

# Traffic Patterns – Follow the bits



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Network latency is the time that it takes packets to get from one end of the network to the other end using the best available path. Network Latency can have an enormous impact on user experience.



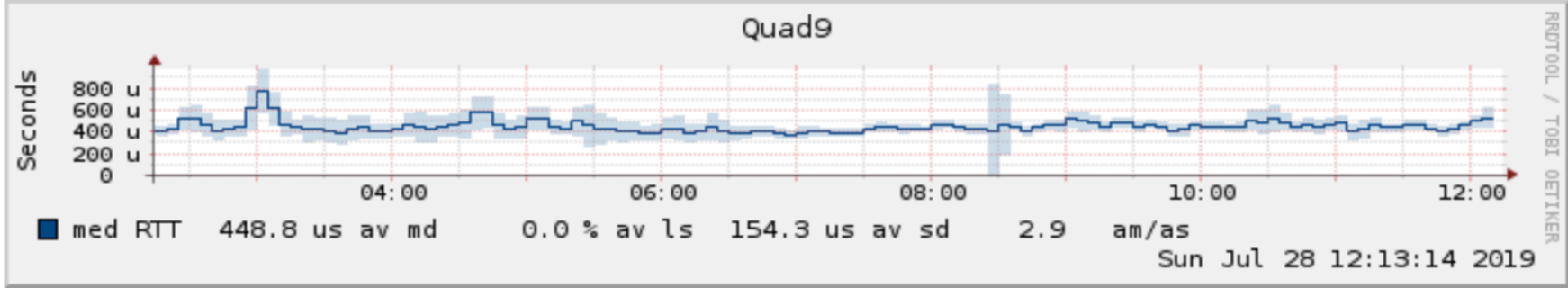
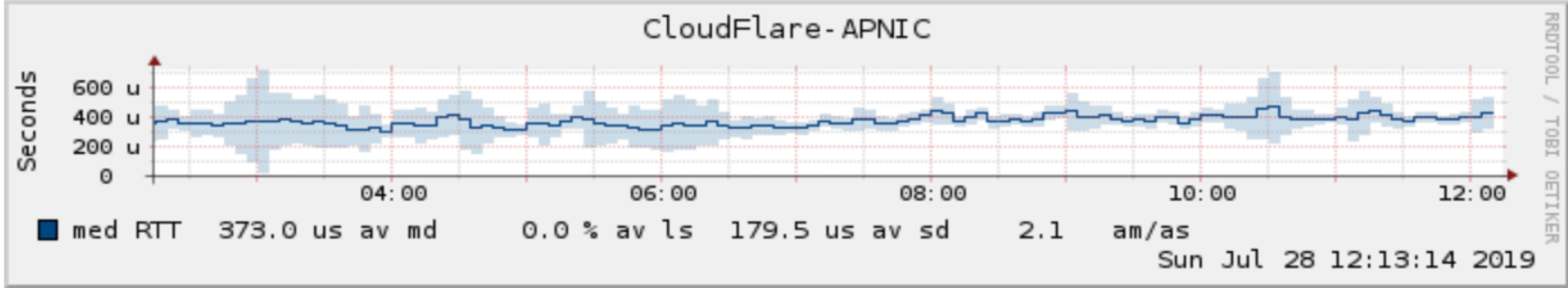
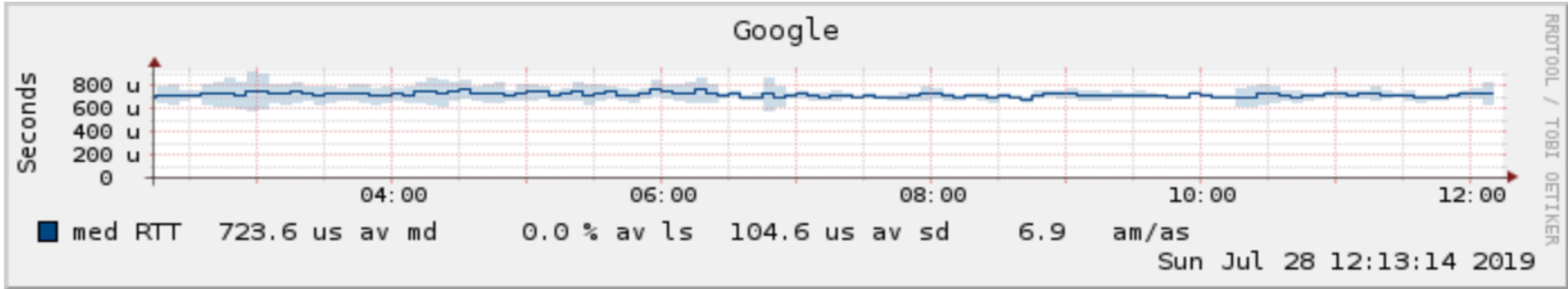
If you have a server in San Francisco in the US and a user in Karachi, Pakistan, there's nothing you can do about reducing the 13,000 KM distance between them. We have these nuisances called oceans and continents that get in the way.

