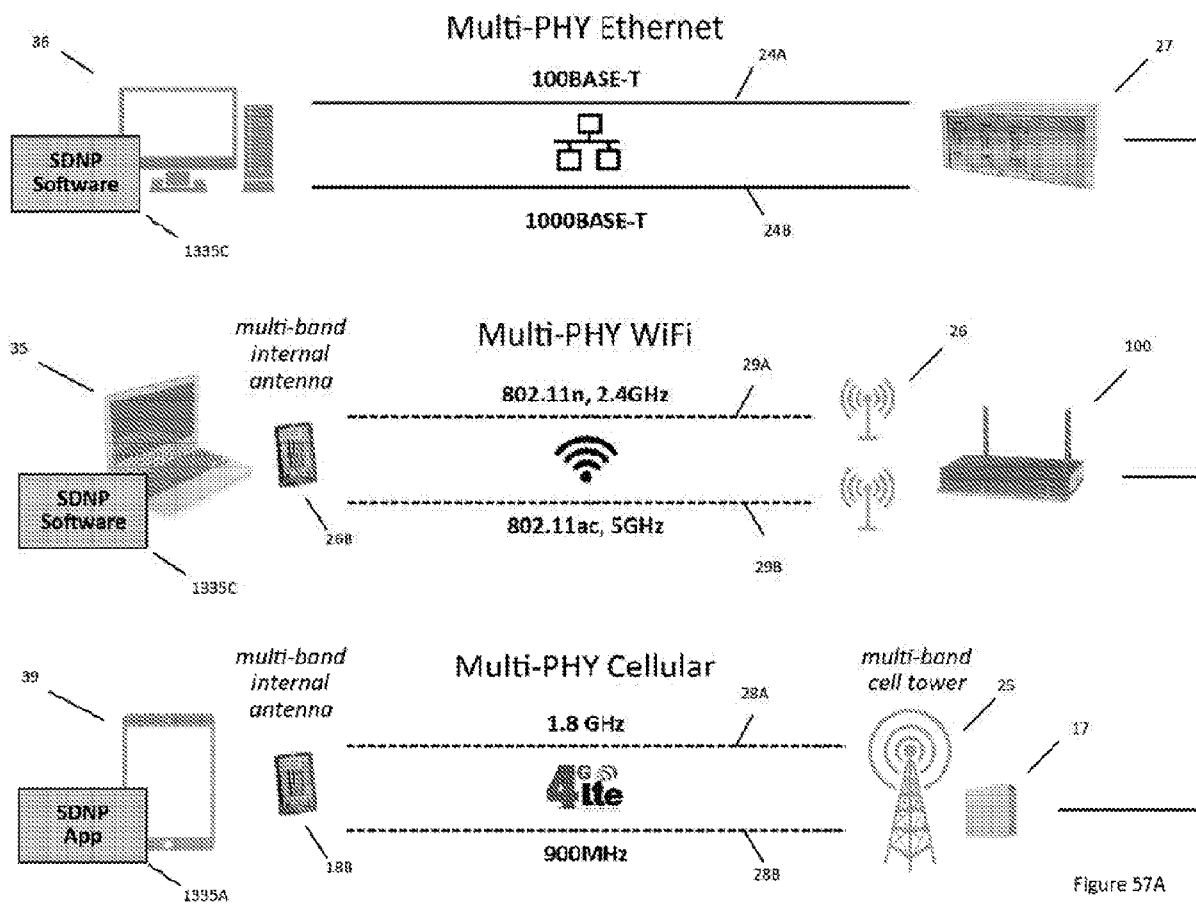
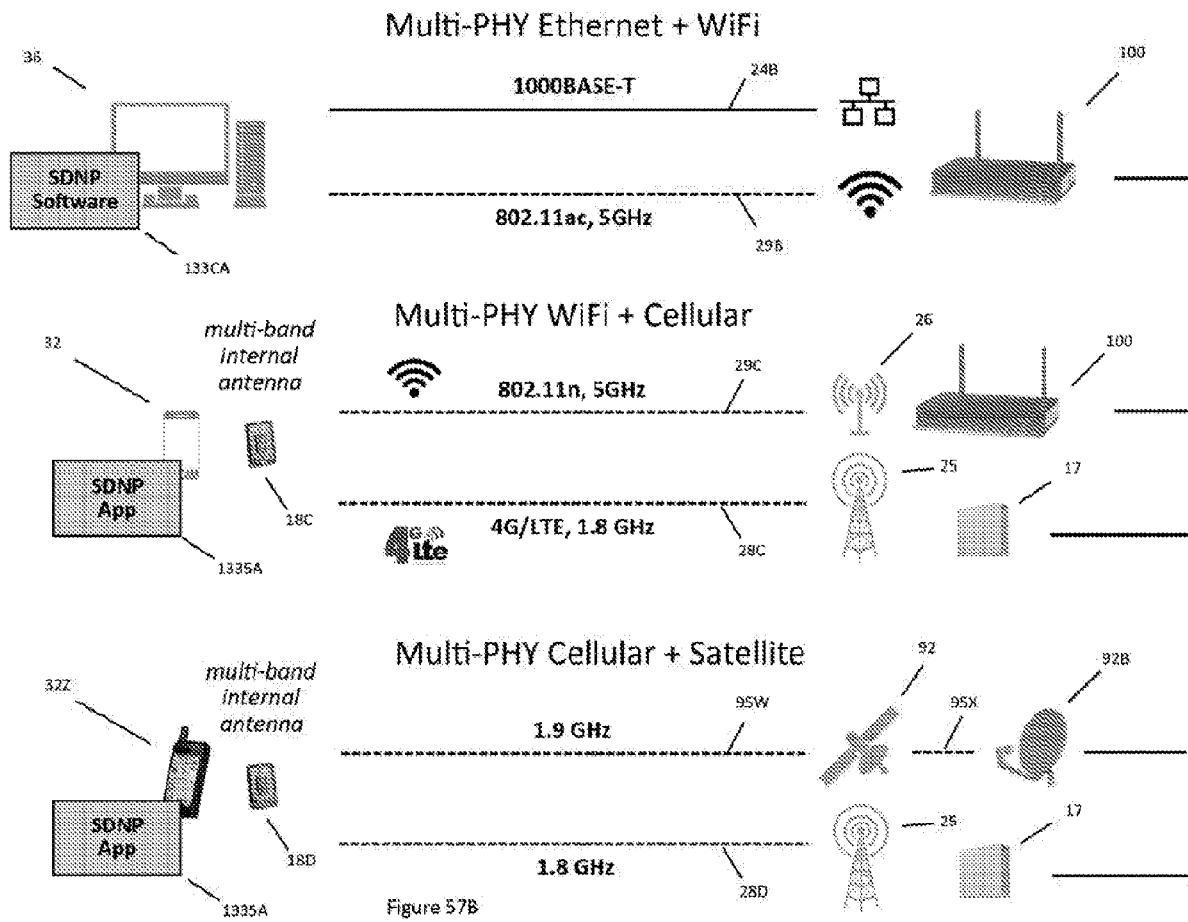


Figure 57A



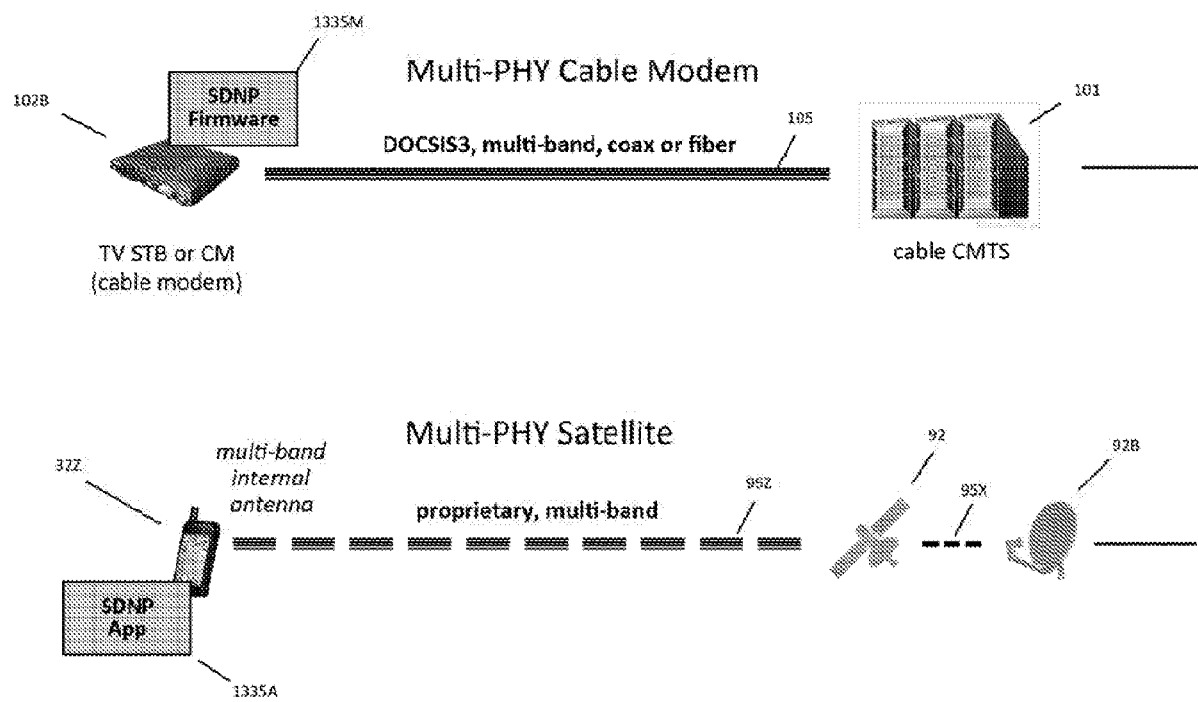
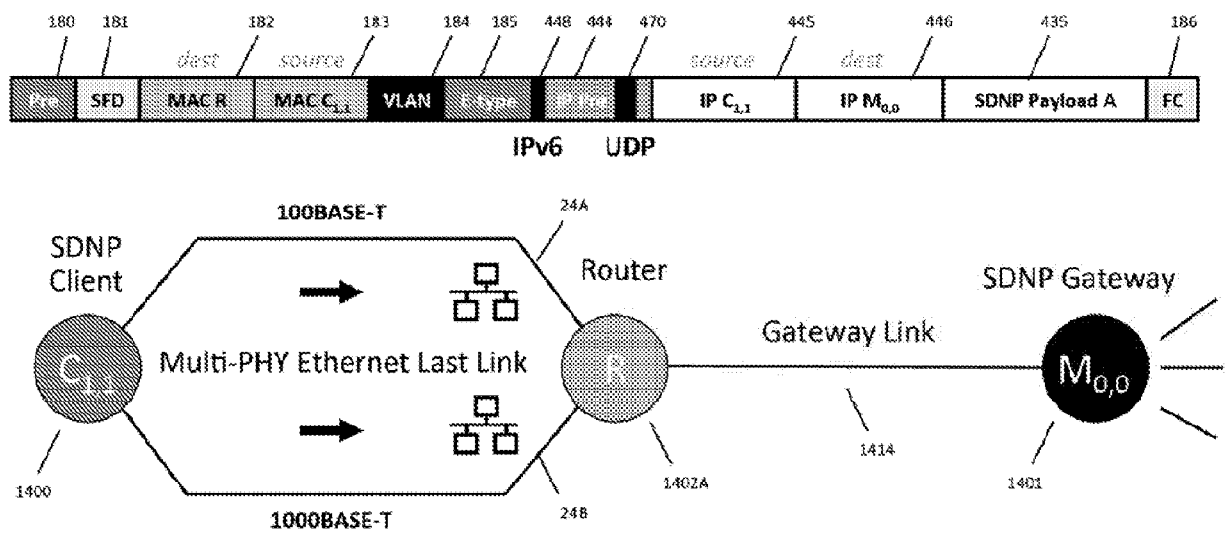


Figure 57C

### Last Link Ethernet Packet A (Client to SDNP Cloud)



### Last Link Ethernet Packet B (Client to SDNP Cloud)

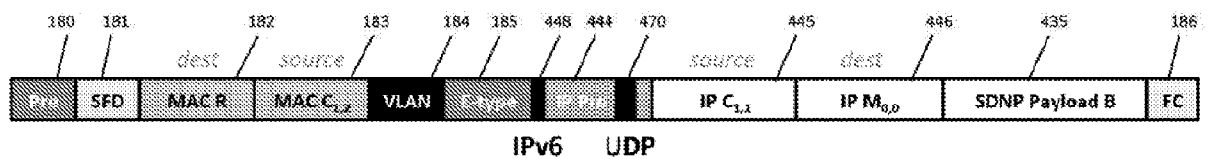
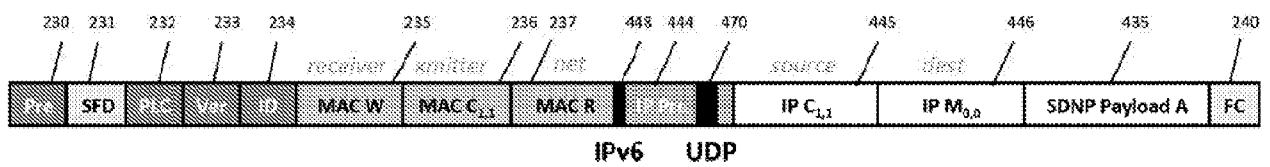


Figure 58

### Last Link / BS Link WiFi Packet A (Client to SDNP Cloud)



### Last Link / BS Link WiFi Packet B (Client to SDNP Cloud)

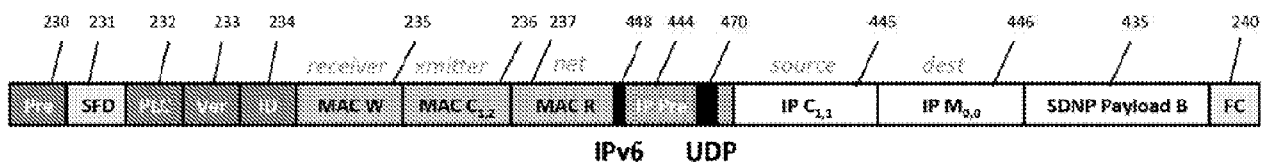
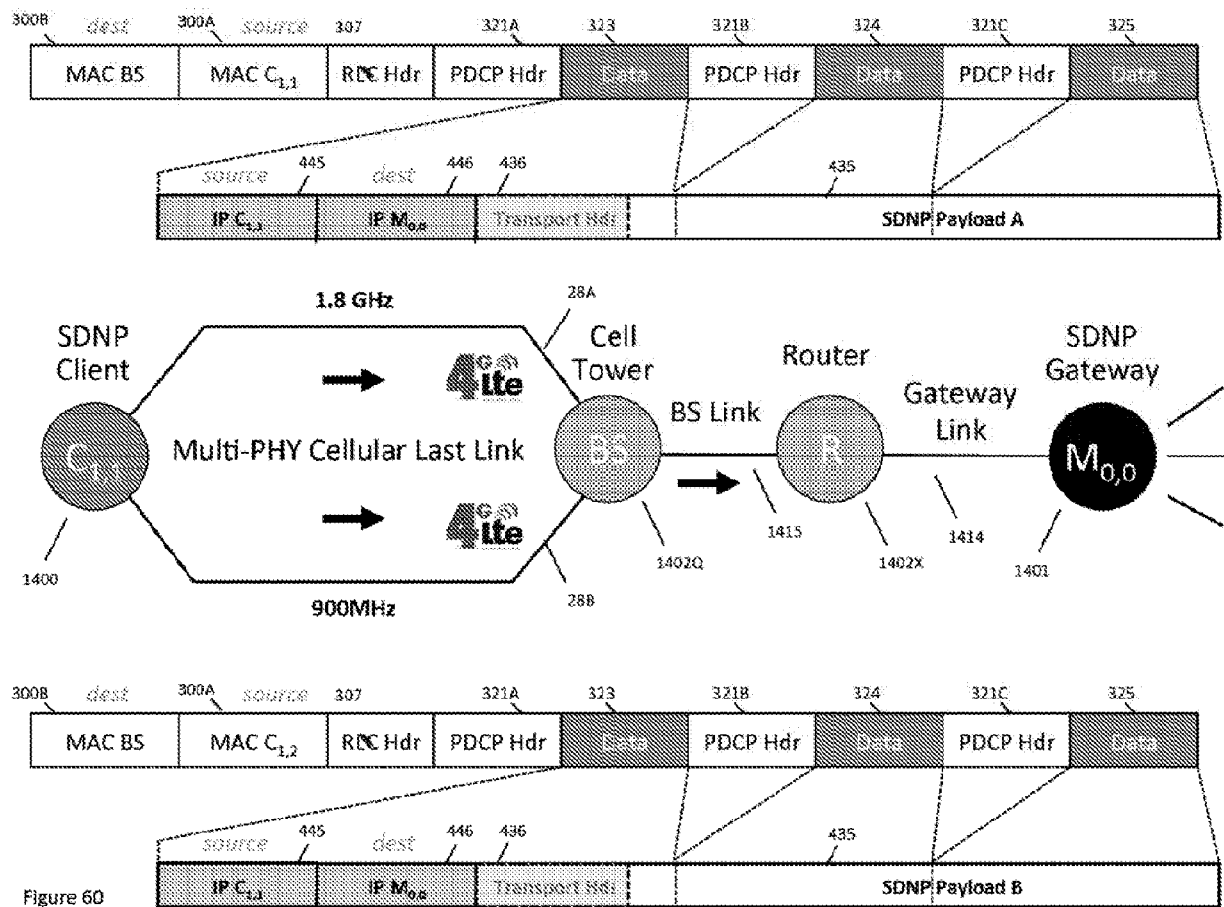
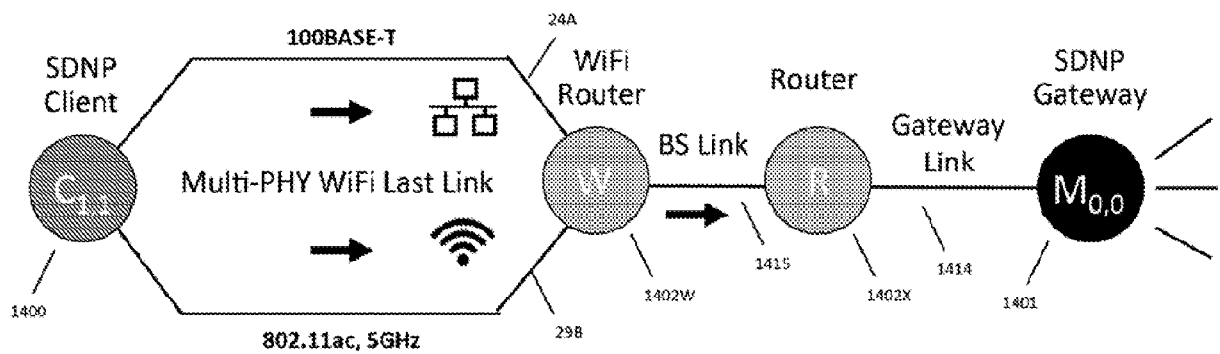
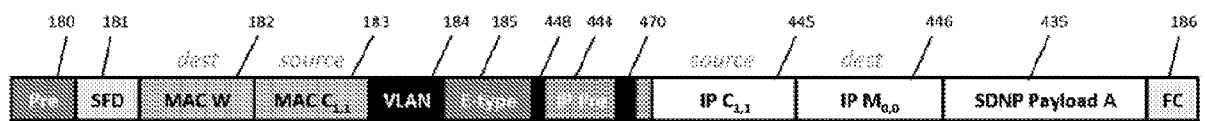


Figure 59



### Last Link Ethernet Packet A (Client to SDNP Cloud)



### Last Link / BS Link WiFi Packet B (Client to SDNP Cloud)

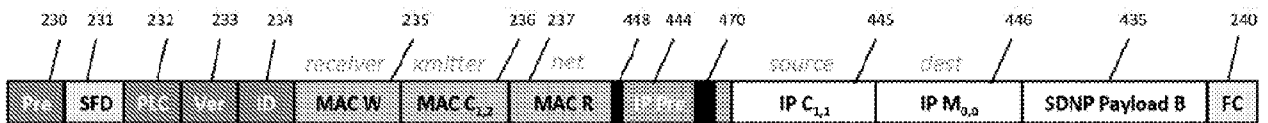
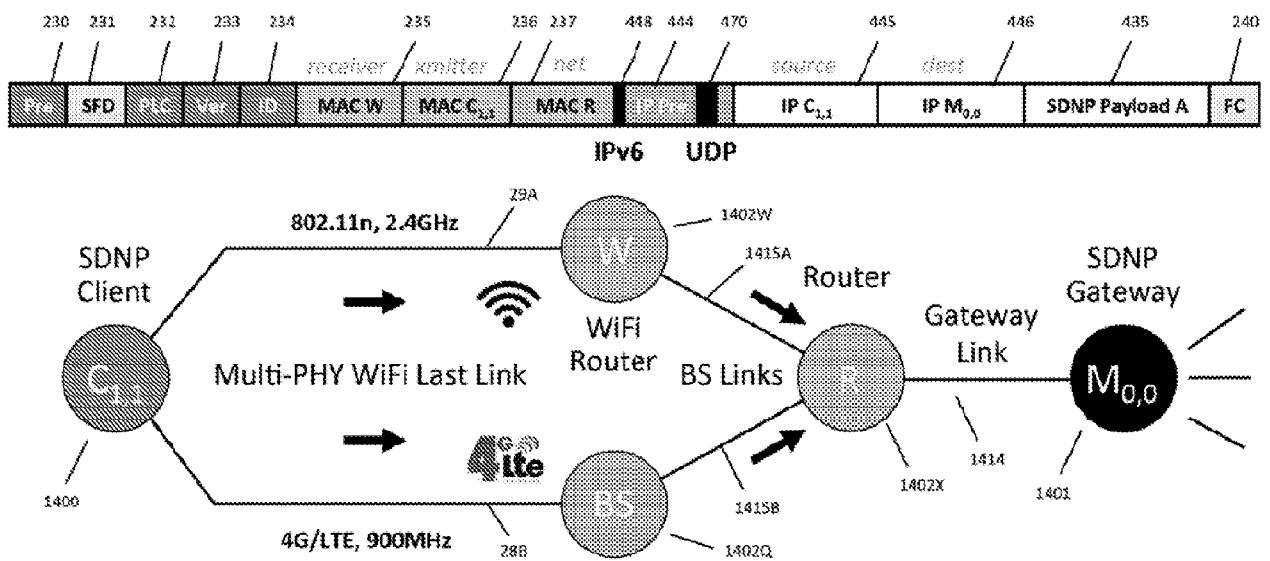


Figure 61

### Last Link / BS Link WiFi Packet A (Client to SDNP Cloud)



### Last Link / BS Link Cellular 4G Packet B (Client to SDNP Cloud)

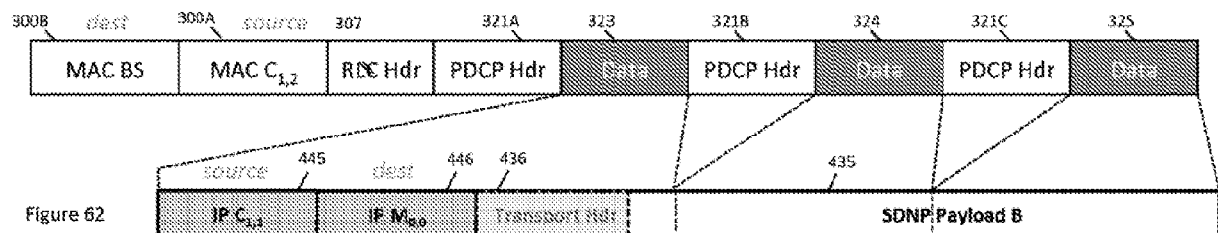


Figure 62

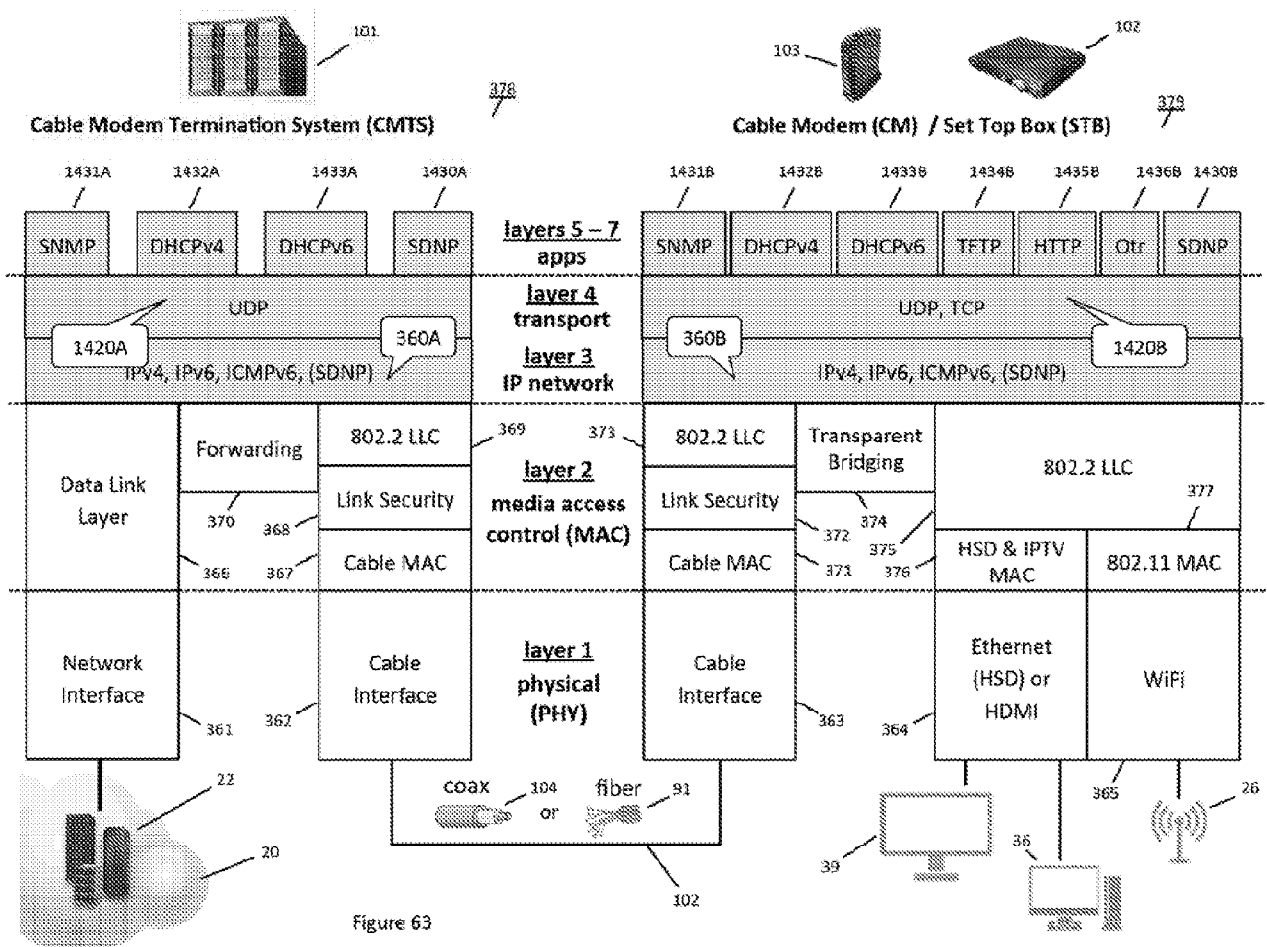
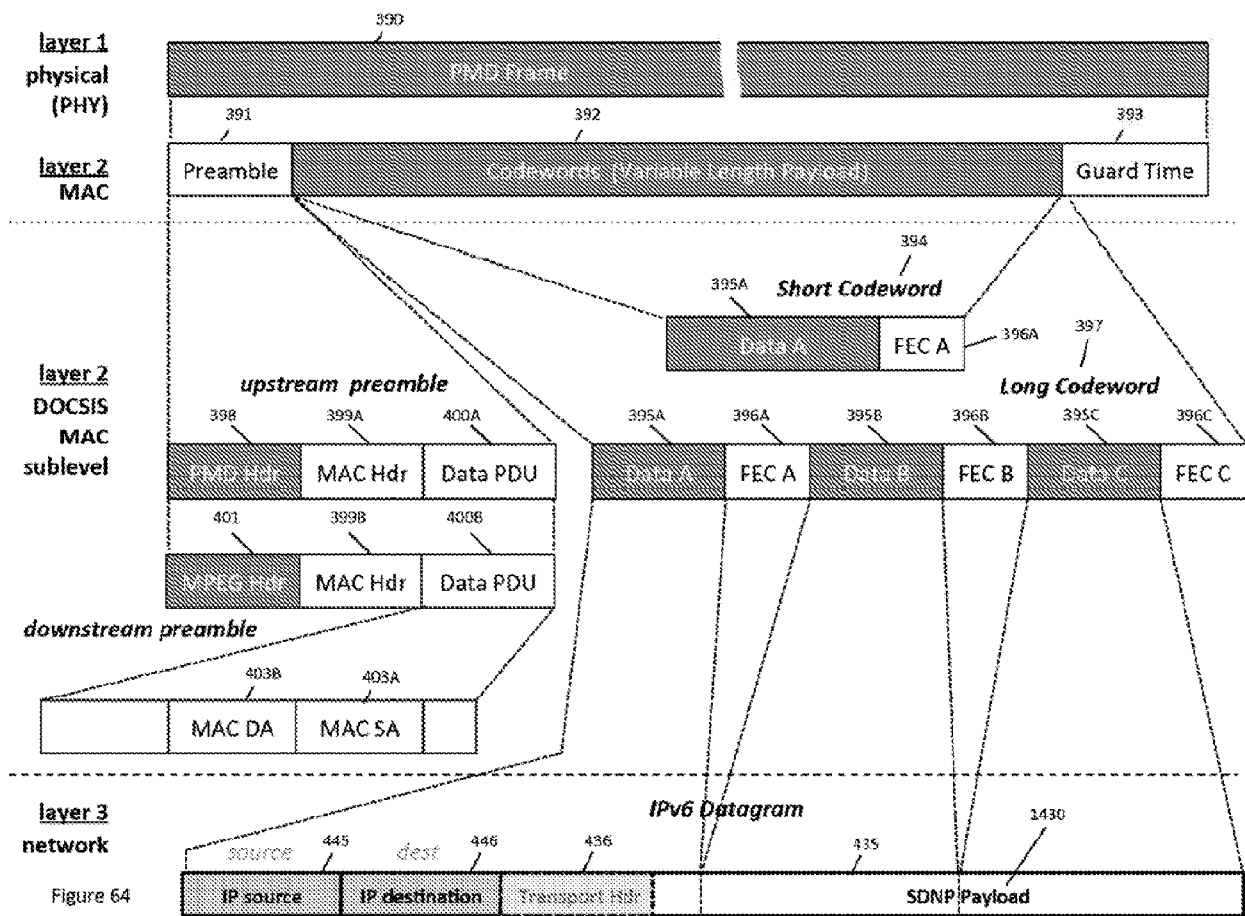
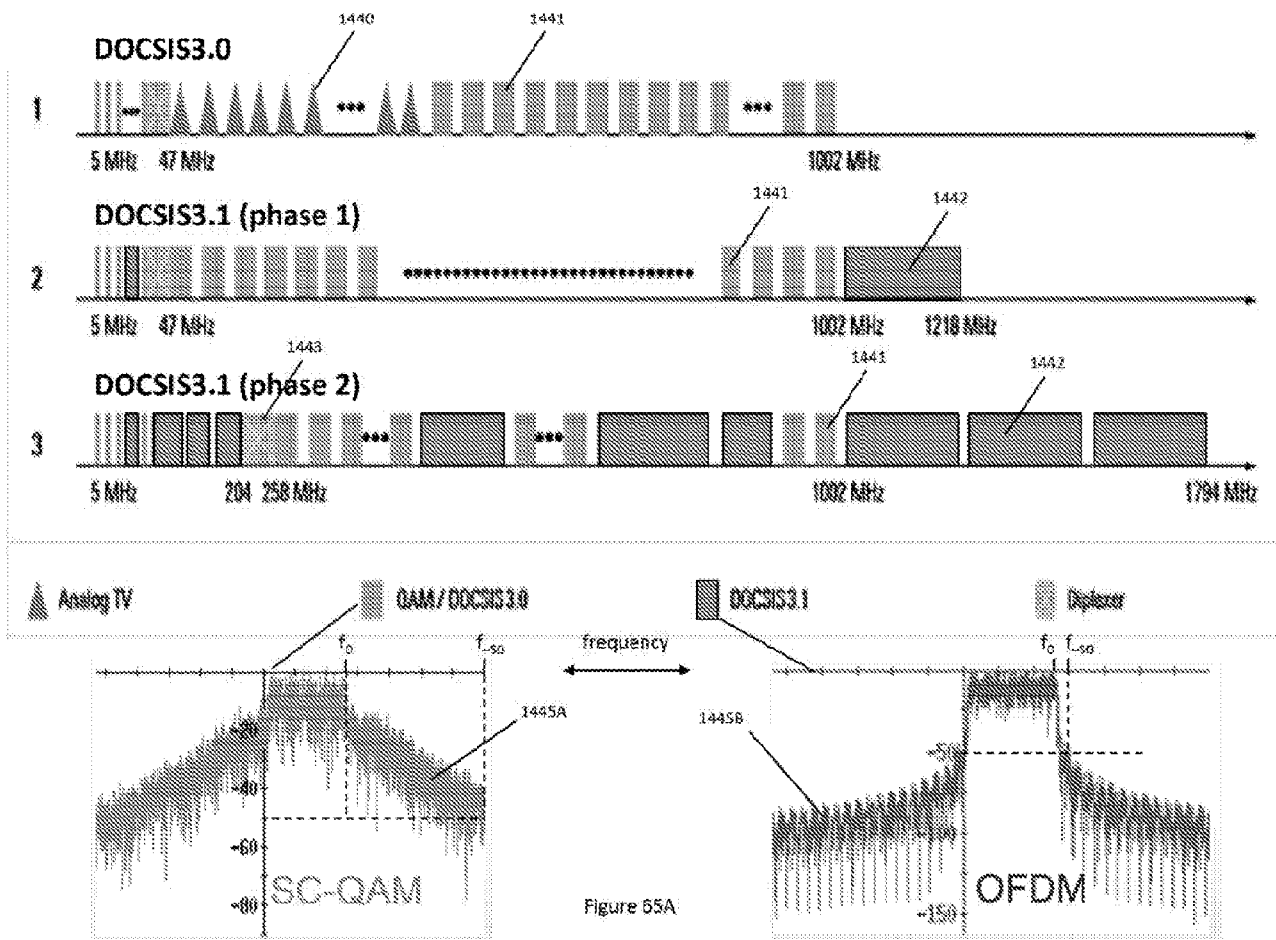
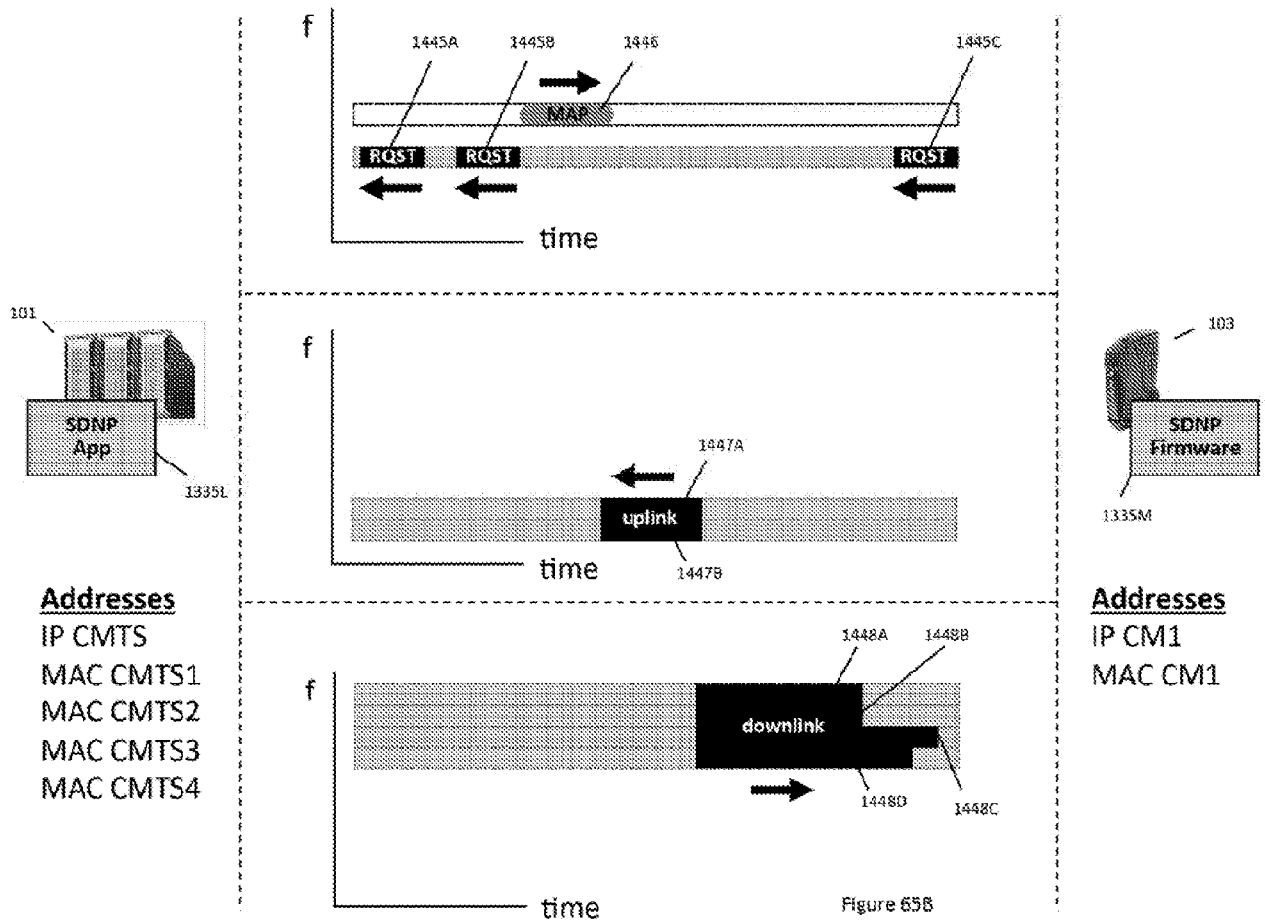


