

REDUCING RTT OF DNS QUERY RESOLUTION

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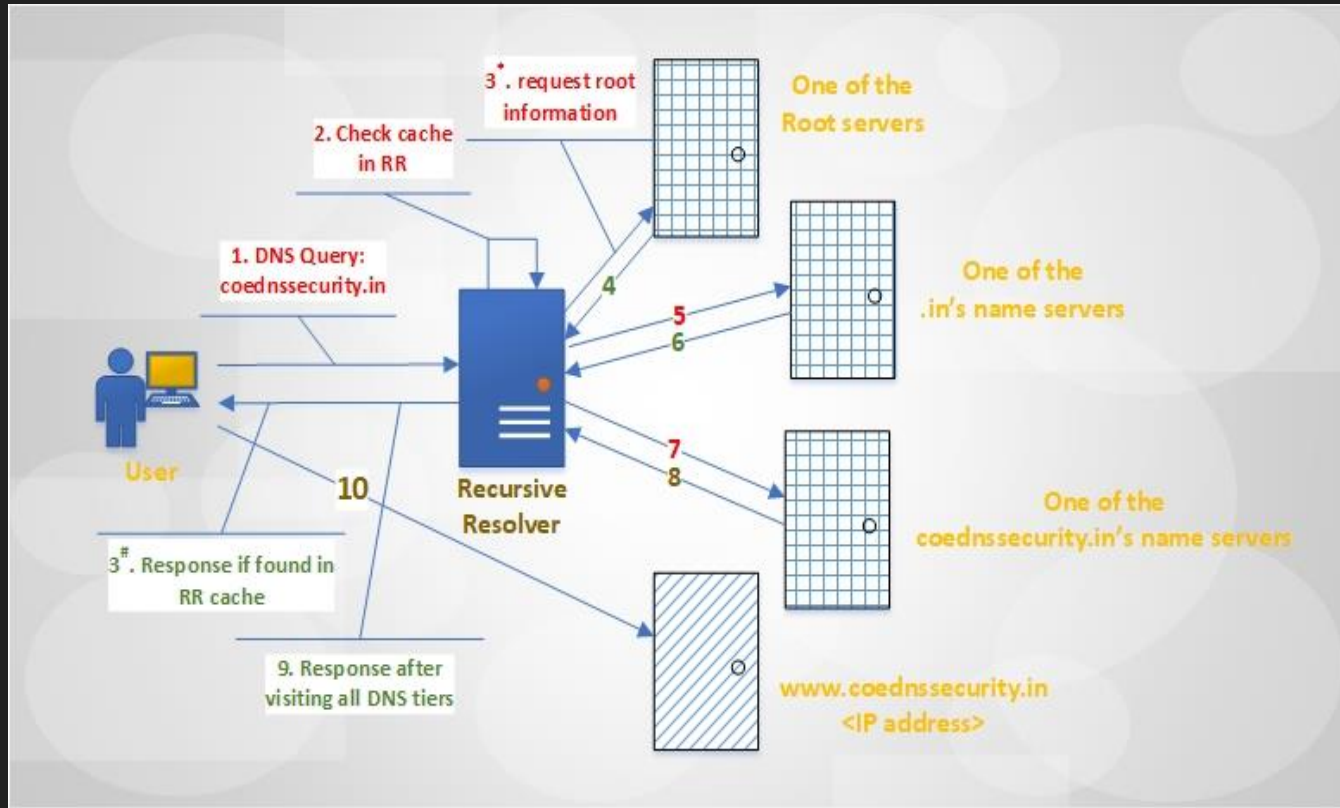
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Conventional approach of DNS Query Resolution



Conventional approach of DNS Query Resolution

“In the conventional approach, the RR server spends considerable time to reach out to the closest root server”