BUT

You can bring "server" closer to Karachi.



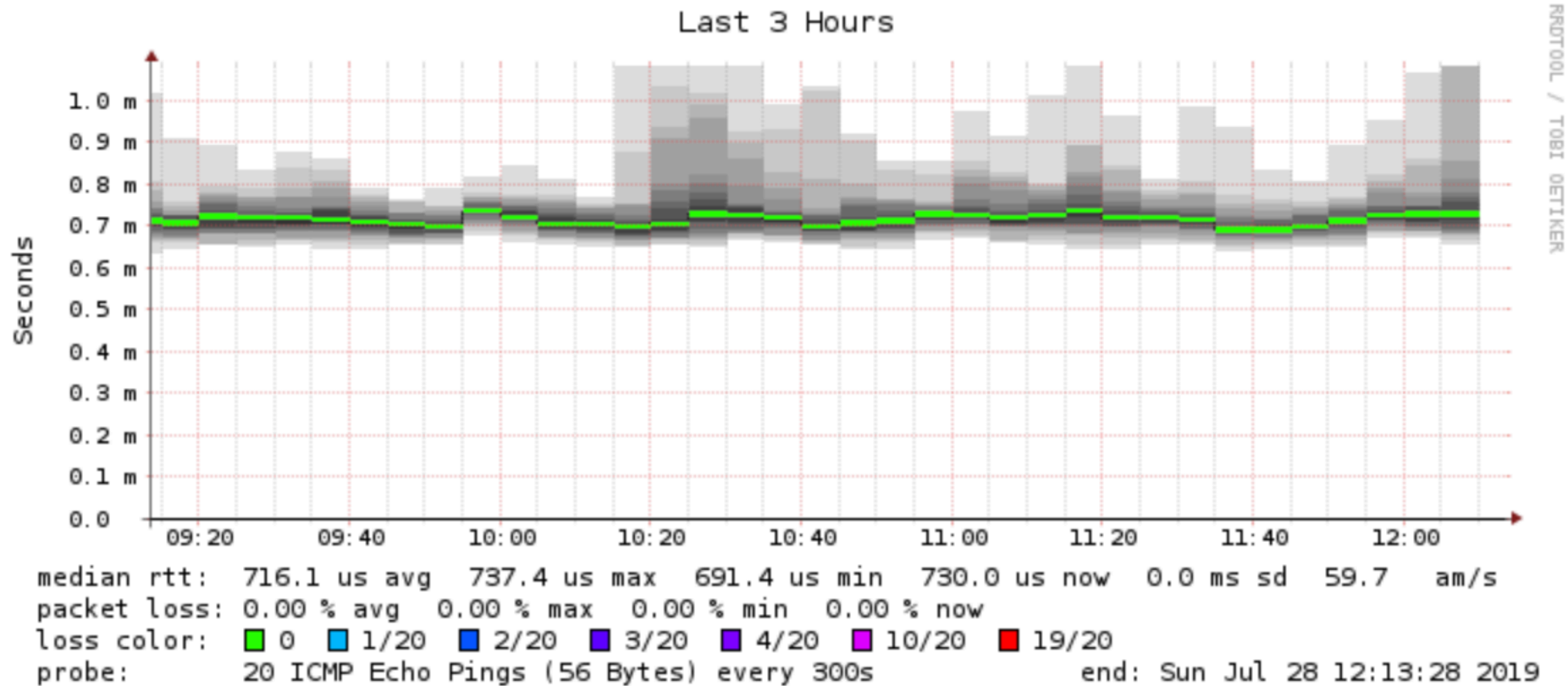
## Public DNS



100 us = 0.1 ms



## Google 8.8.8.8



# Traffic Patterns – Google 8.8.8.8



```
traceroute to 8.8.8.8 (8.8.8.8), 64 hops max, 52 byte packets
 1  10.18.48.1 (10.18.48.1)  7.683 ms  3.913 ms  4.363 ms
 2  202.163.100.105 (202.163.100.105)  4.654 ms  5.716 ms  6.581 ms
 3  * * *
 4  202.163.100.66 (202.163.100.66)  7.731 ms  5.862 ms  4.388 ms
 5  119.159.240.53 (119.159.240.53)  5.593 ms  7.199 ms  7.226 ms
 6  10.253.4.26 (10.253.4.26)  8.717 ms
    10.253.4.8 (10.253.4.8)  6.228 ms
    10.253.4.26 (10.253.4.26)  5.140 ms
 7  74.125.118.170 (74.125.118.170)  25.506 ms  23.927 ms  22.310 ms
 8  * * *
 9  dns.google (8.8.8.8)  25.356 ms  24.182 ms  24.443 ms
```



# Traffic Patterns – Quad9



```
traceroute to 9.9.9.9 (9.9.9.9), 64 hops max, 52 byte packets
 1  10.18.48.1 (10.18.48.1)  2.921 ms  5.942 ms  3.498 ms
 2  202.163.100.105 (202.163.100.105)  5.388 ms  5.041 ms  4.442 ms
 3  202.163.100.25 (202.163.100.25)  5.492 ms
    202.163.100.121 (202.163.100.121)  5.179 ms  5.183 ms
 4  202.163.100.66 (202.163.100.66)  3.842 ms  4.455 ms  2.862 ms
 5  119.159.240.53 (119.159.240.53)  4.525 ms  4.177 ms  4.179 ms
 6  10.253.4.133 (10.253.4.133)  6.869 ms  4.925 ms  6.503 ms
 7  et7-1-5.catania8.cat.seabone.net (93.186.129.38)  104.627 ms  104.593 ms  104.202 ms
 8  ae24.franco31.fra.seabone.net (195.22.211.50)  199.860 ms  134.881 ms  137.868 ms