Figure 63







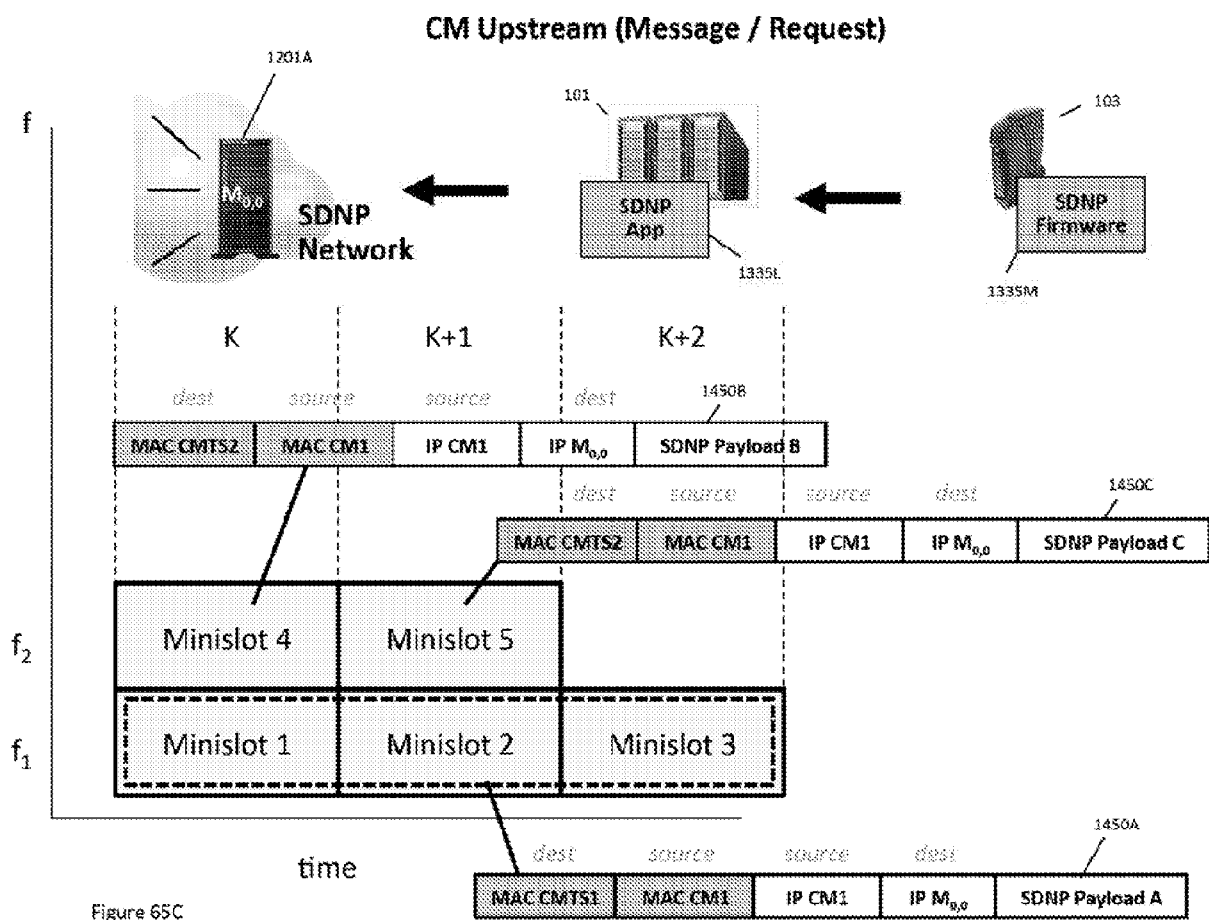
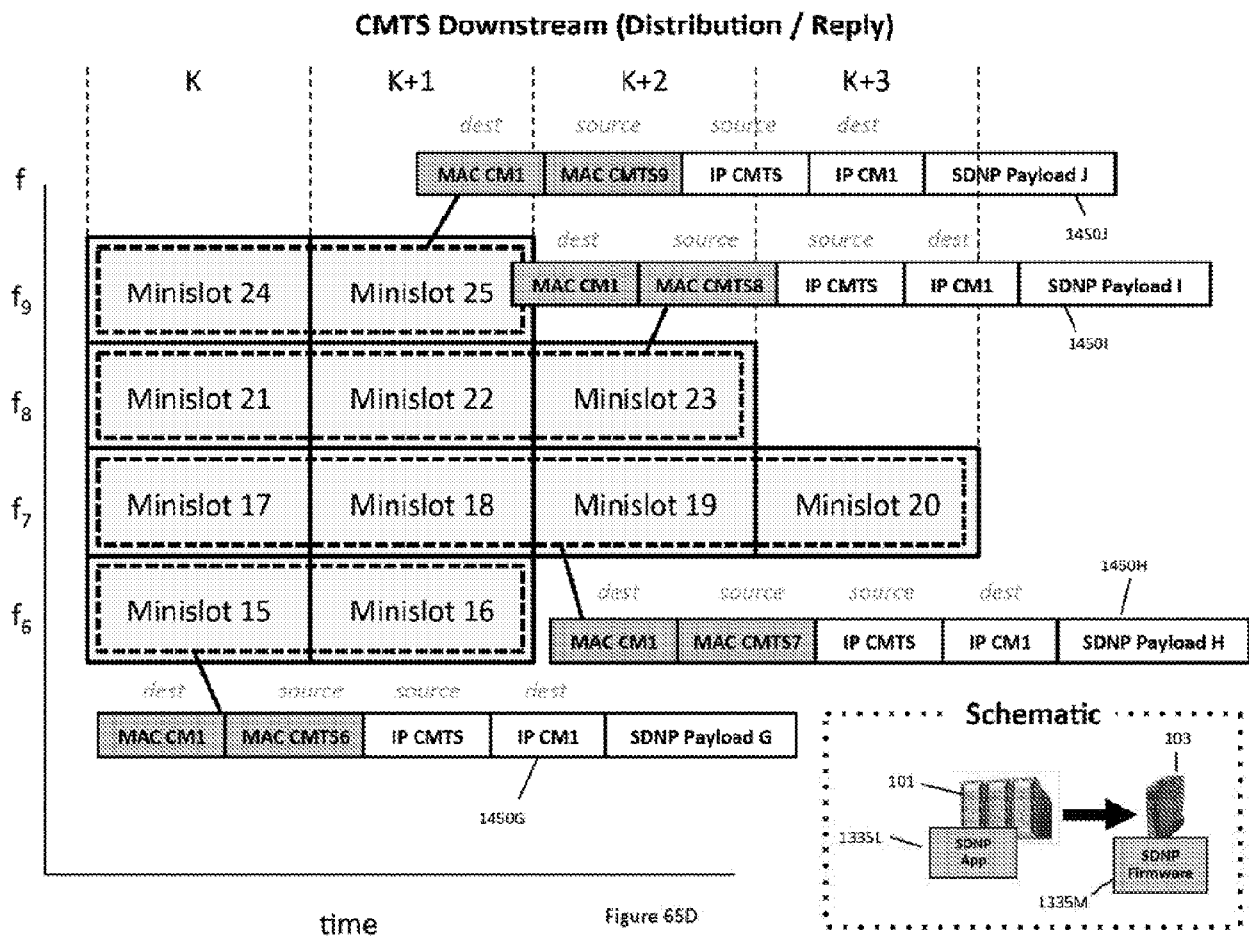


Figure 65C



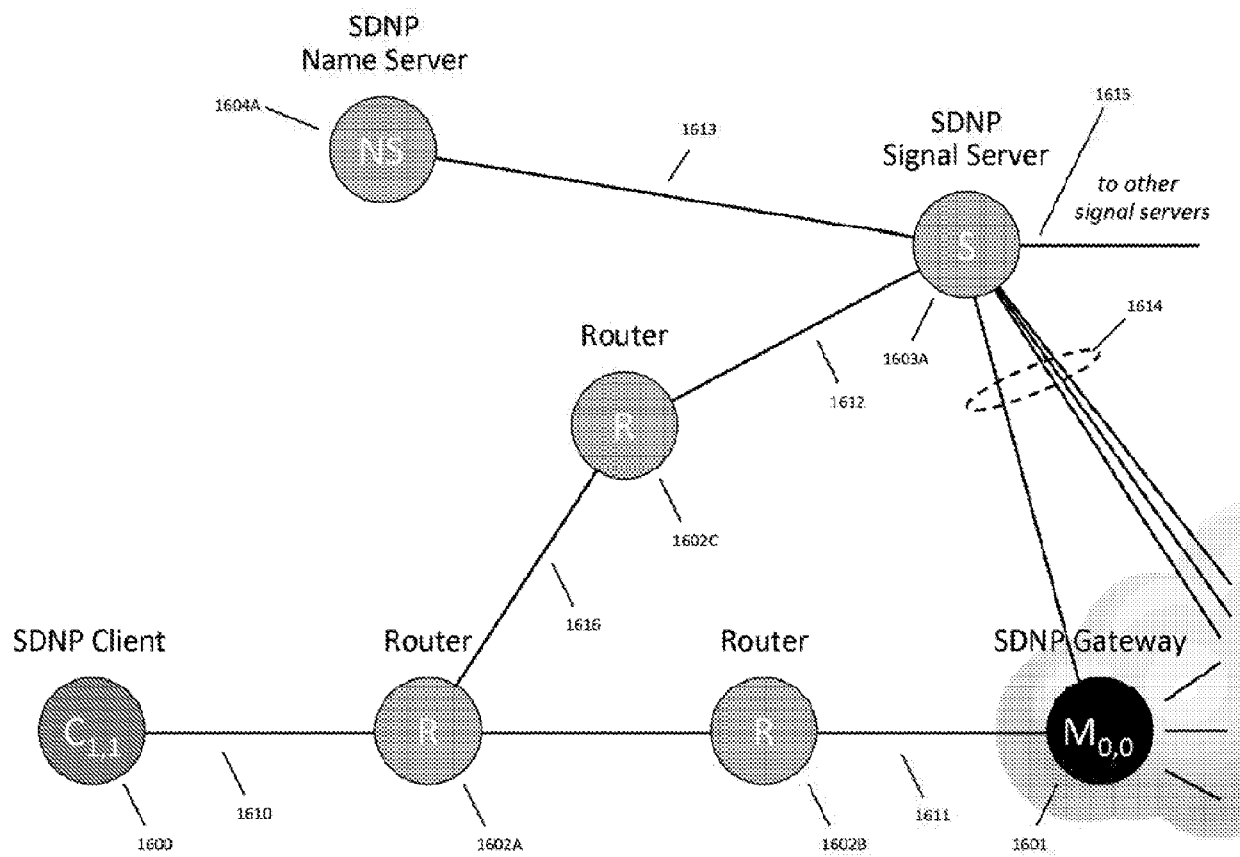


Figure 66

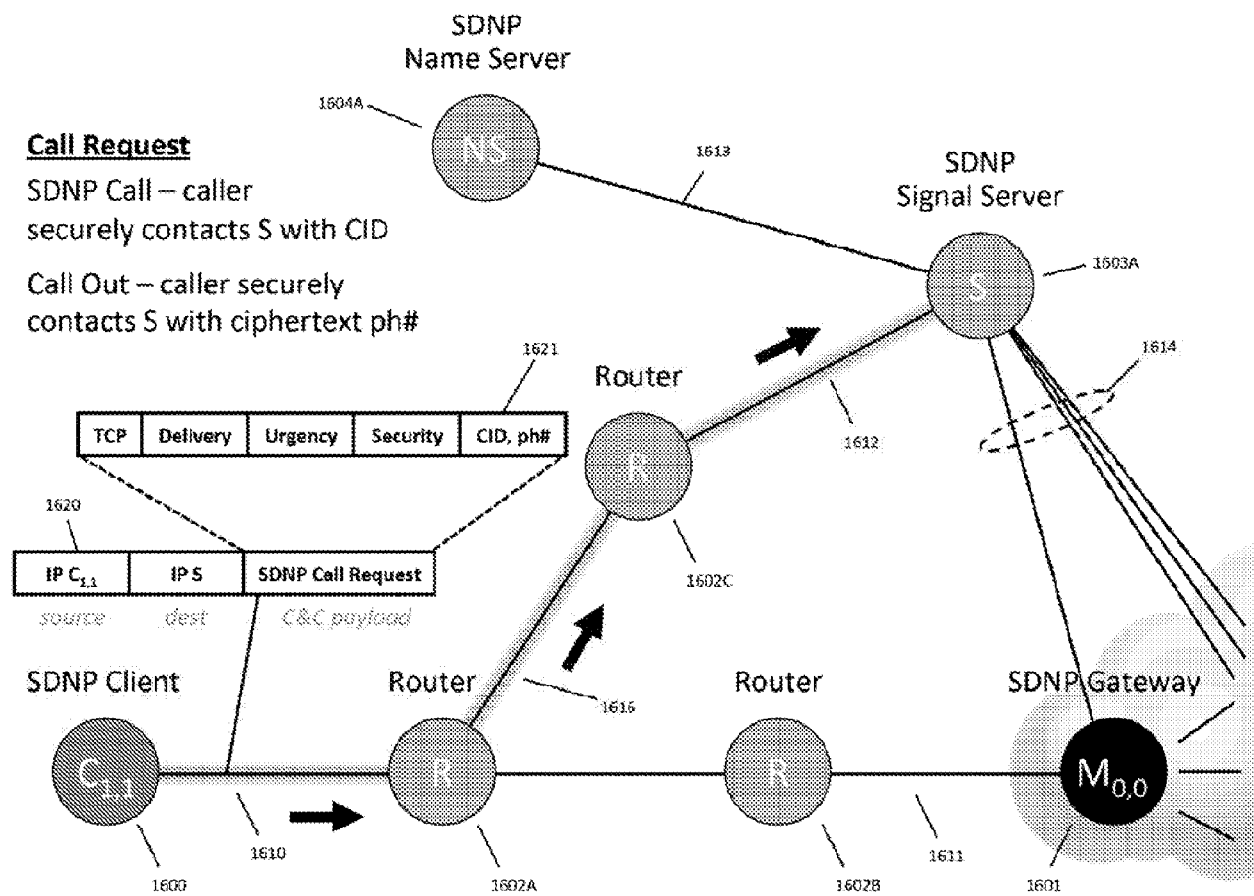
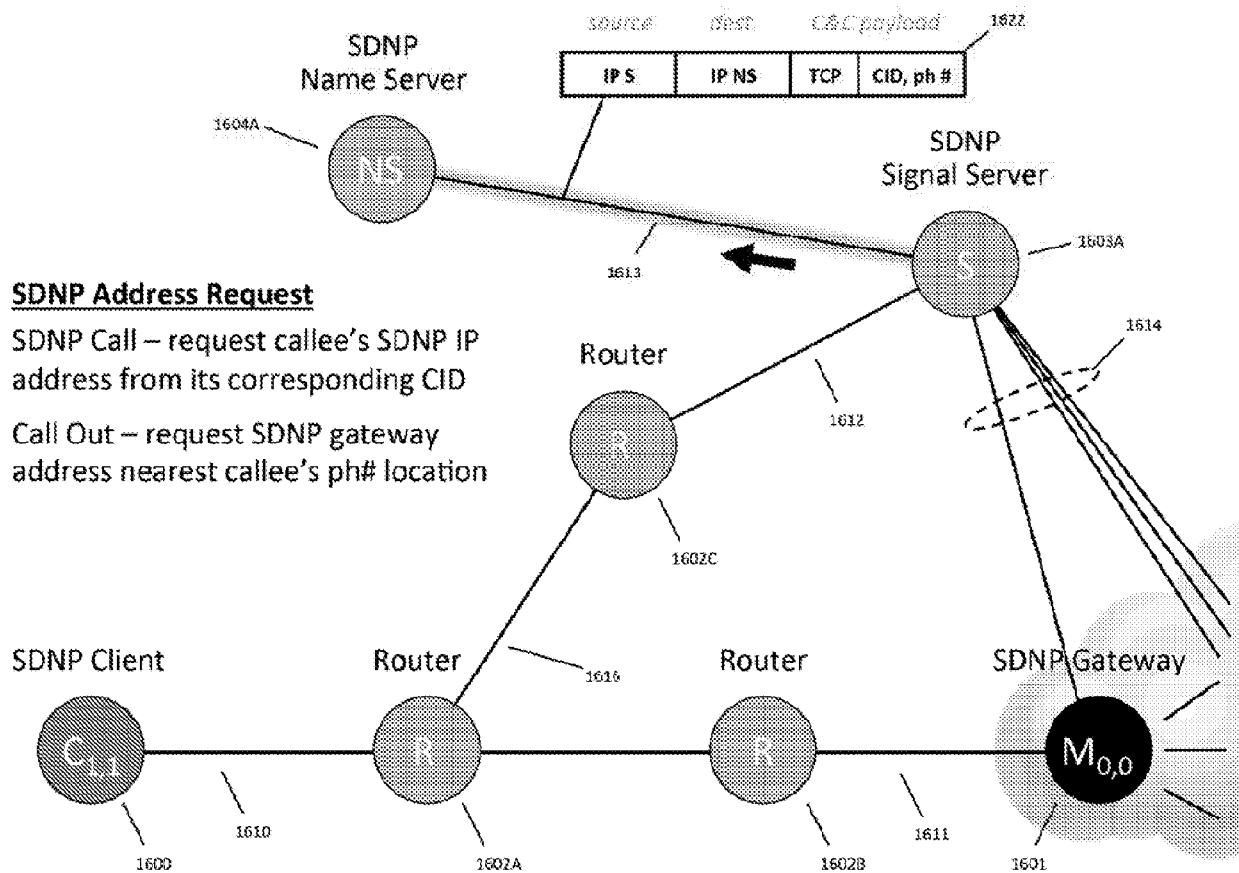


Figure 67



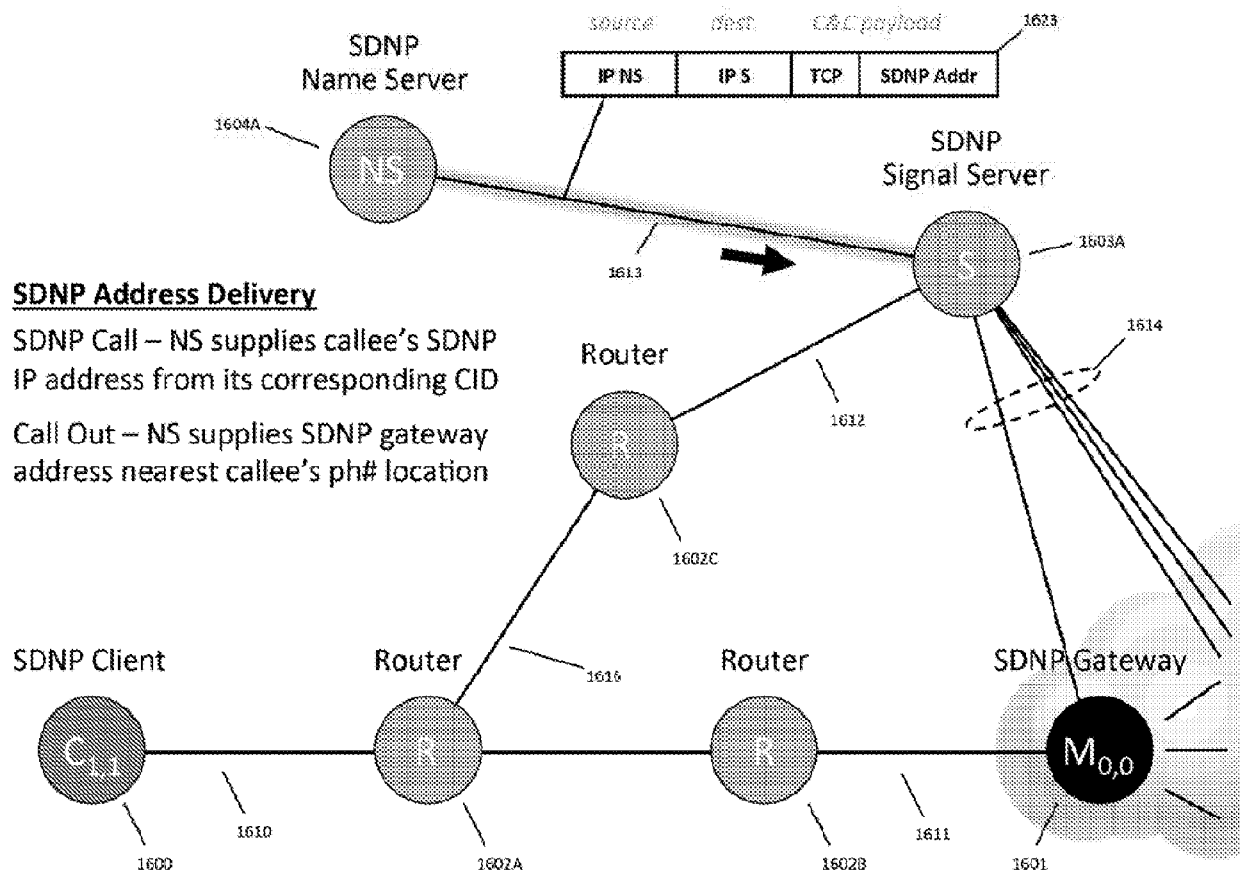


Figure 69

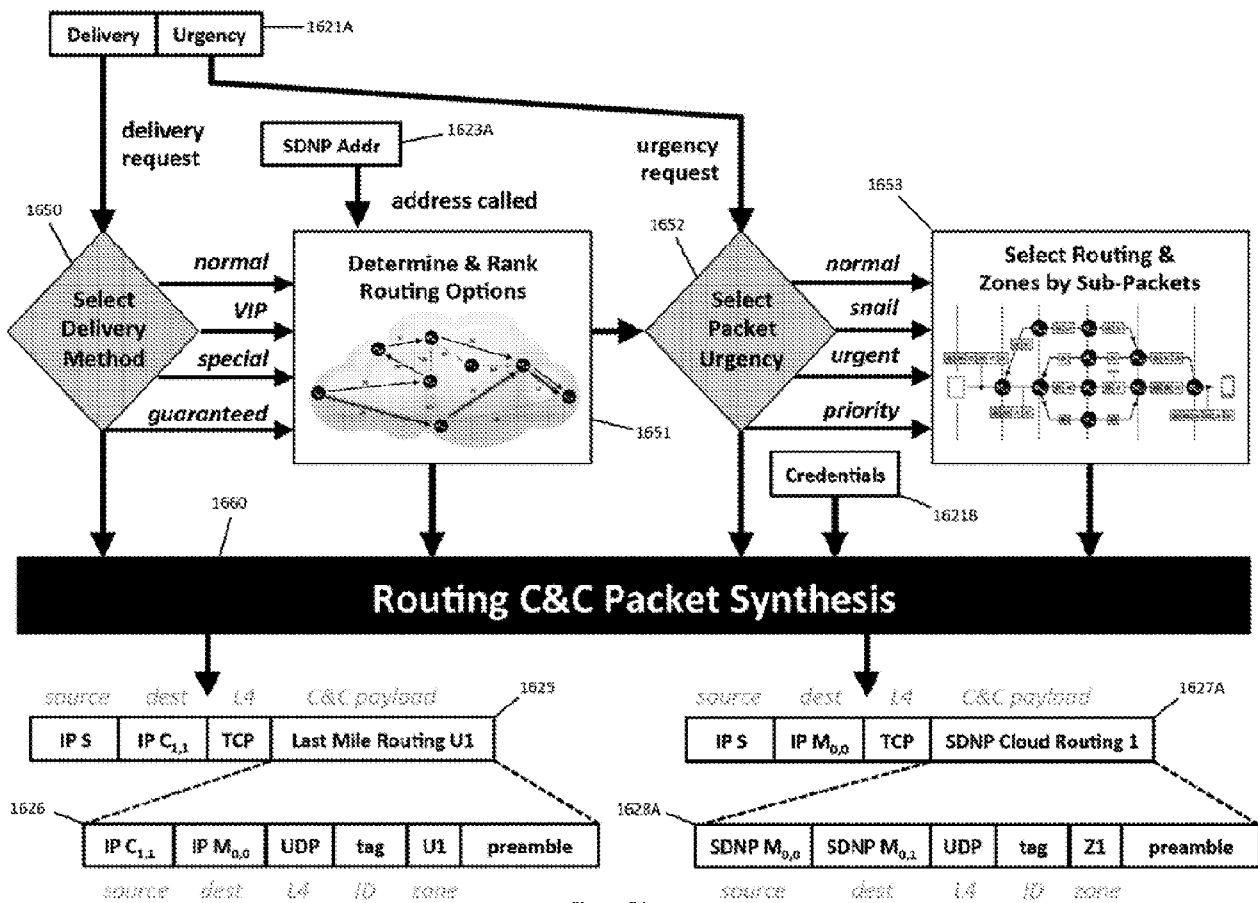


Figure 70

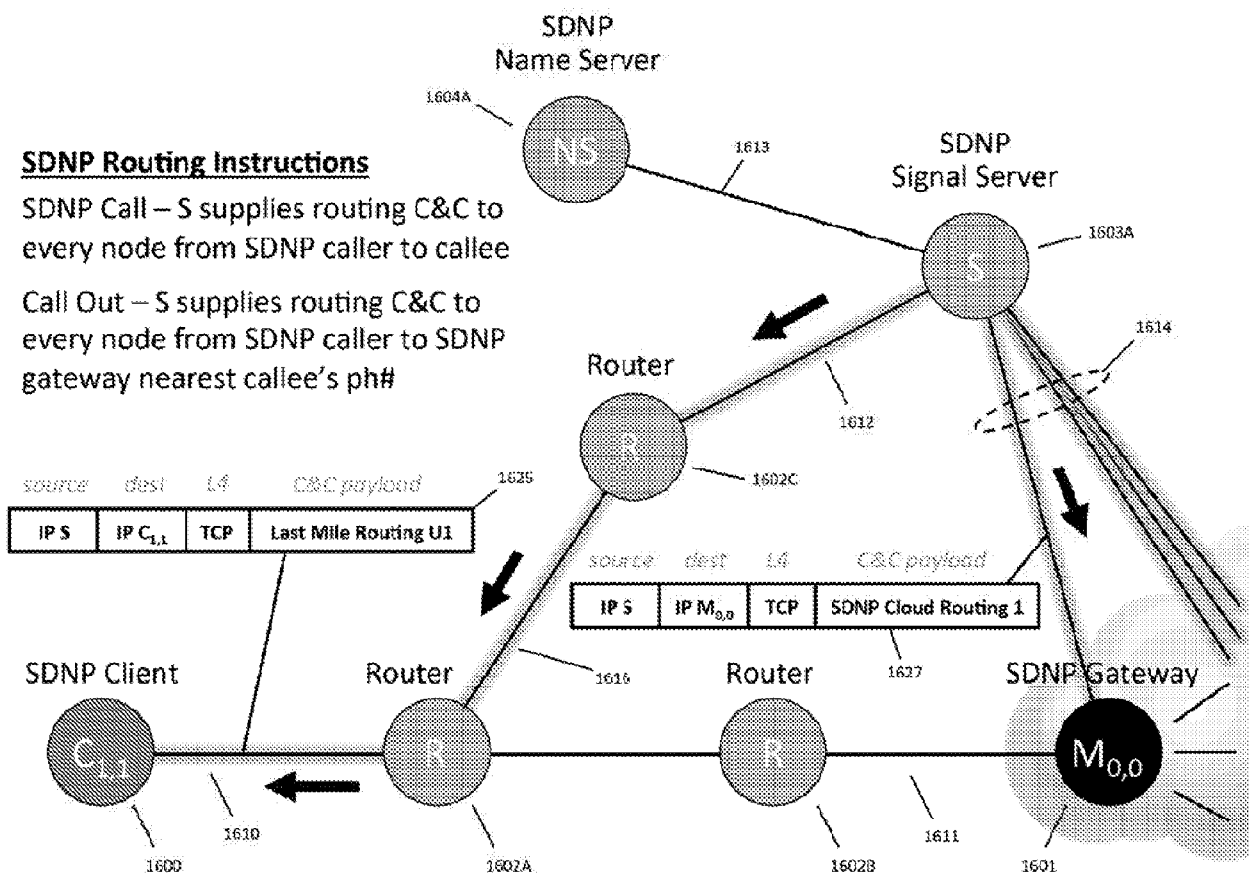


Figure 71

**SDNP Call**

SDNP Call – Call is routed from SDNP caller to SDNP Callee

Call Out – Call is routed from SDNP caller to SDNP gateway and onto local phone network

