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# L3VPN Troubleshooting Guide

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## Step 1 – Identify the Service

### Action:

- Ask for either **Customer Name** or **Service-ID**.
- Use one of the following lookups:
  - If only *Customer Name* is given → search in **services DB** for the **Service-ID**.
  - If *Service-ID* is known → query **NSO service inventory** for service details.

### Expected Output:

- Service details retrieved: **VRF name, PE nodes, CE nodes, loopback IPs, static routes, RTs, etc.**
  - If no service found → stop (cannot continue).
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## Step 2 – Verify CE Loopback Connectivity (Ping Test)



### Action:

- From each **PE node**, ping the **remote CE loopback** (not the CE directly connected to the same PE). You can get the remote CE loopback address from the static routes configured on the PE.

### Command:

```
ping vrf <vrf-name> <CE-loopback-ip>
```

### Evaluation:

-  **Ping succeeds** → Mark PE–CE connectivity as **OK**.
    - If *all CEs* are OK → **STOP (connectivity verified)**.
  -  **Ping fails** → Record **PE–CE pair as problematic**.
    - Example: if ping from PE1 to CE2 fails → mark **PE2–CE2** as suspect.
    - Proceed to **Step 3**.
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## Step 3 – Verify CE-to-PE Interface Status



### Action:

- On the **PE connected to the failing CE**, check interface status.

### Command:

```
show interface <interface-to-CE>
```

### Evaluation:

-  **Interface DOWN** → Root cause identified → **STOP (physical/Layer1 issue)**.
  -  **Interface UP** → Proceed to **Step 4**.
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## Step 4 – Verify VRF-to-Interface Binding



### Action:

- On the same **PE**, check whether the interface is assigned to the correct VRF.

### Command:

```
show vrf <vrf-name>
```

### Evaluation:

-  **Interface not listed** → Root cause identified (VRF not bound) → **STOP**.
  -  **Interface is listed** → Proceed to **Step 5**.
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## Step 5 – Check MP-BGP VPNv4 Routing (Overlay)

### 5.1 – BGP Session Status



### Action:

- On the **PE connected to failing CE**, verify MP-BGP sessions with Route Reflectors (RRs).

### Command:

```
show bgp vpnv4 unicast summary
```

**Evaluation:**

-  **No Established sessions** → Root cause is **BGP session down between PE and RR** → **STOP**.
  -  **Established** → Continue to **Step 5.2**.
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## 5.2 – Route Target (RT) Consistency



**Action:**

- Compare RT import/export configuration on the PE against **NSO service attributes**.

**Command:**

```
show ip vrf detail <vrf-name>
```

**Evaluation:**

-  **RT mismatch** → Root cause identified (wrong RT) → **STOP**.
  -  **RTs match** → Continue to **Step 5.3**.
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## 5.3 – Route Availability in BGP



**Action:**

- Check if the static routes of the service are present in the **BGP VPNv4 vrf table** on all the vrf PE. You should get all the static routes configured from the service parameters. Parse the network part of the static route and locate them on the bgp vpnv4 table. **ALL** the static routes should be present in BGP table on all the PE nodes. Perform this action on all the PE where the VRF is defined.

**Command:**

```
show bgp vpnv4 unicast vrf <name_of_the_vrf>
```

**Evaluation:**

-  **One or more routes missing** → Problem in **redistribution of CE routes into BGP**.
-  **ALL static routes present in BGP** → Problem is not at PE level → **Escalate to Engineering Team**.

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# General Rules

- Always log test results:
    - **Step #**
    - **Node (PE/CE)**
    - **Command run**
    - **Output summary** (OK / Suspect / Fail).
  - **Stop** troubleshooting immediately once a root cause is identified.
  - **Escalate** if all checks pass but the issue persists.
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