



Quick Note 53

Ethernet to W-WAN failover with logical
Ethernet interface.

Digi Support
August 2015

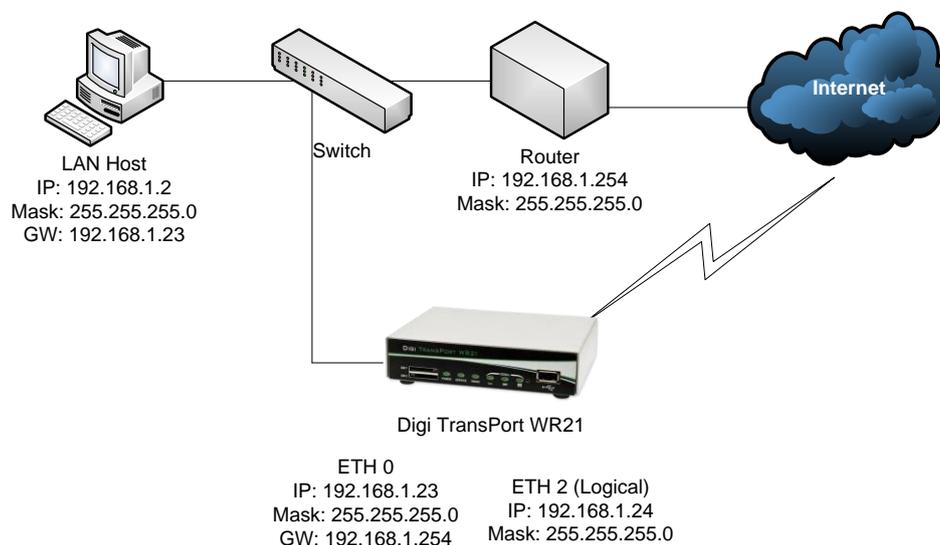
Contents

1	Introduction.....	2
1.1	Introduction.....	2
1.2	Assumptions	3
1.3	Corrections	3
2	Version.....	3
3	TransPort Configuration	4
3.1	Ethernet 0 Configuration.....	4
3.2	Ethernet 2 (Logical) Configuration.....	6
3.3	Mobile Interface Configuration	7
3.4	Default Route 0 Configuration.....	9
3.5	Default Route 1 Configuration.....	10
3.6	Firewall Configuration	11
4	Testing.....	13

1 INTRODUCTION

1.1 Introduction

This document will describe a WAN to Ethernet failover scenario with single Ethernet port Digi TransPort routers such as the WR11, WR21, WR41 using a logical Ethernet port to allow LAN access to devices while the failover is in place. This document is an addition / alternative to: [AN41](#). In this scenario, when the primary default route (Ethernet) will be Out of Service, access to resources on the LAN will still be accessible using the logical Ethernet interface.



In the standard failover scenario, if the LAN Host needs to access the Router's interface while ETH 0 is Out Of Service, it will not be possible. Using a logical Ethernet interface on the same subnet will allow that while maintaining the failover.

1.2 Assumptions

This guide has been written for use by technically competent personnel with a good understanding of the communications technologies used in the product and of the requirements for their specific application. It also assumes a basic ability to access and navigate a Digi TransPort router and configure it with basic routing functions

This application note applies to:

Model: Digi TransPort WR11/21/41/44

Firmware versions: 5246 and later

Configuration: This document assumes that the devices are set to their factory default configurations. Most configuration commands are shown only if they differ from the factory default.

Please note: This application note has been specifically rewritten for firmware release 5246 and later but will work on earlier versions of firmware. Please contact tech.support@digi.com if you require assistance in upgrading the firmware of the TransPort router.

1.3 Corrections

Requests for corrections or amendments to this application note are welcome and should be addressed to: tech.support@digi.com Requests for new application notes can be sent to the same address.