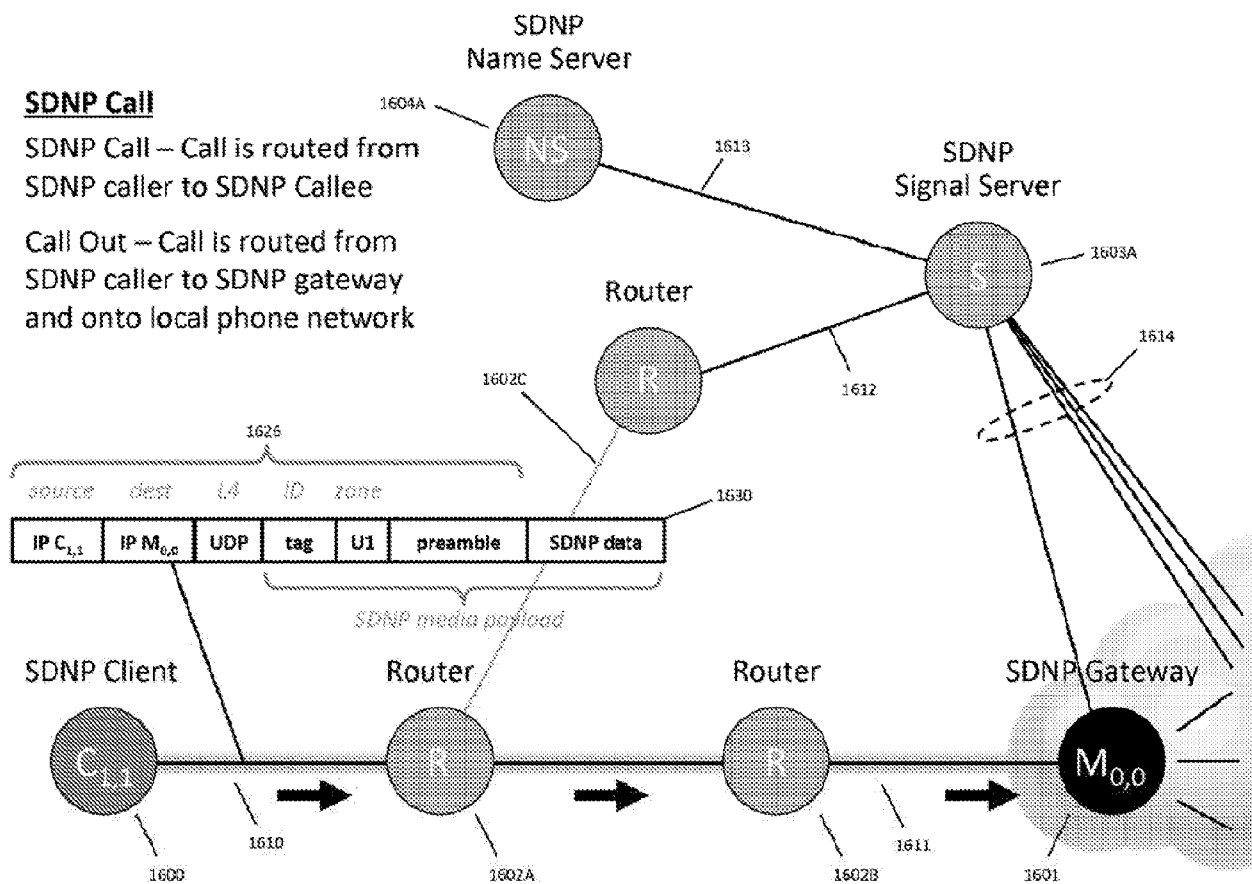


Figure 72

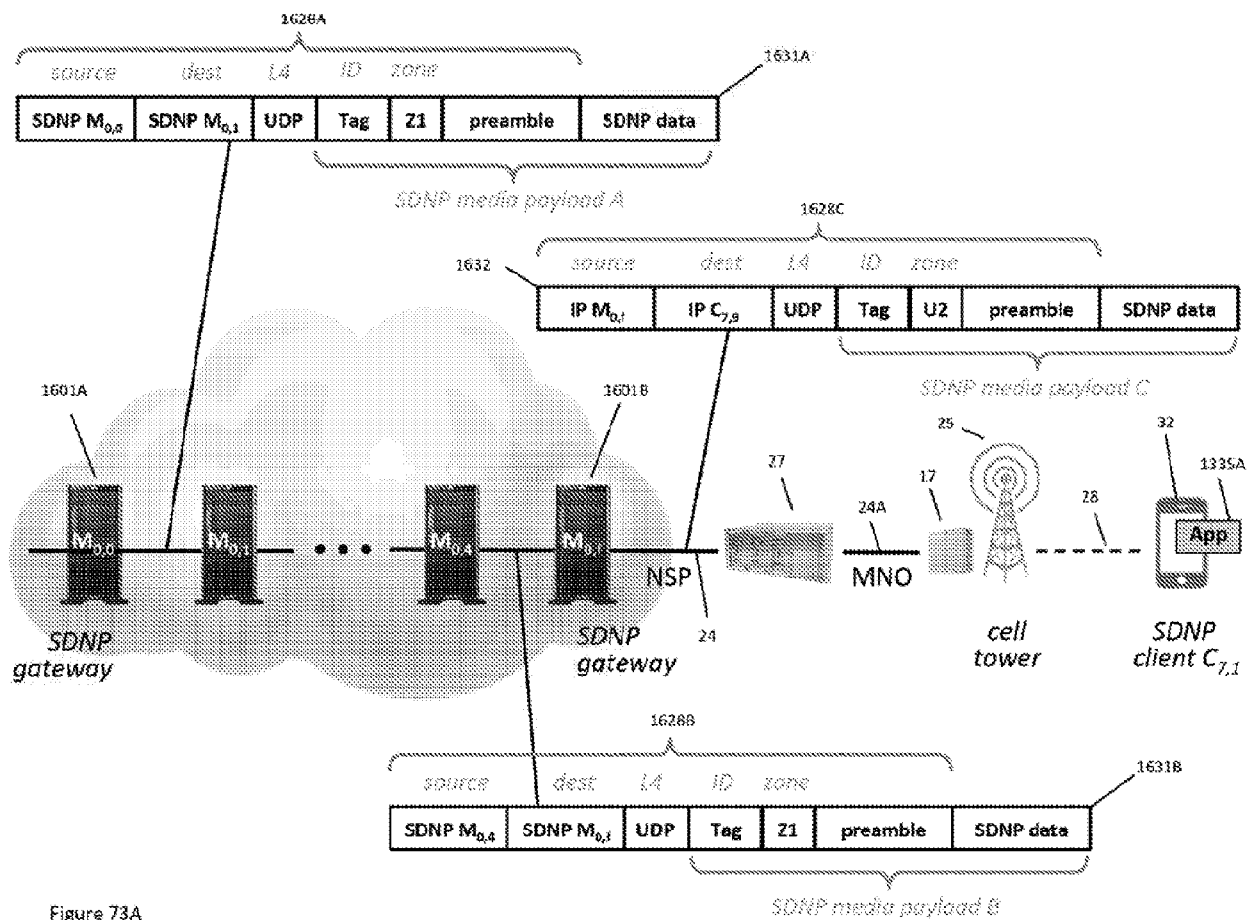


Figure 73A

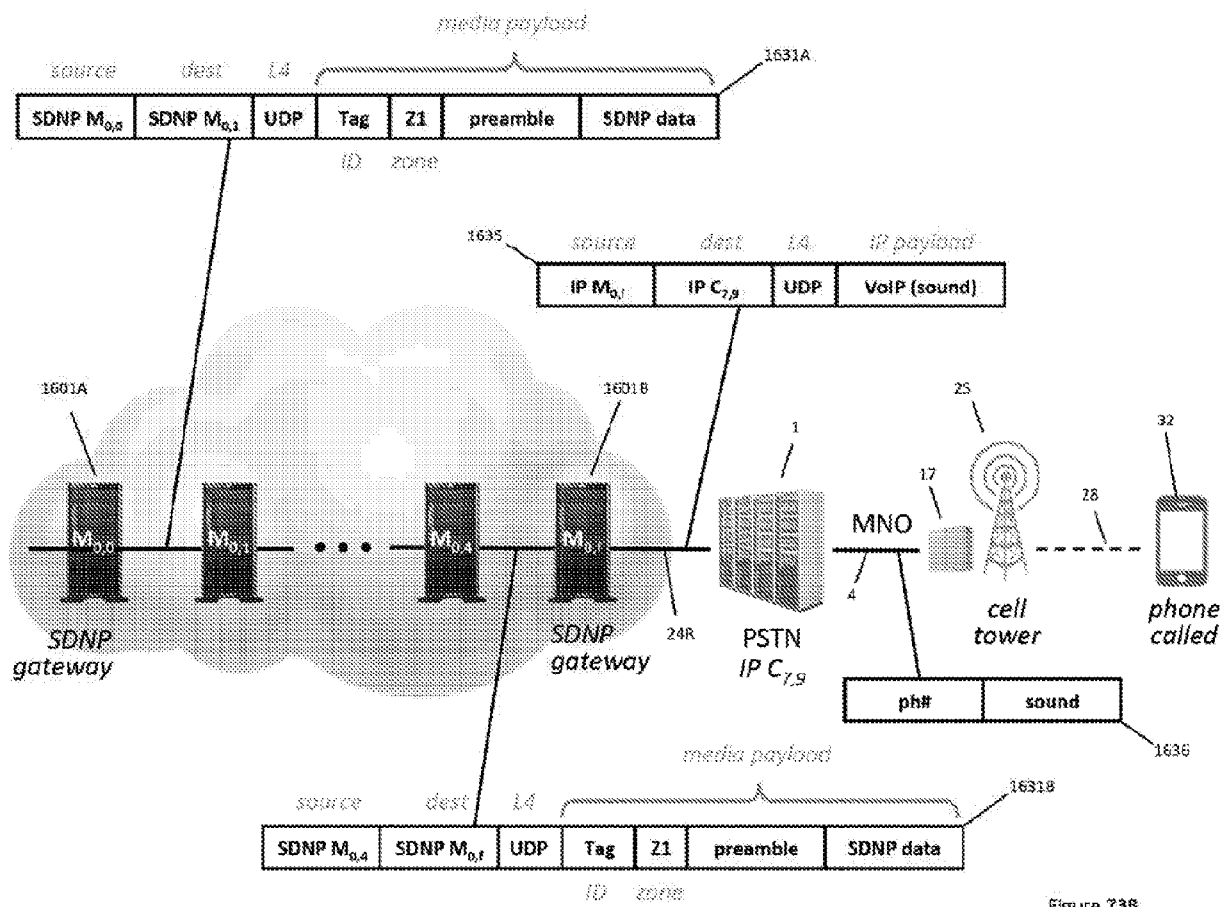


Figure 738



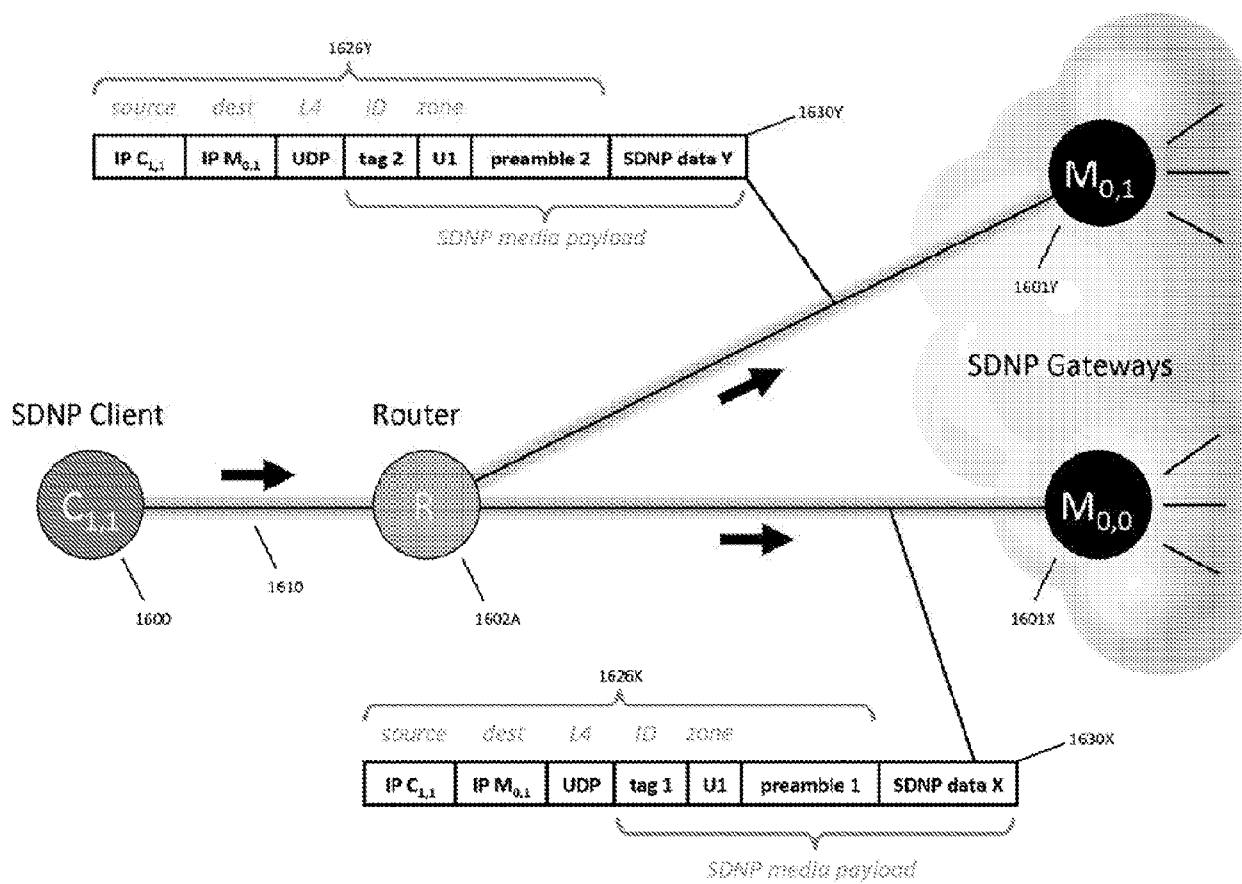


Figure 75A

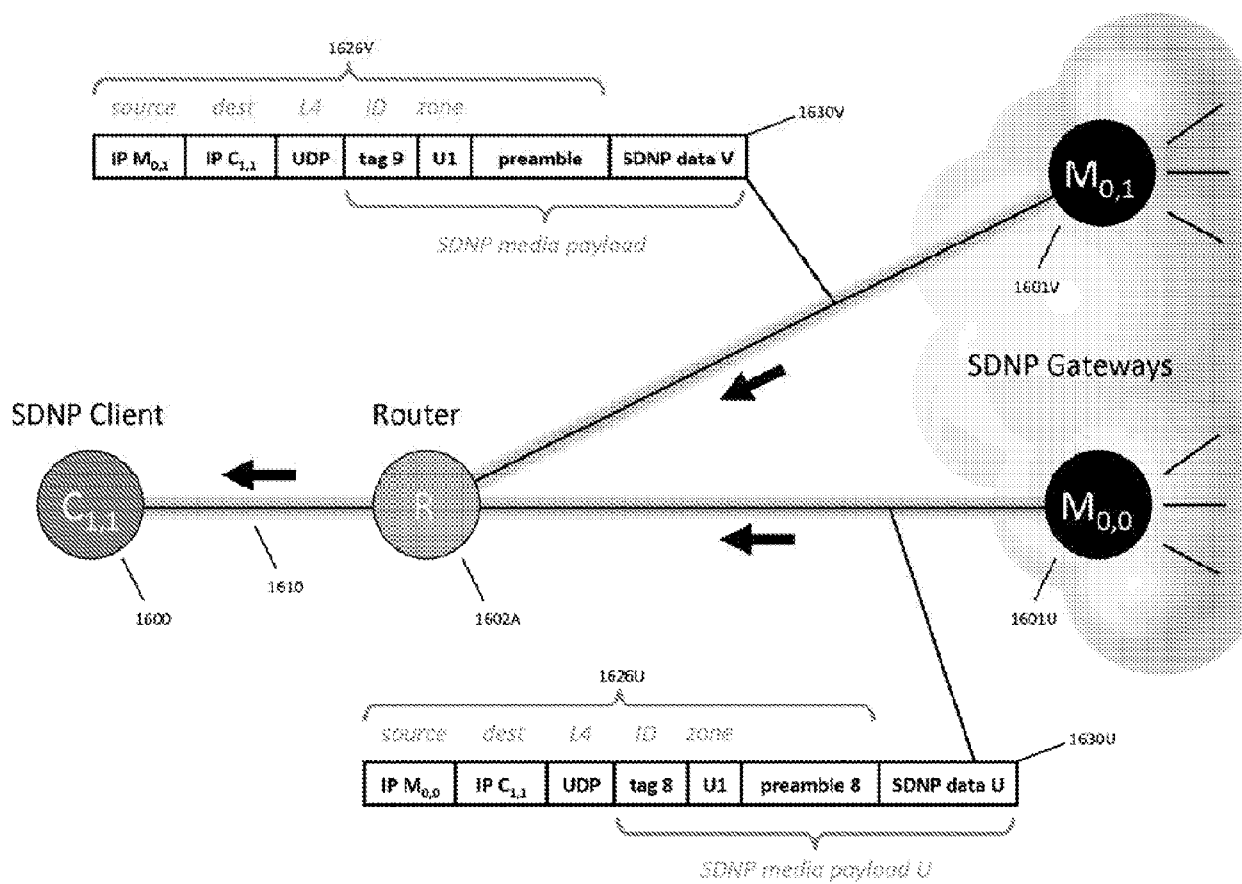


Figure 75B

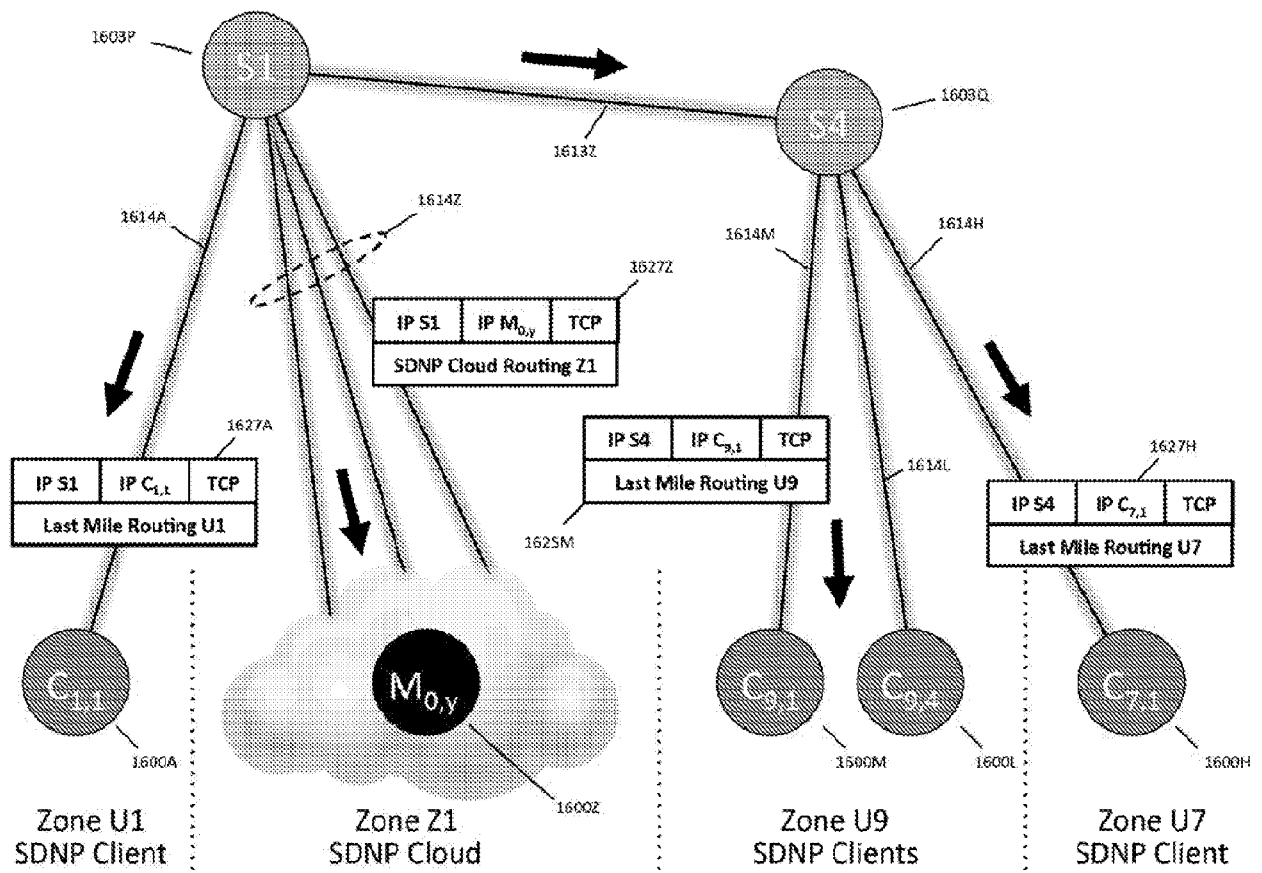


Figure 76

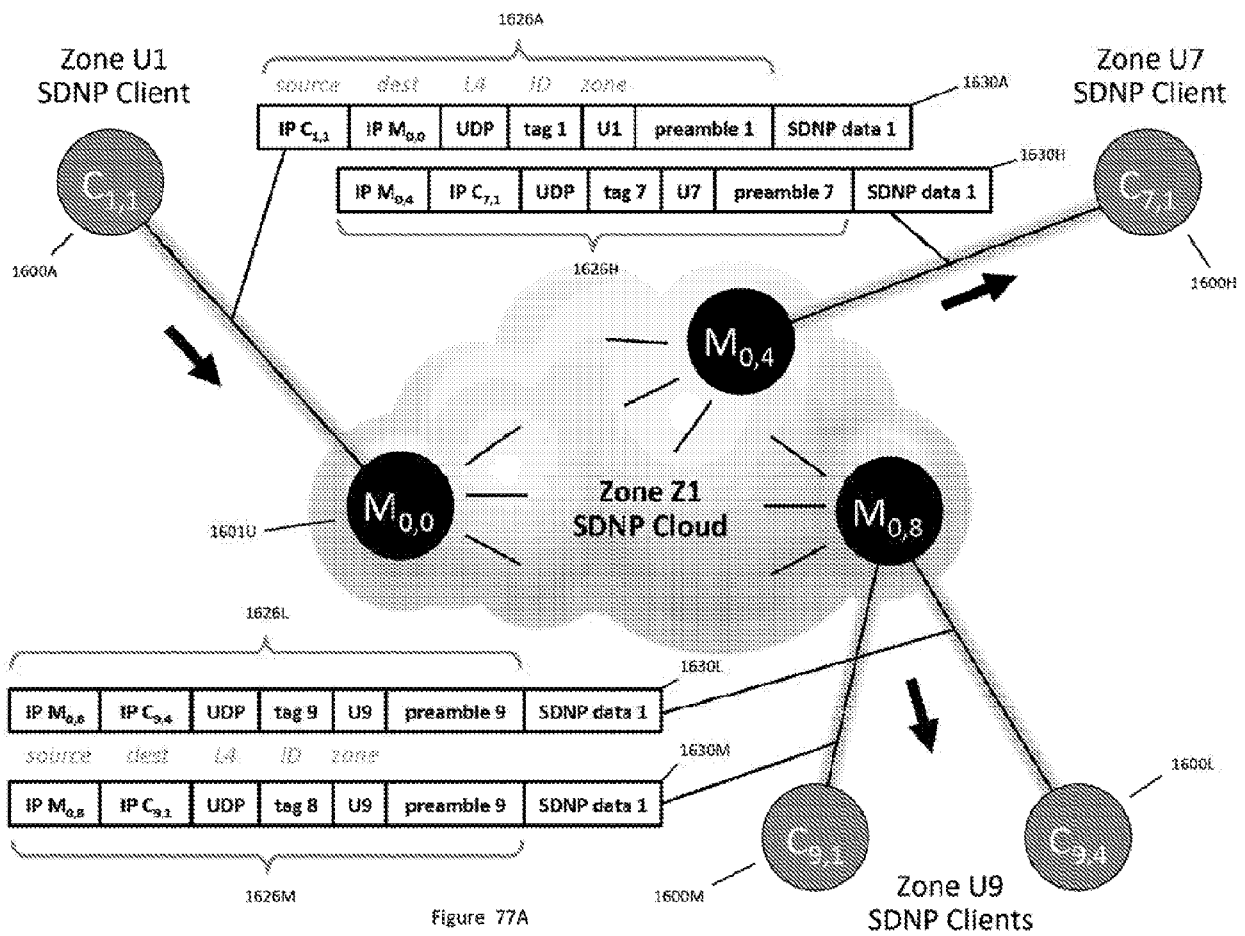


Figure 77A

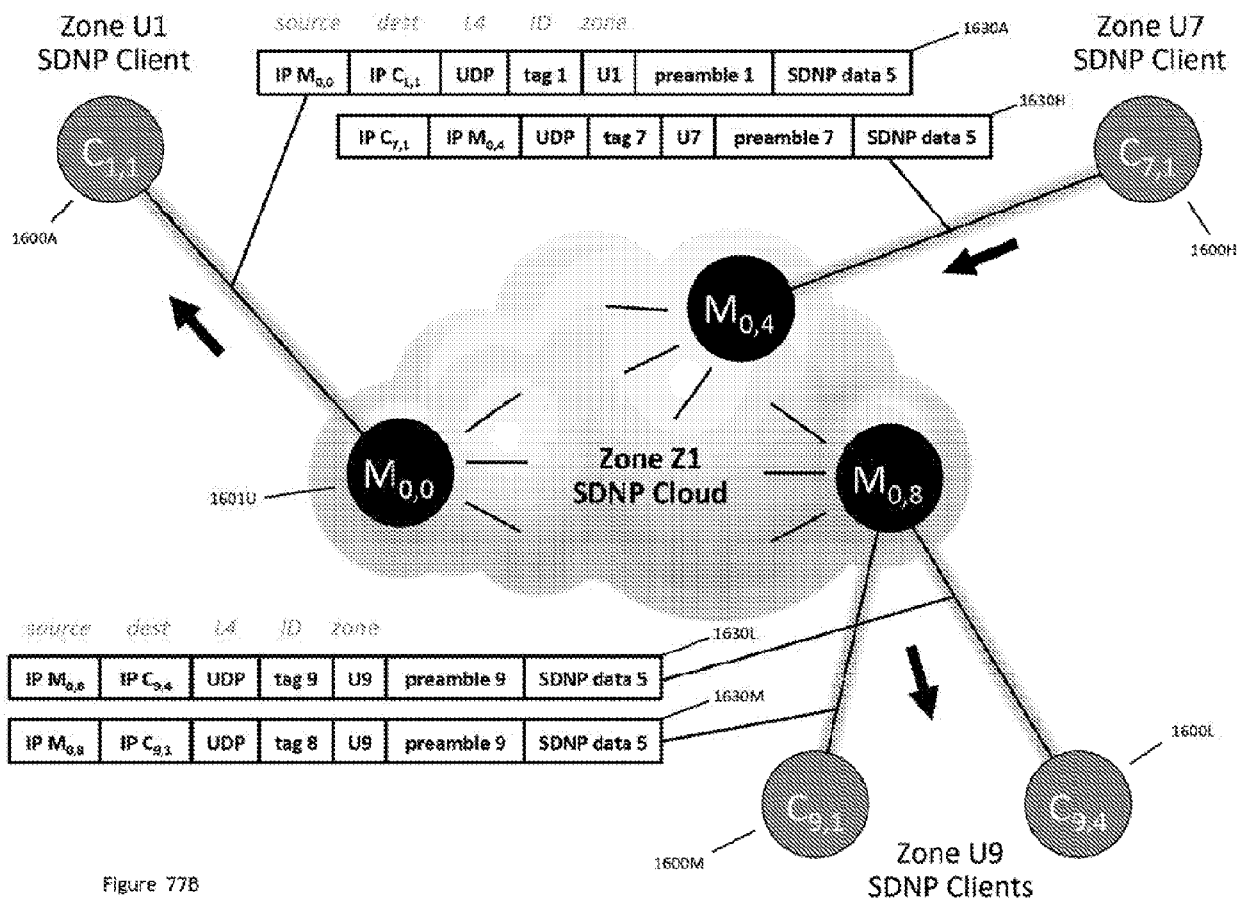


Figure 778

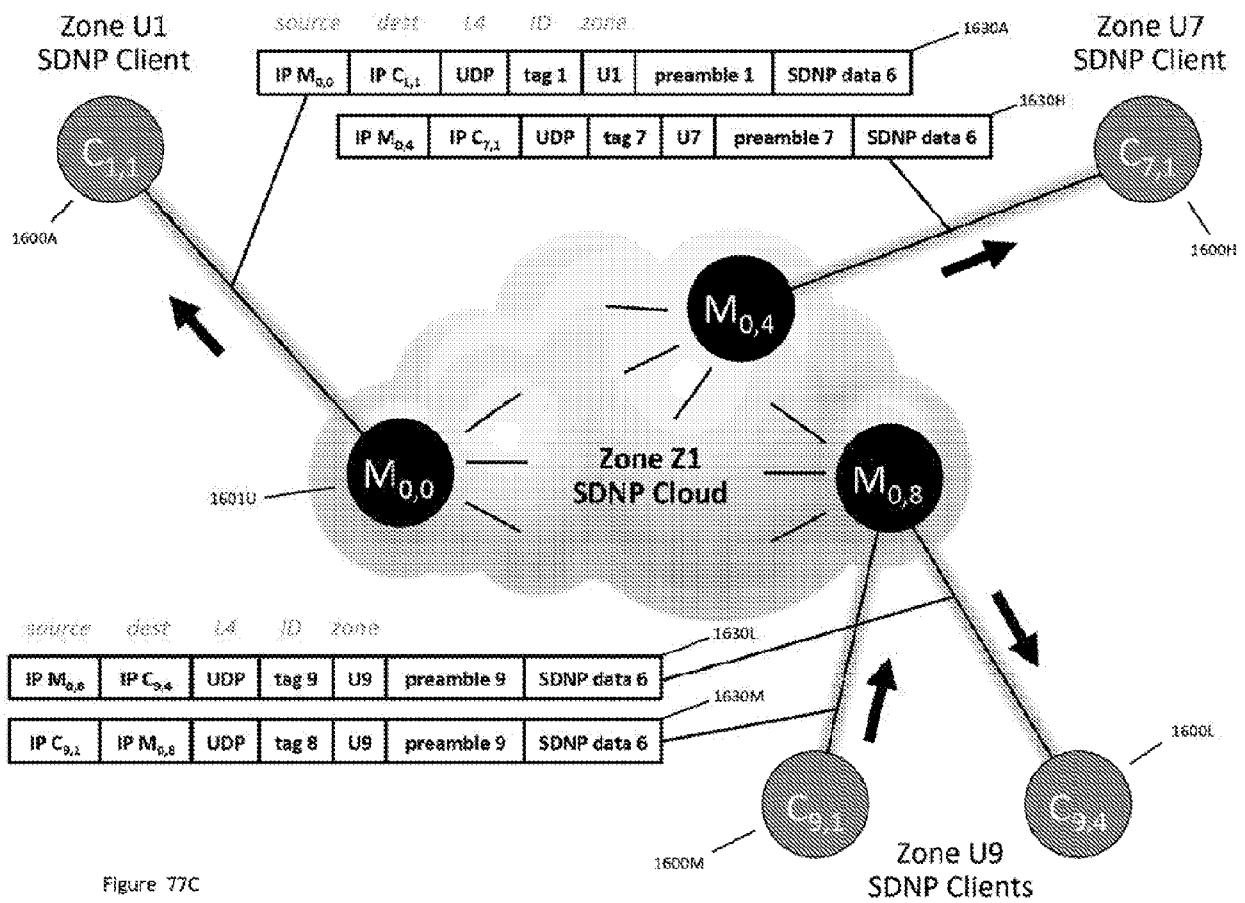
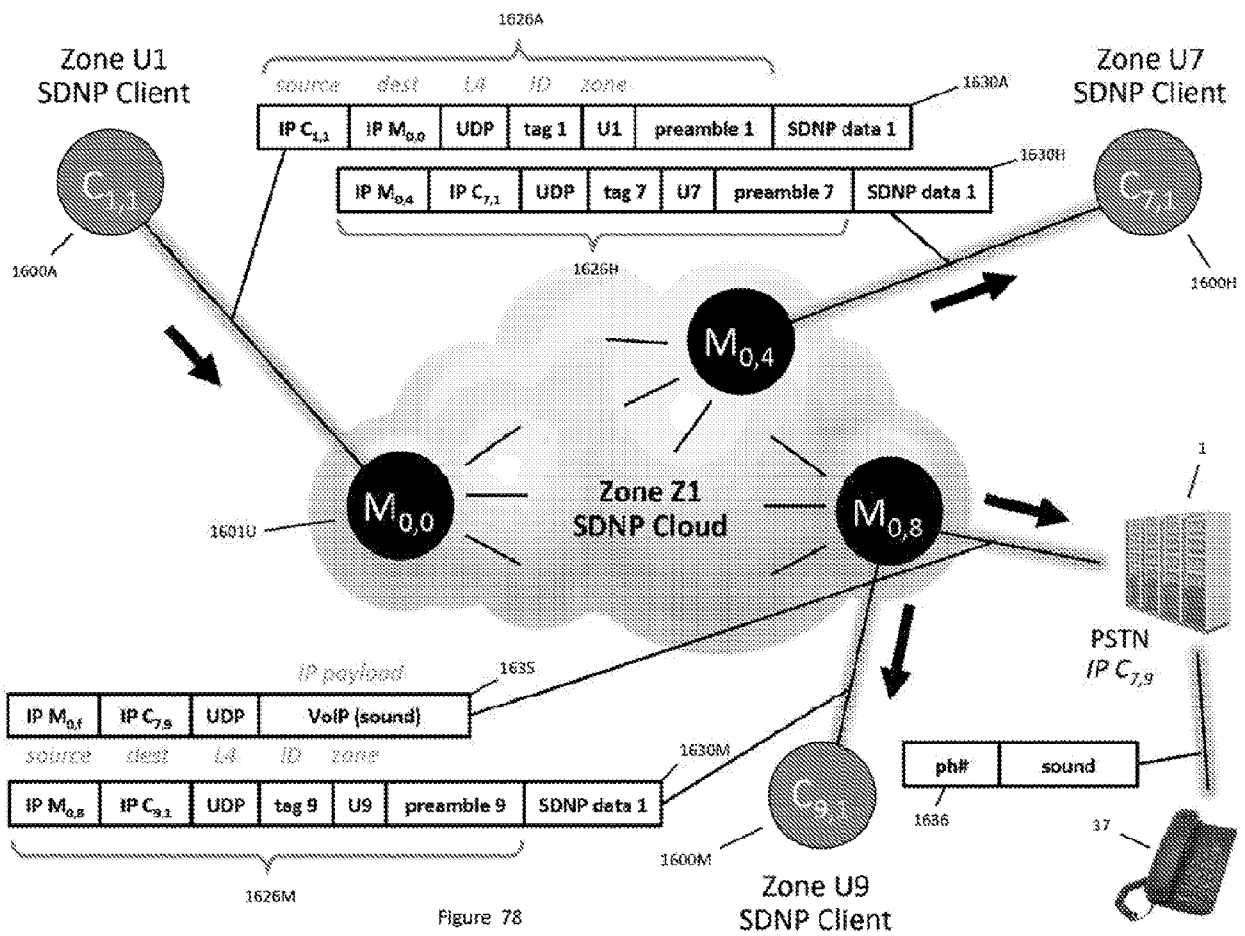


Figure 77C



| Group Call Client |                                   | Regular Call              | Private Call                  |                               |
|-------------------|-----------------------------------|---------------------------|-------------------------------|-------------------------------|
| Network Node      | User Authorization                | All Participants          | Authenticated SDNP Client     | Unauthenticated SDNP Client   |
| $C_{1,1}$         | SDNP Client<br><i>Group Host</i>  | Listen, Talk              | Listen, Talk                  | —                             |
| $C_{7,1}$         | SDNP Client<br><i>Participant</i> | Listen, Talk              | Listen, Talk                  | Microphone &<br>Speaker Muted |
| $C_{9,1}$         | SDNP Client<br><i>Participant</i> | Listen, Talk              | Listen, Talk                  |                               |
| $C_{9,4}$         | SDNP Client<br><i>Listener</i>    | Listen Only,<br>Mic Muted | Listen Only,<br>Mic Muted     |                               |
| Ph #1             | Call Out<br><i>Participant</i>    | Listen, Talk              | Microphone &<br>Speaker Muted |                               |
| Ph #2             | Call Out<br><i>Listener</i>       | Listen Only,<br>Mic Muted | Microphone &<br>Speaker Muted |                               |

Figure 79A

| Group Call Client |                                           | Regular Call           | Hyper-Private Call         |                             |
|-------------------|-------------------------------------------|------------------------|----------------------------|-----------------------------|
| Network Node      | User Authorization                        | All Participants       | Authenticated SDNP Client  | Unauthenticated SDNP Client |
| $C_{1,1}$         | SDNP Client<br><i>Private Group Host</i>  | Listen, Talk           | Listen, Talk               | —                           |
| $C_{7,1}$         | SDNP Client<br><i>Private Participant</i> | Listen, Talk           | Listen, Talk               | Microphone & Speaker Muted  |
| $C_{9,1}$         | SDNP Client<br><i>Participant</i>         | Listen, Talk           | Microphone & Speaker Muted |                             |
| $C_{9,4}$         | SDNP Client<br><i>Private Listener</i>    | Listen Only, Mic Muted | Listen Only, Mic Muted     |                             |
| $C_{9,5}$         | SDNP Client<br><i>Listener</i>            | Listen Only, Mic Muted | Microphone & Speaker Muted |                             |
| Ph #1             | Call Out<br><i>Participant</i>            | Listen, Talk           | Microphone & Speaker Muted |                             |
| Ph #2             | Call Out<br><i>Listener</i>               | Listen Only, Mic Muted | Microphone & Speaker Muted |                             |

Figure 79B

| PTT Group Call Client |                         | Regular Push-to-Talk  |                       | Private Push-to-Talk       |                            |                            |
|-----------------------|-------------------------|-----------------------|-----------------------|----------------------------|----------------------------|----------------------------|
| Network Node          | User Authorization      | Host PTT              | Other PTT             | Authenticated Host PTT     | Authenticated Other PTT    | Unauthenticated Party      |
| $C_{1,1}$             | SDNP Client Group Host  | Talk, Priority Mute   | Listen Only, Mic Mute | Talk, Priority Mute        | Listen Only, Mic Muted     | —                          |
| $C_{7,1}$             | SDNP Client Participant | Listen Only, Mic Mute | Talk, Mute Others     | Listen Only, Mic Mute      | Talk, Mute All Others      | Microphone & Speaker Muted |
| $C_{9,1}$             | SDNP Client Participant | Listen Only, Mic Mute | Listen Only, Mic Mute | Listen Only, Mic Mute      | Listen Only, Mic Mute      |                            |
| $C_{9,4}$             | SDNP Client Listener    | Listen Only, Mic Mute | Listen Only, Mic Mute | Listen Only, Mic Mute      | Listen Only, Mic Mute      |                            |
| $C_{9,5}$             | SDNP Client Listener    | Listen Only, Mic Mute | Listen Only, Mic Mute | Listen Only, Mic Mute      | Listen Only, Mic Mute      |                            |
| Ph #1                 | Call Out                | Listen Only, Mic Mute | Listen Only, Mic Mute | Microphone & Speaker Muted | Microphone & Speaker Muted |                            |

Figure 80A

| PTT Group Call Client |                                 | Regular Push-to-Talk  |                        | Hyper-Private Push-to-Talk |                            |                            |
|-----------------------|---------------------------------|-----------------------|------------------------|----------------------------|----------------------------|----------------------------|
| Network Node          | User Authorization              | Host PTT              | Other PTT              | Authenticated Host PTT     | Authenticated Other PTT    | Unauthenticated Party      |
| $C_{1,1}$             | SDNP Client Group Host          | Talk, Priority Mute   | Listen Only, Mic Muted | Talk, Priority Mute        | Listen Only, Mic Mute      | —                          |
| $C_{7,1}$             | SDNP Client Private Participant | Listen Only, Mic Mute | Talk, Mute Others      | Listen Only, Mic Muted     | Talk, Mute Others          | Microphone & Speaker Muted |
| $C_{9,1}$             | SDNP Client Participant         | Listen Only, Mic Mute | Listen Only, Mic Mute  | Microphone & Speaker Muted | Microphone & Speaker Muted |                            |
| $C_{9,4}$             | SDNP Client Private Listener    | Listen Only, Mic Mute | Listen Only, Mic Mute  | Listen Only, Mic Muted     | Listen Only, Mic Muted     |                            |
| $C_{9,5}$             | SDNP Client Listen Only         | Listen Only, Mic Mute | Listen Only, Mic Mute  | Microphone & Speaker Muted | Microphone & Speaker Muted |                            |
| Ph #                  | Call Out                        | Listen Only, Mic Mute | Listen Only, Mic Mute  | Microphone & Speaker Muted | Microphone & Speaker Muted |                            |