 9  de-cix.woodynet.net (80.81.194.42)  249.100 ms  205.069 ms  204.172 ms
10  dns9.quad9.net (9.9.9.9)  203.927 ms !Z  201.411 ms !Z  204.876 ms !Z
```



# Traffic Patterns – CloudFlare/APNIC



```
traceroute to 1.1.1.1 (1.1.1.1), 64 hops max, 52 byte packets
 1  10.18.48.1 (10.18.48.1)  5.901 ms  2.933 ms  3.664 ms
 2  202.163.100.105 (202.163.100.105)  5.297 ms  5.205 ms  7.234 ms
 3  * * *
 4  202.163.100.66 (202.163.100.66)  6.572 ms  4.340 ms  4.051 ms
 5  119.159.240.53 (119.159.240.53)  3.728 ms  3.403 ms  3.399 ms
 6  khi77.pie.net.pk (221.120.251.205)  9.160 ms
    khi275.p01.pie.net.pk (221.120.251.201)  5.765 ms  7.170 ms
 7  rwp44.pie.net.pk (221.120.251.101)  5.268 ms  4.654 ms
    rwp44.pie.net.pk (221.120.251.88)  4.956 ms
 8  static.khi77.pie.net.pk (221.120.200.3)  5.270 ms  5.438 ms  5.009 ms
 9  one.one.one.one (1.1.1.1)  3.722 ms  3.915 ms  3.467 ms
```





# Traffic Patterns

- Data dump gathered from open domain crawlers
- A sample of around 15000 .pk domains
- DNS A Record
- ccTLD “.pk” statistics
- ccTLD “.gov.pk” statistics
- ccTLD “.edu.pk” statistics



## .pk TLD Report



Description: Pakistan

Delegated to: PKNIC

|                            |   |
|----------------------------|---|
| Nameserver Status          | ✓ |
| IPv4 Enabled Nameservers   | ✓ |
| A Glue in the Root Zone    | ✓ |
| IPv6 Enabled Nameservers   | ✓ |
| AAAA Glue in the Root Zone | ✓ |

