Setting Up `radvd` for IPv6 Router Advertisements

This guide helps you configure **`radvd`** to advertise an IPv6 prefix and set up SLAAC (Stateless Address Autoconfiguration) for your clients.

Network Details:

- **Prefix**: `2001:db8::/64`
- **Router IP**: `2001:db8::1/64`
- **Domain**: `contoso.com`
- **DNS Server**: `2001:db8::1` (optional)

Steps to Configure `radvd`:

1. **Install `radvd`**:
   - On **Ubuntu/Debian**:

     ```
     sudo apt-get install radvd
     ```

   - On **CentOS/RHEL**:

     ```
     sudo yum install radvd
     ```

2. **Edit `radvd.conf`**:
   - Open `/etc/radvd.conf` in a text editor:

     ```
     sudo nano /etc/radvd.conf
     ```

   - Add the following configuration:

```
interface eth0 {                    # Replace eth0 with your network interface
    AdvSendAdvert on;               # Enable Router Advertisements
    prefix 2001:db8::/64 {         # The network prefix you're advertising
        AdvOnLink on;               # Advertise the prefix as an on-link
network
        AdvAutonomous on;           # Enable SLAAC (Stateless Address
Autoconfiguration)
        AdvRouterAddr on;           # Advertise this router’s address as the
default gateway
    };

    RDNSS 2001:db8::1;              # Advertise your internal DNS server
    DNSSL contoso.com;              # Advertise the domain name search list
};
```

   - **Explanation**:

- `AdvSendAdvert on;`: Enables RA advertisements.
- `prefix 2001:db8::/64 { ... }`: Advertises the IPv6 prefix.
- `AdvAutonomous on;`: Enables SLAAC for automatic client address configuration.
- `RDNSS 2001:db8::1;`: Advertises the DNS server (optional).
- `DNSSL contoso.com;`: Advertises the DNS search domain (optional).

3. **Enable IPv6 Forwarding**:
   - Temporarily enable IPv6 forwarding:

     ```
     sudo sysctl -w net.ipv6.conf.all.forwarding=1
     ```

   - To make it permanent, edit `/etc/sysctl.conf`:

     ```
     sudo nano /etc/sysctl.conf
     ```

     Add:

     ```
     net.ipv6.conf.all.forwarding=1
     ```

4. **Start `radvd`**:
   - Start and enable the `radvd` service:

     ```
     sudo systemctl start radvd
     sudo systemctl enable radvd
     ```

5. **Verify RAs are Sent**:
   - Check with `tcpdump`:

     ```
     sudo tcpdump -i eth0 icmpv6
     ```

Client Configuration:

- **SLAAC**: Clients will automatically configure their IPv6 address using the `2001:db8::/64` prefix.
- **Default Gateway**: Clients will use `2001:db8::1` (your router) as the default gateway.
- **DNS**: Clients will use `2001:db8::1` as their DNS server if advertised by `radvd`.

Verification on Clients:

1. **On a Linux client**:

- Check the assigned IPv6 address:

```
ip -6 addr
ip -6 route
```

2. **On a Windows client**:
    - Use:

```
ipconfig /all
```

Troubleshooting:

- Ensure IPv6 forwarding is enabled on the router.
- Use `tcpdump` to confirm that Router Advertisements are being sent.
- Check client configurations to ensure they're using the correct IPv6 addresses and default gateway.