2 VERSION

Version Number	Status
1.0	Published

3 TRANSPORT CONFIGURATION

3.1 Ethernet 0 Configuration

Configuration - Network > Interfaces > Ethernet > ETH 0

The screenshot shows the configuration page for Ethernet 0. The breadcrumb trail is "Configuration - Network > Interfaces > Ethernet > ETH 0". The page has a tree view on the left with "Interfaces", "Ethernet", and "ETH 0" expanded. The main content area includes a "Description:" text box. Below it are two radio buttons: "Get an IP address automatically using DHCP" (unselected) and "Use the following settings" (selected). A red box highlights the static IP configuration fields: "IP Address: 192.168.1.23", "Mask: 255.255.255.0", "Gateway: 192.168.1.254", "DNS Server: 192.168.1.254", and "Secondary DNS Server: 8.8.8.8". At the bottom, a note states: "Changes to these parameters may affect your browser connection".

Parameter	Setting	Description
Description:	<Description of Interface>	Use something that will be meaningful to your setup e.g. "WAN Port"
IP Address:	192.168.1.23	Ethernet 0 IP address
Mask:	255.255.255.0	Ethernet 0 subnet mask
Gateway:	192.168.1.254	Eth 0 gateway address (WAN Router IP Address)

Please note: It is possible to use "Get an IP address automatically using DHCP" if the primary WAN connection uses dynamic IP addressing and the router/modem acts as a DHCP server.

Configuration - Network > Interfaces > Ethernet > ETH 0 > Advanced

Enable NAT and configure the WAN interface for auto ping tests (in this case Google's DNS server)

Configuration - Network > Interfaces > Ethernet > ETH 0 > Advanced

Advanced

This interface is associated with: ETH 0

This device is currently in Hub mode

Metric:

MTU:

Enable auto-negotiation

Speed (currently 100Base-T): Auto 10Base-T 100Base-T

Duplex: Auto Full Duplex Half Duplex

TCP transmit buffer size: bytes

Take this interface out of service after seconds when the link is lost (e.g. cable removed or broken)

Enable NAT on this interface

IP address IP address and Port

Enable IPsec on this interface

Enable the firewall on this interface

Enable DNS inbound blocking

Enable DMNR advertisement from this subnet

Remote management access:

Multihome additional consecutive addresses:

Respond to ARP requests only if the requestor is of this network

Enable IGMP on this interface

Enable Bridge on this interface

Generate Heartbeats on this interface

Generate Ping packets on this interface

Send byte pings to IP host every hrs mins seconds

Switch to sending pings to IP host after failures

Ping responses are expected within seconds

Only send Pings when this Ethernet interface is "In Service"

No PING response request interval (s):

Take this interface "Out of Service" after receiving no responses for seconds

Keep this interface out of service for seconds

Click **Apply**

Parameter	Setting	Description
Take this interface out of service after <n> seconds when the link is lost	1	To enable fast failover if the cable is removed.
Enable NAT on this interface	Ticked + IP address	Reveals options for NAT mode select either IP address or IP address and port
Generate Ping packets on this interface	Ticked	This option will reveal the settings for ping generation on this interface
Send <n> byte pings	0	Size of ICMP packet to send
to IP host	<IP to ping>	Valid IP address to ping for link up/down testing.
Every	10 Seconds	Interval in hours, minutes and seconds for the test pings to be sent
Only Send Pings when Ethernet Interface is "in Service"	Ticked	This will allow the firewall to control the pings sent to recover the interface when connectivity is working again.

3.2 Ethernet 2 (Logical) Configuration

Please Note: The logical Ethernet Interface number will vary depending on the device being used. (WR44 will start at 12 for example)

Configuration - Network > Interfaces > Ethernet > Logical Ethernet Interfaces > ETH 2

Logical Ethernet Interfaces

ETH 2

Description:

Get an IP address automatically using DHCP
 Use the following settings

IP Address:

Mask:

Gateway:

DNS Server:

Secondary DNS Server:

Changes to these parameters may affect your browser connection

Parameter	Setting	Description
Description:	<Description of Interface>	Use something that will be meaningful to your setup e.g. "WAN Port"
IP Address:	192.168.1.24	Ethernet 2 IP address (In the same Subnet as ETH 0)
Mask:	255.255.255.0	Ethernet 2 subnet mask

Configuration - Network > Interfaces > Ethernet > Logical Ethernet Interfaces > ETH 2 > Advanced

Configuration - Network > Interfaces > Ethernet > Logical Ethernet Interfaces > ETH 2 > Advanced

Link with Ethernet instance: ▼

▶ QoS

▶ VRRP

Apply

Link the Logical Ethernet Interface with ETH 0.

