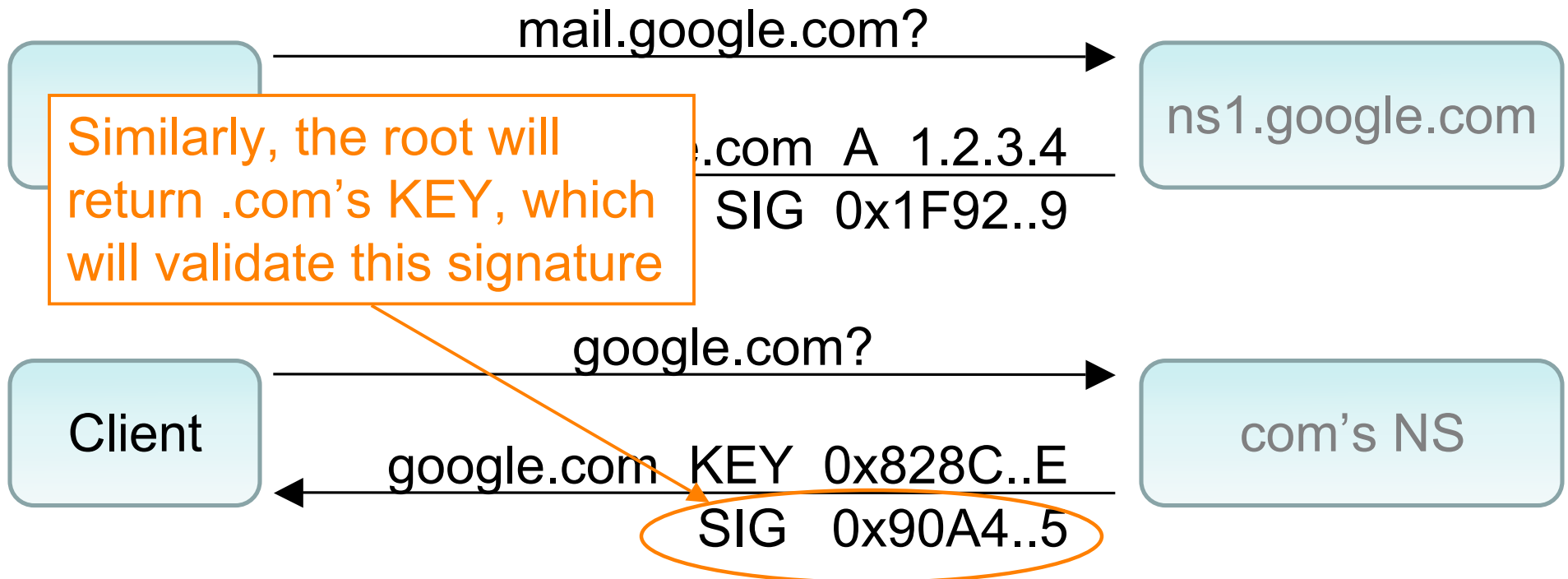


## Ordinary DNS:



## DNSSEC:



% dig +dnssec berkeley.edu

```
<<>> DiG 9.6-ESV-R4-P3 <<>> +dnssec berkeley.edu
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 10036
;; flags: qr rd ra; QUERY: 1, ANSWER: 2, AUTHORITY: 7, ADDITIONAL: 21
```