Figure 80B

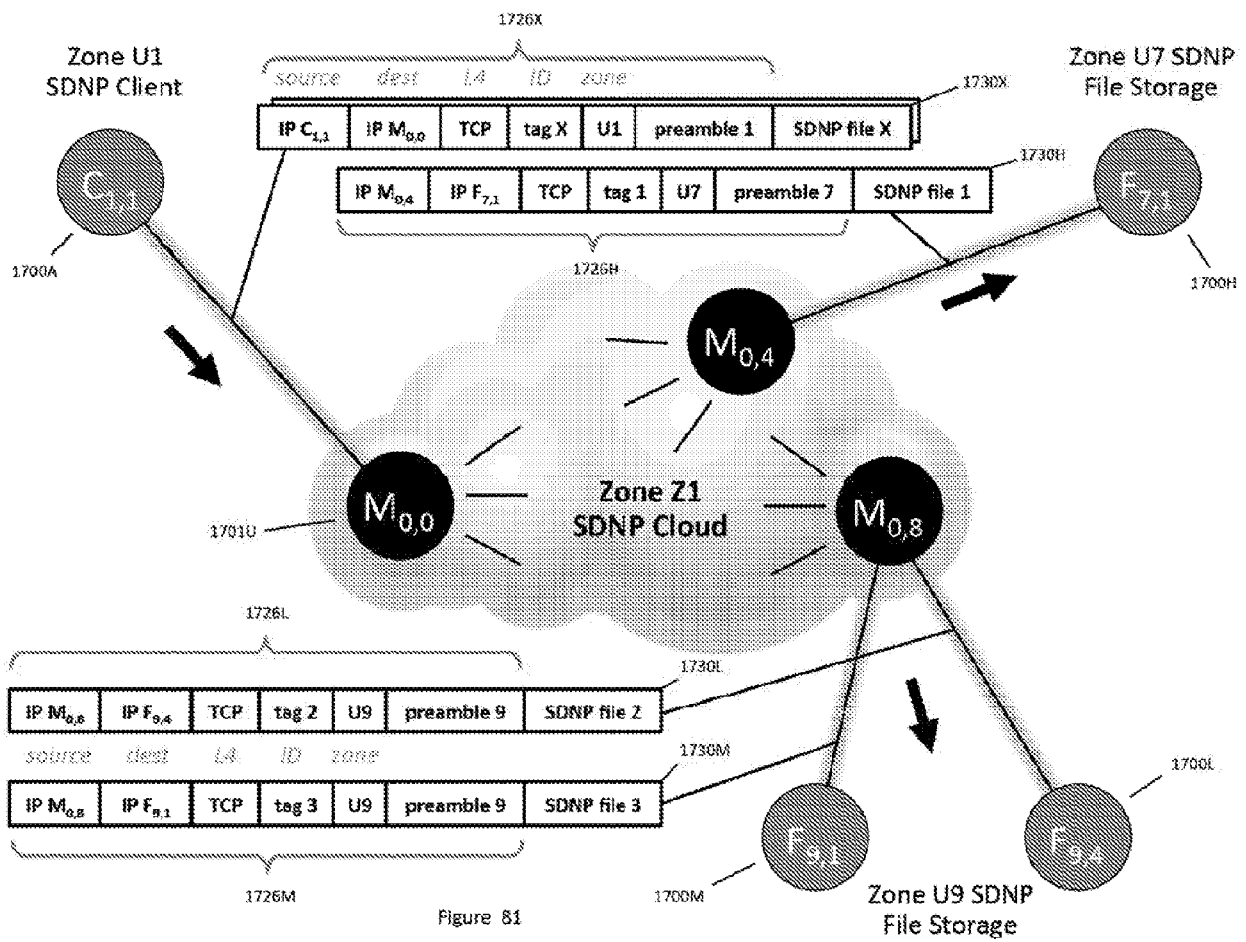


Figure 81

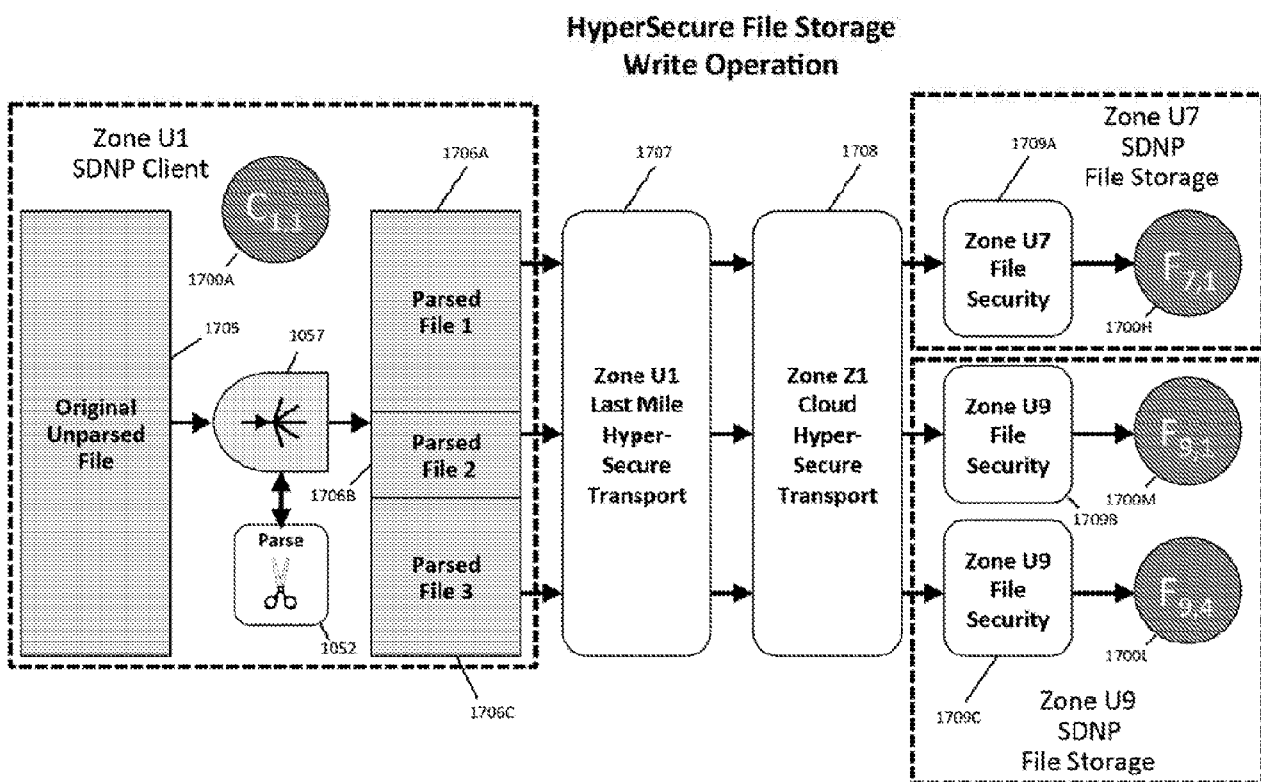


Figure 82A

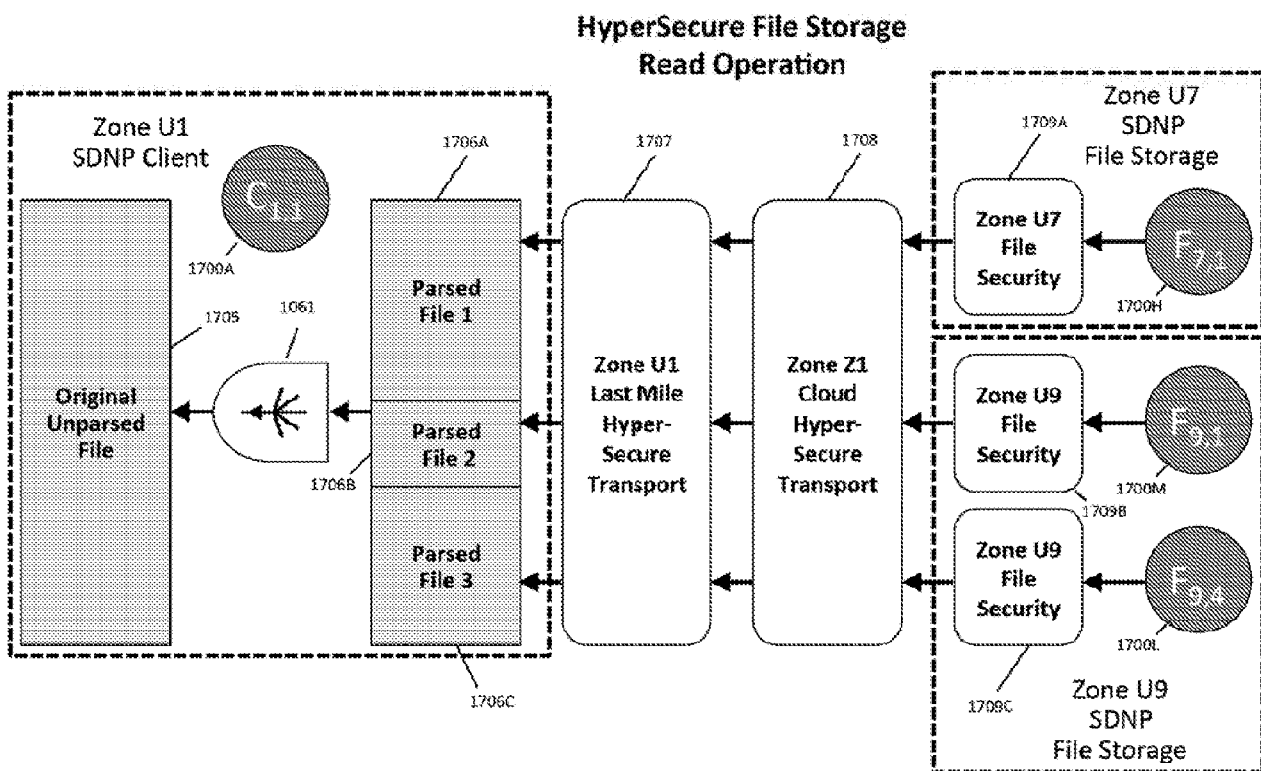


Figure 82B

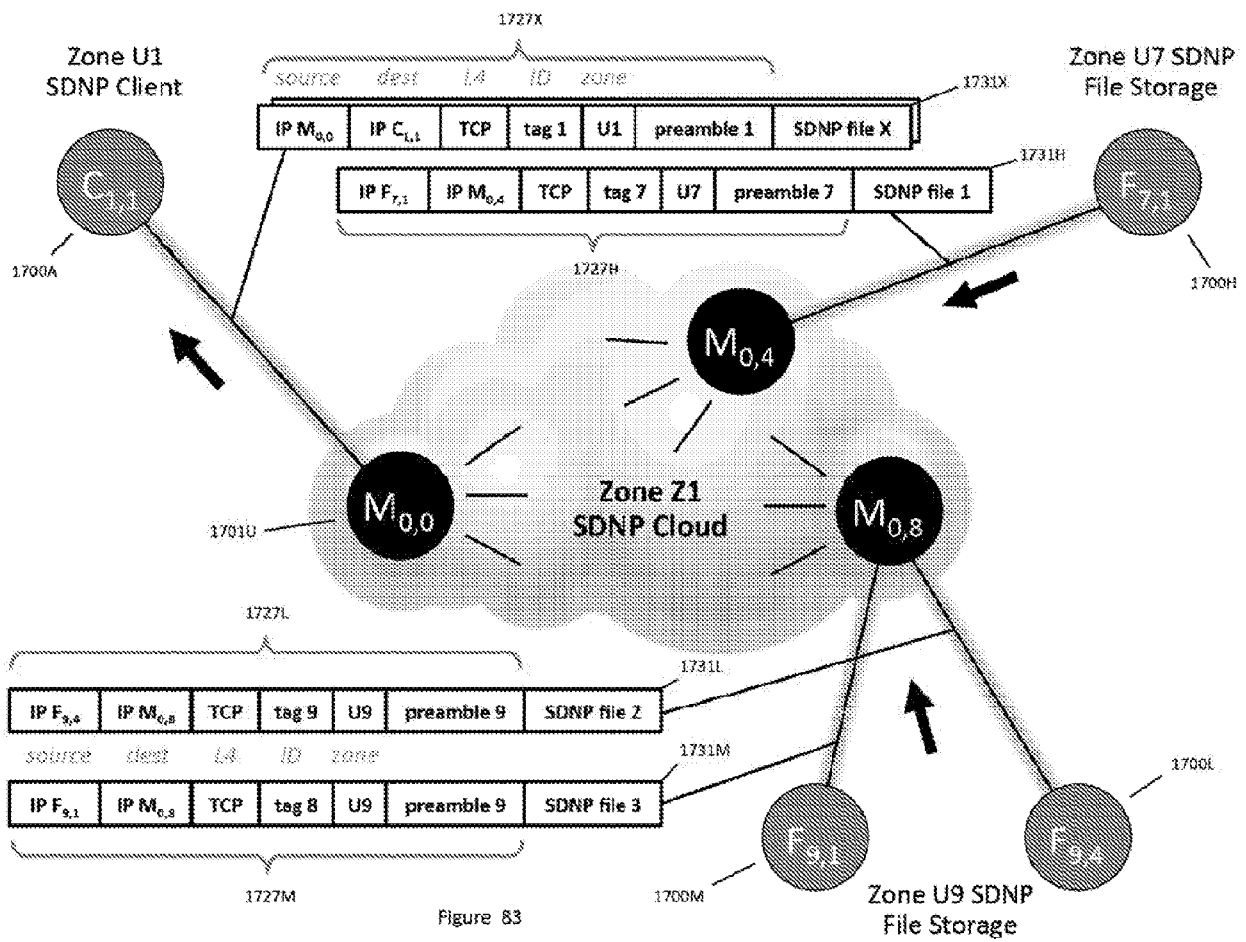
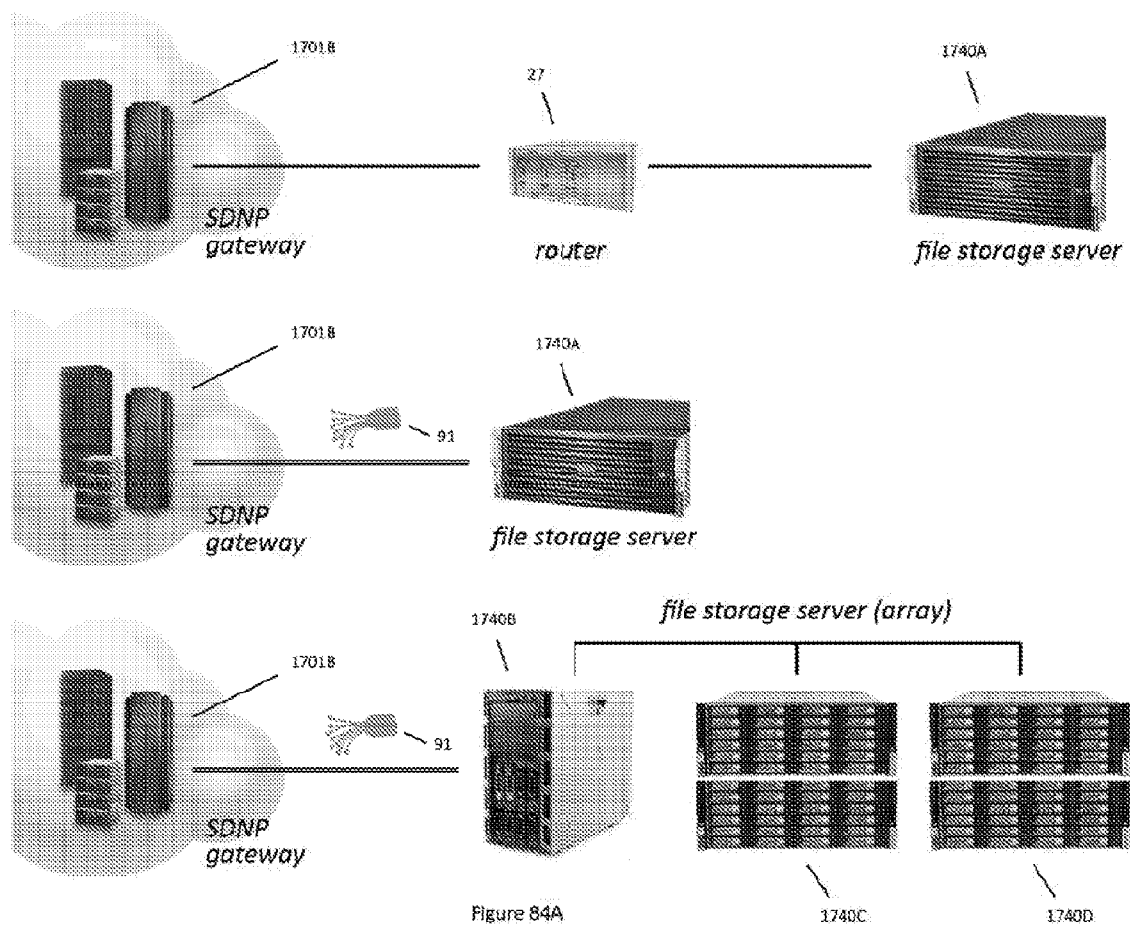


Figure 83



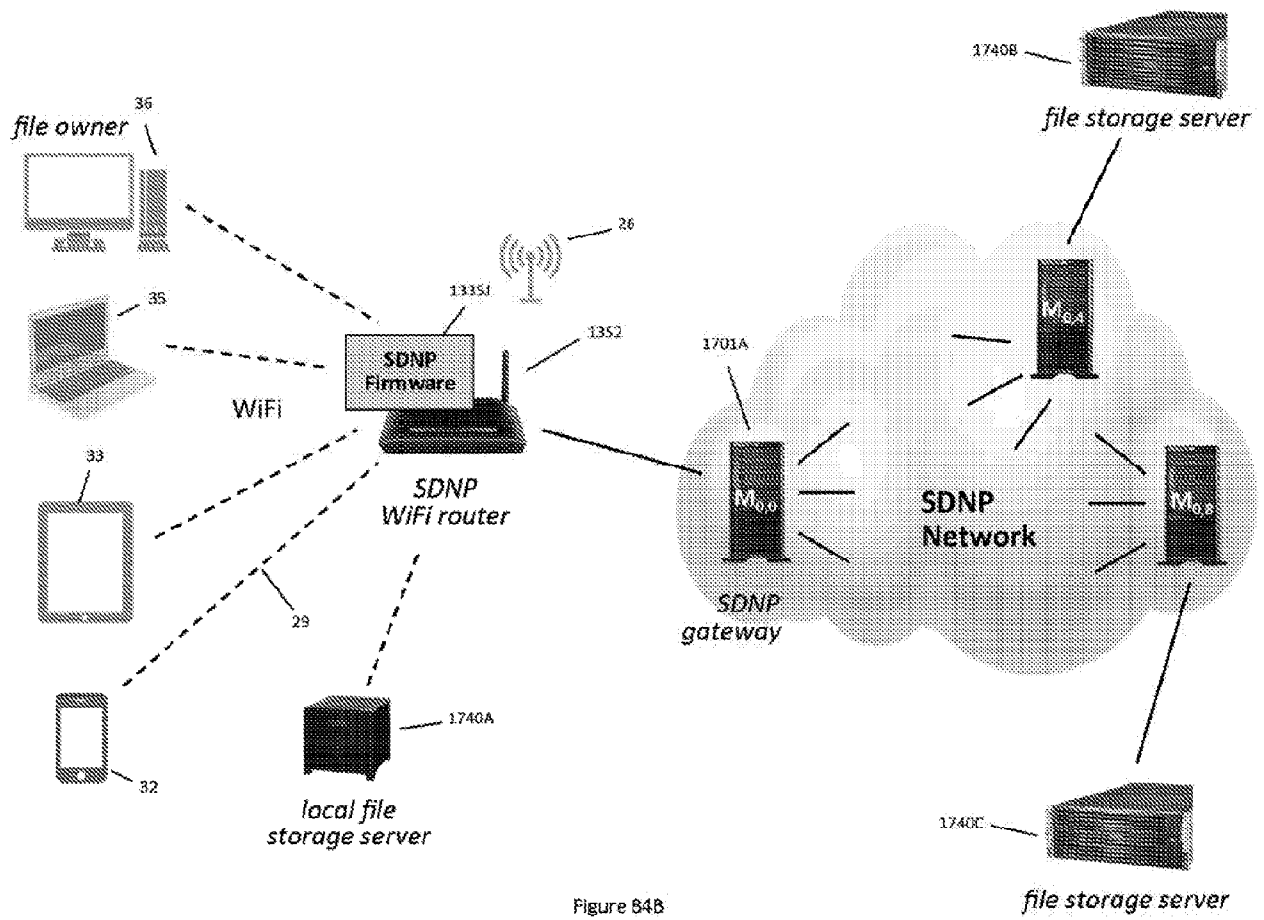


Figure 64B

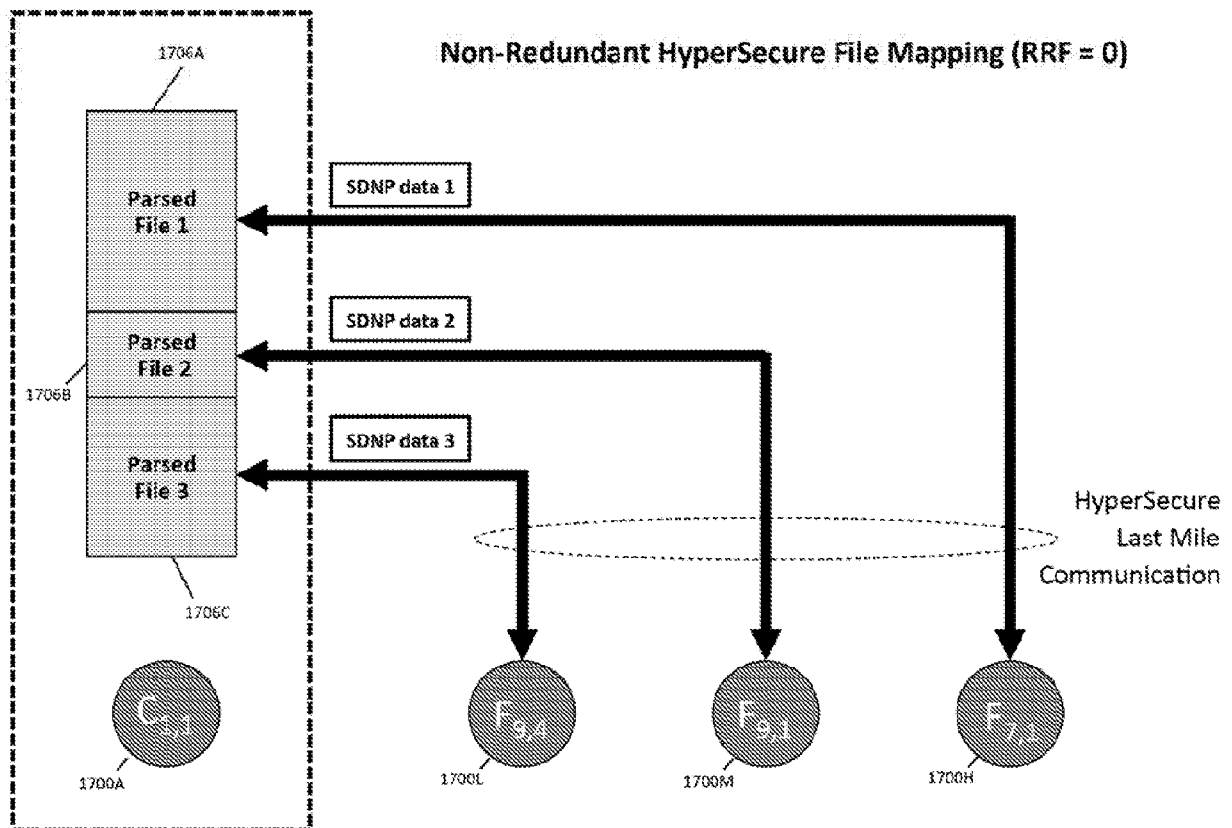


Figure 85A

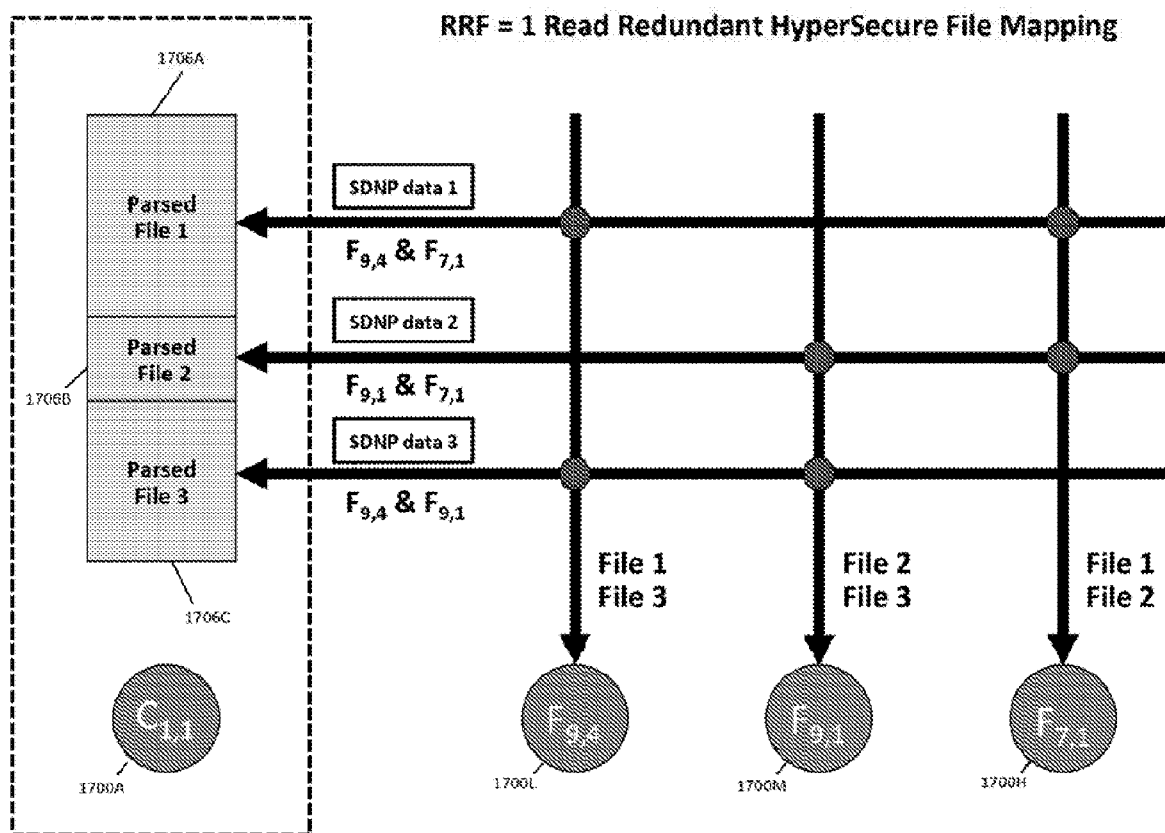
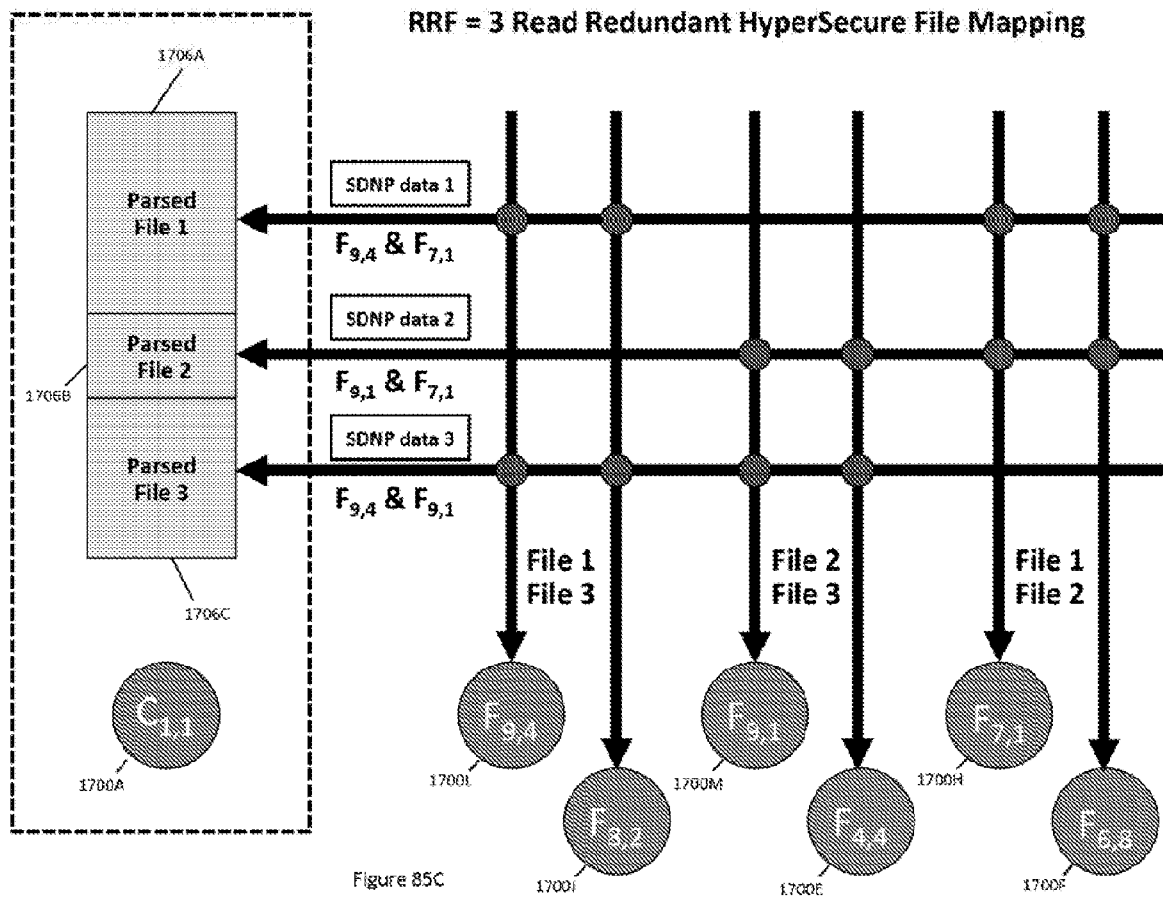