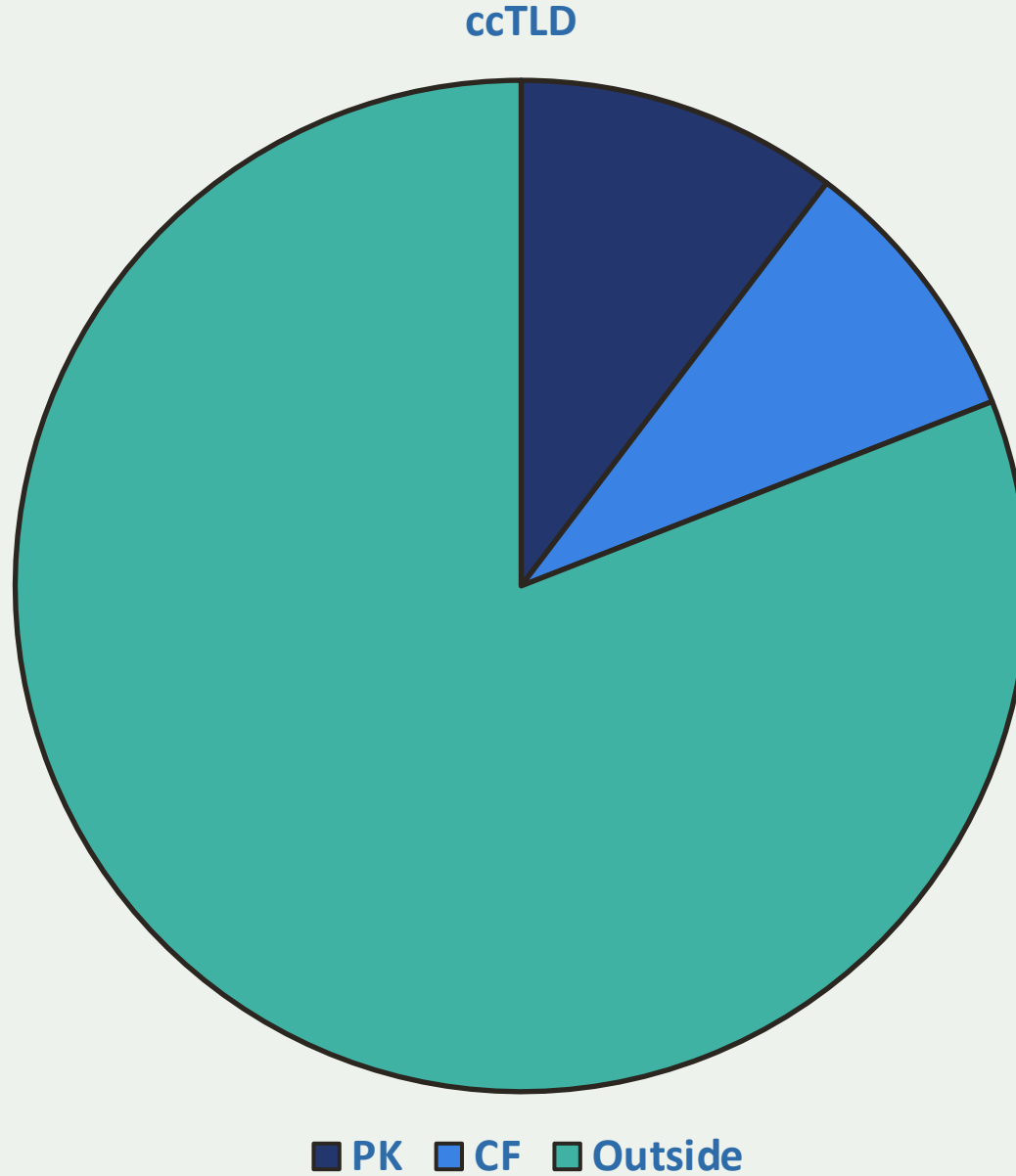
|               |                       |
|---------------|-----------------------|
| Domains:      | 44,768                |
| A records:    | 19,410                |
| A glue:       | 2,044                 |
| AAAA records: | 1,166                 |
| AAAA glue:    | 0                     |
| Updated:      | 18 Jan 2020 02:56 PST |

