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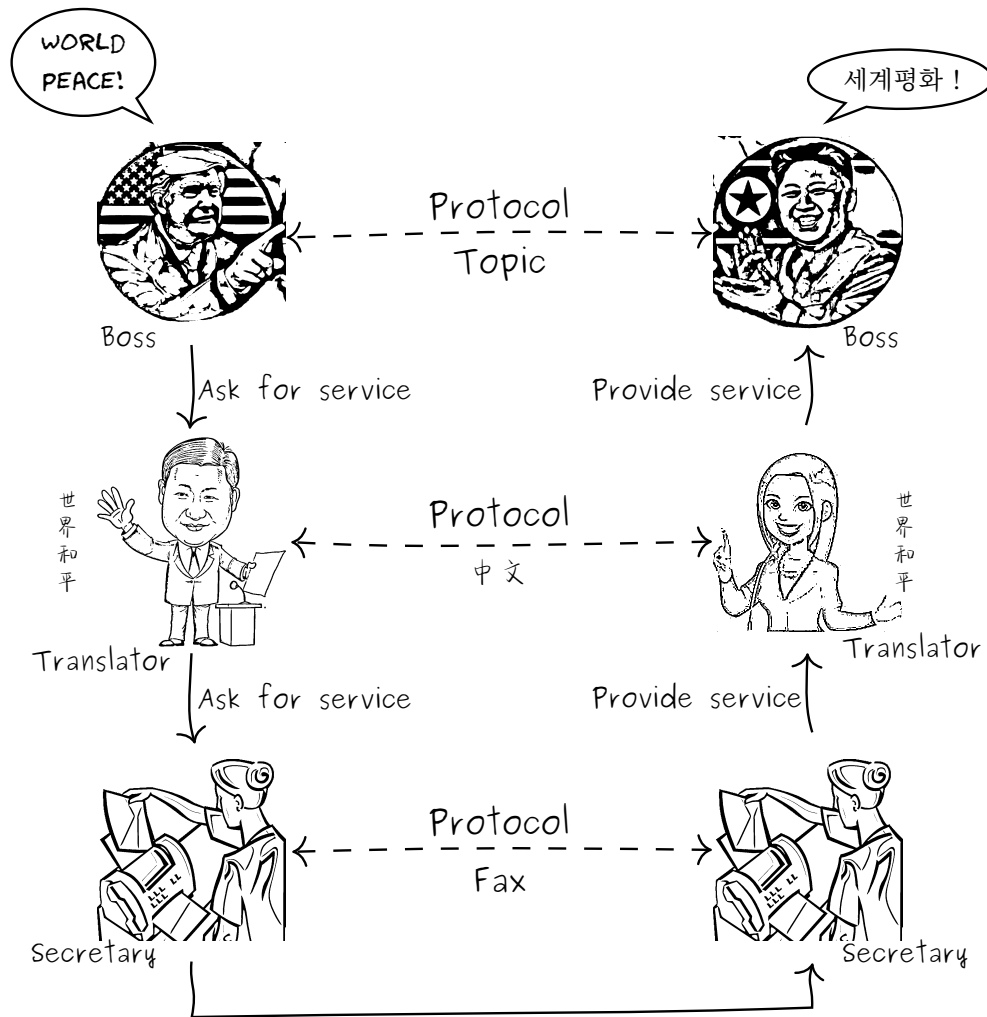