3.3 Mobile Interface Configuration

Configure the mobile interface according to the SIM card used.

Configuration - Network > Interfaces > Mobile > Mobile Settings

The screenshot shows the 'Mobile Settings' configuration page. At the top, there's a breadcrumb trail: 'Configuration - Network > Interfaces > Mobile'. Below this, there are sections for 'Interfaces' (Ethernet and Mobile), 'Mobile Settings', and 'Mobile Service Provider Settings'. The 'SIM' dropdown is set to '1 (PPP 1)'. The 'Service Plan / APN' field contains 'apn'. There are checkboxes for 'Use backup APN' and 'Retry the main APN after 0 minutes'. Optional fields for 'SIM PIN', 'Username', and 'Password' are also visible.

Parameter	Setting	Description
Settings on this page apply to the selected SIM	SIM: 1 (PPP 1)	
Mobile Settings > Service Plan / APN:	<Enter APN>	Enter your ISP / carrier APN value here
SIM PIN	<Enter PIN>	If the SIM card requires a PIN, enter it here
Username	<Enter username>	If the APN requires a username
Password	<Enter password>	If the APN requires a password

Configuration - Network > Interfaces > Advanced > PPP 1 > Advanced

Configuration - Network > Interfaces > Advanced > PPP 1 > Advanced

Enable "Always On" mode of this interface

On On and return to service immediately

Put this interface "Out of Service" when an always-on connection attempt fails

Attempt to re-connect after seconds

If a PPP interface that would be inhibited by this PPP is connected, attempt to re-connect after seconds

Wait seconds after power-up before activating this interface

Keep this interface up for at least seconds

Click [here](#) to assign a timeband to this interface

Add a route to if the peer's IP address is not negotiated

Enable DNS inbound blocking

Forward IP broadcasts over this interface if this interface is on the same IP network as an Ethernet interface

Send LCP echo request packet to the remote peer

Generate Heartbeats on this interface

Generate Ping packets on this interface

Send byte pings to IP host every hrs mins secs

Send pings every hrs mins seconds if ping responses are not being received

Switch to sending pings to IP host after failures

Ping responses are expected within seconds

Only send Pings when this interface is "In Service"

New connections to resume with previous Ping interval

Reset the link if no response is received within seconds

Use the ETH 0 IP address as the source IP address

Defer sending pings if IP traffic is being received

Parameter	Setting	Description
Enable "Always ON" mode of this interface	Ticked (or Unticked*)	The default is "Always on" and is recommended so that failover happens more quickly. (*Disabling "Always on" mode causes the mobile PPP 1 interface to come up only when there is traffic to route. This can take several seconds.)
Generate Ping packets on this interface	Ticked	Reveals auto ping options
Send <n> byte pings	0	Size of ICMP packet to send
to IP host	<IP to ping>	Valid IP address to ping for link up/down testing.
Every	10 Seconds	Interval in hours, minutes and seconds for the test pings to be sent
Only Send Pings when Ethernet Interface is "in Service"	Ticked	Pings will only be sent when the PPP interface is active.

3.4 Default Route 0 Configuration

Set the default route to Ethernet 0 and deactivate the mobile interface (PPP 1) whenever this route is in service.

