



CCIE Routing & Switching
Advanced Troubleshooting Bootcamp

Multicast Troubleshooting

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Multicast Workflow

- Multicast operation can be subdivided into five discrete steps...
 - Establish underlying IGP routing
 - Establish PIM control plane
 - RP Info Dissemination
 - Process client IGMP messages
 - IGMP Snooping
 - Multicast data plane forwarding
 - RPF and OIL

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IGP Routing

- PIM is used for Mcast tree signaling
- IGP is used for RPF
- IGP must be 100% working
 - Check full-reachability
- Ensure there are no routing loops
- IGP redistribution may cause RPF issues!



PIM Control Plane

- PIM is used for Mcast tree signaling
- Check PIM interfaces & adjacencies
- PIM modes must match
- Check PIM timers
- PIM Assert is important on NBMA clouds
- Troubleshooting Commands:
 - `show ip pim interface`
 - `show ip pim neighbor`



RP Info Dissemination

- Static, BSR, Auto-RP
- Auto-RP uses Dense-Mode groups
 - Make sure the Auto-RP groups are flooded
- BSR uses PIM
- Both BSR and Auto-RP messages are subject to RPF checks!
- Watch for MA placement with NBMA clouds
- Troubleshooting Commands:

```
debug ip pim auto-rp
debug ip pim bsr
debug ip mpacket
show ip pim rp-mapping
```

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IGMP Signaling

- Ensure the correct version is used
- Check for IGMP access-control
- Verify IGMP snooping and disable if needed
- IGMP might be blocked by multicast-boundary

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Data Plane: RPF Check

- RPF and OIL
- IGP is used for RPF checks
- RPF failures are the most common problem
 - RPF failures often happens with redistribution
- OIL is built using PIM
 - OIL issue on NBMA interfaces
 - PIM NBMA mode
 - Sub-interfaces/Tunnels

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Data Plane Troubleshooting

- Simulate Traffic using ping or IP SLA
- Check for RP for the group if PIM SM
- Validate shared tree & source registration
- Validate SPT starting from leaves
- Troubleshooting commands:

```
show ip mroute <Group>
show ip route <Source>
debug ip mpacket (no ip mroute-cache)
ping <Group> repeat XXX
debug ip pim
```

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Further Reading

- [Basic Multicast Troubleshooting Tools](#)
- [IP Multicast Troubleshooting Guide](#)