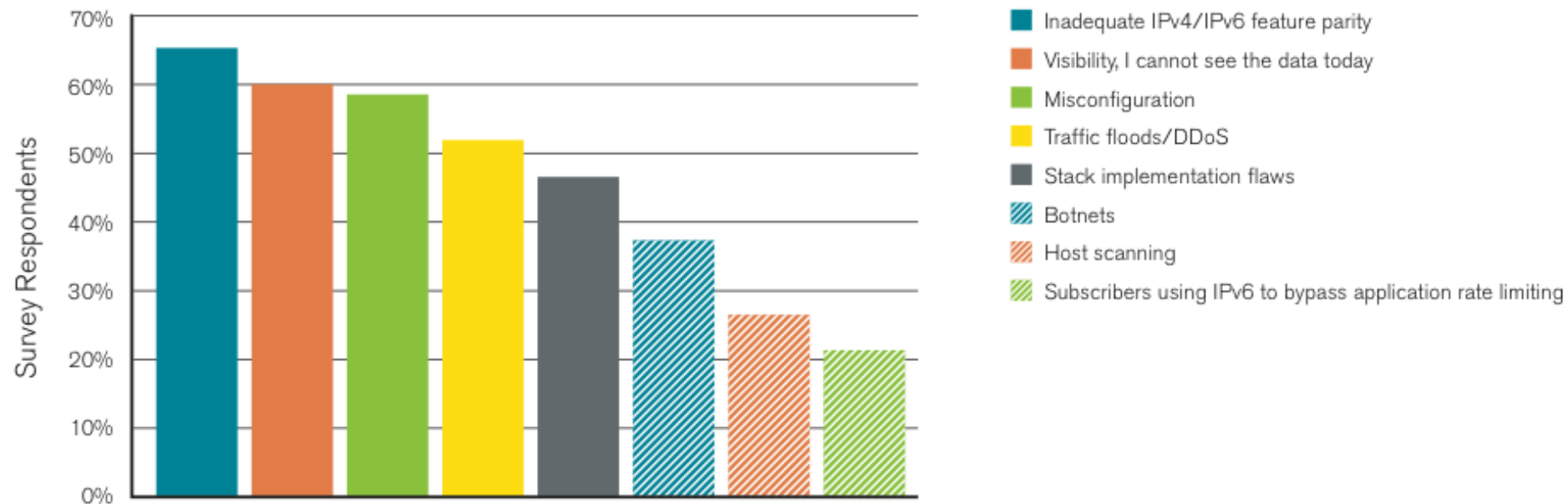
```
;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags: do; udp: 4096
;; QUESTION SECTION:
;berkeley.edu.                IN      A
```

```
;; ANSWER SECTION:
berkeley.edu.      60      IN      A      169.229.216.200
berkeley.edu.      60      IN      RRSIG   A 10 2 300 20121129202230 20121025202230 28219 berkeley.edu. gM19EappMSDAofCz0+PHMEhVDz/2qXvMbq5QLD/LsqyvDWf0nUzSQ7/4 3JFg0qdZT5n2JwM9XK1aEpZ8sSqP5ohM+fau
wynT6M07z00vsY9z6jGs xvzAzyg2fybXtub9Rvd/0gFgzPPUu76mFIAqUuUabt81sy3b0Cc1FBzR Ld0=
```

```
;; AUTHORITY SECTION:
berkeley.edu.      78276   IN      NS      sns-pb.isc.org.
berkeley.edu.      78276   IN      NS      adns1.berkeley.edu.
berkeley.edu.      78276   IN      NS      phloem.uoregon.edu.
berkeley.edu.      78276   IN      NS      adns2.berkeley.edu.
berkeley.edu.      78276   IN      NS      aodns1.berkeley.edu.
berkeley.edu.      78276   IN      NS      ns.v6.berkeley.edu.
berkeley.edu.      78306   IN      RRSIG   NS 10 2 172800 20121129002244 20121025002244 28219 berkeley.edu. 1a5Mioua87Ekb1a91HGNO3gXmGnSJ96gECVYwNsYfZ4esmjQxiog9QnF gGUsI763T7gceb7IVi2a1etCWdC2jcXH
04akXjlWhtM17jHel08bewHt kHr/h055qVz4b0wF1YrgoNKMQRXse6q+mf2AD6dN922mnP2F9cjR8v u/4=
```