Figure 85B



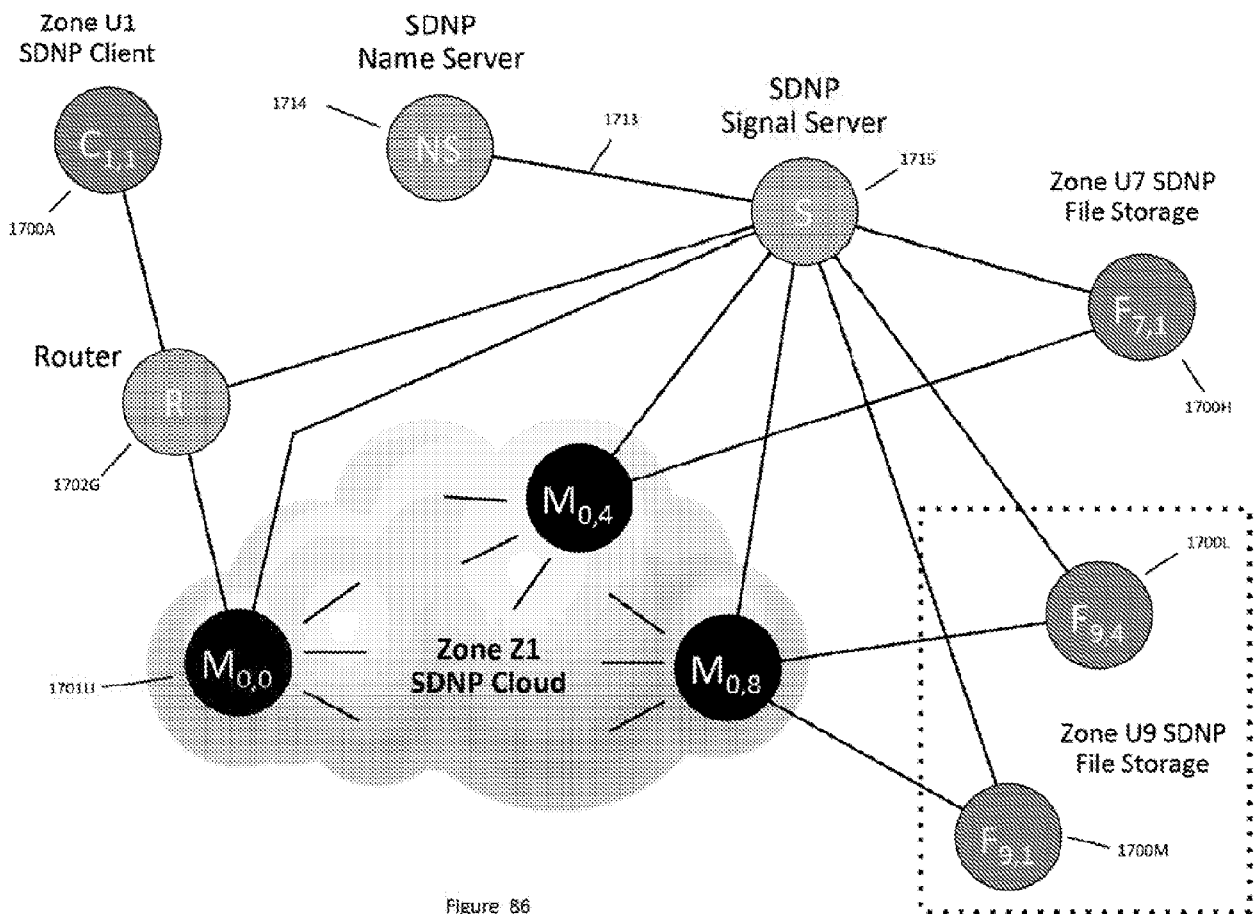


Figure 86

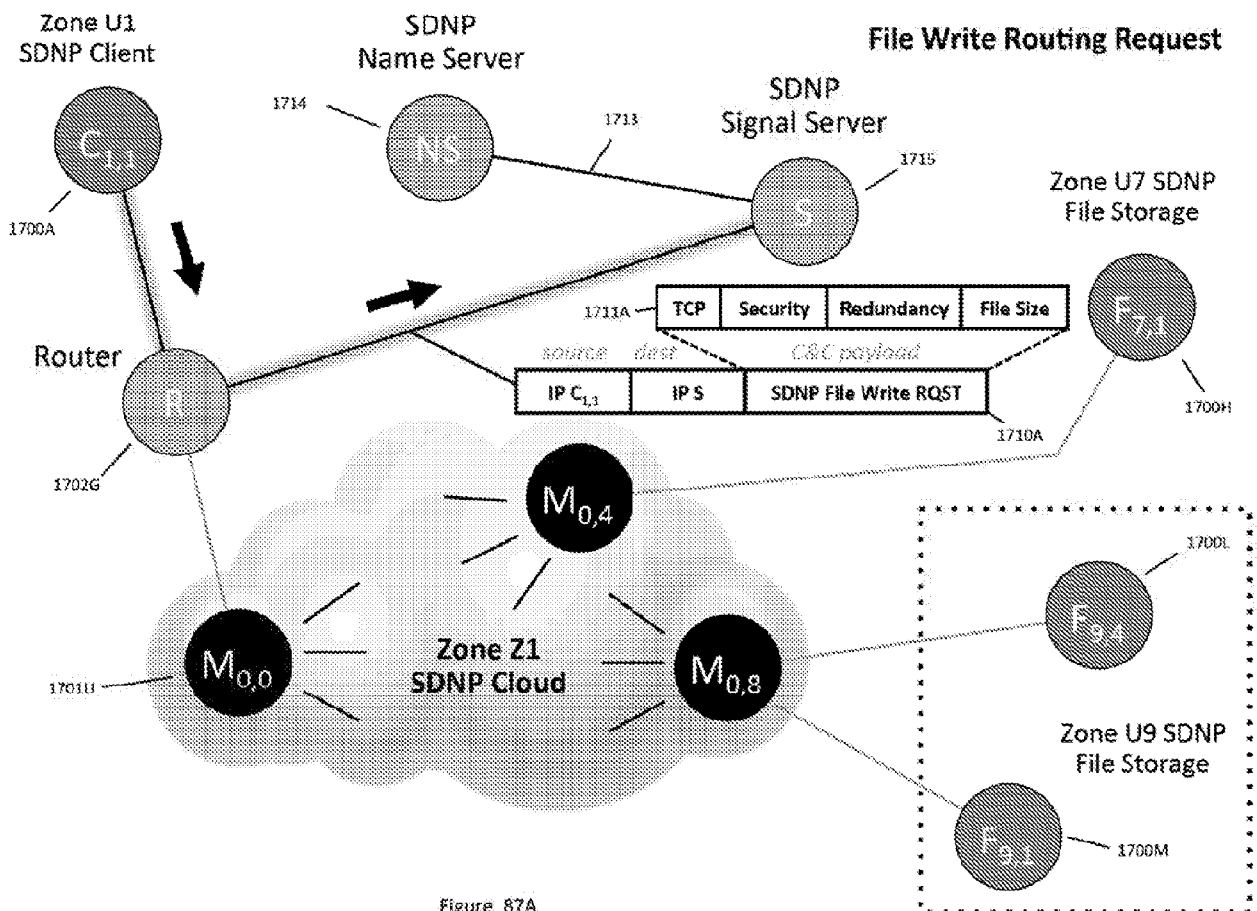


Figure 87A

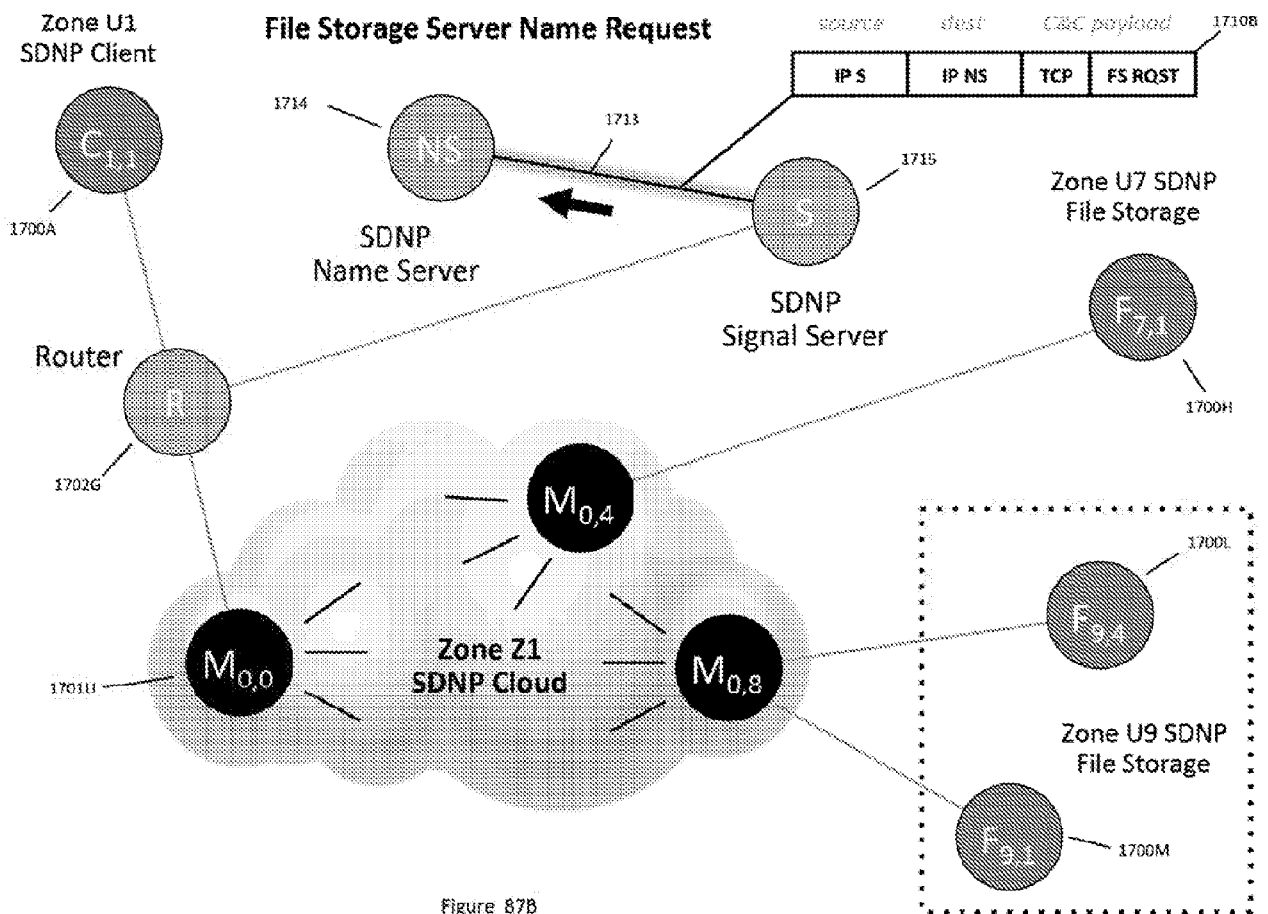


Figure 67B

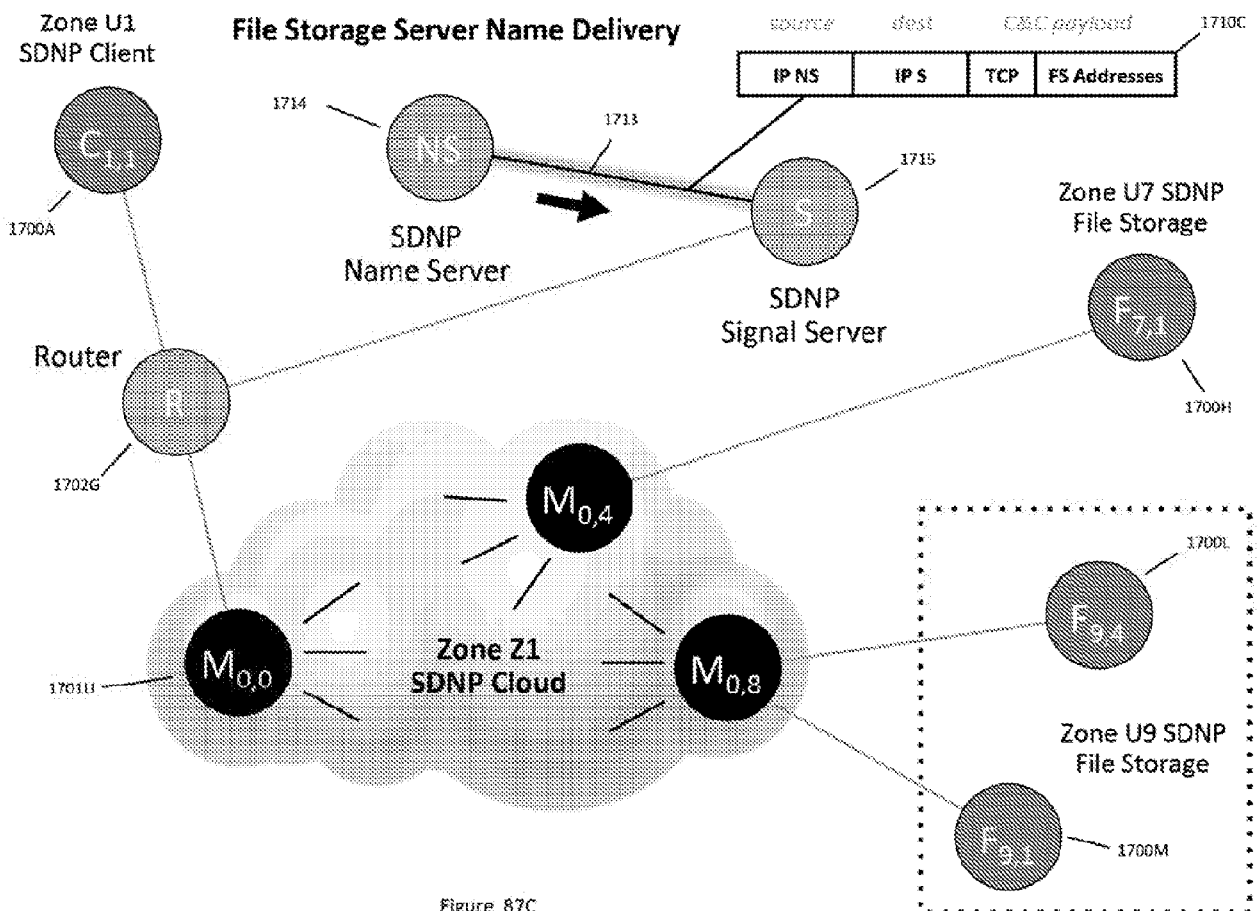
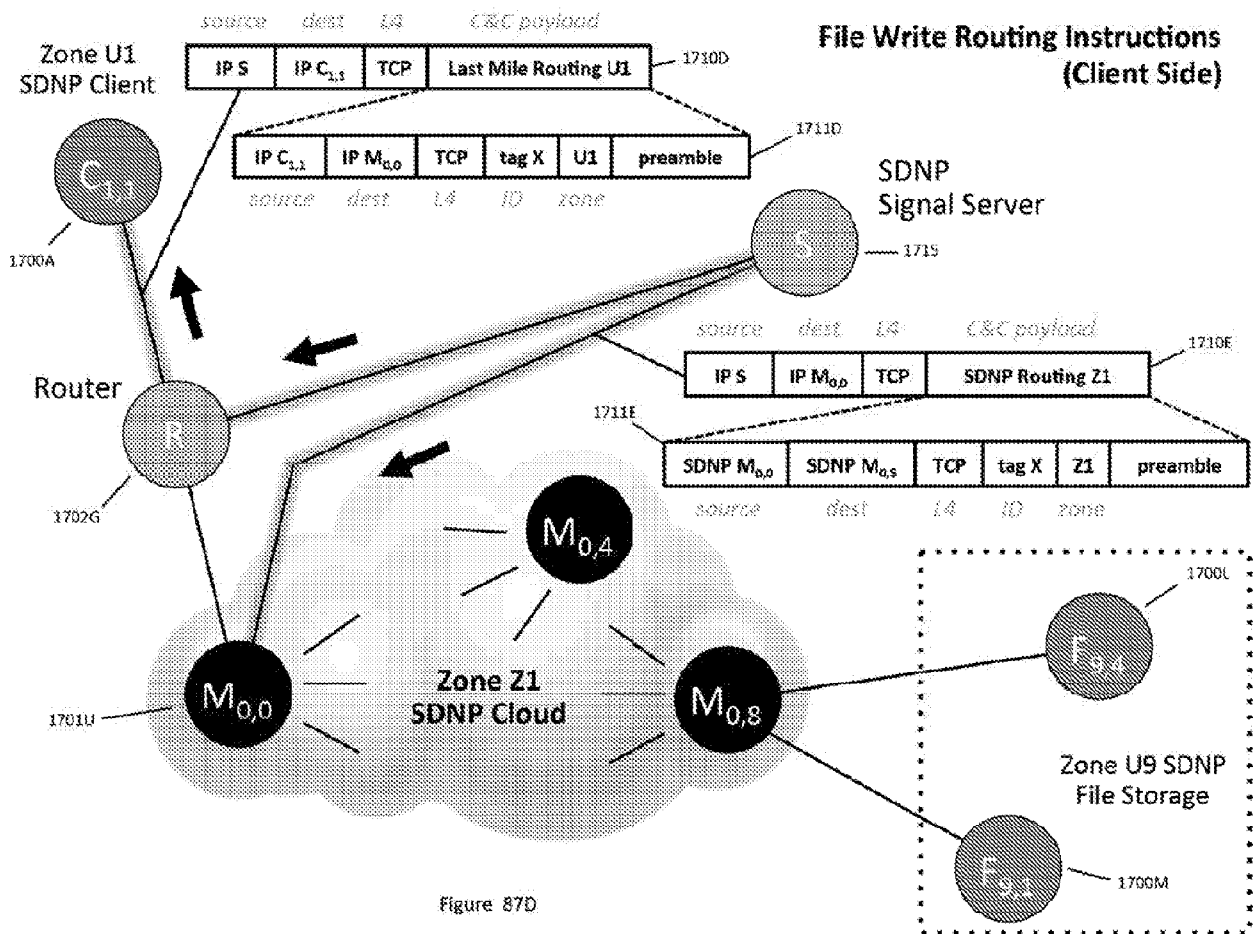
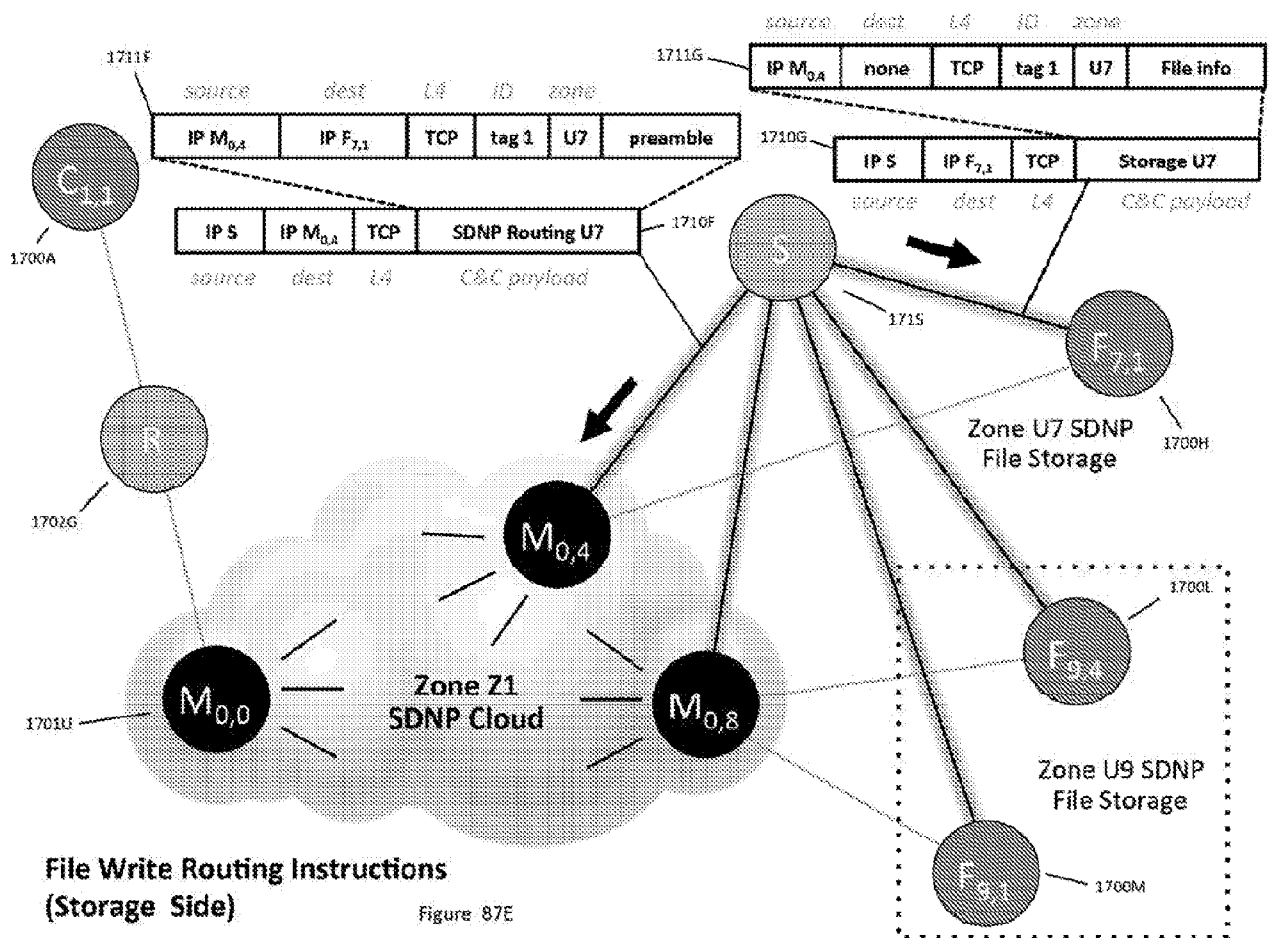
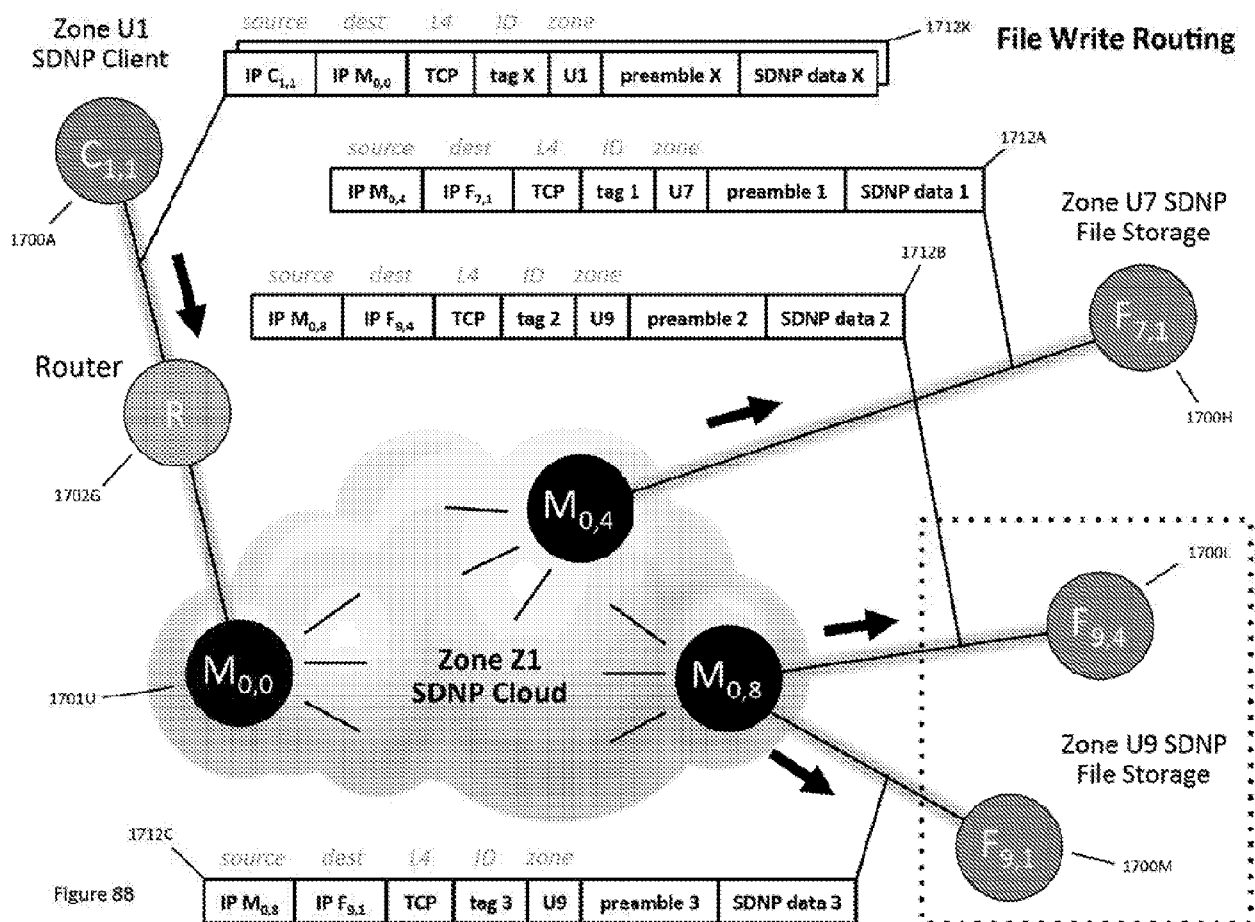


Figure 87C







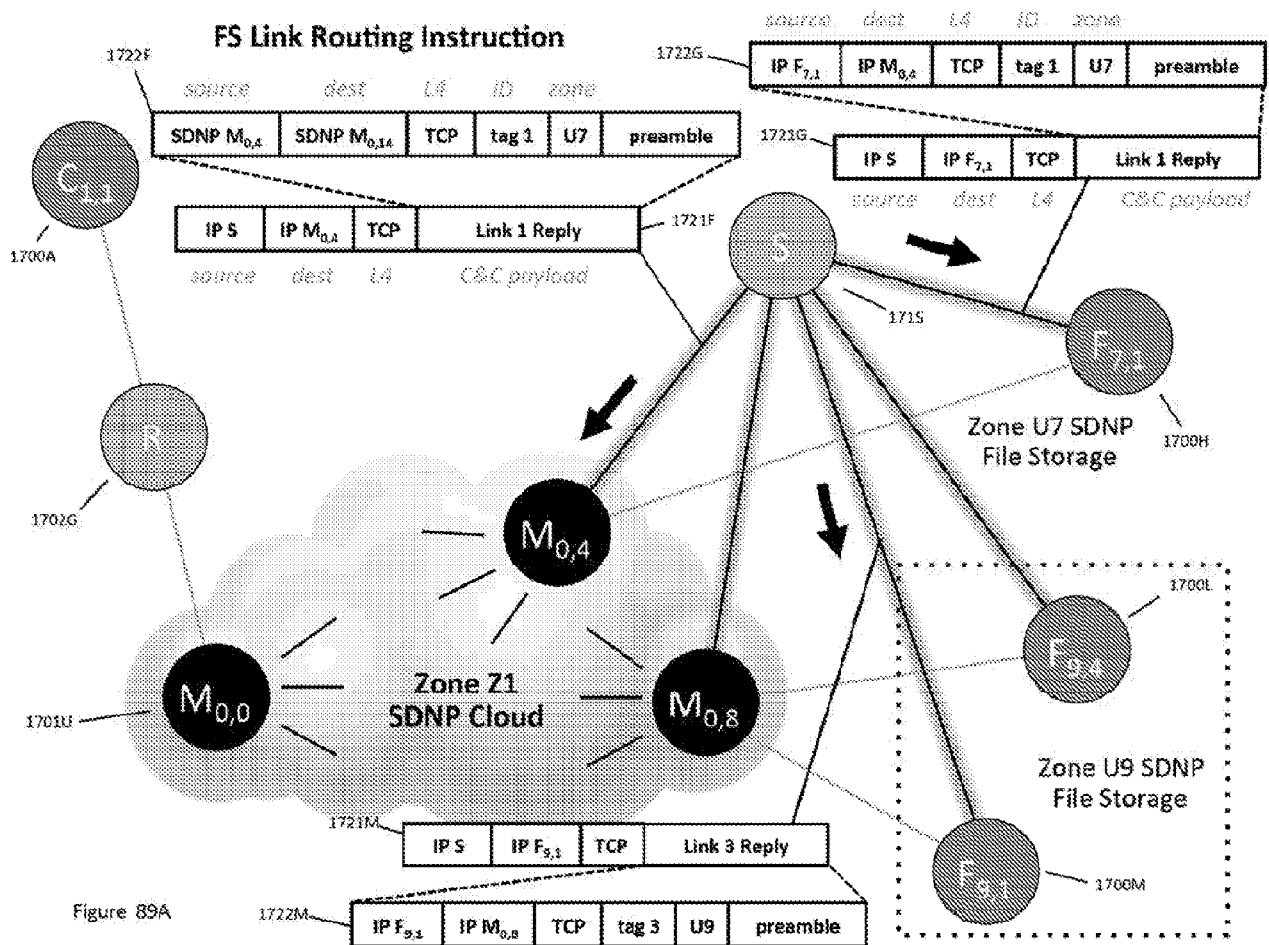
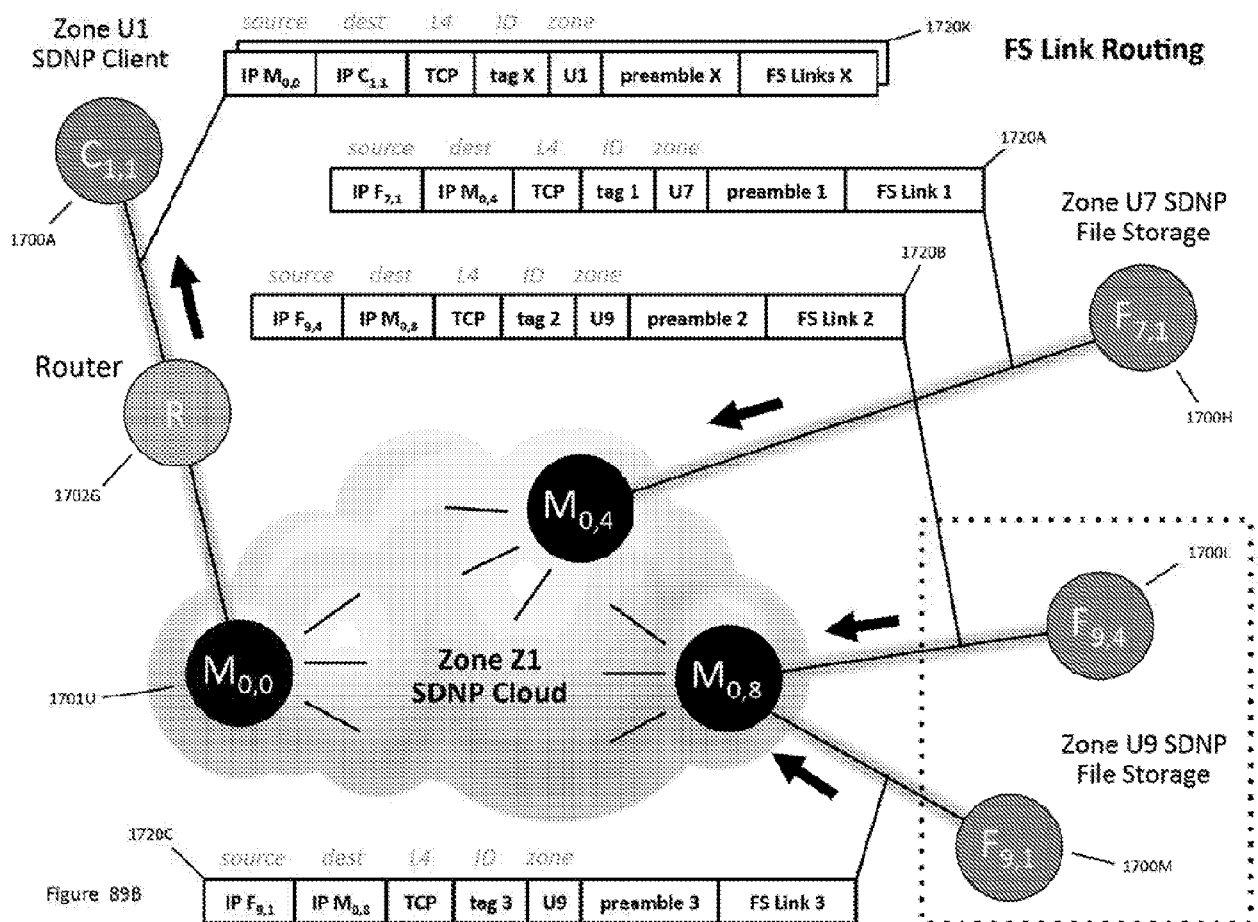