Configuration - Network > IP Routing/Forwarding > Static Routes > Default Route 0

Configuration - Network > IP Routing/Forwarding > Static Routes > Default Route 0

▼ Default Route 0

Description:

Default route via

Gateway:

Interface: **Ethernet**

Metric:

▶ Advanced

Parameter	Setting	Description
Interface	Ethernet 0	Set Ethernet 0 as the default interface

Configuration - Network > IP Routing/Forwarding > Static Routes > Default Route 0 > Advanced

Configuration - Network > IP Routing/Forwarding > Static Routes > Default Route 0

Only queue one packet whilst waiting for the interface to connect

When this route becomes available, deactivate the following interfaces

PPP after seconds

None after seconds

Parameter	Setting	Description
When this route becomes available, deactivate the following interfaces	PPP 1	Select PPP 1 as the interface to deactivate

3.5 Default Route 1 Configuration

This default route will use PPP 1 and will be configured as an on demand interface. This will stop the router from sending unnecessary traffic to test the interface connectivity when the interface is not in service. In case of data bandwidth being limited or charged, this will keep transferred data on the wireless WAN link to a minimum.

Configuration - Network > IP Routing/Forwarding > Static Routes > Default Route 1

Configuration - Network > IP Routing/Forwarding > Static Routes > Default Route 1

▼ Default Route 1

Description:

Default route via

Gateway:

Interface: PPP

Use PPP sub-configuration:

Metric:

▼ Advanced

Use metric when the interface is down

Configuration - Network > IP Routing/Forwarding > Static Routes > Default Route 1 > Advanced

Configuration - Network > IP Routing/Forwarding > Static Routes > Default Route 1

▼ Default Route 1

Description:

Default route via

Gateway:

Interface: PPP

Use PPP sub-configuration:

Metric:

▼ Advanced

Use metric when the interface is down

Parameter	Setting	Description
Interface	PPP 1	Set PPP 1 as the next available default route
Metric	2	Set Metric 2 for this default route
Metric	2	Use metric 2 when the interface is down

3.6 Firewall Configuration

The firewall rules needed for this application are very simple.

There are only three rules to add:

The first rule will enable the monitoring of the ICMP traffic exiting the Ethernet 0 interface. If the ICMP traffic fails then this interface will be taken out of service and the recovery ping process will verify when the test host is responding to test traffic again.

The second rule will enable the monitoring of the ICMP traffic exiting the PPP 1 interface. If the traffic fails then this interface will be taken out of service, the PPP interface is deactivated then re-activated in attempt to get the PPP connection working again. If this rule is activated there will be a short interruption to service whilst a working network connection is established.

The default firewall rule set included in a production device will by default allow all outgoing traffic and restrict incoming traffic. You may want to filter more traffic than this using the extensive capabilities of the Digi TransPort firewall – please see the Digi TransPort User Guide for more details on what the firewall can do for you. The manual is available from the Digi website at www.digi.com/support/

Please Note: This example will not use any of the default firewall rules.

Configuration - Security > Firewall

Using the Digi TransPort web GUI, click on “insert” and type/paste in this rule (all on one line):

```
pass out break end on Eth 0 proto icmp from addr-Eth 0 to 8.8.8.8 icmp-type echo
inspect-state oos 10 t=3 c=3 d=3 r=ping,3,3
```

Click “OK” to add the rule

Click the “Insert” button on the line below the new Eth 0 rule, type/paste in this rule:

```
pass out break end on ppp 1 proto icmp from addr-ppp 1 to 8.8.8.8 icmp-type echo
inspect-state oos 10 t=5 c=3 d=3
```

Click “OK” to add the rule.

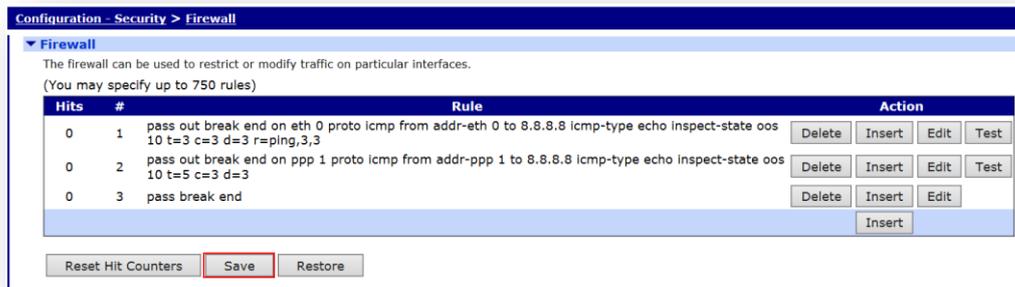
Click the “Insert” button on the line below the new PPP 1 rule, type/paste in this rule:

```
pass break end
```