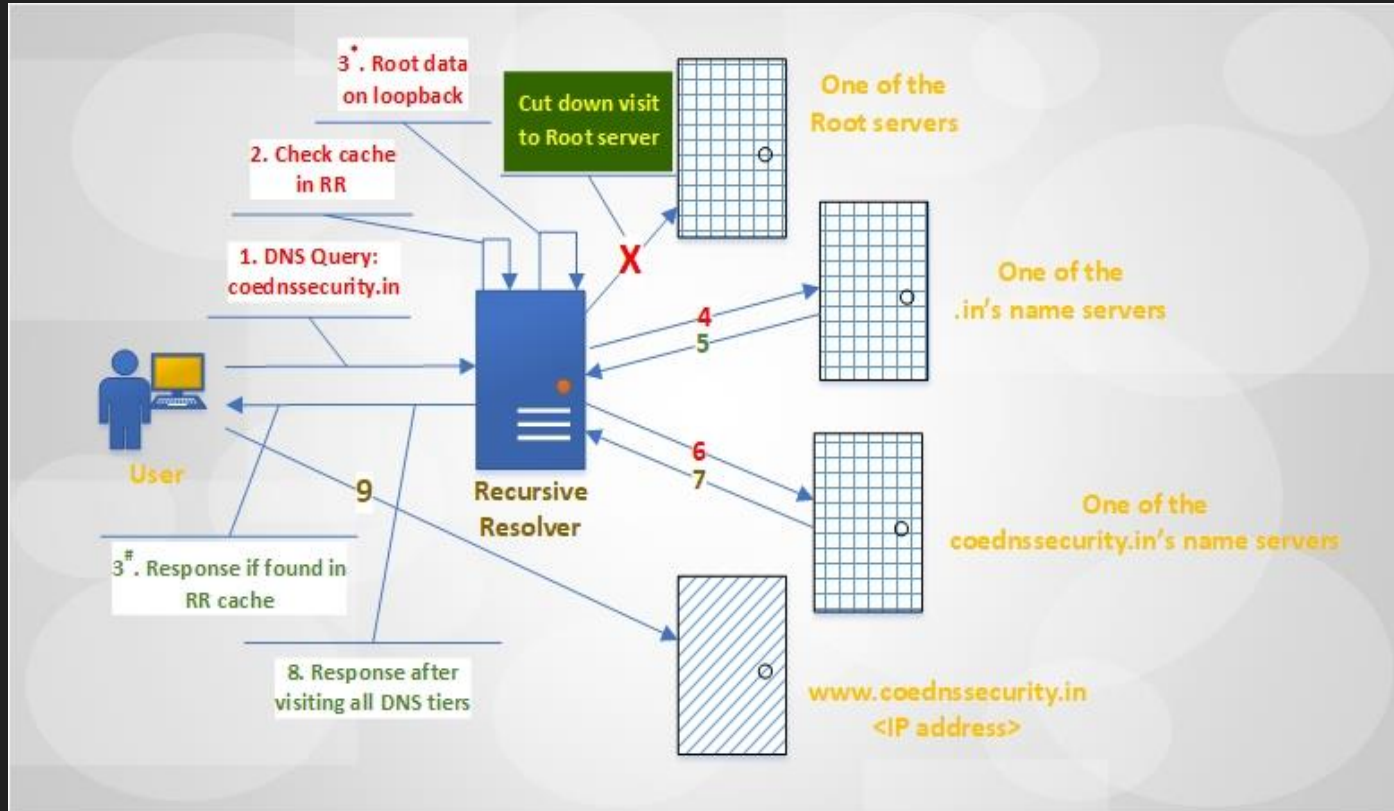
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RFC 7706 based approach of DNS Query Resolution



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“In the RFC 7706 based approach, the loopback server containing root data is hosted on the RR server itself to avoid visiting the root servers for root data”



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RFC 7706 based approach of DNS Query Resolution

- **Pre-requisites:**

- Must have a software to do the configuration changes.
Example: Bind 9.9.4
- Capable of running an authoritative server on one of its loopback addresses (*127/8 in IPv4 and ::1 in IPv6*).
- Must be able to retrieve a copy of the entire root zone including all DNSSEC-related records, and validate them.



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- Places to look for root zone data:

Root server operators	b.root-servers.net
	c.root-servers.net
	f.root-servers.net
	g.root-servers.net
	k.root-servers.net
DNS servers from ICANN	xfr.lax.dns.icann.org
	xfr.cjr.dns.icann.org

RFC 7706 based approach of DNS Query Resolution

- Procedure:

- Add the following configuration settings to “*named.conf*”:

```
view root {  
    match-destinations { 127.0.0.1; };  
    zone "." {  
        type slave;  
        file "rootzone.db";  
        notify no;  
        masters {  
            192.228.79.201;  
            192.33.4.12;  
            192.5.5.241;  
            192.112.36.4;        }  
    }  
}
```


RFC 7706 based approach of DNS Query Resolution

- **Procedure:**

- Add the following configuration settings to “*named.conf*”:

```
193.0.14.129;  
192.0.47.132;  
192.0.32.132;  
2001:500:84::b;  
2001:500:2f::f;  
2001:7fd::1;  
2620:0:2830:202::132  
2620:0:2d0:202::132  
  
};  
  
};  
  
};
```

