# Compatible Systems Tech Notes: RIP Problems with Class A Subnetting

## Document ID: 17678



# Introduction

**The environment:** MicroRouter Frame Relay (or other set up with numbered WAN)

This document discusses RIP problems with Class A subnetting.

# Prerequisites

## Requirements

There are no specific requirements for this document.

# Problem

ISP assigns a subnet of Class A for each interface. A user makes subnets from their assigned network. RIP packets back to the ISP are not correct and routing stops.

How ISP originally sets up the router:

```
WAN address:         38.2.121.111
WAN subnet mask:     255.255.255.0
Network address:     38.250.178.0
Router LAN address:  38.250.178.1
Subnet mask:         255.255.255.0
Broadcast address:   38.250.178.255
```

This is OK because RIP uses the subnet masks when it receives and sends RIPs to determine how the routes should be installed in the router. Since the subnet masks are the same, subnets (these are 38.0.0.0 subnets after all) are passed reliably.

What the customer does:

```
WAN address:                     38.2.121.111
WAN subnet mask:                 255.255.255.0

(Sub)subnet #0 Network address:  38.250.178.0
Router LAN address:              38.250.178.1
Subnet mask:                     255.255.255.192
Broadcast address:               38.250.178.63
```

```
(Sub)subnet #1 Network address:  38.250.178.64
Router LAN address:              38.250.178.65
Subnet mask:                     255.255.255.192
Broadcast address:               38.250.178.127

(Sub)subnet #2 Network address:  38.250.178.128
Router LAN address:              38.250.178.129
Subnet mask:                     255.255.255.192
Broadcast address:               38.250.178.191

(Sub)subnet #3 Network address:  38.250.178.192
Router LAN address:              38.250.178.193
Subnet mask:                     255.255.255.192
Broadcast address:               38.250.178.255
```

This is still OK if the router closest to the ISP (MicroRouter) uses the 38.250.178.0 subnet for its Ethernet. RIP to ISP contains routes to 38.250.178.0, 38.250.178.64, 38.250.178.128, and 38.250.178.192 entries. The RIP receiver at ISP interprets these routes as one network route (38.250.178.0) and three host routes (38.250.178.64, 38.250.178.128, and 38.250.178.192).

Why is this? The reason goes back to the subnet mask of the WAN port. When the RIP receiver gets the RIP packet it uses its subnet mask (since RIP does not pass that information) to determine if the routes are network routes or host routes. Since the 38.250.178.0 route has 0 for the host bits, it says network route, but since the others have bits on in the host portion, those are deemed host routes.

Where our customers get into trouble lately is when they choose to use a (sub)subnet other than 0 for their LAN address and do not use the 0 (sub)subnet at all. Since it does not get RIP'd to the ISP, the ISP does not have anything but host routes for that network. No packets get passed.

If customers want to subnet the assigned address, make sure that they use the 0 (sub)subnet, preferably on the LAN. That way the MicroRouter sends a network route with a metric of 1 over to the ISP.

## Related Information

- **Technical Support & Documentation − Cisco Systems**



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