Fig. 1: Layered design

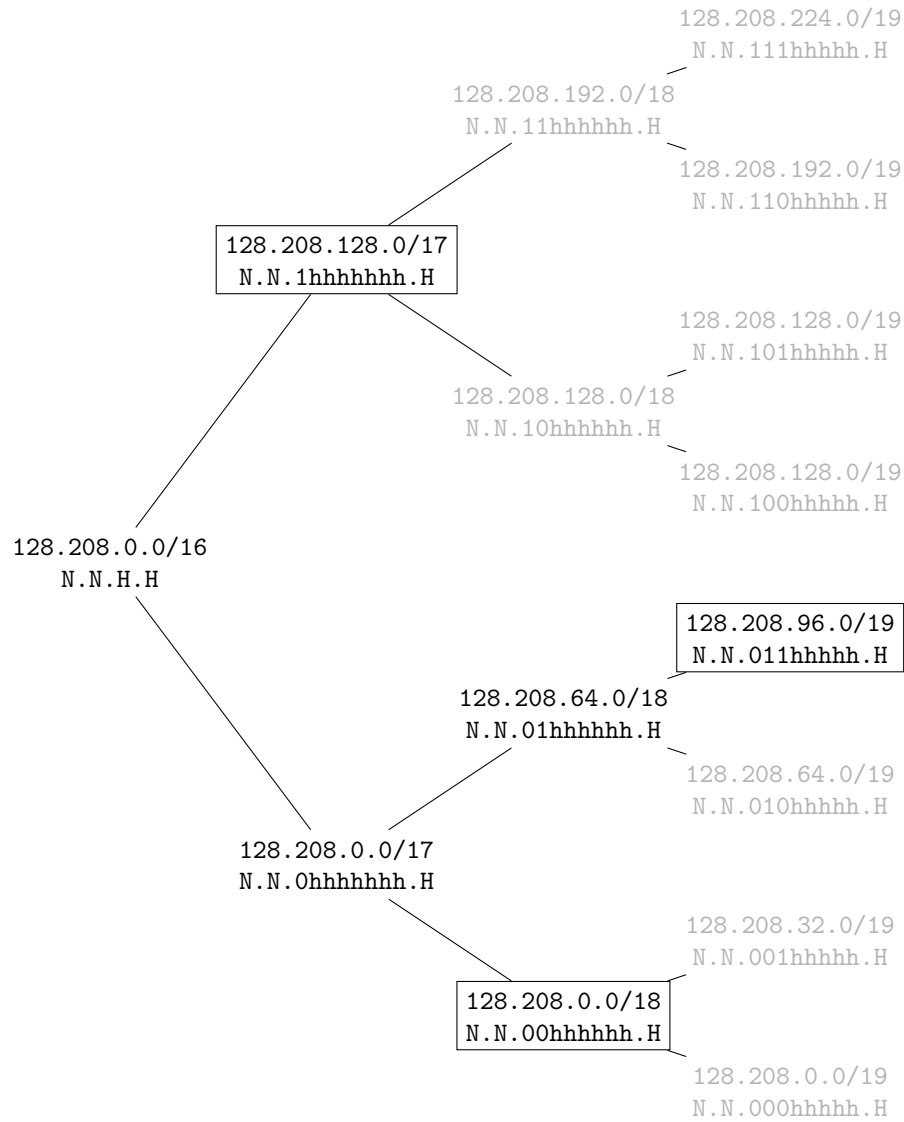


Fig. 2: Subnet hierarchy

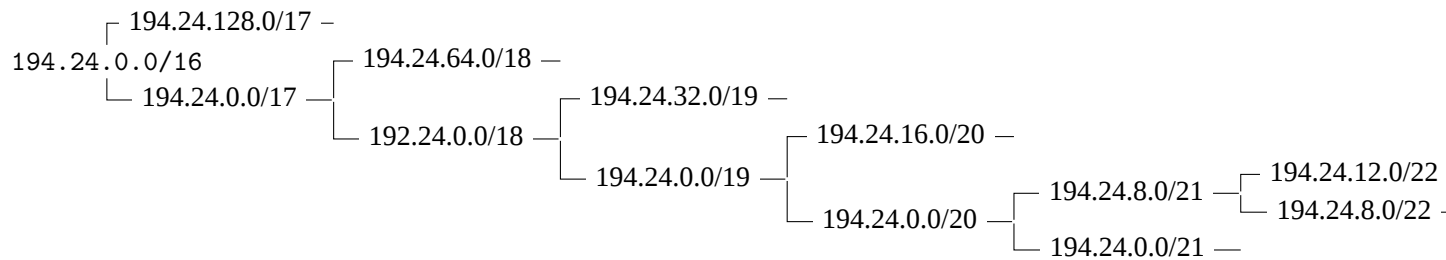


Fig. 3: Subnetting example - 194.24.0.0/16

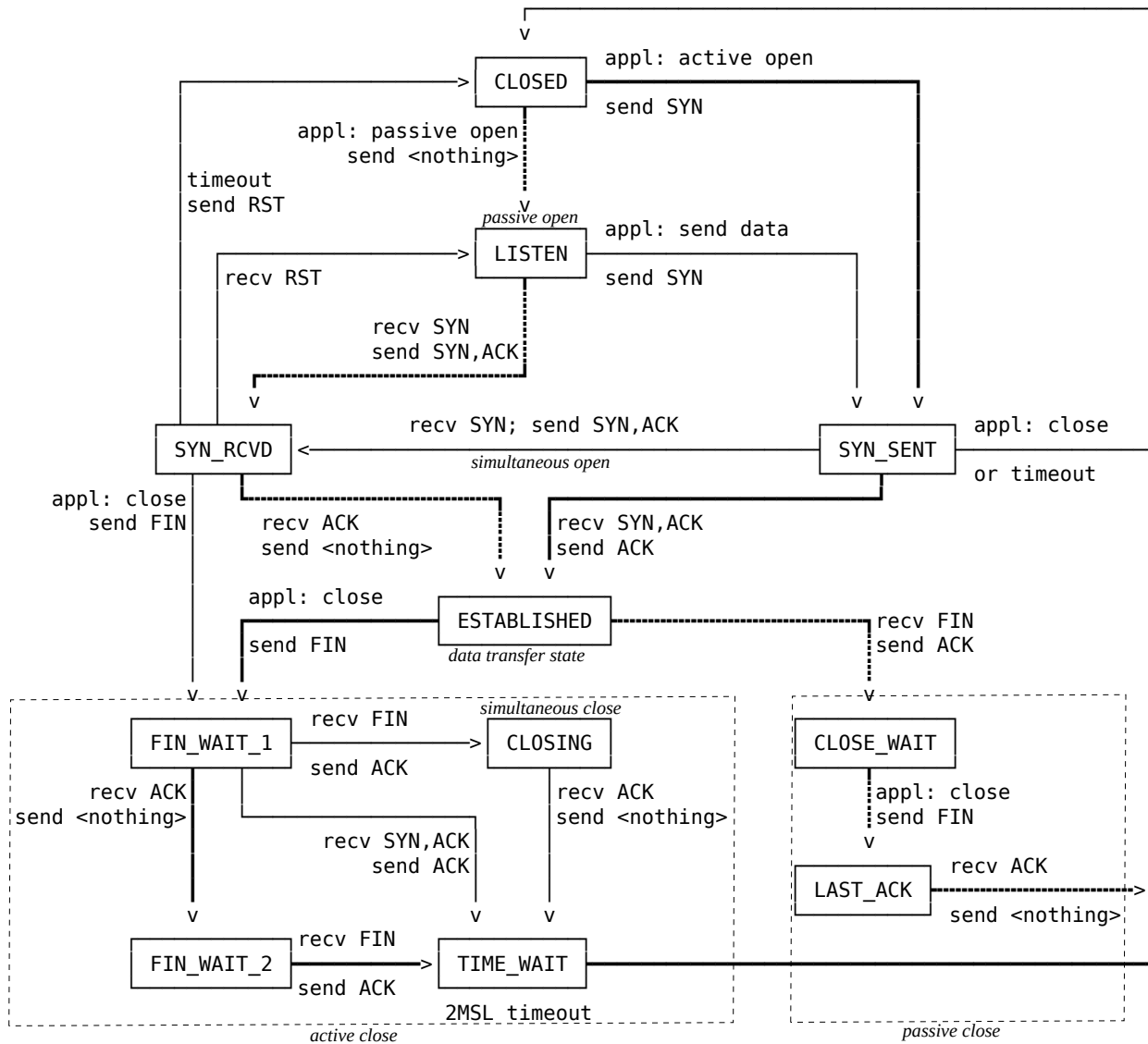


Fig. 4: TCP state transition diagram

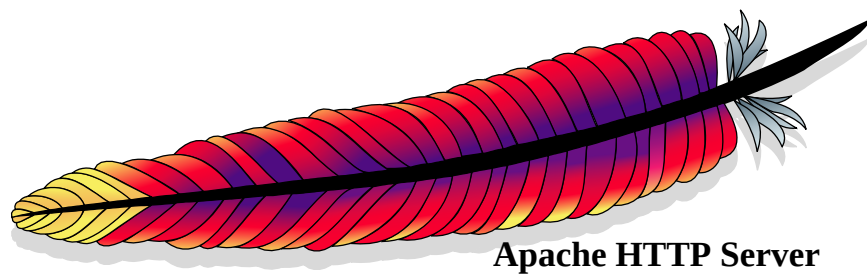