Figure 89A



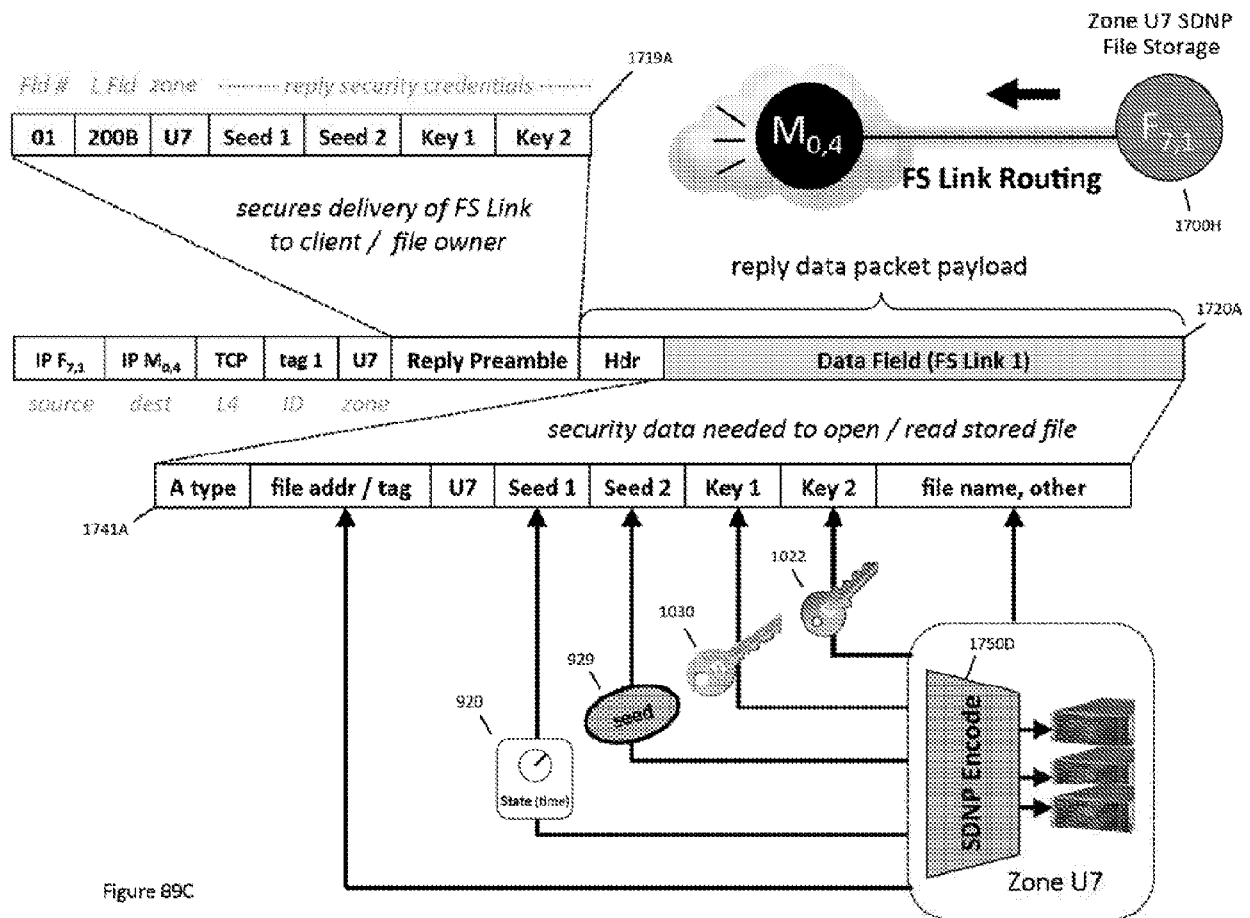


Figure 89C

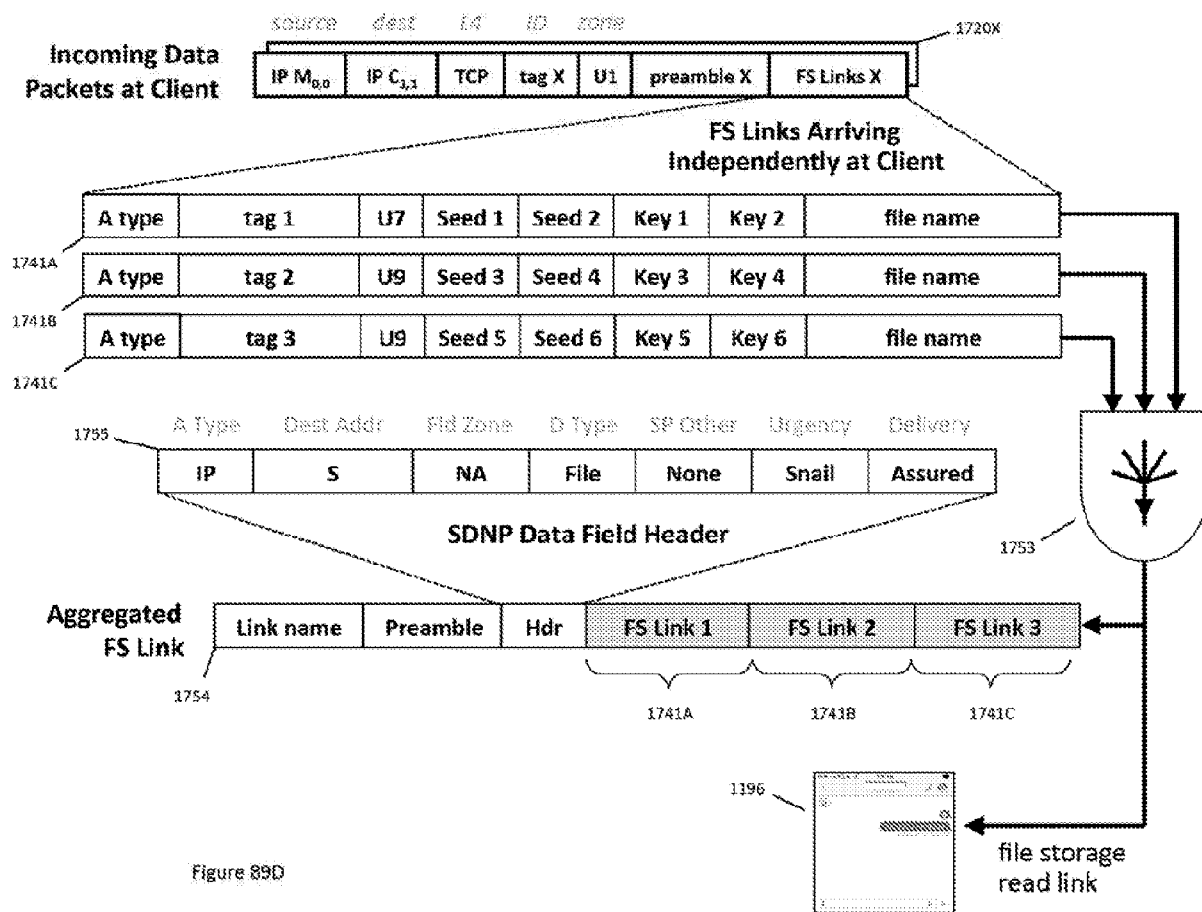


Figure 89D

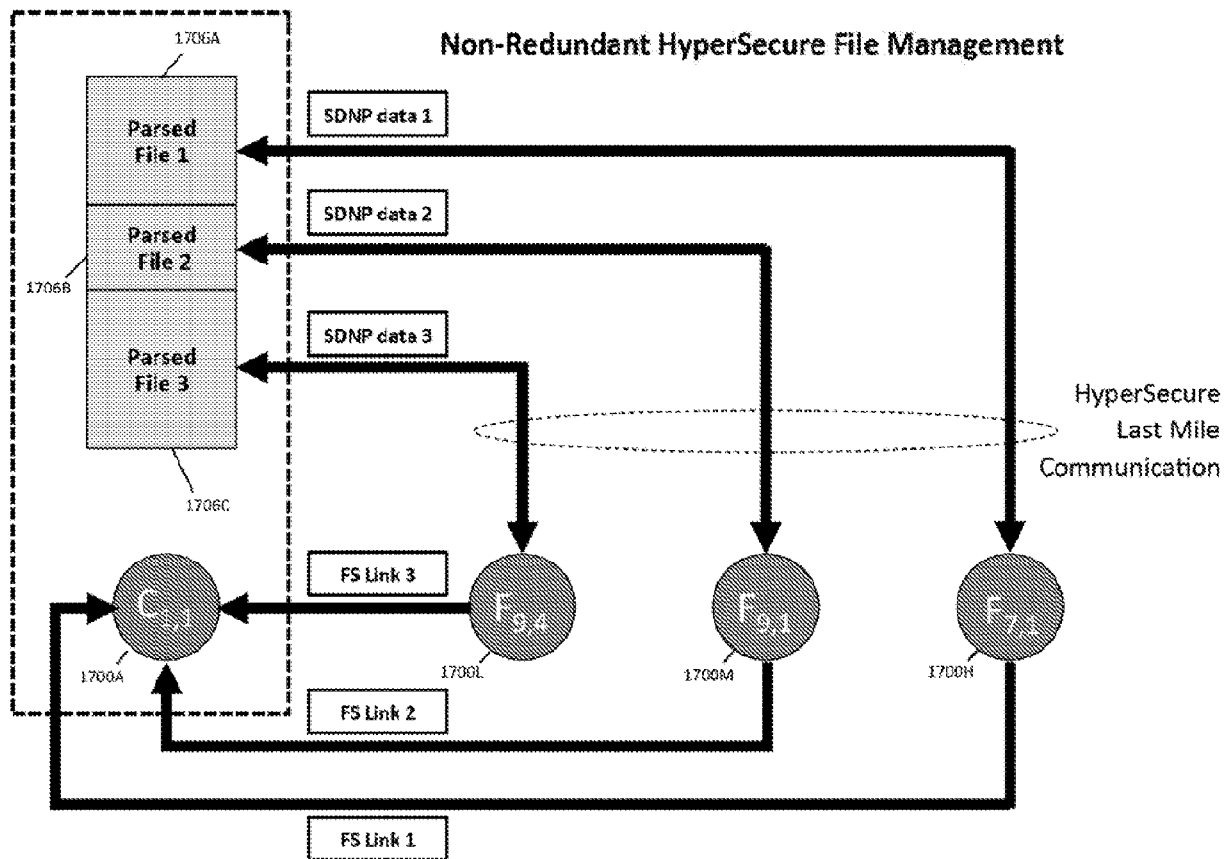


Figure 90A

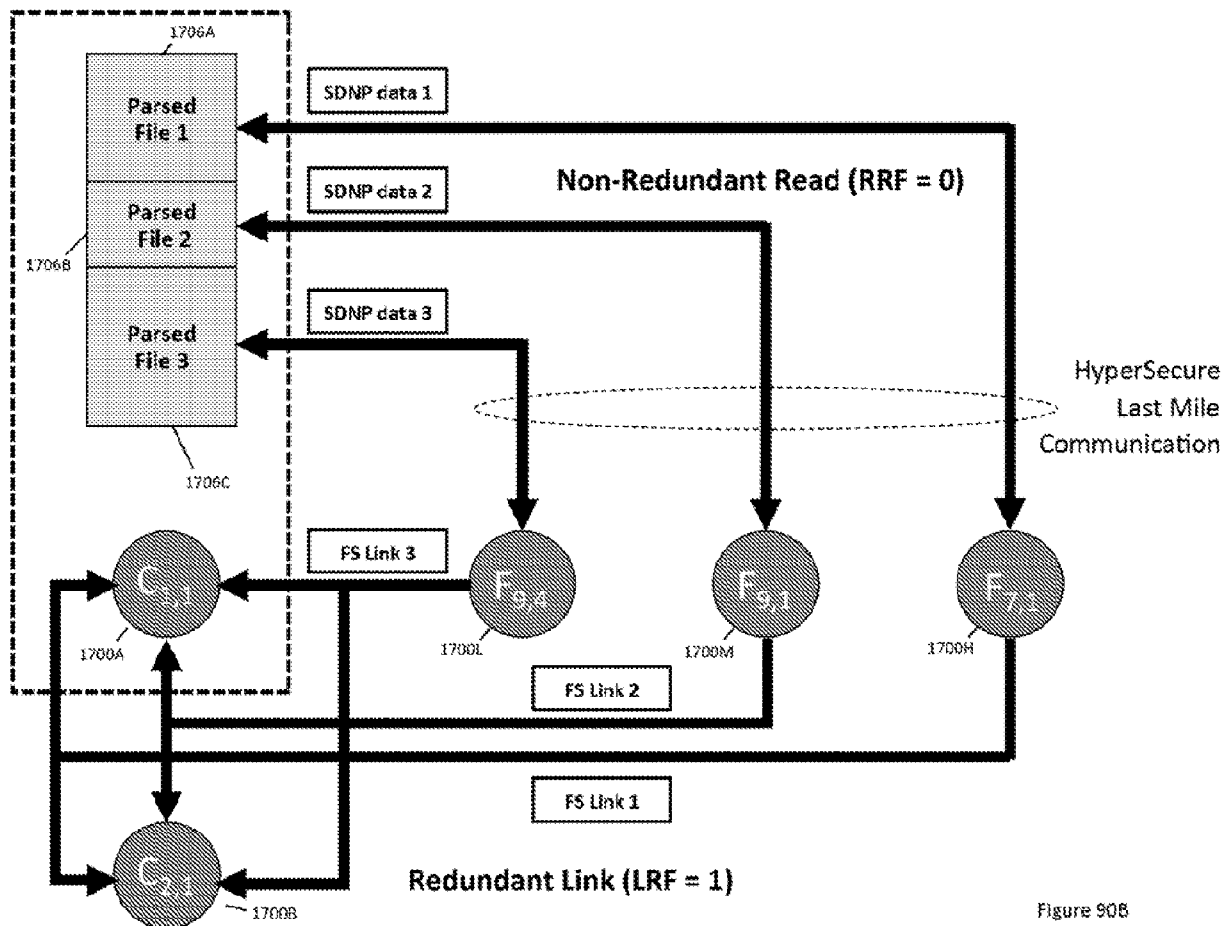


Figure 90B

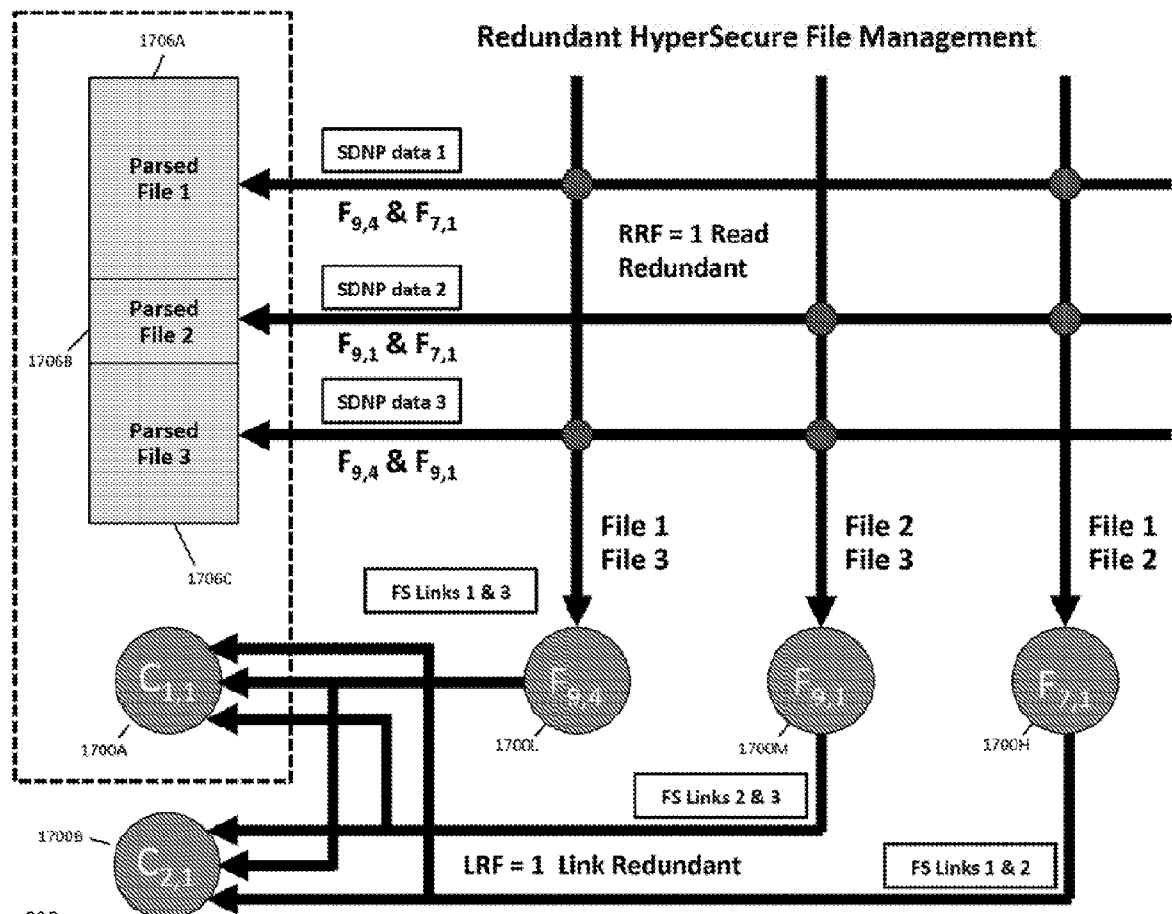


Figure 90C

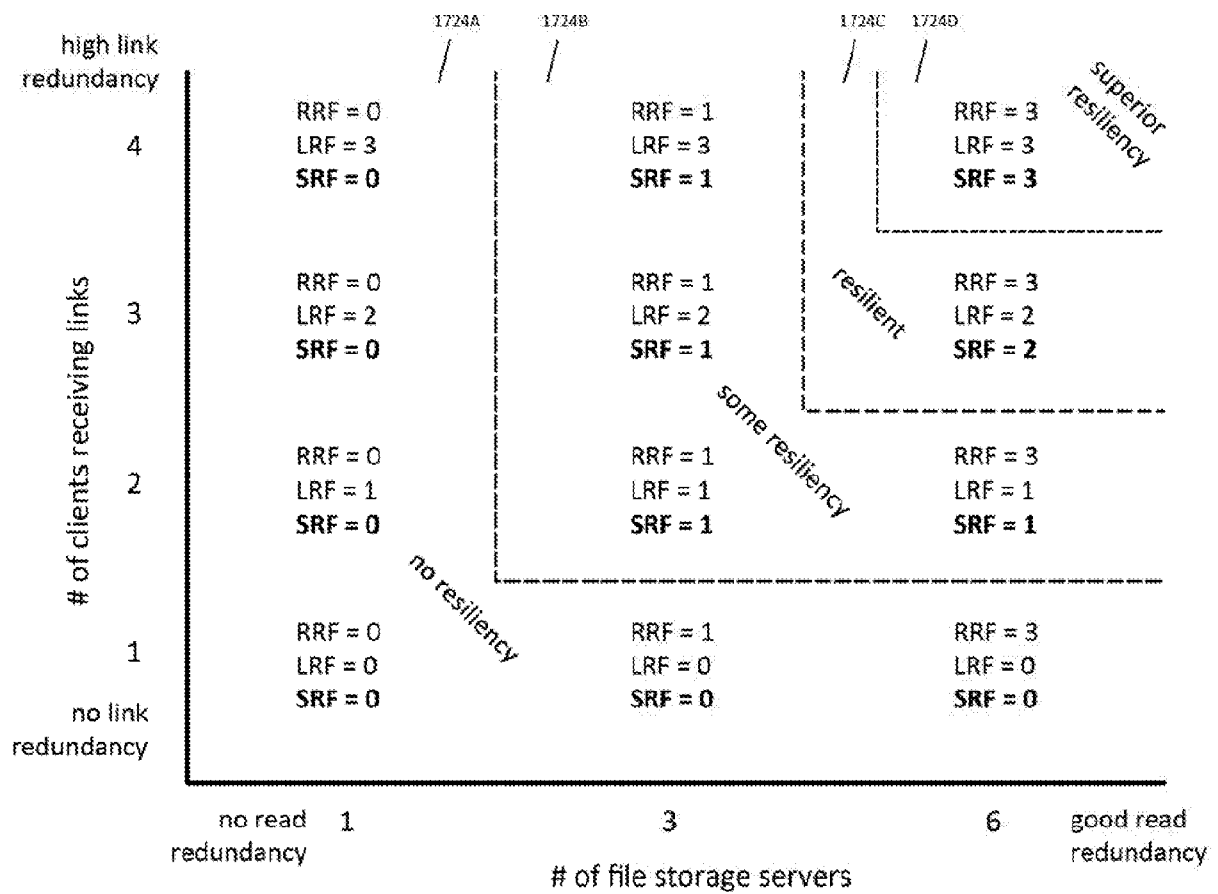


Figure 91

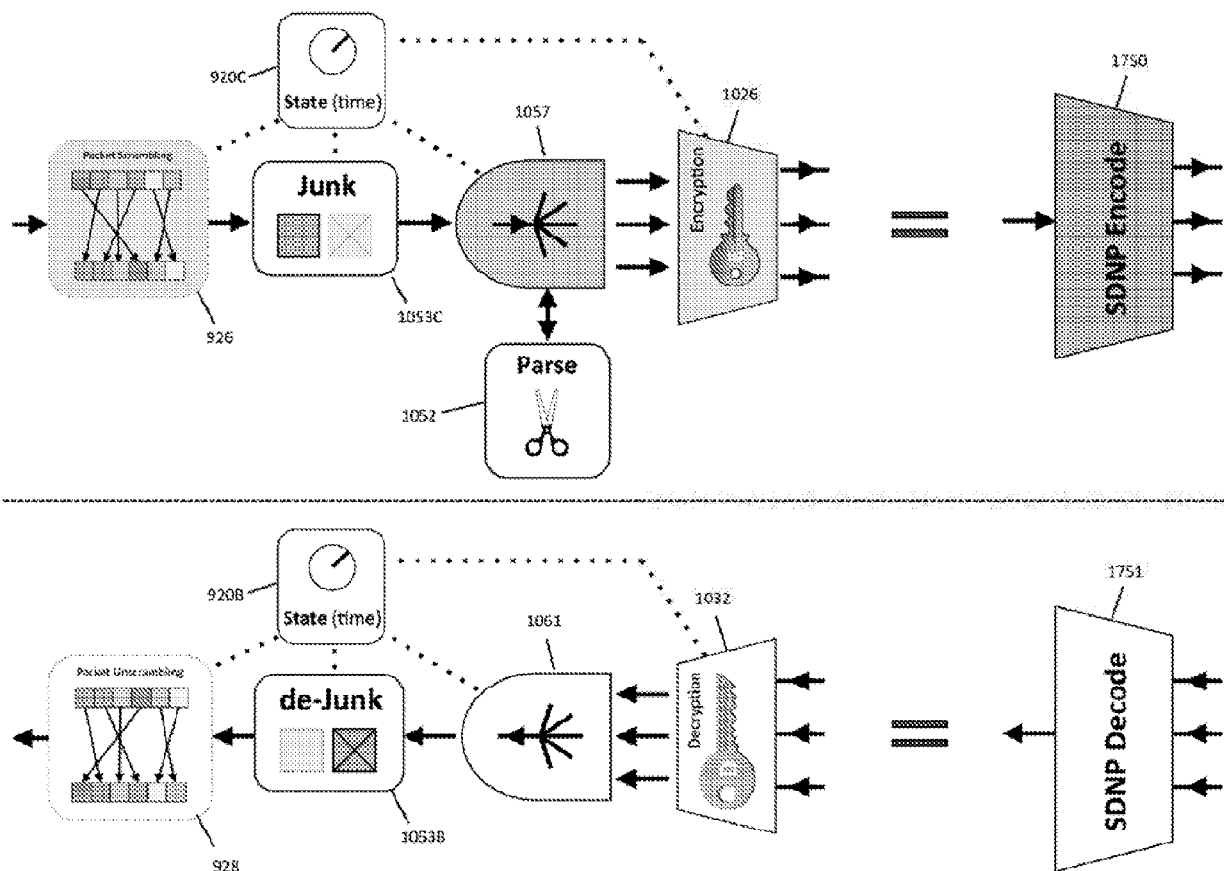
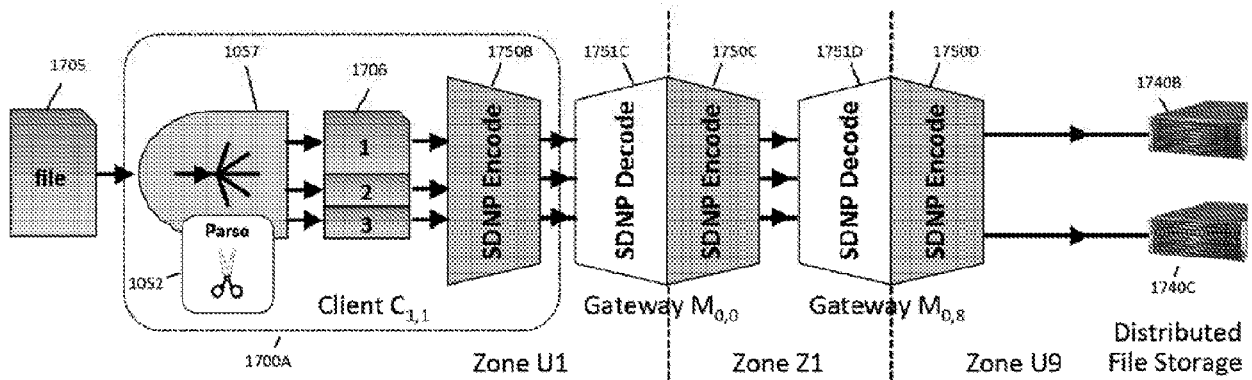


Figure 92



Figure 93A



Client Zone Fragmented, Storage Zone Encoded

Fully Nested, Client & Storage Zone Encoded

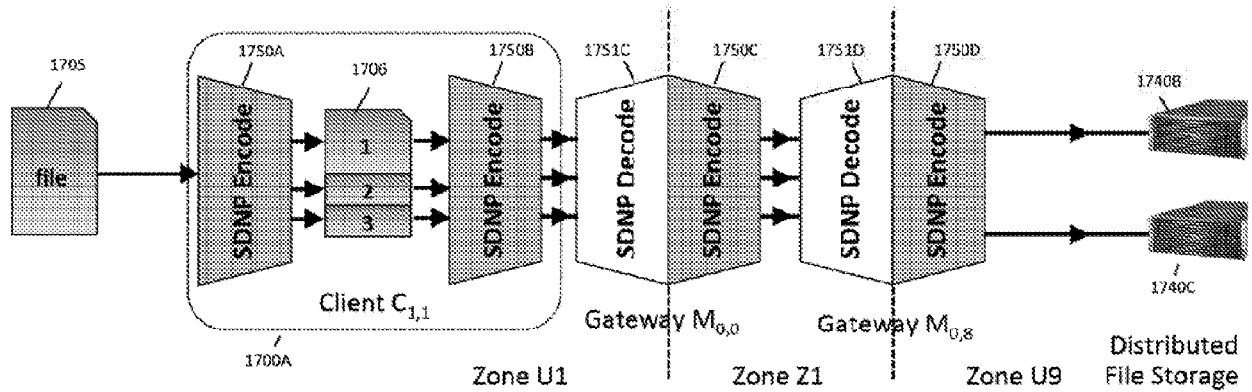


Figure 93B

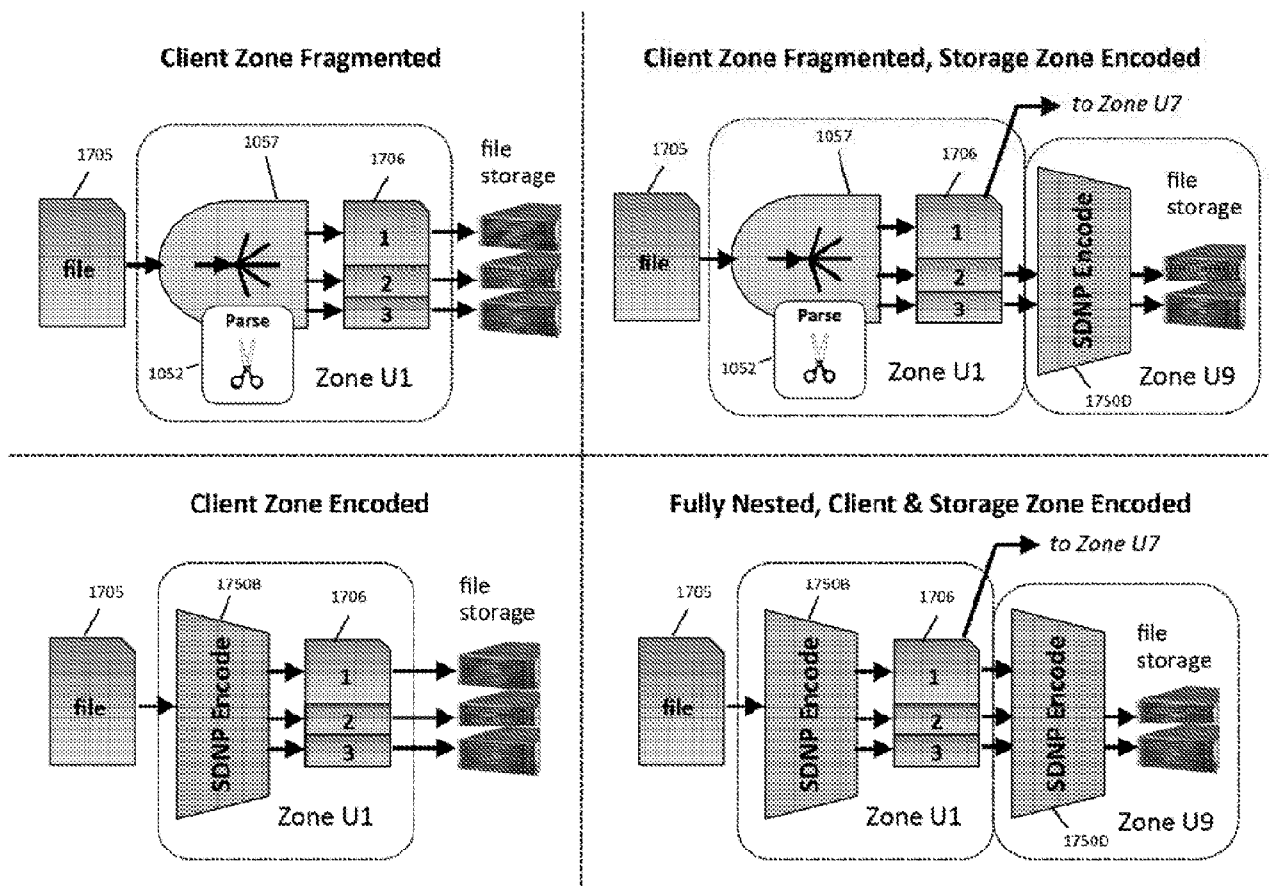


Figure 94

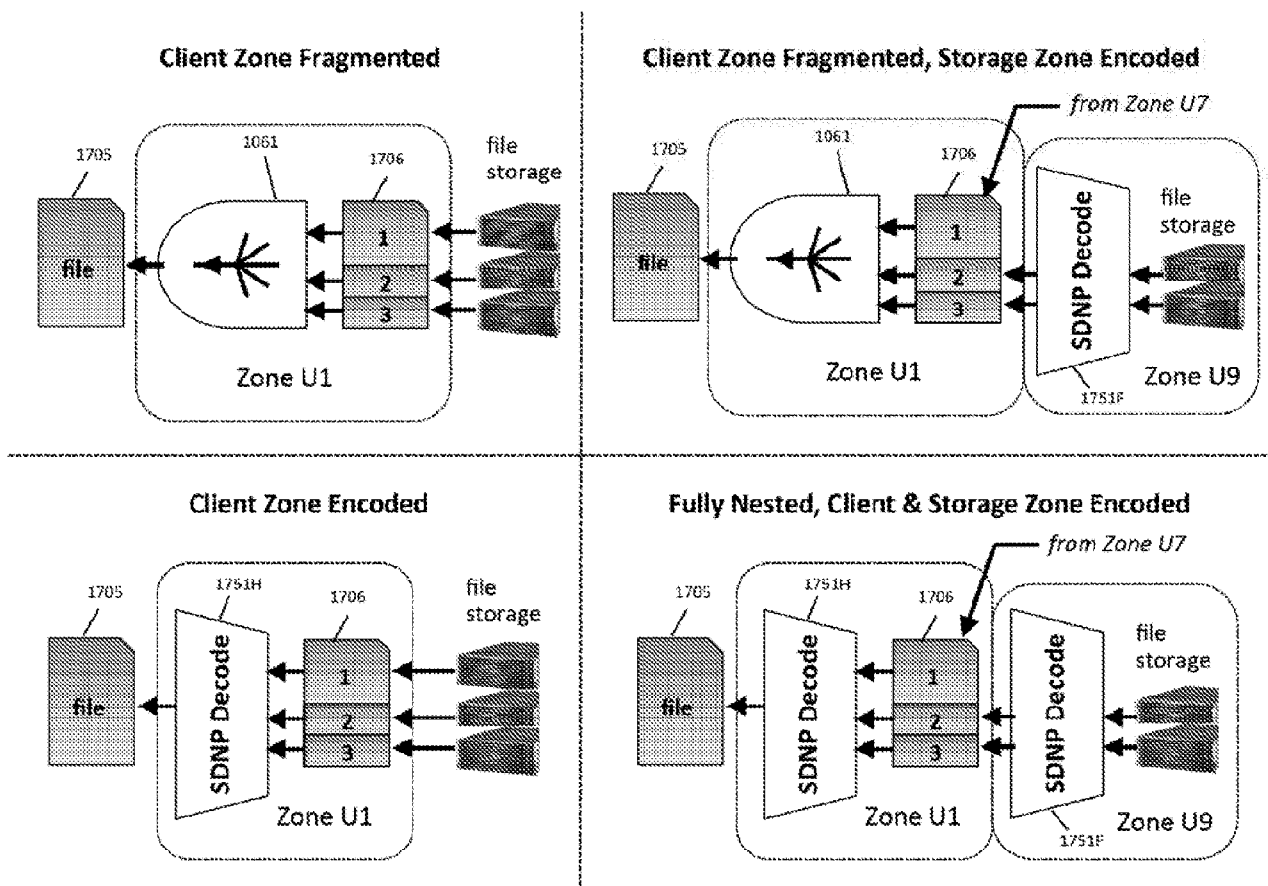


Figure 95

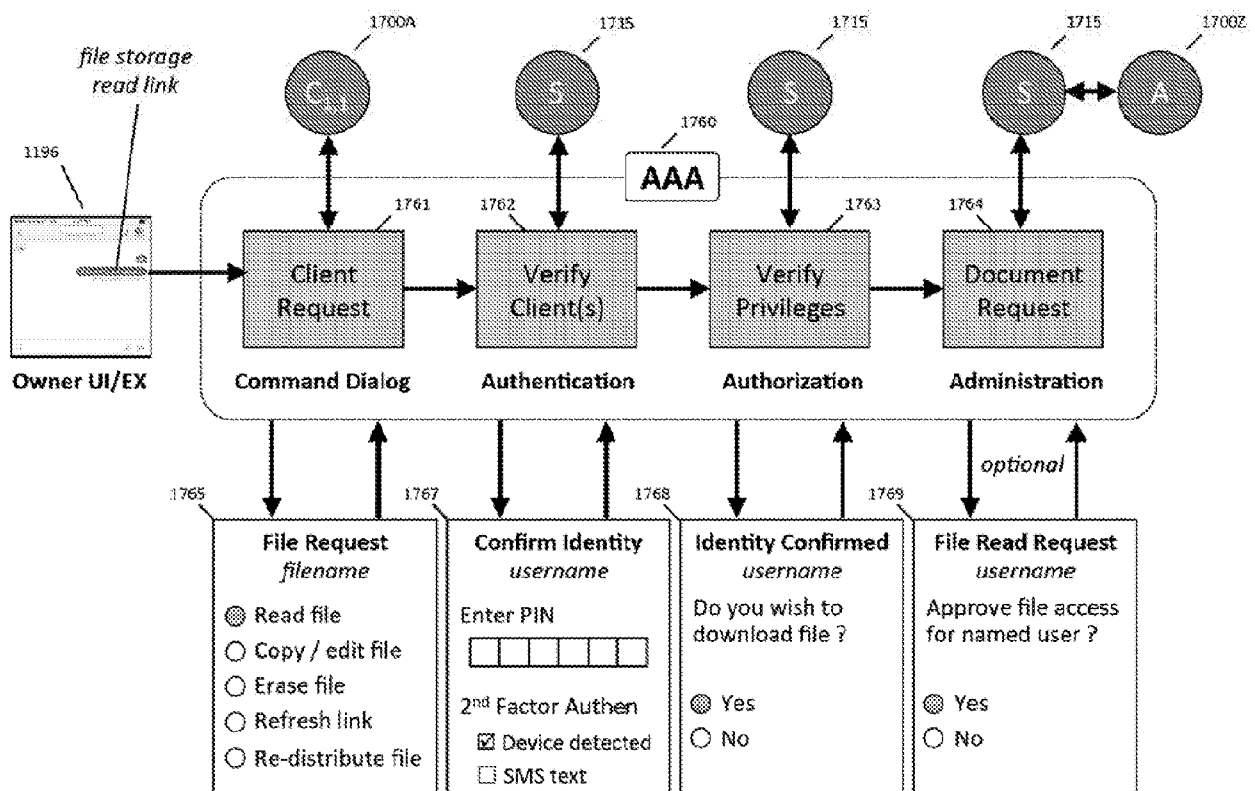


Figure 95A

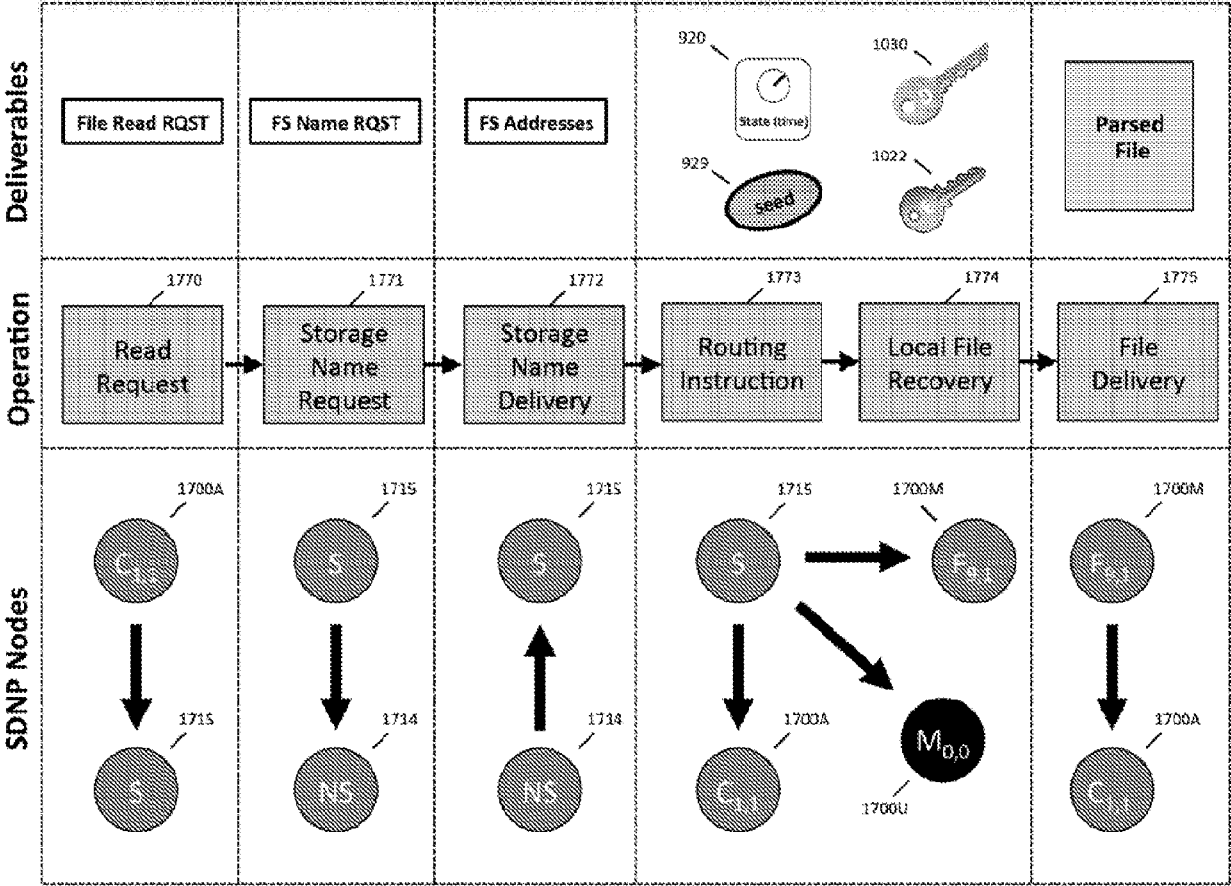


Figure 95B

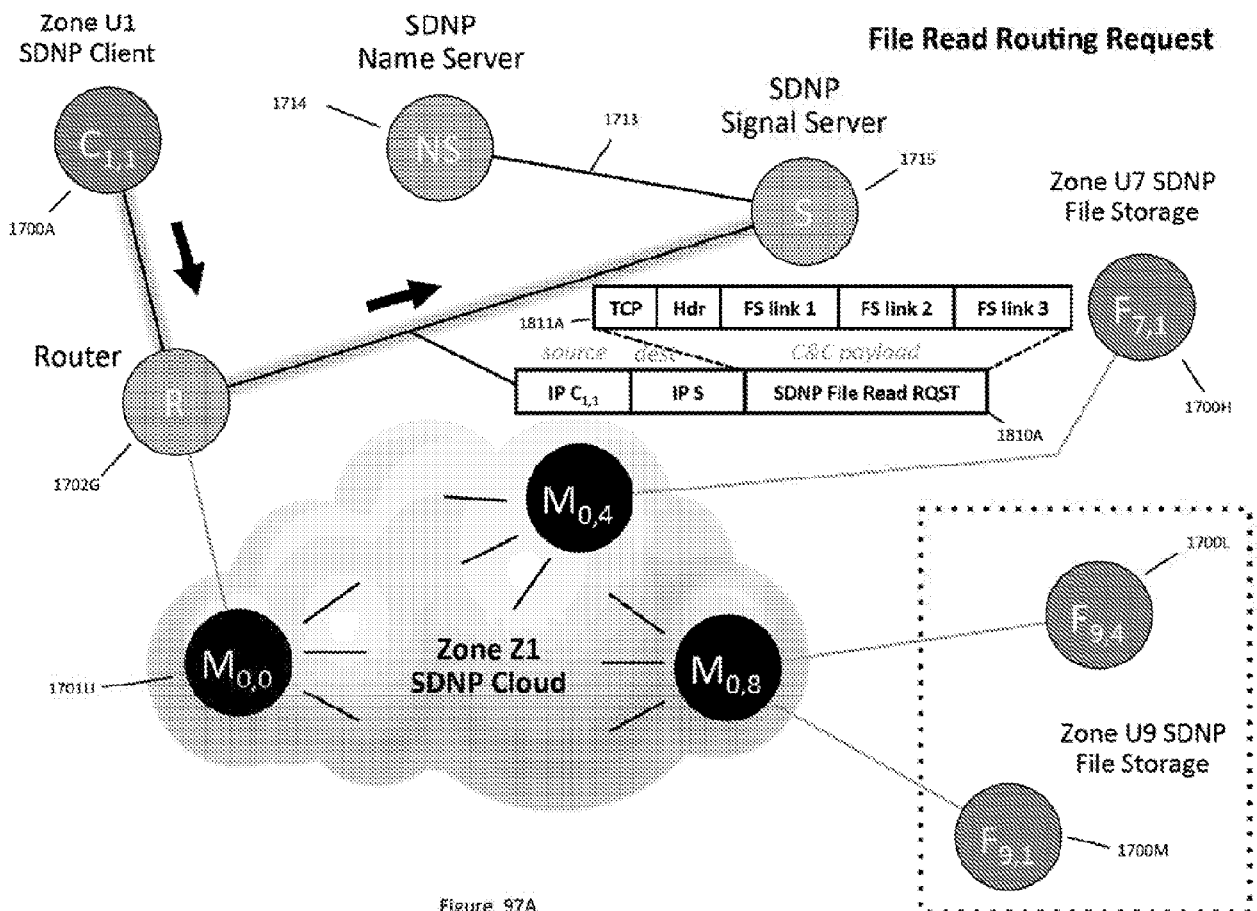


Figure 97A

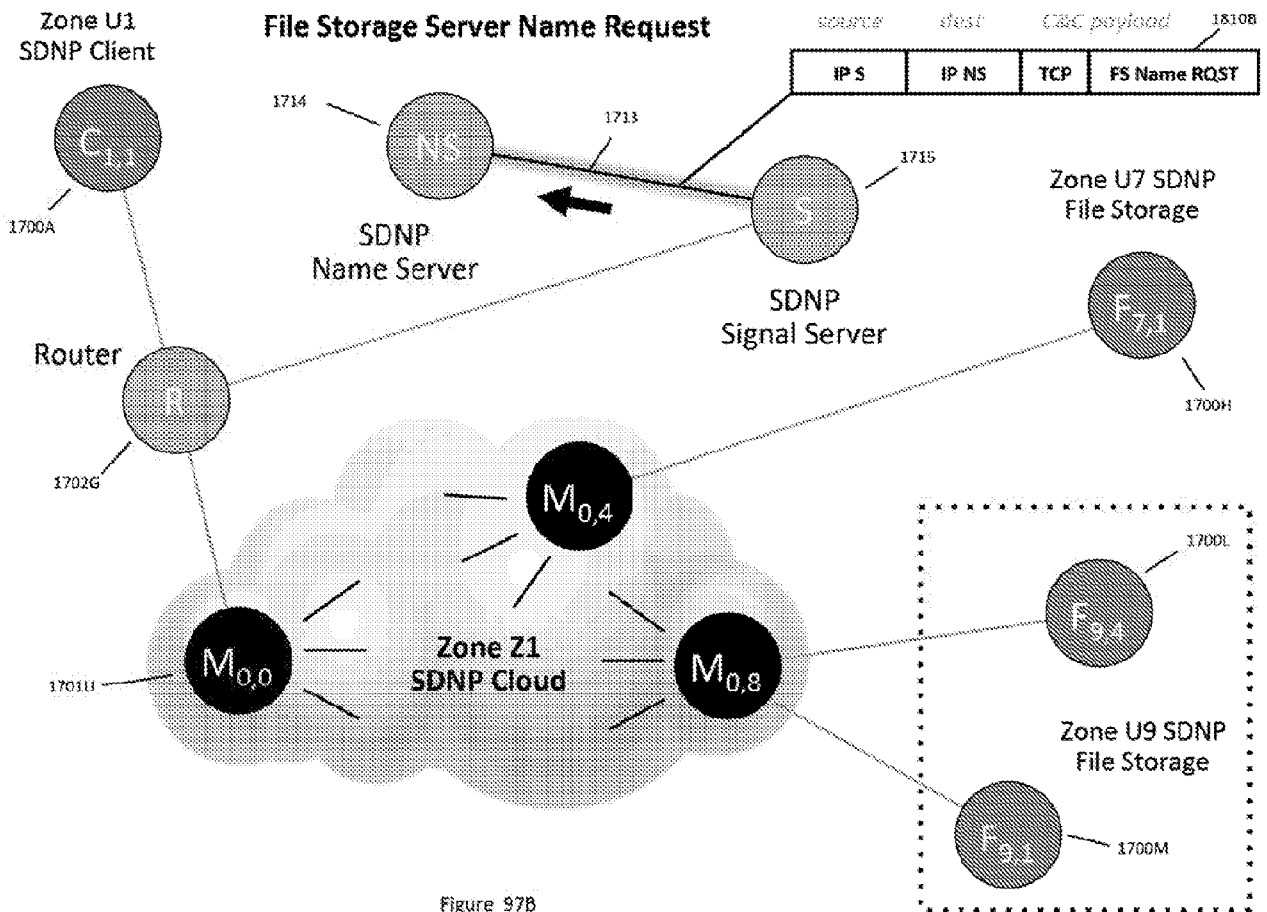


Figure 97B

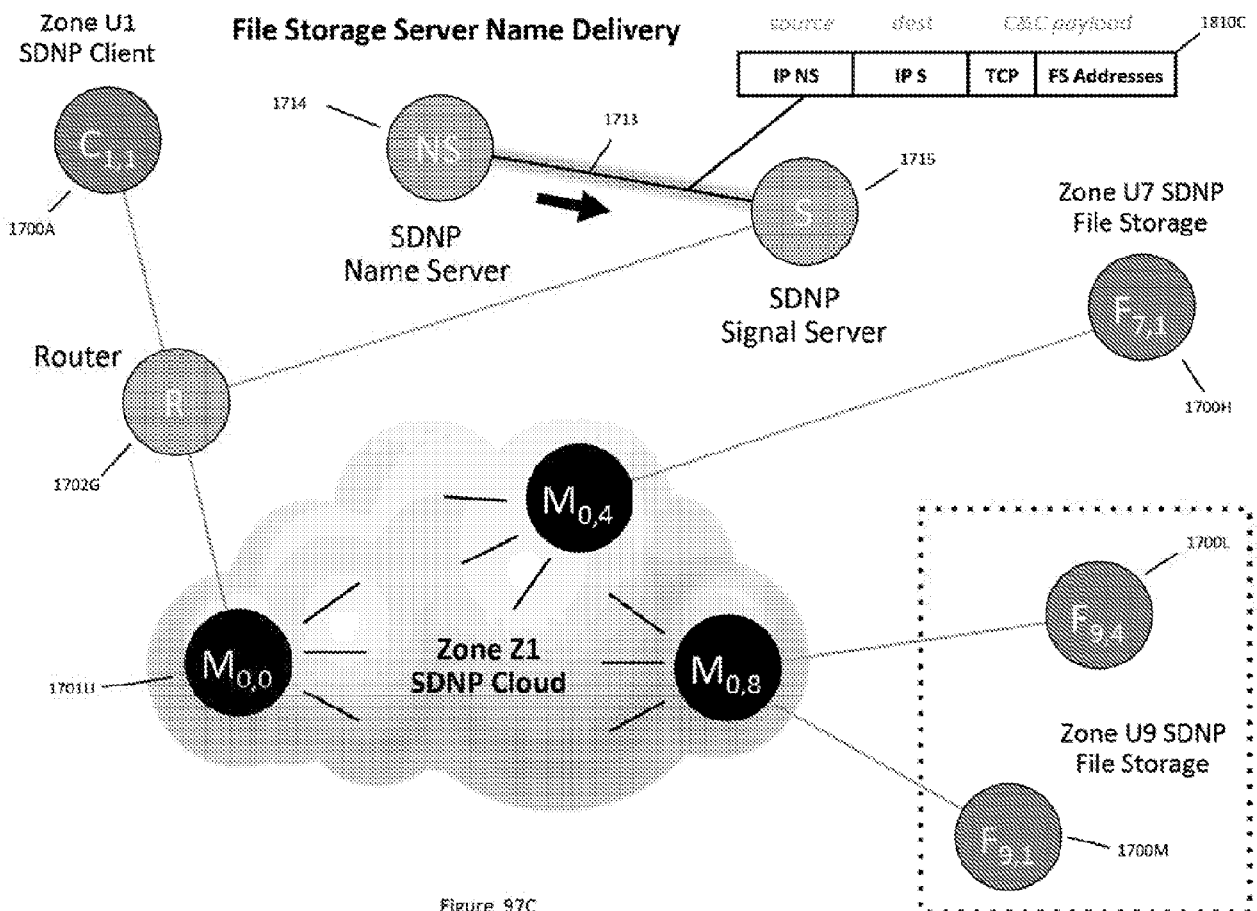
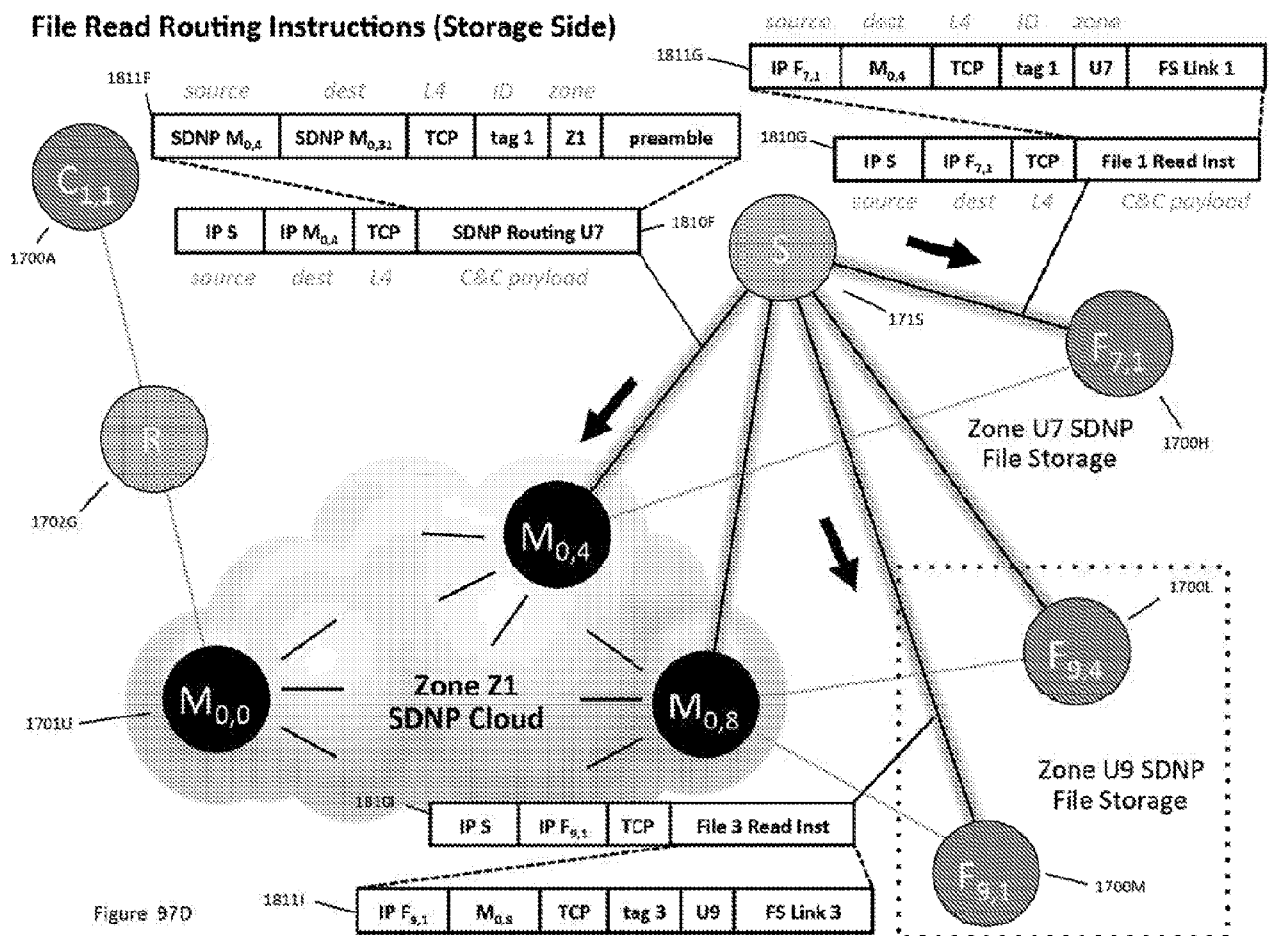