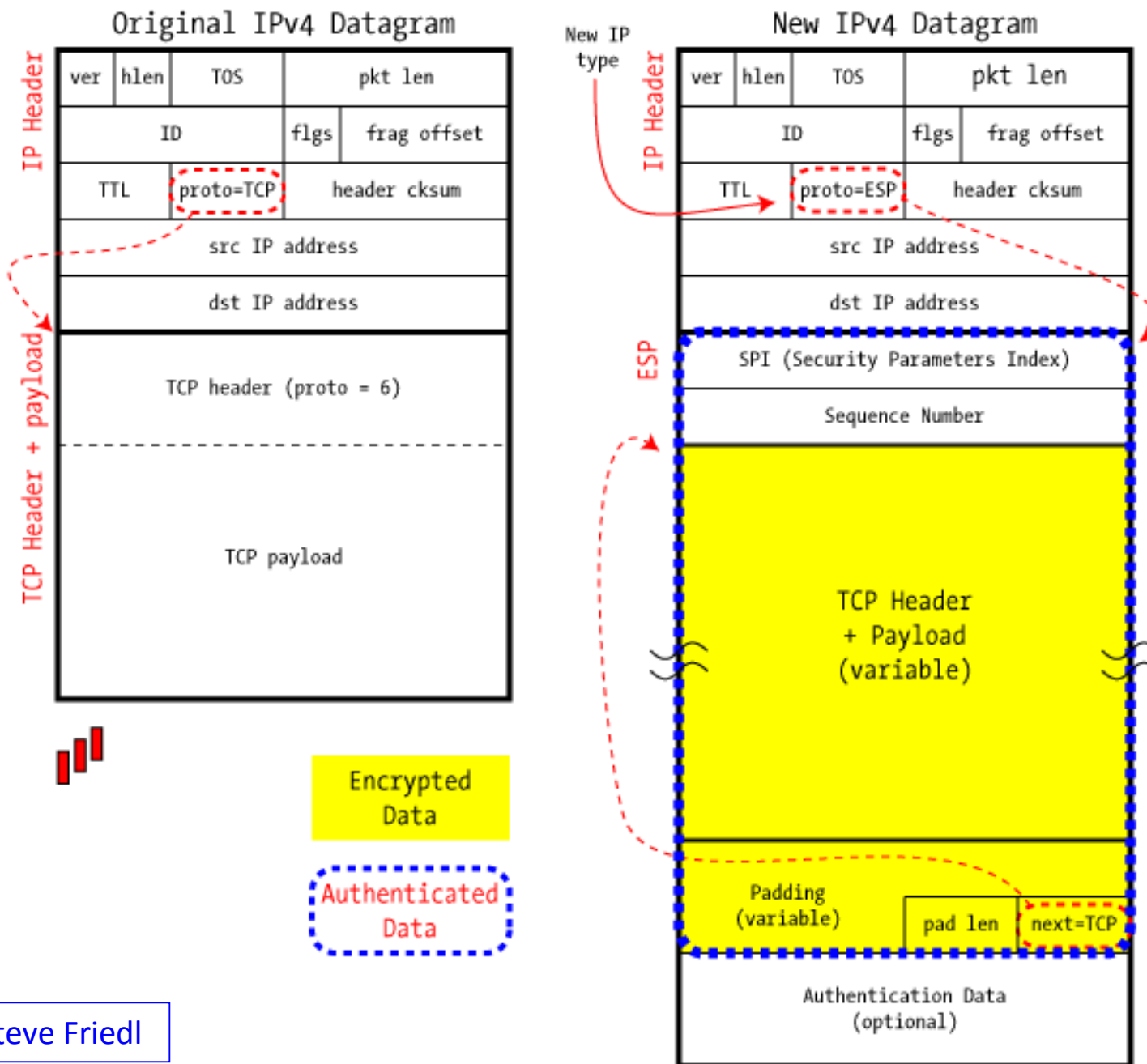
```
;; ADDITIONAL SECTION:
sns-pb.isc.org.     842     IN      A      192.5.4.1
sns-pb.isc.org.     78279   IN      AAAA   2001:500:2e::1
aodns1.berkeley.edu. 3029    IN      A      192.35.225.133
aodns1.berkeley.edu. 89287   IN      AAAA   2607:f010:3f8:8000::ff:fe00:53
phloem.uoregon.edu. 78351   IN      A      128.223.32.35
phloem.uoregon.edu. 55046   IN      AAAA   2001:468:d01:20::80df:2023
adns2.berkeley.edu. 78306   IN      A      128.32.136.14
adns2.berkeley.edu. 3596    IN      AAAA   2607:f140:ffff:ffff::e
ns.v6.berkeley.edu. 78306   IN      A      128.32.136.6
ns.v6.berkeley.edu. 85587   IN      AAAA   2607:f140:ffff:ffff::6
adns1.berkeley.edu. 78294   IN      A      128.32.136.3
adns1.berkeley.edu. 3596    IN      AAAA   2607:f140:ffff:ffff::3
sns-pb.isc.org.     842     IN      RRSIG   A 5 3 7200 20121121233449 20121022233449 4442 isc.org. 1ceskiNs+YR0l1b3psUHipvp6RDx4U3m+6cYCY2h3nLuTikiK2z4dCba 2oM1Y8FaB+UfGrJw+7Go40X0aNAR78P64Q1BVEANb/
Fwe2hc+2ibDjwy 4osCQb+g0PQ1Zf9AehvZoiEngByz3LV2ow3bZawsR+QqHAdsje0fMhu WI4=
sns-pb.isc.org.     248     IN      RRSIG   AAAA 5 3 7200 20121121233449 20121022233449 4442 isc.org. BLuidvyB5IKl1CjikfmTchBtBGUv1o/0oI+r13apdbb0wKwpScC7U47u A3RpHa49Cj82E42mUIrFgw38C0jsFxVo9VWn+0R
P2Yxmk0vU6HfHwBQE A1sBpCi1nmCVickU5BgTL4FF//uN7zLnz1KCKAdioBX7epAPbcMvsi/ ieA=
aodns1.berkeley.edu. 3029    IN      RRSIG   A 10 3 3600 20121129202230 20121025202230 28219 berkeley.edu. njoXhHn0mBTgmXQK9Ff9TrW9RLMhyDquDyAERA3pJ0zvQjnIcr2WddLm Y0FsDuopYnF8KbXtEmzNfWiyXfshvHaDGLr