Fig. 5: Apache HTTP Server

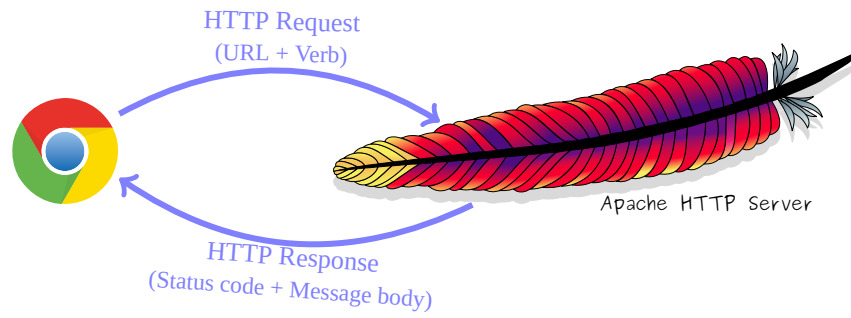


Fig. 6: HTTP client/server interaction

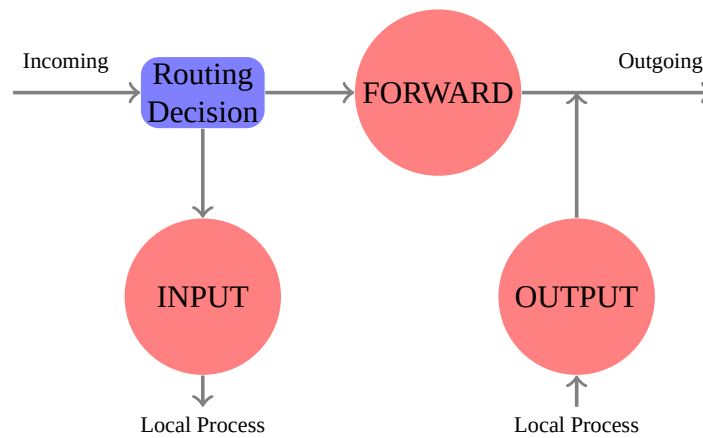


Fig. 7: iptables chains

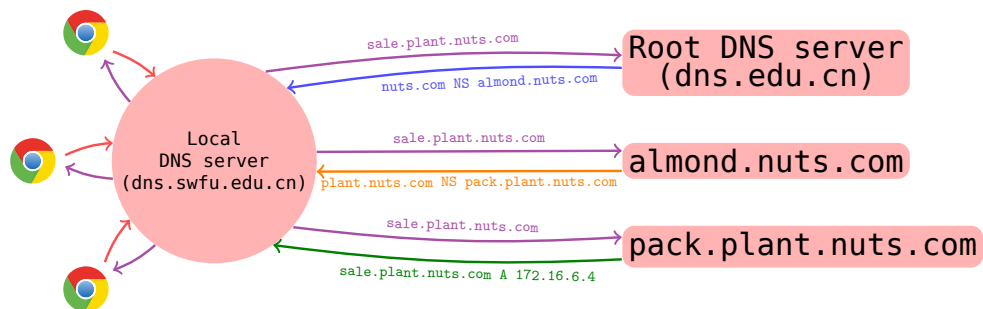


Fig. 8: DNS non-recursive transaction

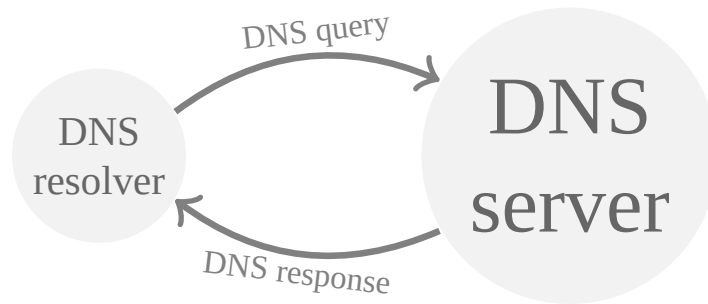


Fig. 9: DNS overview

```

~$ curl -v cs2.swfu.edu.cn/index.html
* Connected to cs2.swfu.edu.cn (202.203.132.242) port 80
> GET /index.html HTTP/1.1      ← Request line
> User-Agent: curl/7.38.0
> Host: cs2.swfu.edu.cn
> Accept: */*
>                                ← Empty line
  