Figure 97C



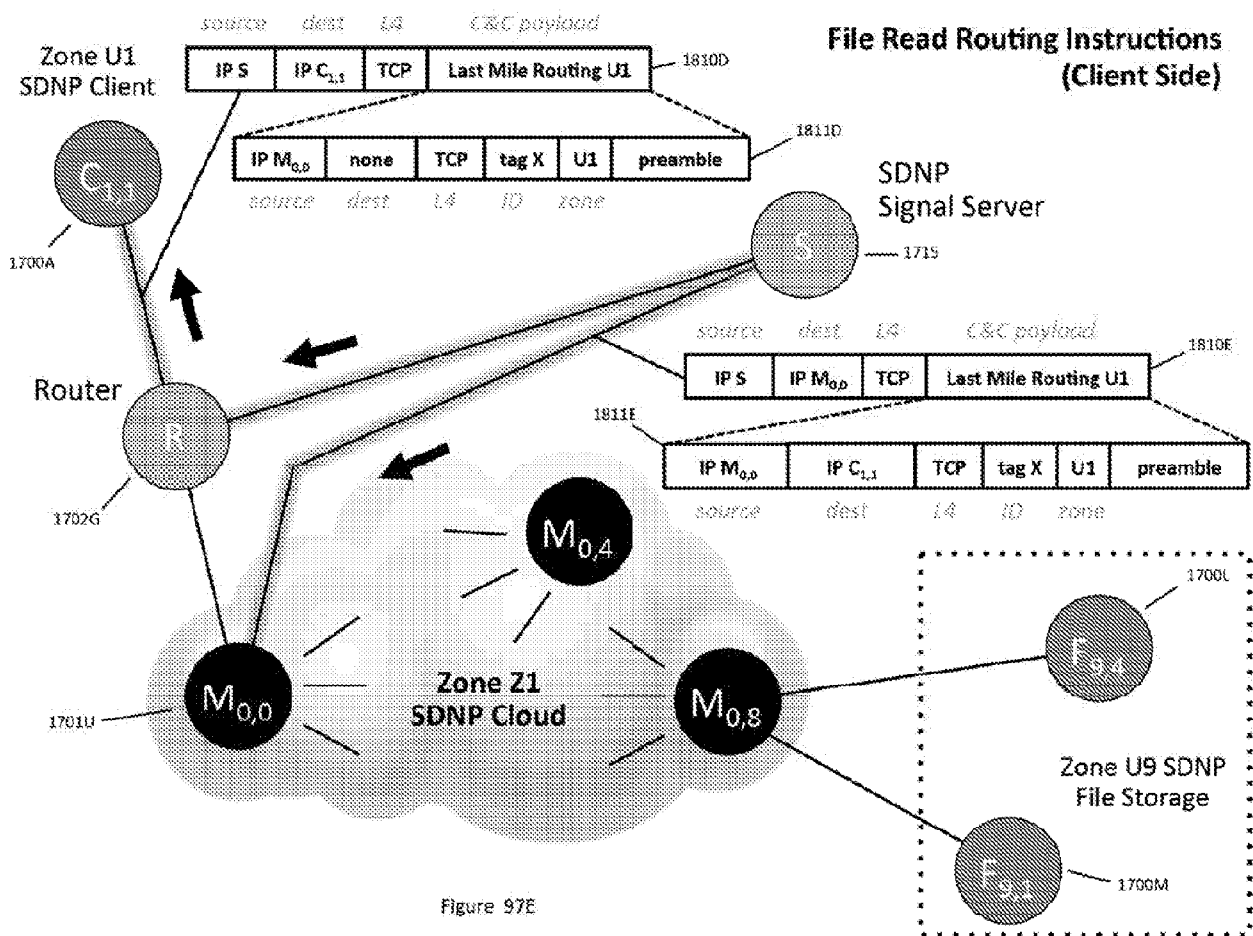


Figure 97E

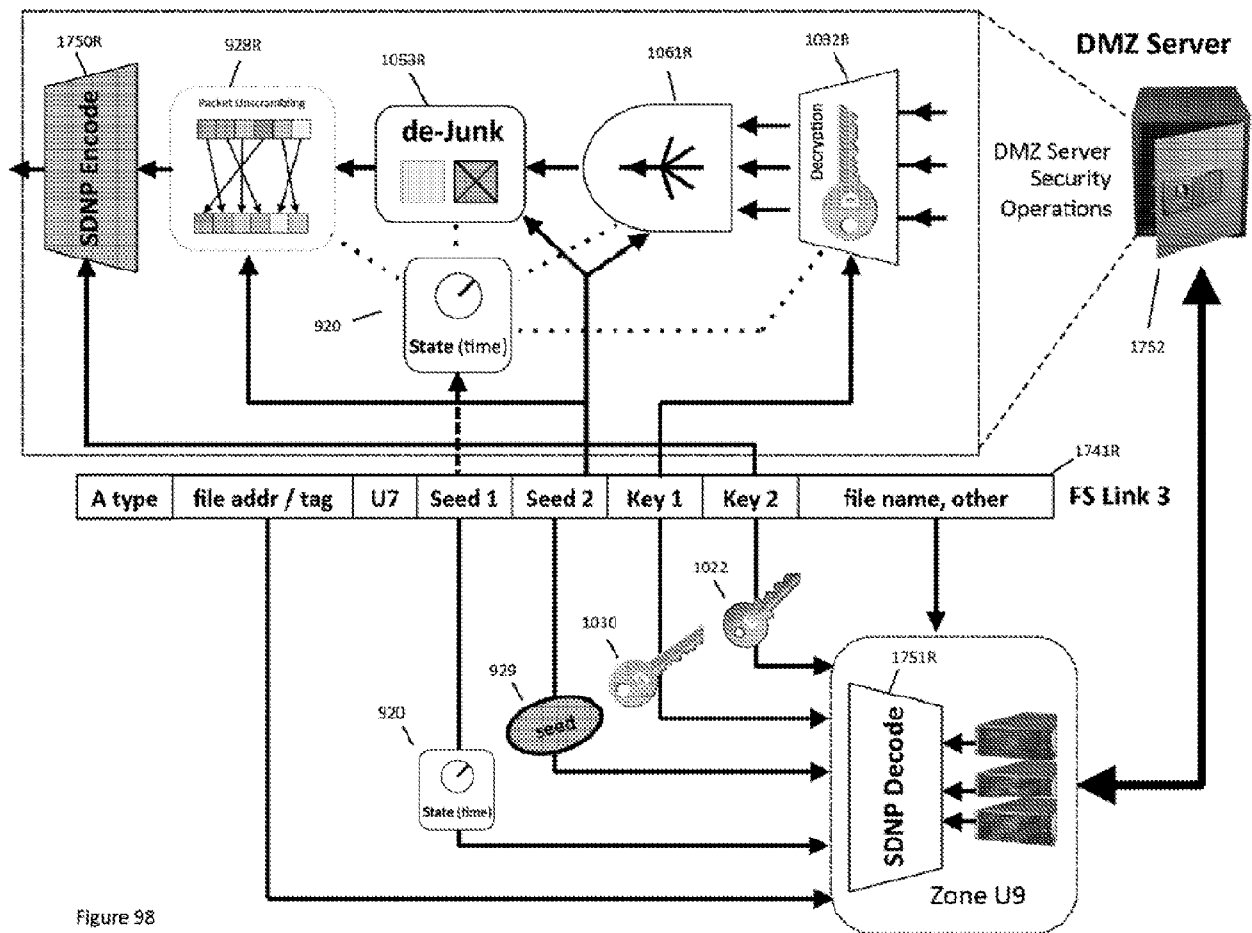
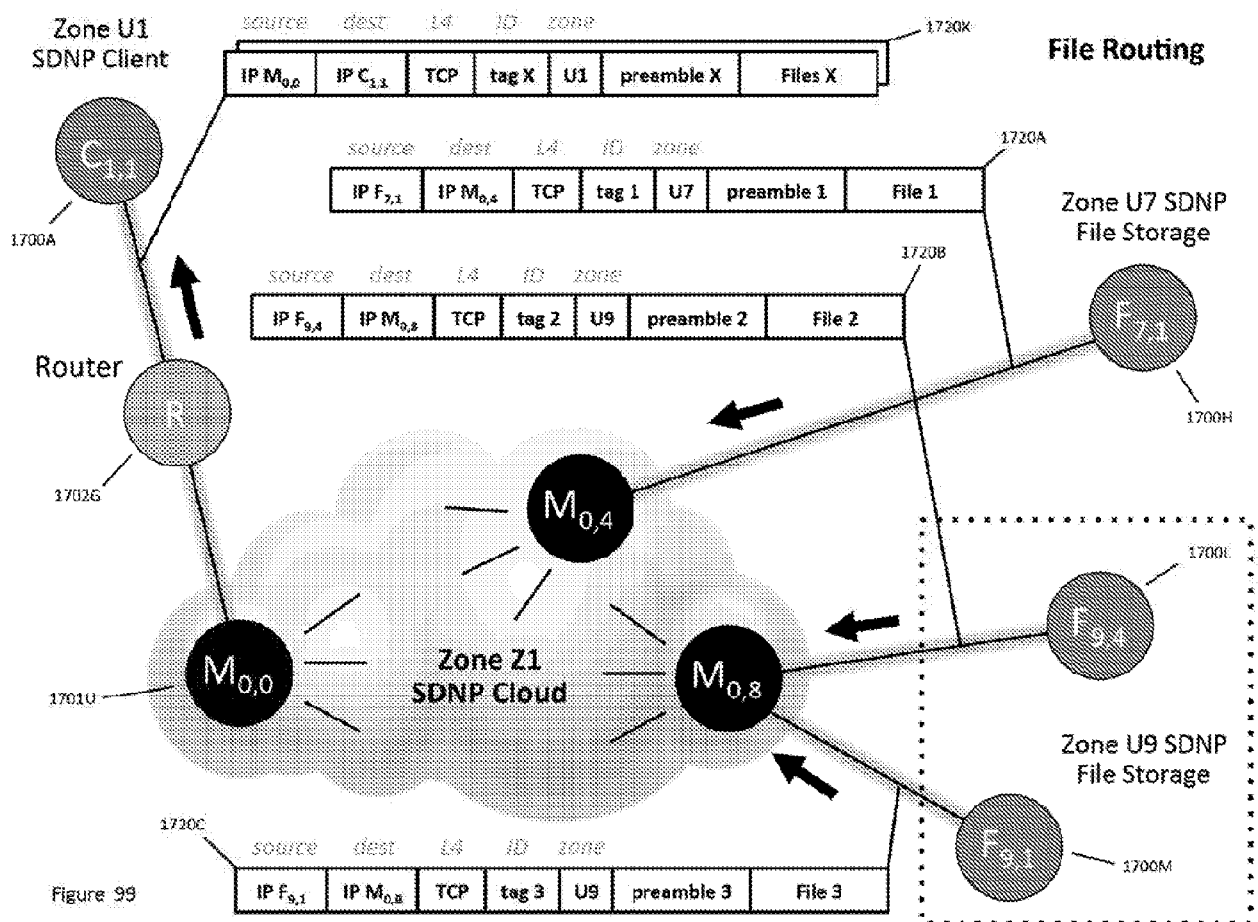


Figure 98



## Link Refresh

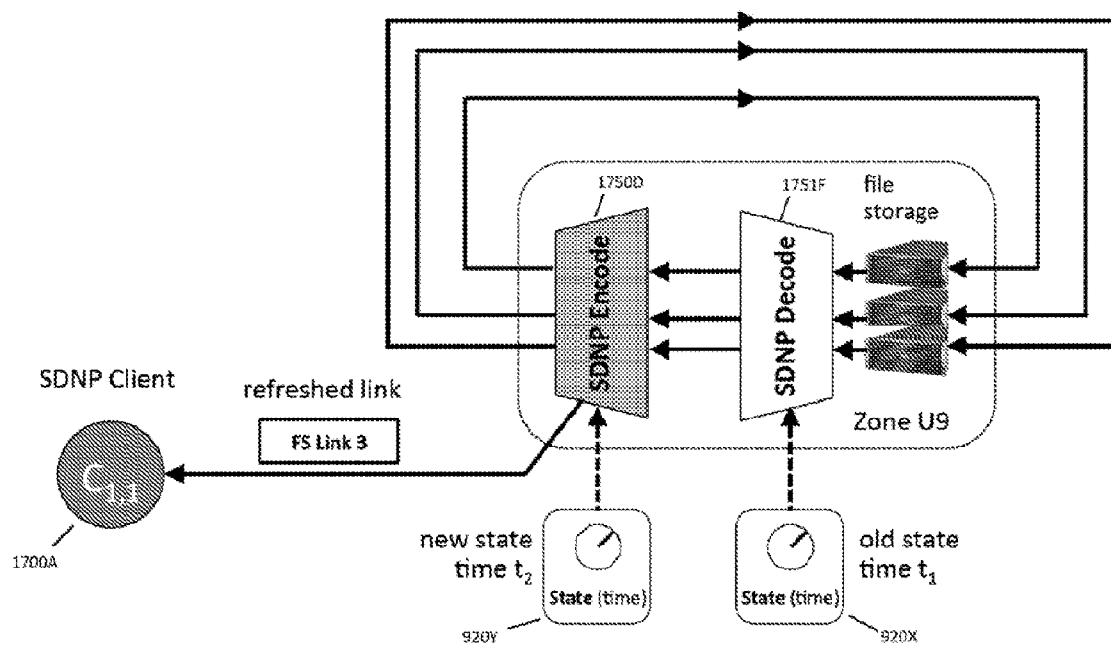


Figure 100

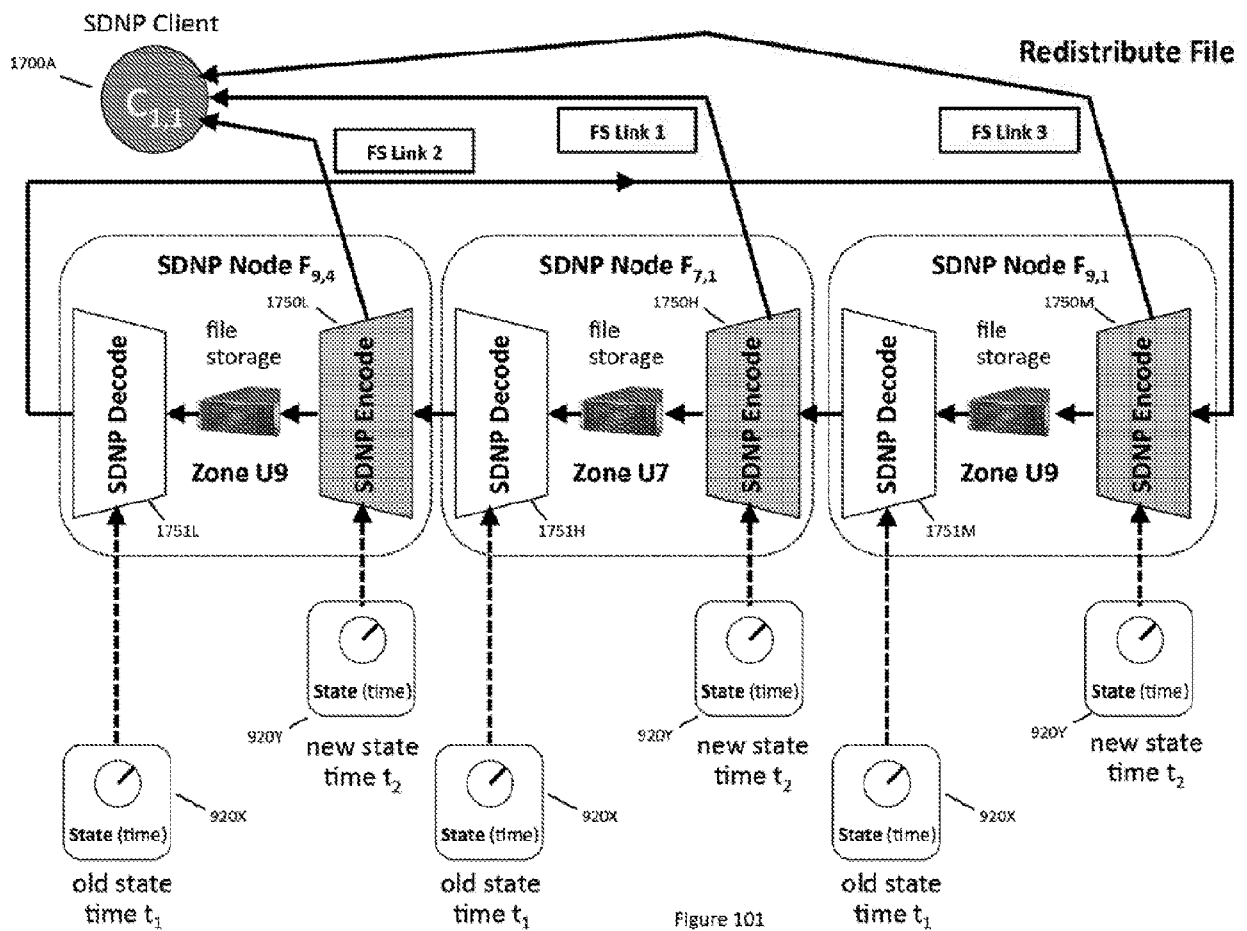


Figure 101

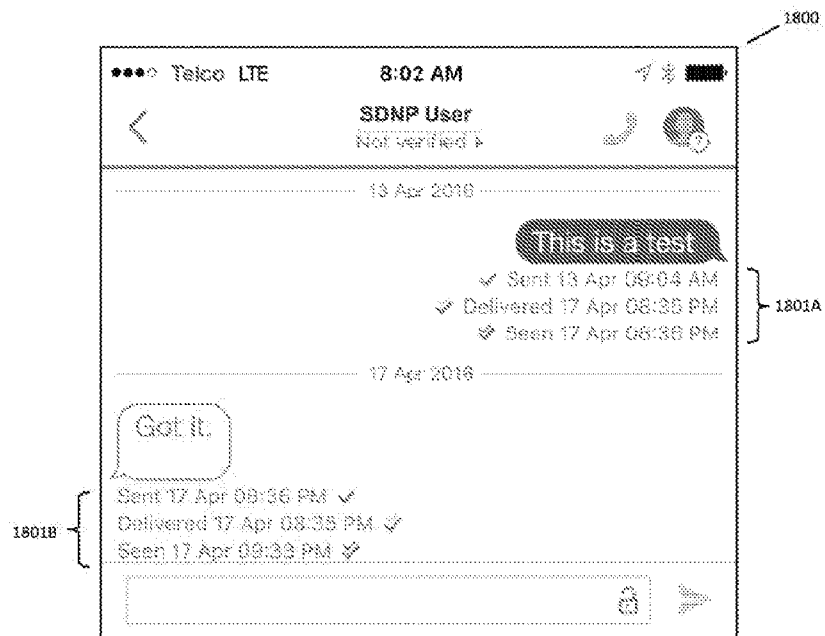


Figure 102

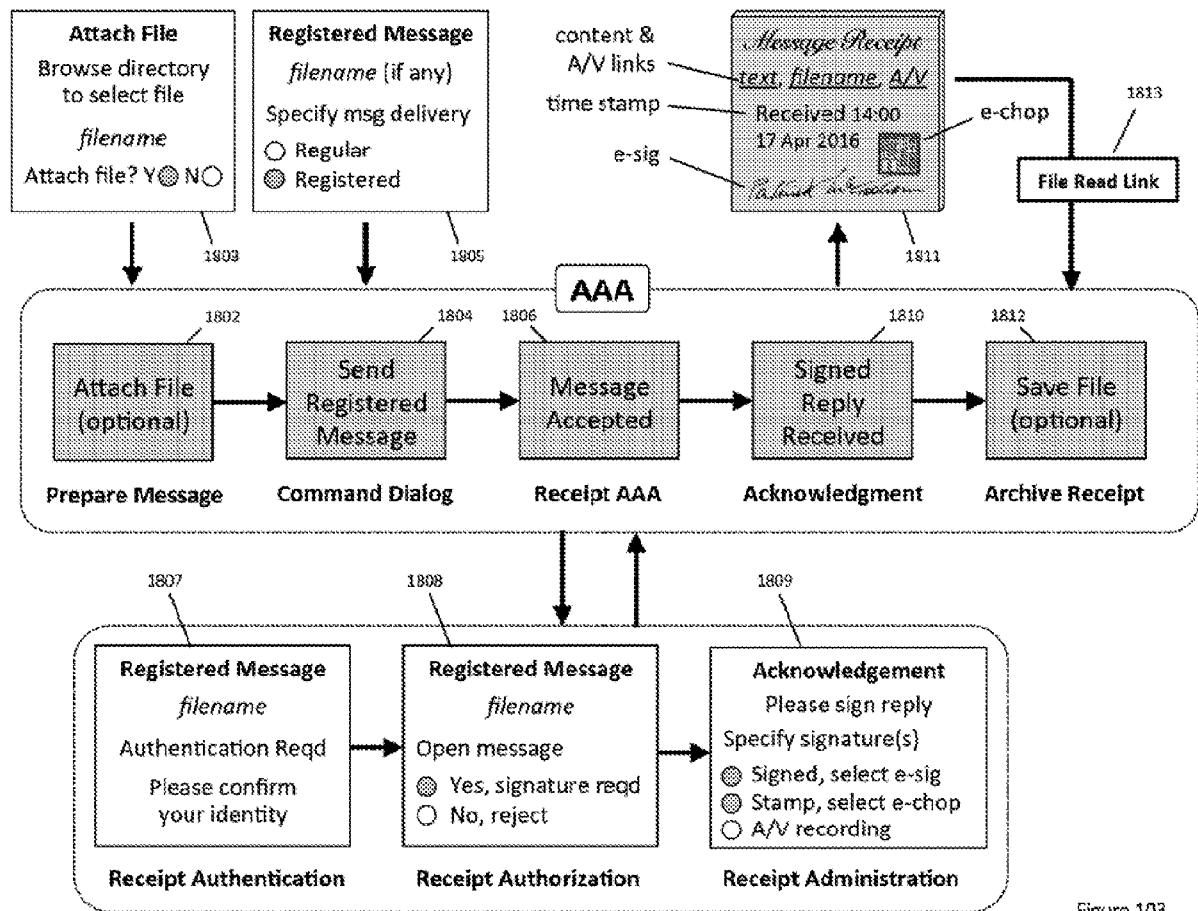
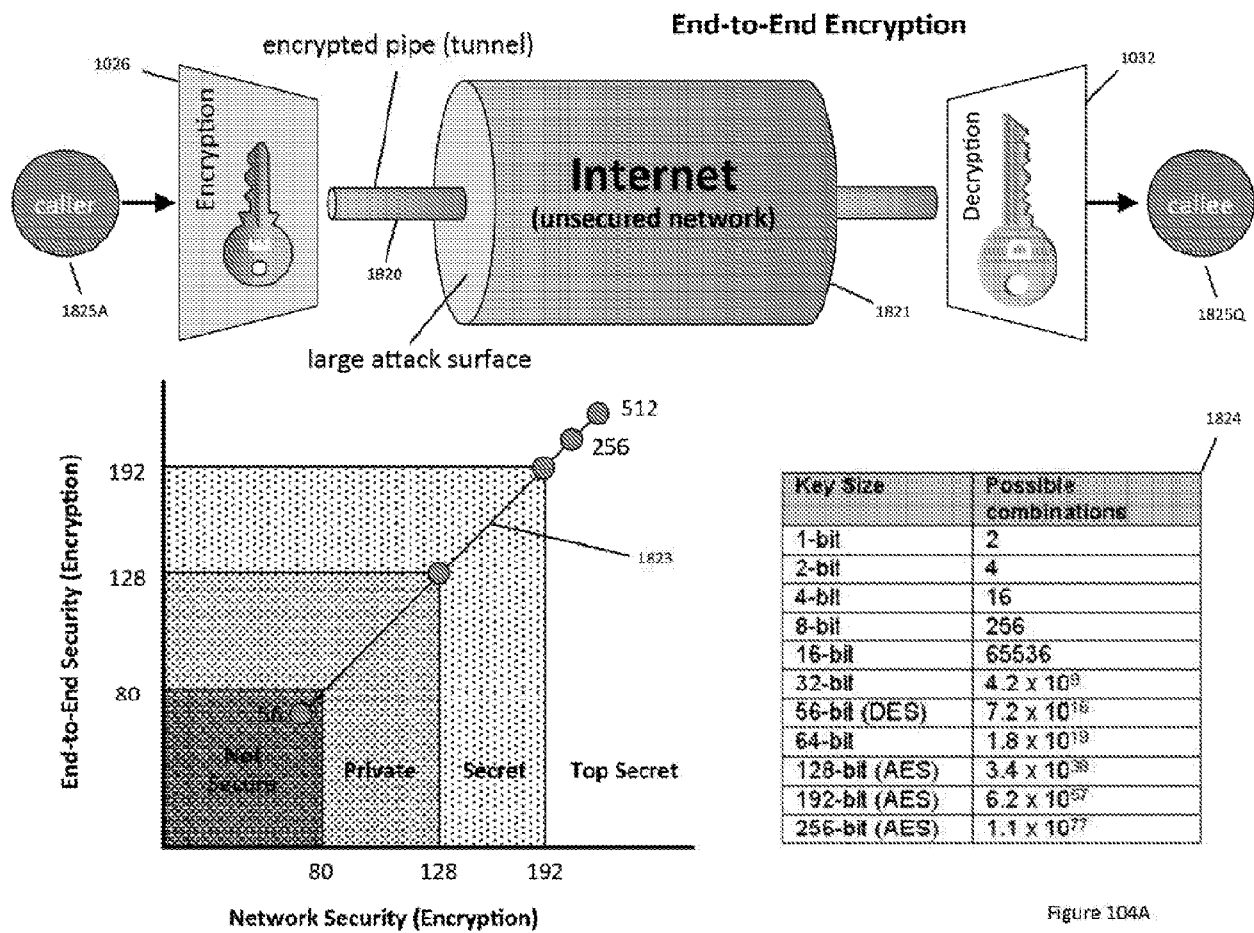