h+u3UZ+Cfq5Cbugt5p+Ht Hh7DacPpfGxrsDSzio1bse5TSzIKRR63GLDEGrk++VMq/u4Cq4iLMEJ1 lsU=
aodns1.berkeley.edu. 3533    IN      RRSIG   AAAA 10 3 3600 20121129202230 20121025202230 28219 berkeley.edu. XNvdohhvNrk0y95zb2K1nxP5fEia2HYWMvtKkptxHtpYZvJshRc+++/Y c4MGKEFVfp4HPMHSw2u4sAA8nq17Sw0T
92ZMLwWvDpcrG1xGgMVqRRX c25hqt0RsF1U1/Fy0zXXPJ9xBD7wi013kyjDNcf0KI6T9e8tzHBm/0VQ tAA=
adns2.berkeley.edu. 78306   IN      RRSIG   A 10 3 172800 20121129002244 20121025002244 28219 berkeley.edu. GEm0ddcBT9k56kA+n94f2es428pKW/M/T2Rqwbmft1MTyqilY4+jm+rV VW3rdsppv4rVGjR4ydMMeEWd7Espd/i60
Va3ThwzTFdgruS3Z10z1toG ml19umqKakggqlTP9T3hqdTcdG20GjG5pEOsEnuibczTBKtp7Y3rxqZJ mcE=
adns2.berkeley.edu. 3596    IN      RRSIG   AAAA 10 3 3600 20121129202230 20121025202230 28219 berkeley.edu. FyQrnninwU5DdQV9R3dbr7Xk1YpIAAn0AteBj1GarT3E/GJrfUPTIRZ7z S0uxF7VjwXQWphdLcb5VMSZCQajxNMci
qLkp4DnXZjwGsQvfcY2Ah1/O nQeYB20VTI4sX4avb8Lx2zxsDE7dUbwWP2biGmyRFCeGR0JgTL5c/fv0p Ces=
adns1.berkeley.edu. 78294   IN      RRSIG   A 10 3 172800 20121129002244 20121025202230 28219 berkeley.edu. LEwqPKb3gKHUxojV3lVeZwH85VoZkMjZg8awWpjsi9fdLS+kwVcsL+yf ctsdAw5UgB3tqSiAxliYPhVU/tmGgk6/ZZ
C706/d2yUd+3Ugtov6b9bcV Lz4eSKj9EpD5h9R+yGVh/EvkV3JfFMcs/muI2rKekjrjPYvJawWfYAI6 yCU=
adns1.berkeley.edu. 3596    IN      RRSIG   AAAA 10 3 3600 20121129202230 20121025202230 28219 berkeley.edu. OdPnw+kYy8M6Q79bfN6mxHneU2yNEF2CUvDy5s7qvvwDDQgqkmcR0iJQ oadV0De+VrouFieTspplCp21KcTWlpg
NcosMiqjnlgae74hjAKDoo3d jHI31HWTHKtQsgiwXsQkGogt+9RDNrVNL5lGRcFeBSenB4npMChc/j cxQ=
```