[https://bgp.he.net/report/dns/pk#\\_tldinfo](https://bgp.he.net/report/dns/pk#_tldinfo)

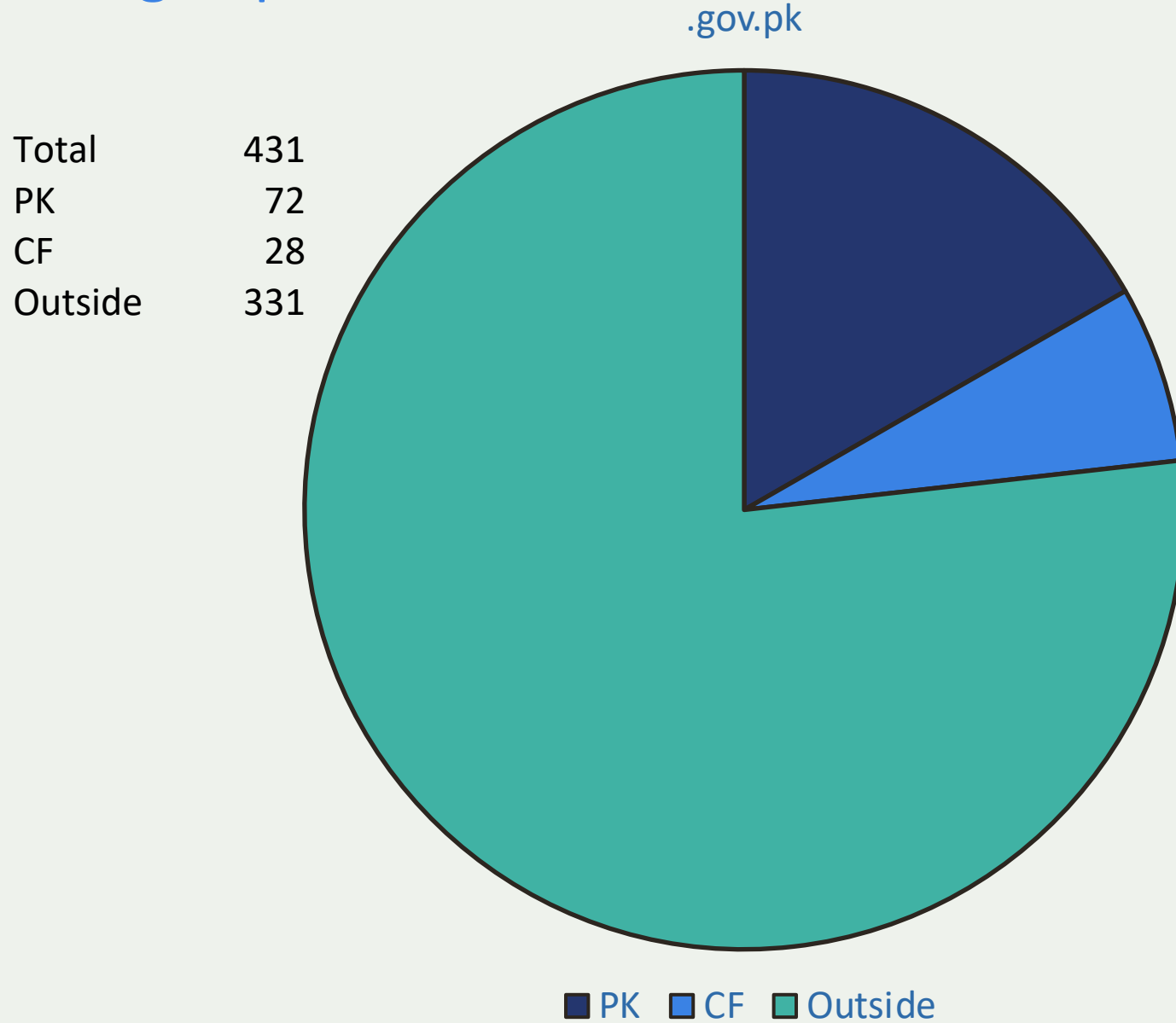


# DNS Records

|         |       |
|---------|-------|
| Total   | 14927 |
| PK      | 1541  |
| CF      | 1304  |
| Outside | 12082 |

