Step-by-Step Guide: Setting Up DNS-Layer Security Using Google Cloud and No-IP

Step 1: Create a Free Subdomain on No-IP

1. **Sign Up for No-IP**:
   - Go to No-IP.
   - Click on `Sign Up` and create a free account by filling in the required details.
2. **Create a Free Subdomain**:
   - Once logged in, go to the `Dynamic DNS` section.
   - Click `Create Hostname`.
   - Choose a hostname (e.g., `urldetection`).
   - Select a free domain from the provided options (e.g., `ddns.net`).
   - Set the hostname type to `DNS Host (A)` and enter the IP address of your Google Cloud VM (you can leave this blank for now if you haven't set up the VM yet).
   - Click `Create Hostname`.

Step 2: Set Up a Google Cloud VM

1. **Create a VM Instance**:
   - Sign in to Google Cloud Console.
   - Navigate to `Compute Engine > VM Instances`.
   - Click `Create Instance`.
   - Configure the instance with:
     - Name: `dns-vm-instance`
     - Region: Select a region close to your location.
     - Machine type: Choose `e2-micro` (sufficient for a DNS server).
     - Boot disk: Use the default settings (Debian/Ubuntu).
   - Click `Create`.
2. **Note the External IP Address**:
   - After the VM is created, note the external IP address assigned to your VM.

Step 3: Install and Configure BIND9 on Your VM

1. **SSH into Your VM**:
   - In the Google Cloud Console, click `SSH` next to your VM instance to open a terminal window.
2. **Install BIND9**:
   - Update package lists and install BIND9:

     ```
     sudo apt-get update
     sudo apt-get install bind9 bind9utils bind9-doc -y
     ```

3. **Configure BIND9**:
   - Edit `named.conf.local` to add your zone configuration:

     ```
     sudo nano /etc/bind/named.conf.local
     ```

     Add the following:

```
zone "urldetection.ddns.net" {
    type master;
    file "/etc/bind/db.urldetection.ddns.net";
};
```

- Edit `named.conf.options` to configure options:

```
sh
Copy code
sudo nano /etc/bind/named.conf.options
```

Update the file to look like this:

```
options {
    directory "/var/cache/bind";

    forwarders {
        8.8.8.8;
        8.8.4.4;
    };

    auth-nxdomain no;    # conform to RFC1035
    listen-on { any; };
    listen-on-v6 { none; };
};
```

- Create and edit the zone file for your domain:

```
sudo cp /etc/bind/db.local /etc/bind/db.urldetection.ddns.net
sudo nano /etc/bind/db.urldetection.ddns.net
```

Update the file to look like this:

```
sh
Copy code
;
; BIND data file for local loopback interface
;
$TTL    604800
@       IN      SOA     ns1.urldetection.ddns.net.
admin.urldetection.ddns.net. (
                              2         ; Serial
                         604800         ; Refresh
                          86400         ; Retry
                        2419200         ; Expire
                         604800 )       ; Negative Cache TTL
;
@       IN      NS      ns1.urldetection.ddns.net.
@       IN      A       35.198.184.159
ns1     IN      A       35.198.184.159
www     IN      A       35.198.184.159
```

4. **Restart BIND9**:
   - Restart the BIND9 service to apply the changes:

```
sudo systemctl restart bind9
sudo systemctl enable bind9
```

Step 4: Configure Firewall Rules on Google Cloud

1. **Set Up Firewall Rules**:
   - Go to `VPC Network > Firewall` in the Google Cloud Console.
   - Click `Create Firewall Rule`.
   - Configure the rule as follows:
     - Name: `allow-dns`
     - Network: `default` (or your custom network)
     - Targets: All instances in the network
     - Source IP ranges: `0.0.0.0/0`
     - Protocols and ports: `Specified protocols and ports`, `tcp:53`, `udp:53`
   - Click `Create`.

Step 5: Verify DNS Functionality

1. **Install `dnsutils`**:
   - Install the `dnsutils` package to use the `dig` command:

     ```
     sudo apt-get install dnsutils -y
     ```

2. **Test DNS Resolution**:
   - Use the `dig` command to verify that your DNS server is correctly resolving the domain:

     ```
     dig @35.198.184.159 urldetection.ddns.net
     ```

   - Expected output:

     ```
     ; <<>> DiG 9.18.24-1-Debian <<>> @35.198.184.159
     urldetection.ddns.net
     ; (1 server found)
     ;; global options: +cmd
     ;; Got answer:
     ;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 32978
     ;; flags: qr aa rd; QUERY: 1, ANSWER: 1, AUTHORITY: 0,
     ADDITIONAL: 1
     ;; WARNING: recursion requested but not available

     ;; OPT PSEUDOSECTION:
     ; EDNS: version: 0, flags:; udp: 1232
     ; COOKIE: f78e9a353b06371201000000066715f836320e4918d40347d
     (good)
     ;; QUESTION SECTION:
     ;urldetection.ddns.net.         IN      A

     ;; ANSWER SECTION:
     urldetection.ddns.net.  604800  IN      A       35.198.184.159

     ;; Query time: 0 msec
     ;; SERVER: 35.198.184.159#53(35.198.184.159) (UDP)
     ;; WHEN: Tue Jun 18 10:20:51 UTC 2024
     ;; MSG SIZE  rcvd: 94
     ```

Summary

By following these steps, you have successfully set up a DNS server on Google Cloud using BIND9 and a free subdomain from No-IP. You have configured the DNS server to resolve a custom domain and verified its functionality. If you need further assistance with additional configurations or functionalities, feel free to ask!

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