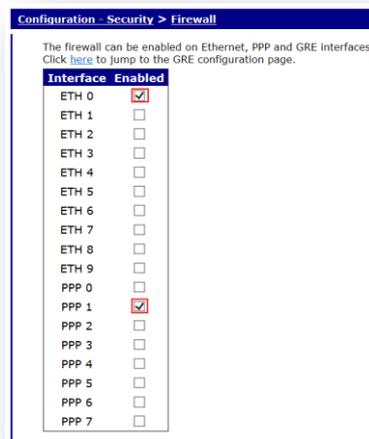
Click “OK” to add the rule.

Click “Save” button, to write the firewall rules to the fw.txt file on the router’s FLASH.

The firewall configuration should look like this:



Scroll down to the Firewall configuration page to the Interface list and tick the boxes to enable the firewall on **ETH 0** and **PPP 1**:



Click the **Apply** button to enable the firewall on those two interfaces.

Please note: The IP address that is used in this demo for sending test pings to is not guaranteed to reply (Google DNS) so you should choose an IP address within your ISP's or a public IP address that you own and have control of.

4 TESTING

When ETH 0 will go Out Of Service due to loss of communication (ping failure) the default route will be the PPP 1 interface. It will however still be possible for the host to reach any devices on the LAN such as the gateway/router.

Event log showing the Default Route 0 (ETH 0) going Out Of Service :

```
Management - Event Log
05:01:49, 02 Jan 2000,Default Route 0 Out Of Service,Firewall
05:01:49, 02 Jan 2000,ETH 0 Out Of Service,Firewall
04:54:58, 02 Jan 2000,Default Route 1 Available,Activation
04:54:58, 02 Jan 2000,PPP 1 up
04:54:52, 02 Jan 2000,PPP 1 Start IPCP
04:54:52, 02 Jan 2000,PPP 1 Start AUTHENTICATE
04:54:52, 02 Jan 2000,PPP 1 Start LCP
04:54:52, 02 Jan 2000,PPP 1 Start
```

```
05:01:49, 02 Jan 2000,Default Route 0 Out Of Service,Firewall
05:01:49, 02 Jan 2000,ETH 0 Out Of Service,Firewall
04:54:58, 02 Jan 2000,Default Route 1 Available,Activation
```

Testing a ping shows the default route going through PPP 1 :

```
Command: ping 8.8.8.8
Command result

Pinging Addr [8.8.8.8]

sent PING # 1
PING receipt # 1 : response time 0.18 seconds
Iface: PPP 1
Ping Statistics
Sent      : 1
Received  : 1
Success   : 100 %
Average RTT : 0.18 seconds

OK
```

Checking the routing table shows ETH 0 Out Of Service and ETH 2 UP with the same destination subnet as ETH 0

```
Command: route print
Command result
```

Destination	Gateway	Metric	Protocol	Idx	Interface	Status
90.122.9.106/32	90.122.9.106	1	Local	-	PPP 1	UP
192.168.1.0/24	192.168.1.24	1	Local	-	ETH 2	UP
192.168.1.0/24	192.168.1.23	-	Local	-	ETH 0	OOS
0.0.0.0/0	90.122.9.106	3	Static	1	PPP 1	UP
0.0.0.0/0	192.168.1.254	-	Static	0	ETH 0	OOS

```
OK
```

Test ping on the LAN side (Router) show packets going through the Logical Ethernet Interface:

```
Command: ping 192.168.1.254
Command result

Pinging Addr [192.168.1.254]

sent PING # 1
PING receipt # 1 : response time 0.00 seconds
Iface: ETH 2
Ping Statistics
Sent      : 1
Received  : 1
Success   : 100 %
Average RTT : 0.00 seconds

OK
```