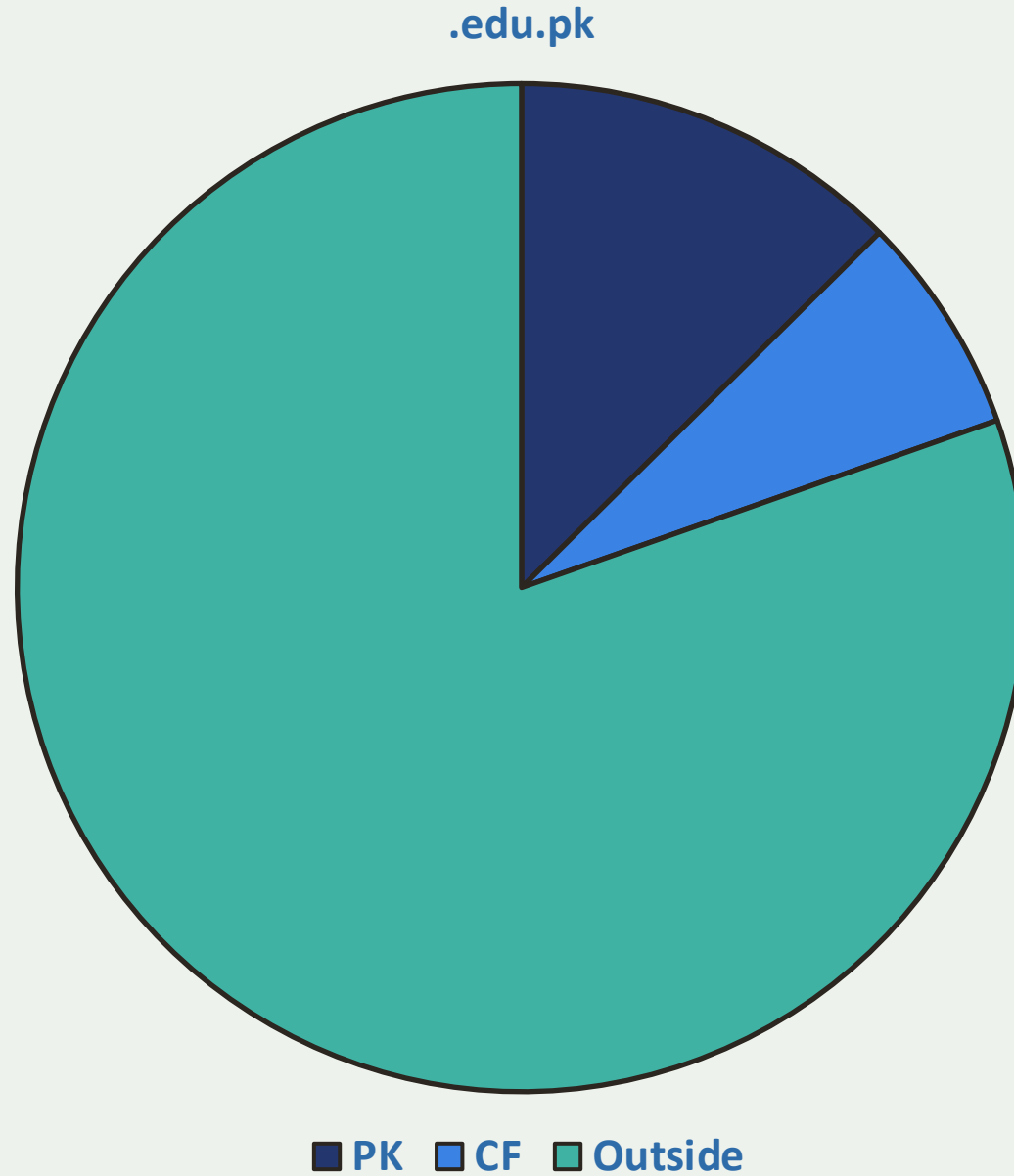


# DNS Records “.gov.pk”



# DNS Records “.edu.pk”

|         |      |
|---------|------|
| Total   | 1035 |
| PK      | 130  |
| CF      | 73   |
| Outside | 832  |



Starting an Internet Exchange is a major achievement, but it's only part of a process to build a reliable and scalable domestic Internet ecosystem and economy.

**“Collaborate, Communicate, Cooperate”**



## Examples – New Zealand

- Population 5 million
- 603 Registered ASN