## IPv6 Security Concerns



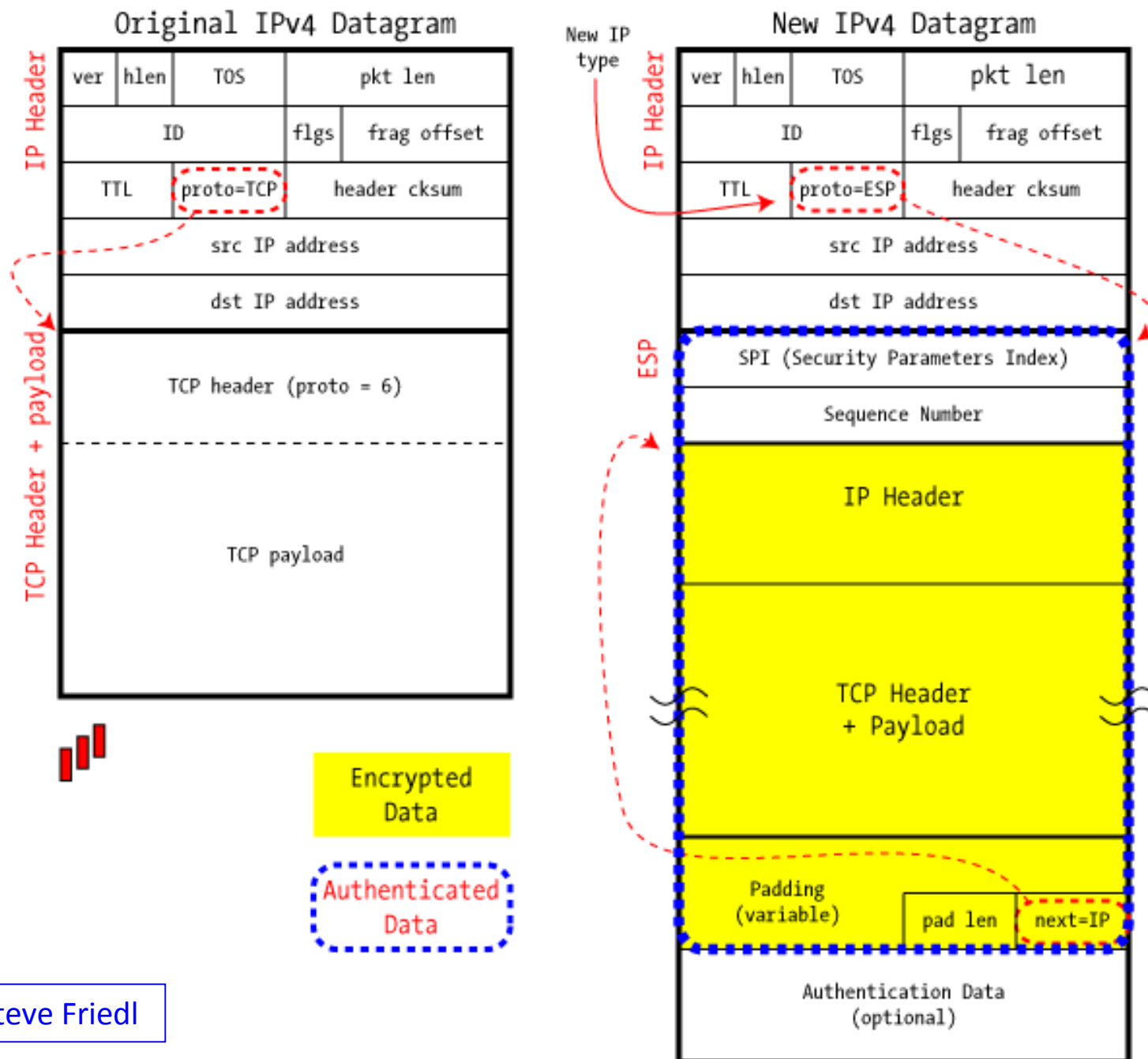
**Figure 64** Source: Arbor Networks, Inc.

## IPSec in ESP Transport Mode



Credit: Steve Friedl

## IPSec in ESP Tunnel Mode



Credit: Steve Friedl