```

Header lines

Fig. 10: HTTP request

```

< HTTP/1.1 200 OK      ← Status line
< Date: Thu, 15 Jan 2015 08:18:50 GMT
< Server: Apache/2.4.10 (Debian)
< Last-Modified: Tue, 02 Sep 2014 03:49:24 GMT
< ETag: "1fd-5020d015e5e4a"
< Accept-Ranges: bytes
< Content-Length: 509
< Vary: Accept-Encoding
< Content-Type: text/html
<                                ← Empty line
<html>
<head>
<title>Hello, world!</title>
</head>
<body>
<h1>Hello, world!</h1>
</body>
</html>
* Connection #0 to host cs2.swfu.edu.cn left intact
  
```

Header lines

Data

Fig. 11: HTTP Response

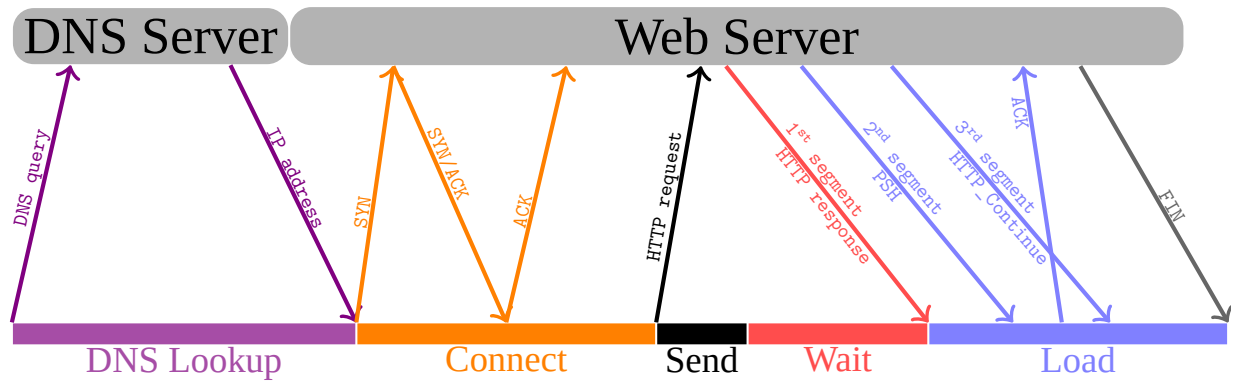