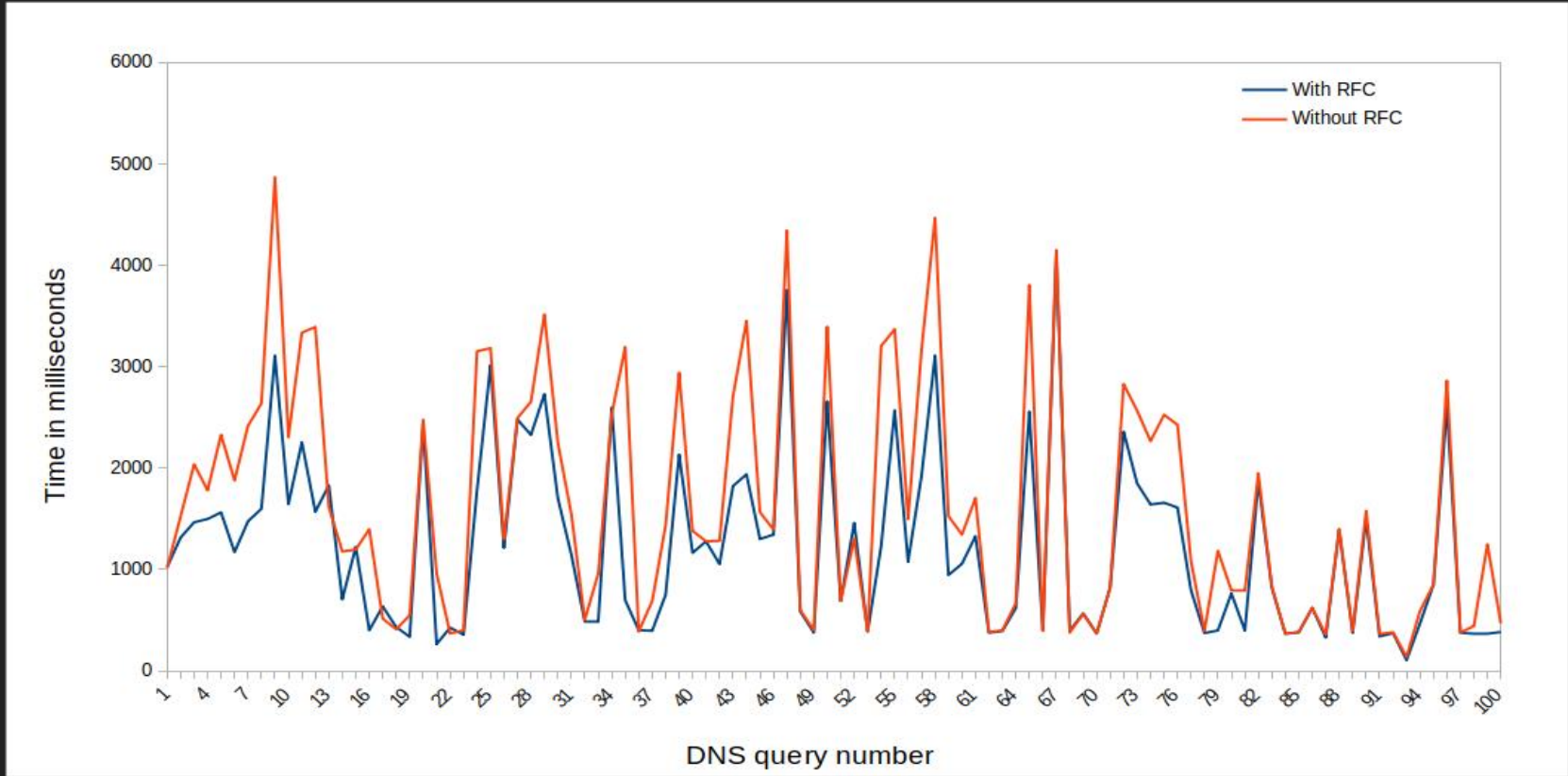
RFC 7706 based approach of DNS Query Resolution

- **Procedure:**

- Add the following configuration settings to “*named.conf*” to enable root zone transfer with DNSSEC:

```
view recursive {
    dnssec-validation auto;
    allow-recursion { any; };
    recursion yes;
    zone "." {
        type static-stub;
        server-addresses { 127.0.0.1; };
    };
};
```

RTT for domain resolution with and without RFC 7706



Advantages of implementing RFC 7706 at RR

- Reduced RTT
- Resiliency against DDoS on the root server system

References

- RFC 7706: <https://tools.ietf.org/html/rfc7706>
- Procedure for configuring DNS Bind server on CentOS 7: <https://www.itzgeek.com/how-tos/linux/centos-how-tos/configure-dns-bind-server-on-centos-7-rhel-7.html>



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Thank You

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