Figure 103



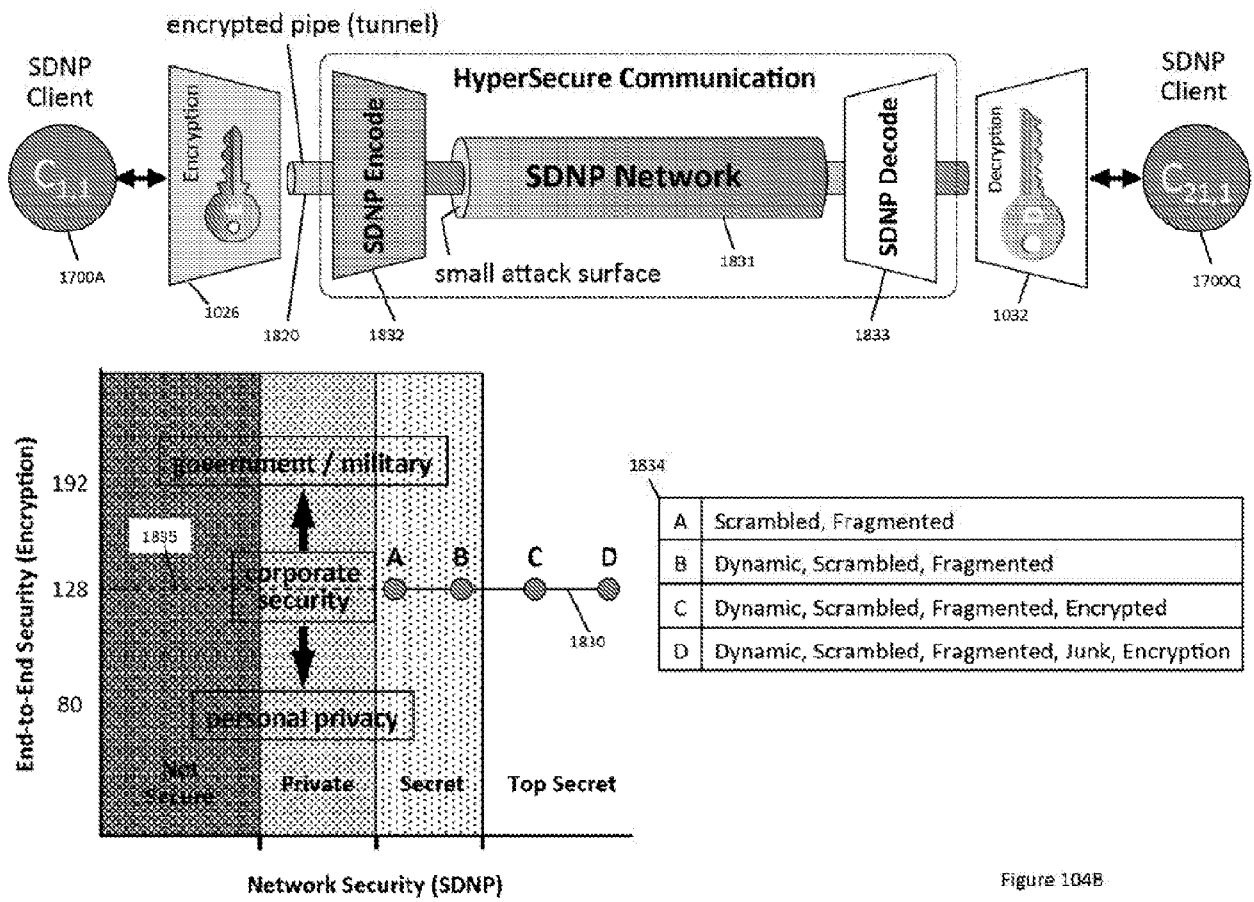


Figure 104B

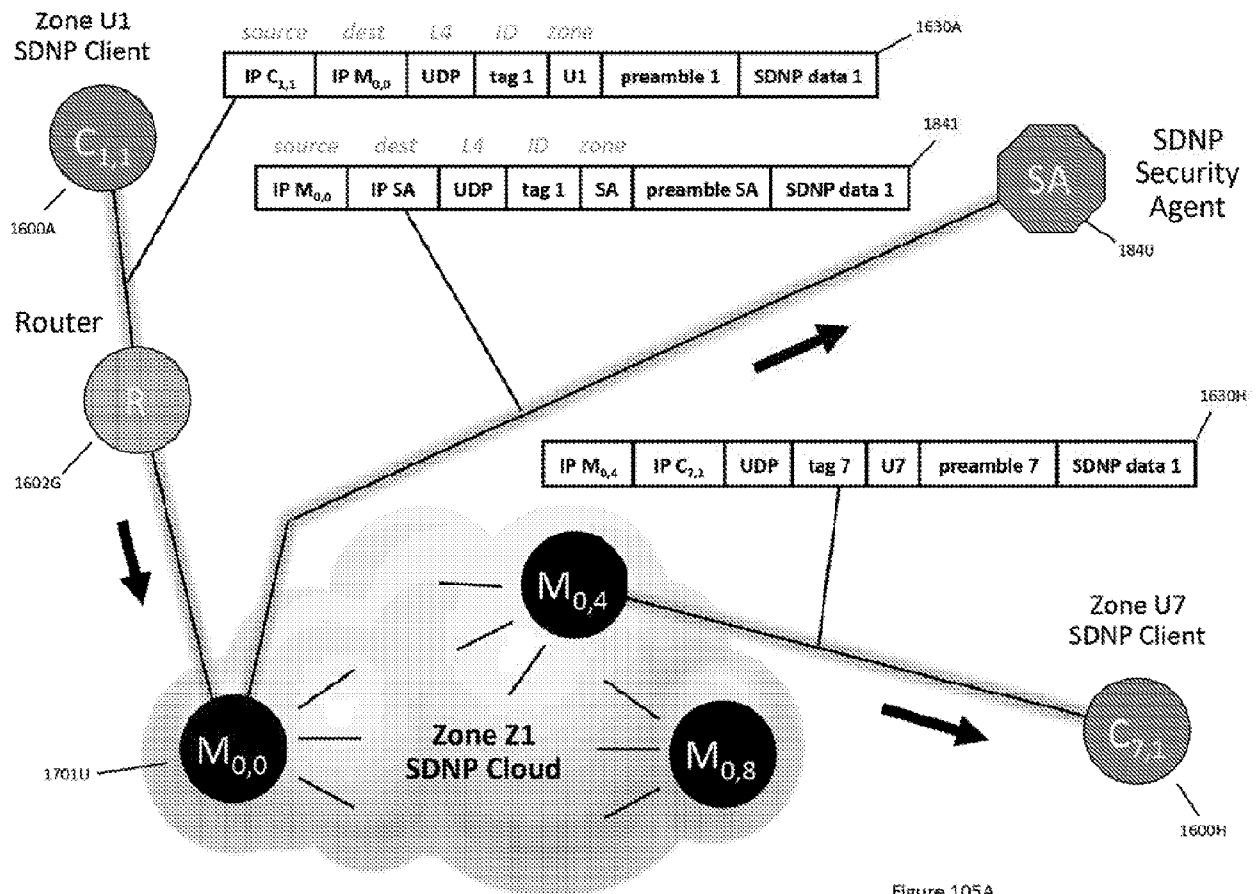


Figure 105A

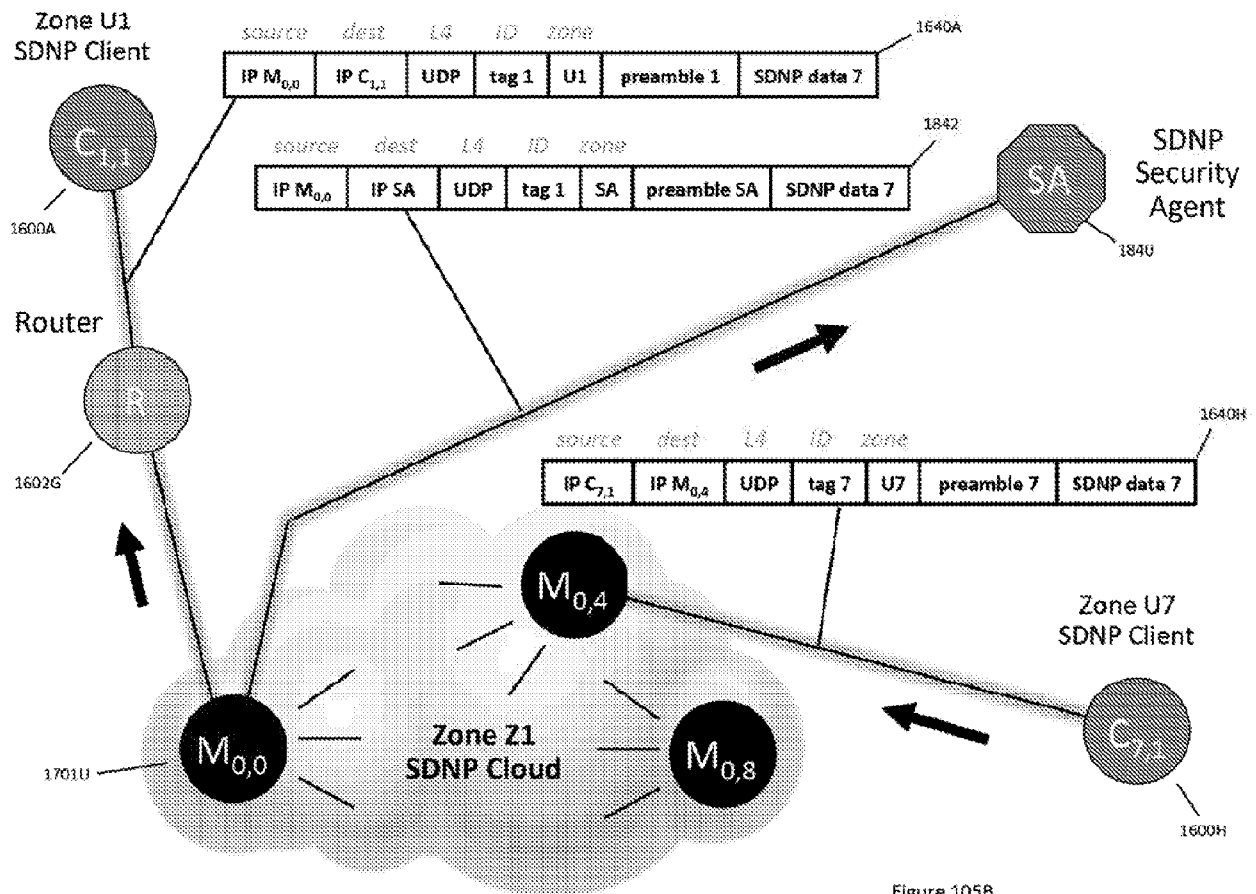


Figure 105B

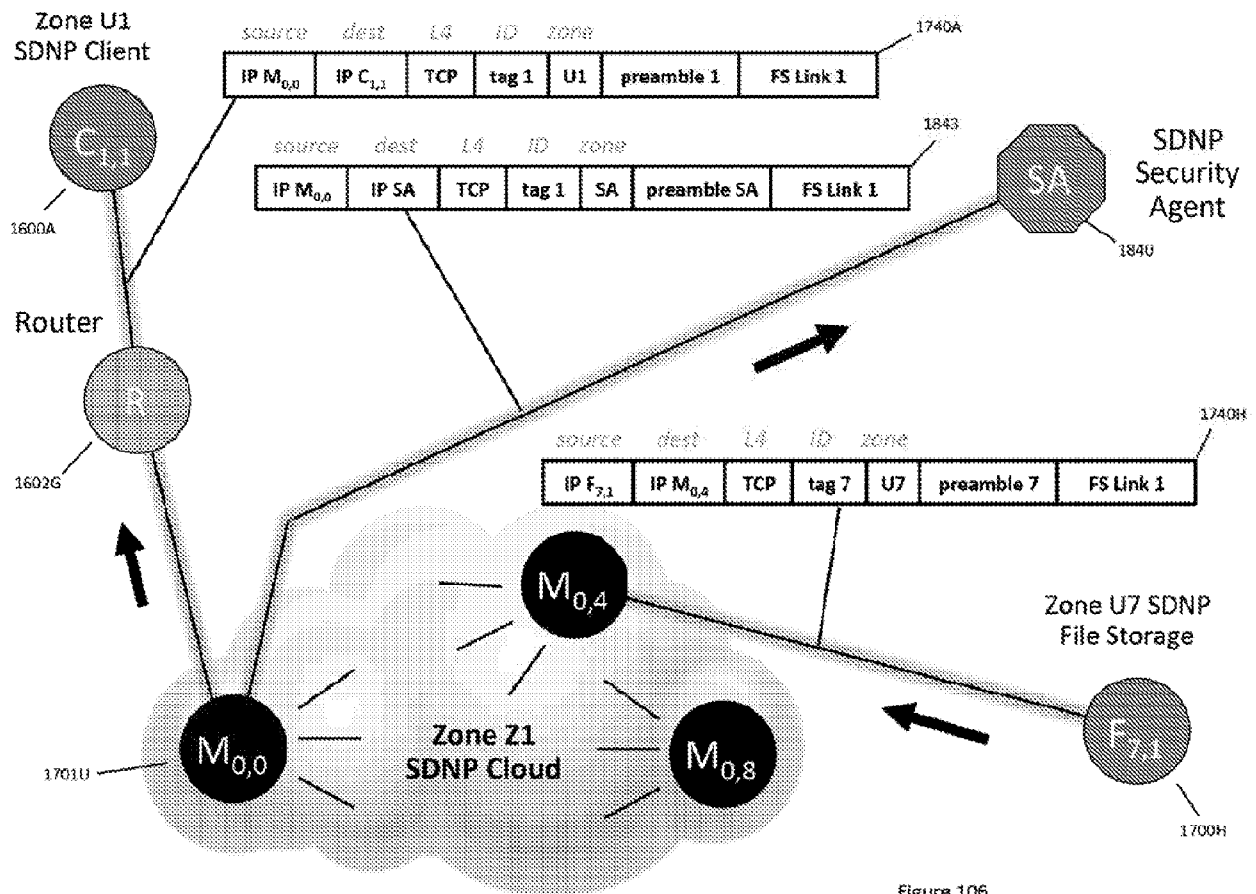


Figure 106

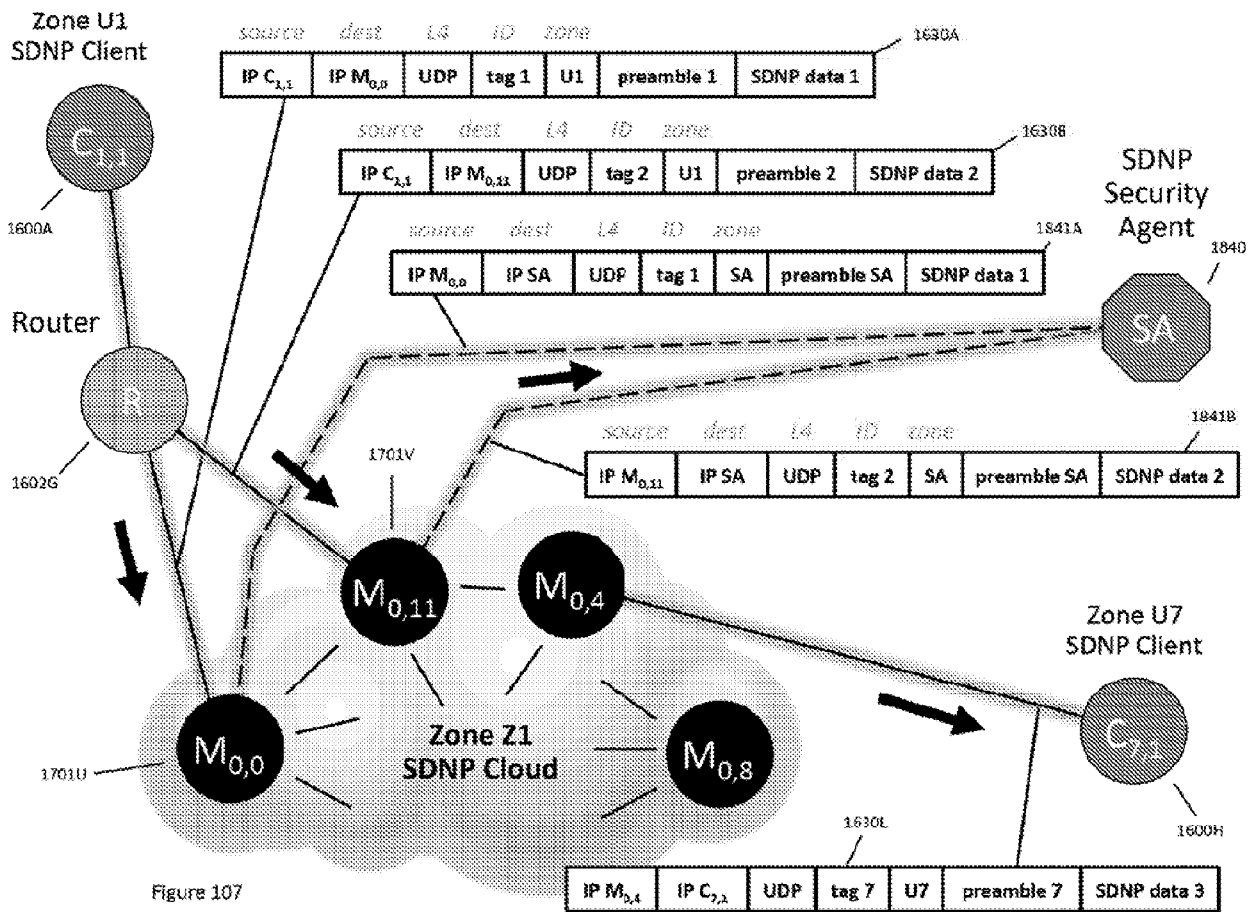


Figure 107

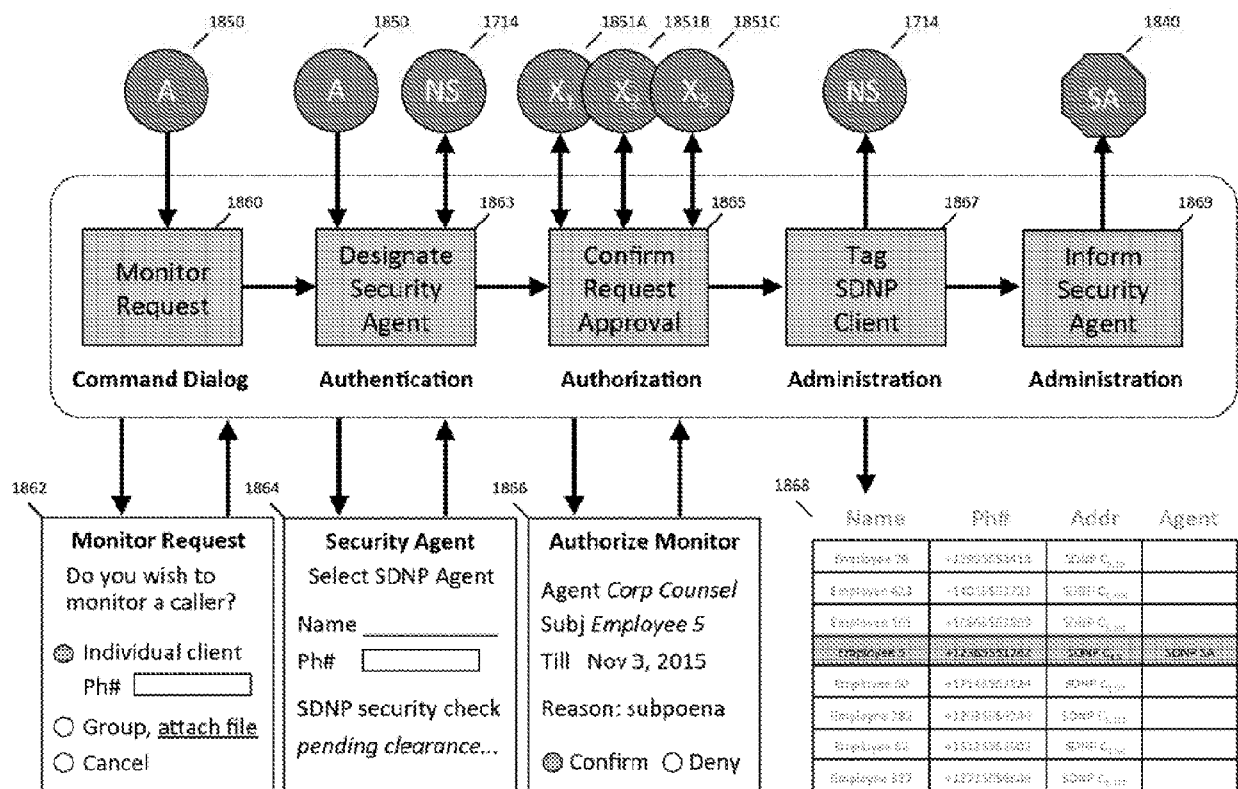


Figure 108

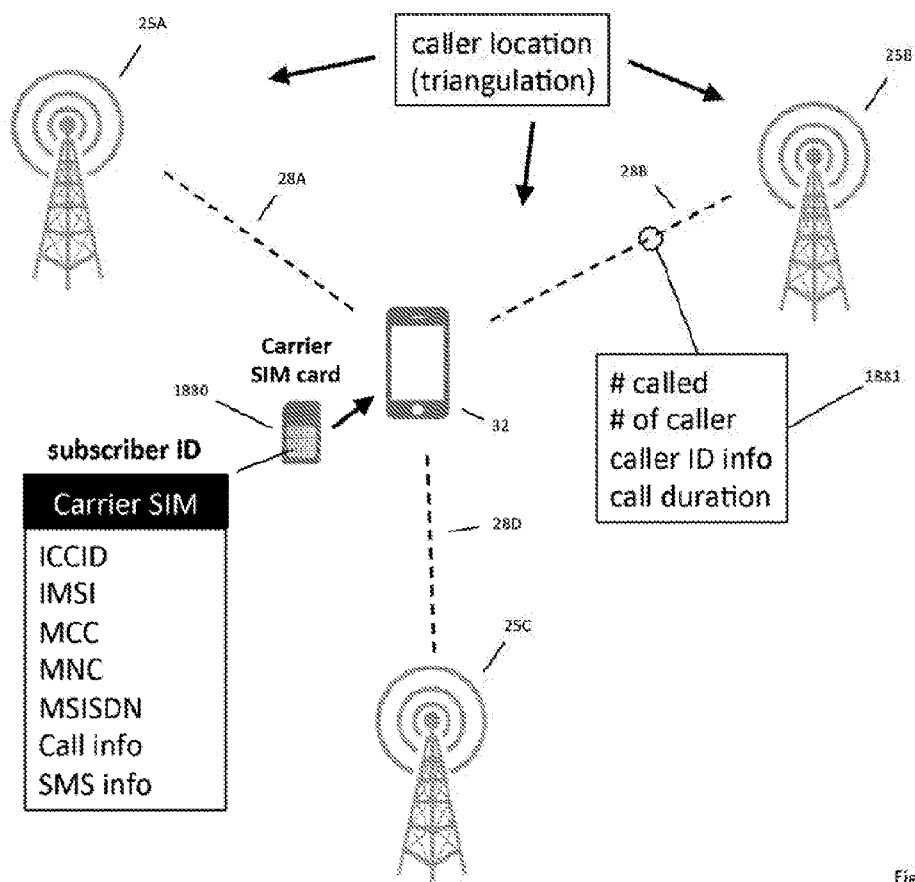


Figure 109

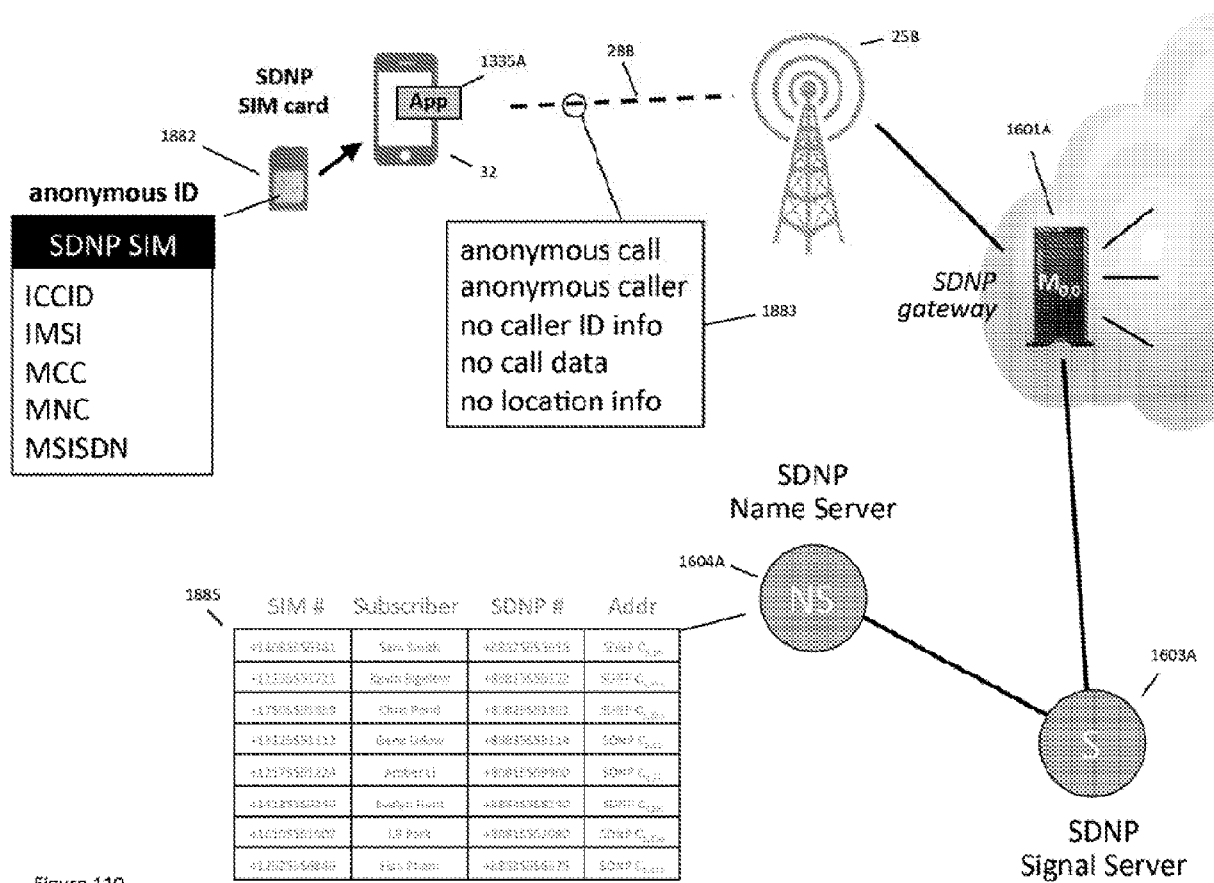


Figure 110

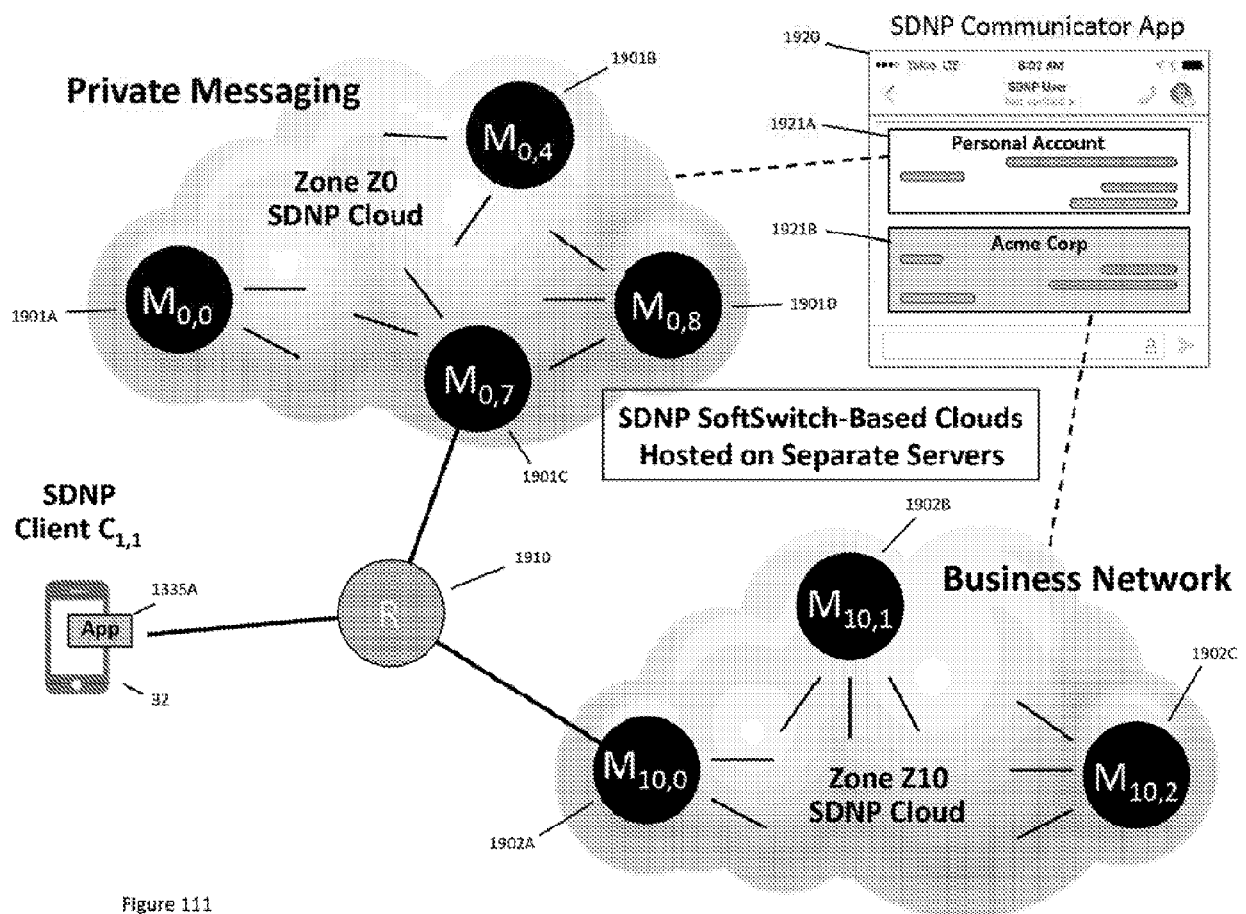


Figure 111

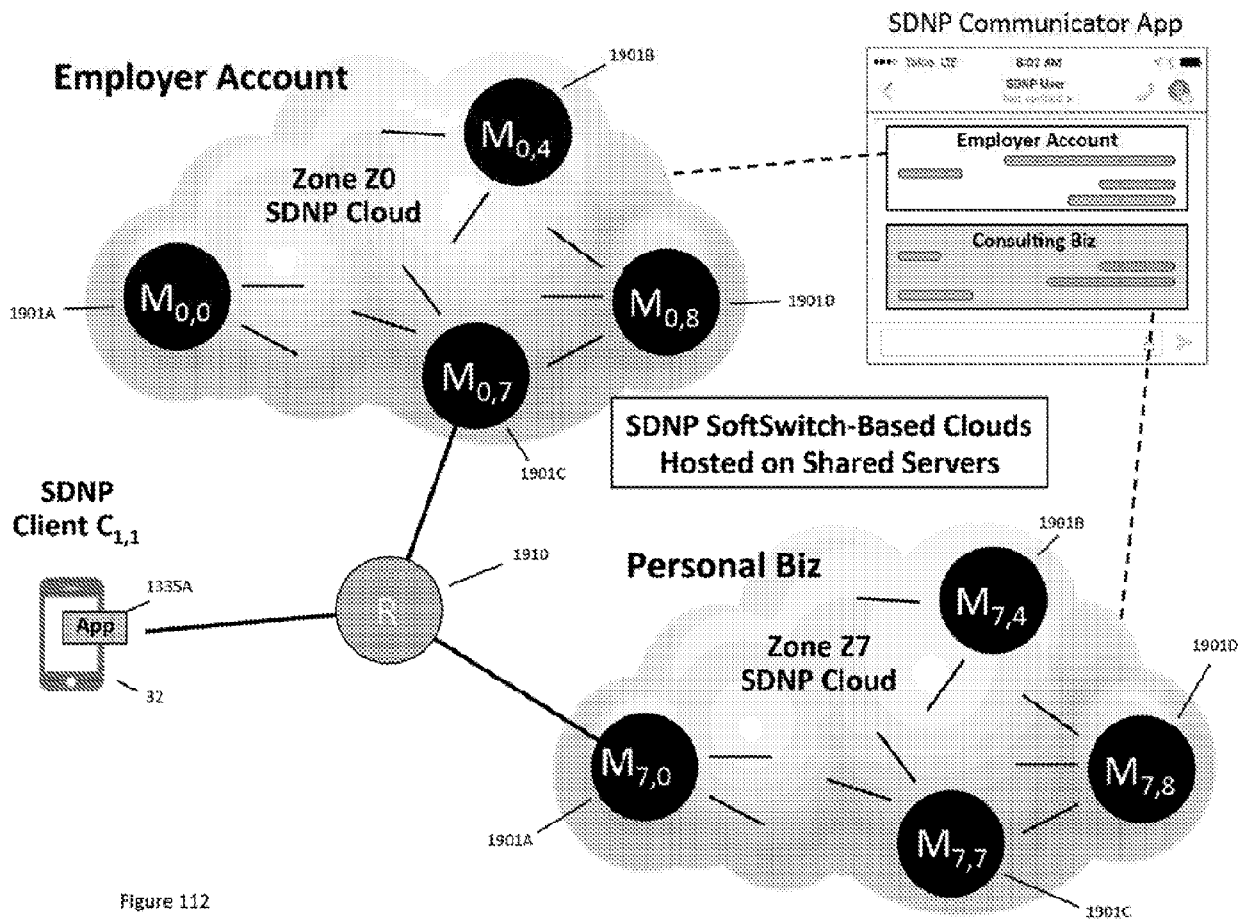


Figure 112

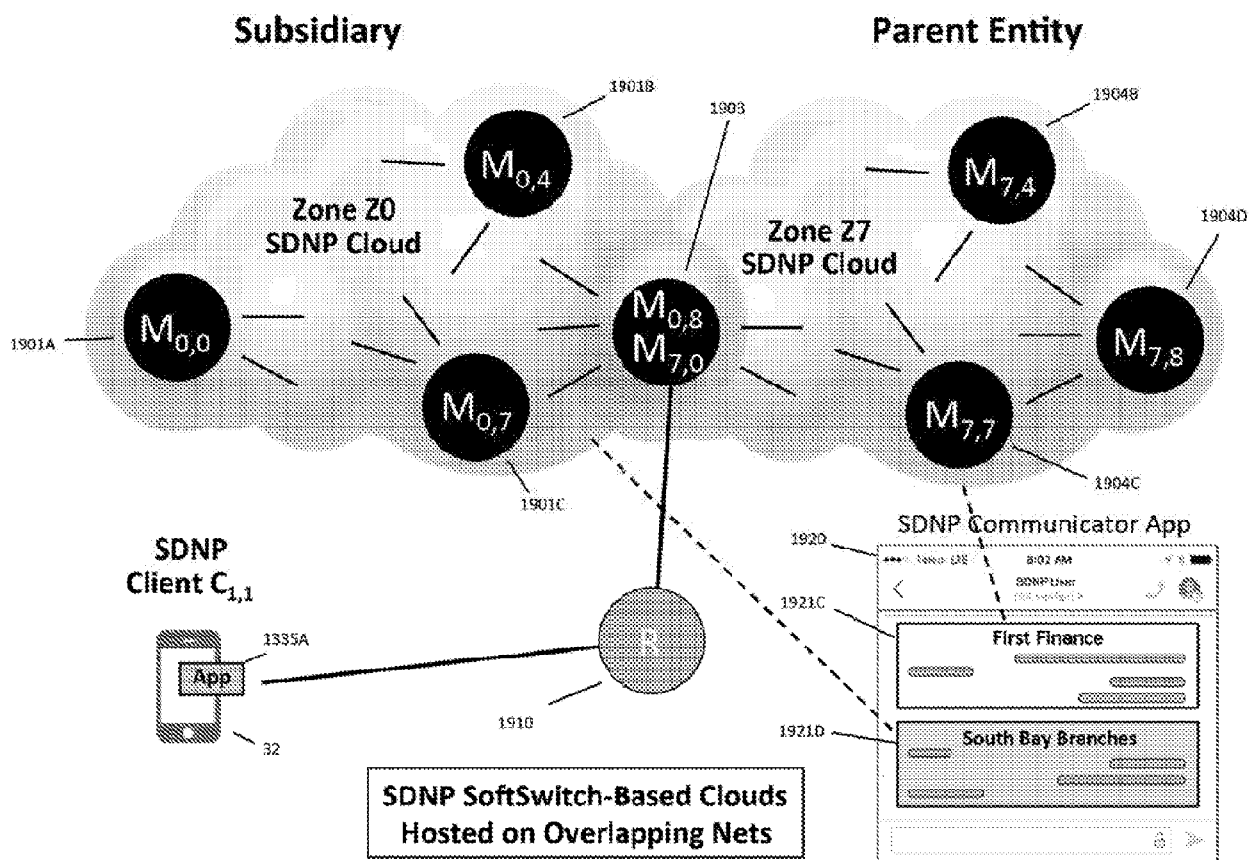


Figure 113

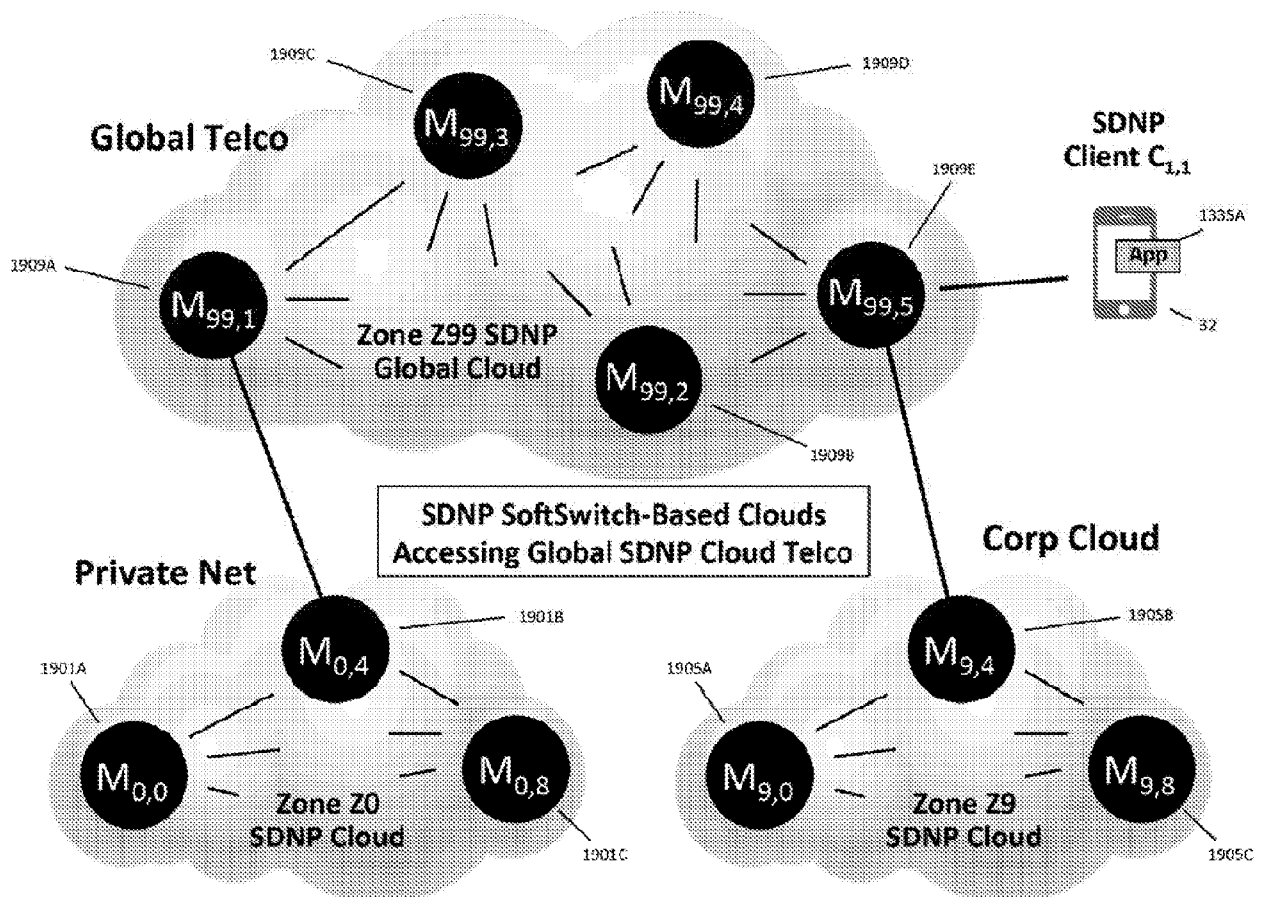


Figure 114

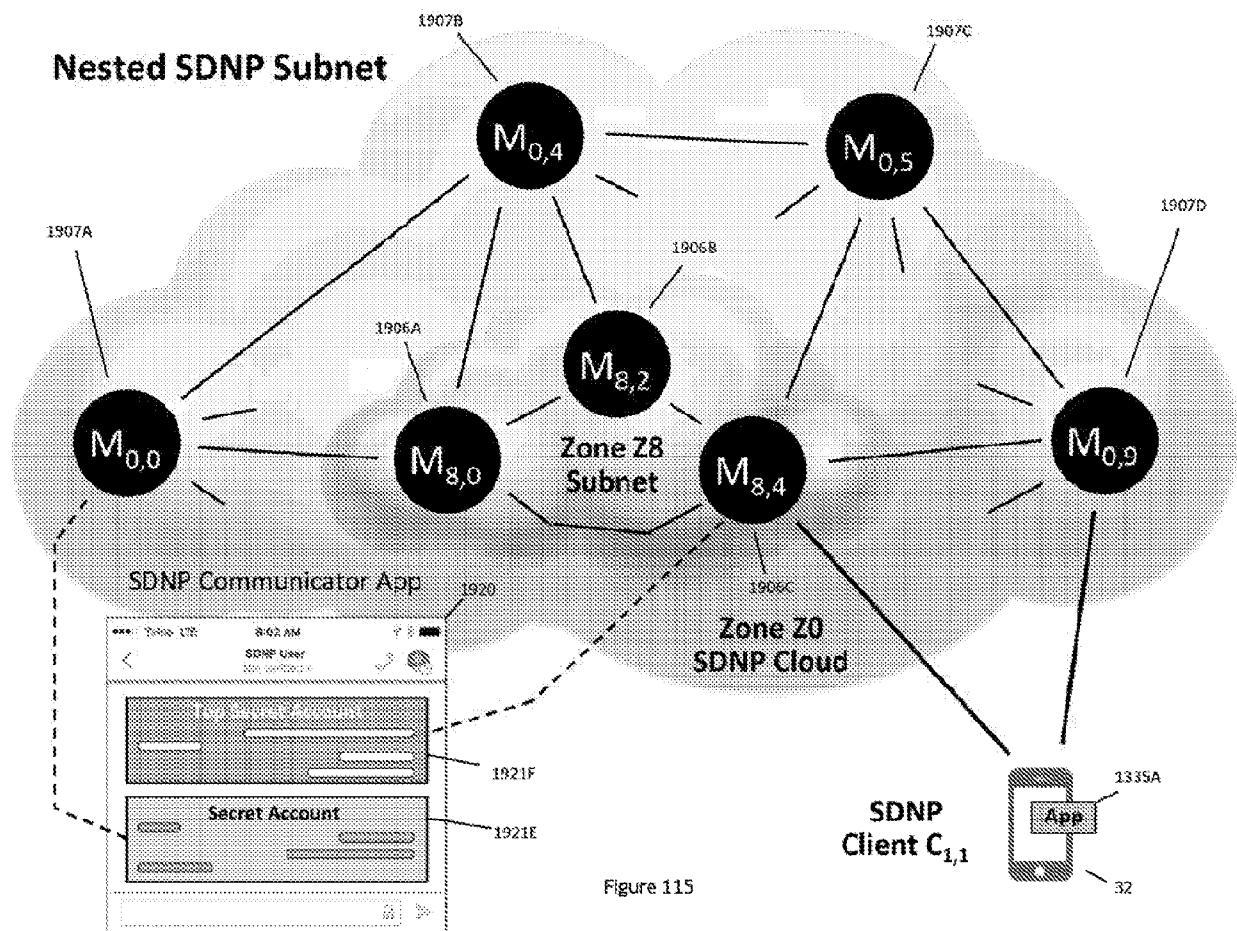


Figure 115