Fig. 12: HTTP transaction

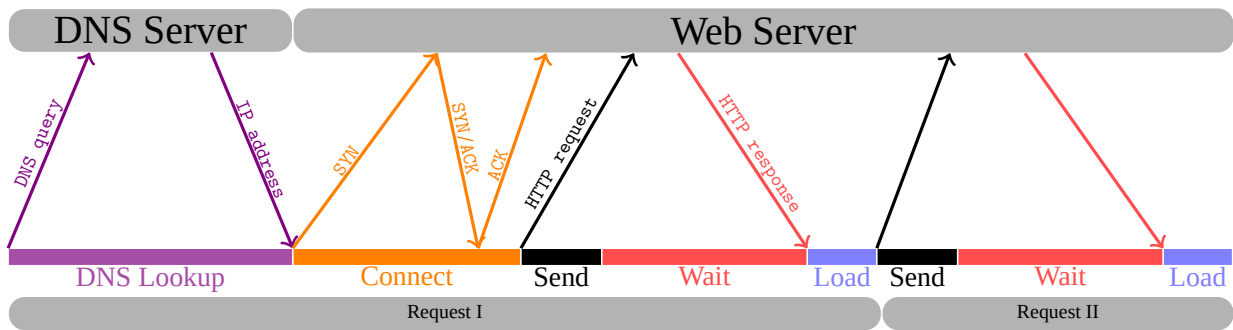


Fig. 13: HTTP persistent transaction

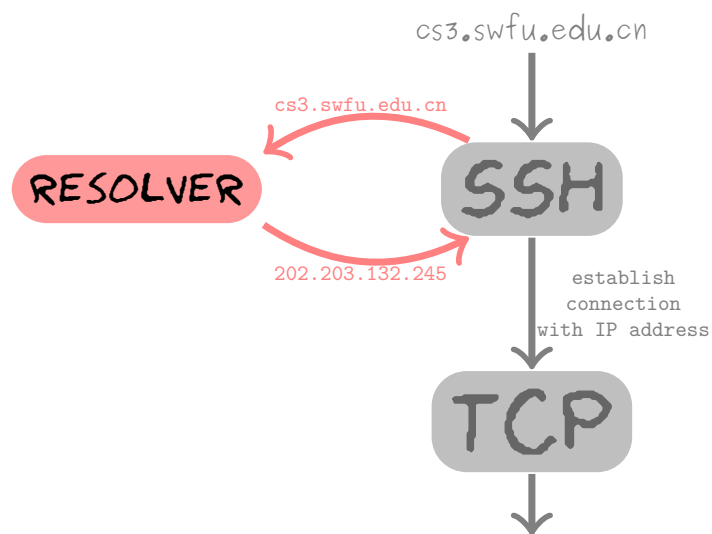


Fig. 14: DNS resolver

```

wx672@cs3:~$ netstat -at | grep http | grep ESTAB
tcp    0    0 cs3.swfu.edu.cn:http  220.163.96.3:47179  ESTABLISHED

```

address
port

address
port

socket

socket

a pair of sockets form a TCP connection

Fig. 15: TCP socket pair

host

query

protocol

resource path

http://en.wikipedia.org/w/index.php?title=Hello&oldid=636846770

Fig. 16: URL

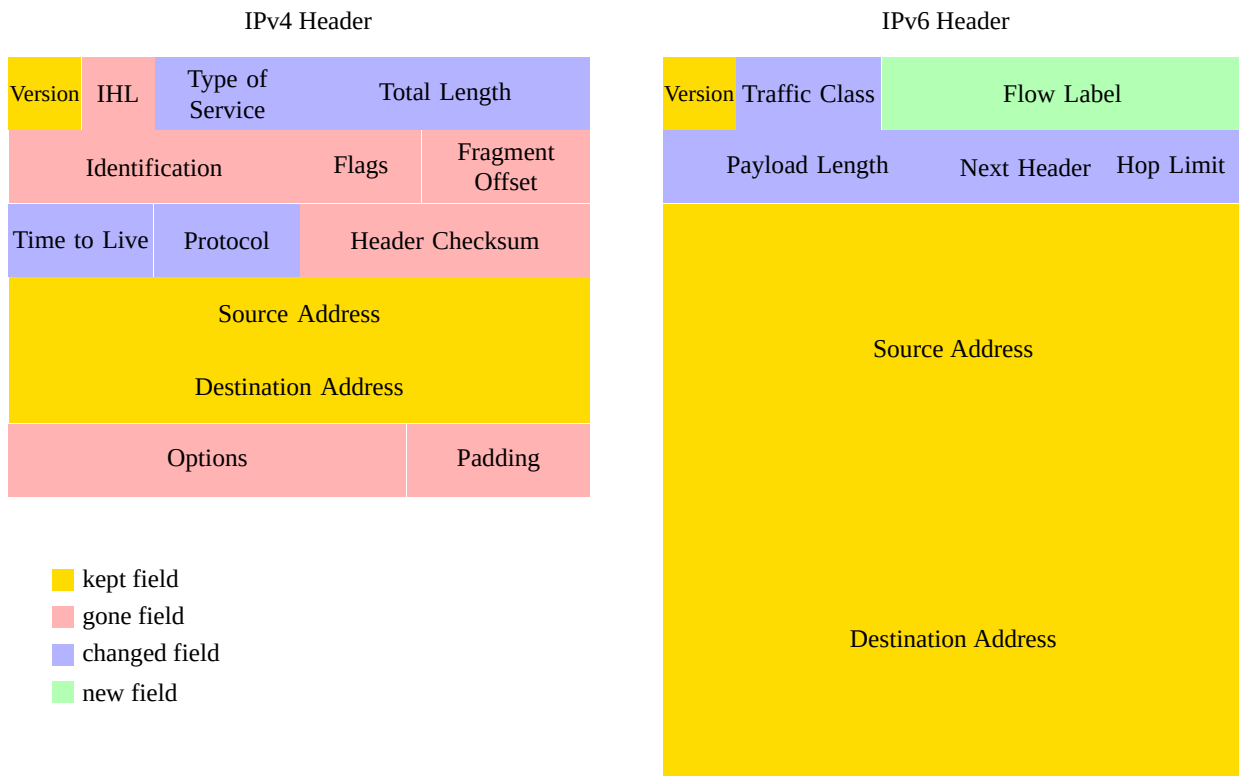


Fig. 17: IPv4 header vs. IPv6 header