

Configuration Example 12

Using Triggers to Backup Routers and Links

The AR Series router's trigger facility provides a powerful mechanism for automatic and timed management of the router, by automating the execution of router commands in response to certain events.

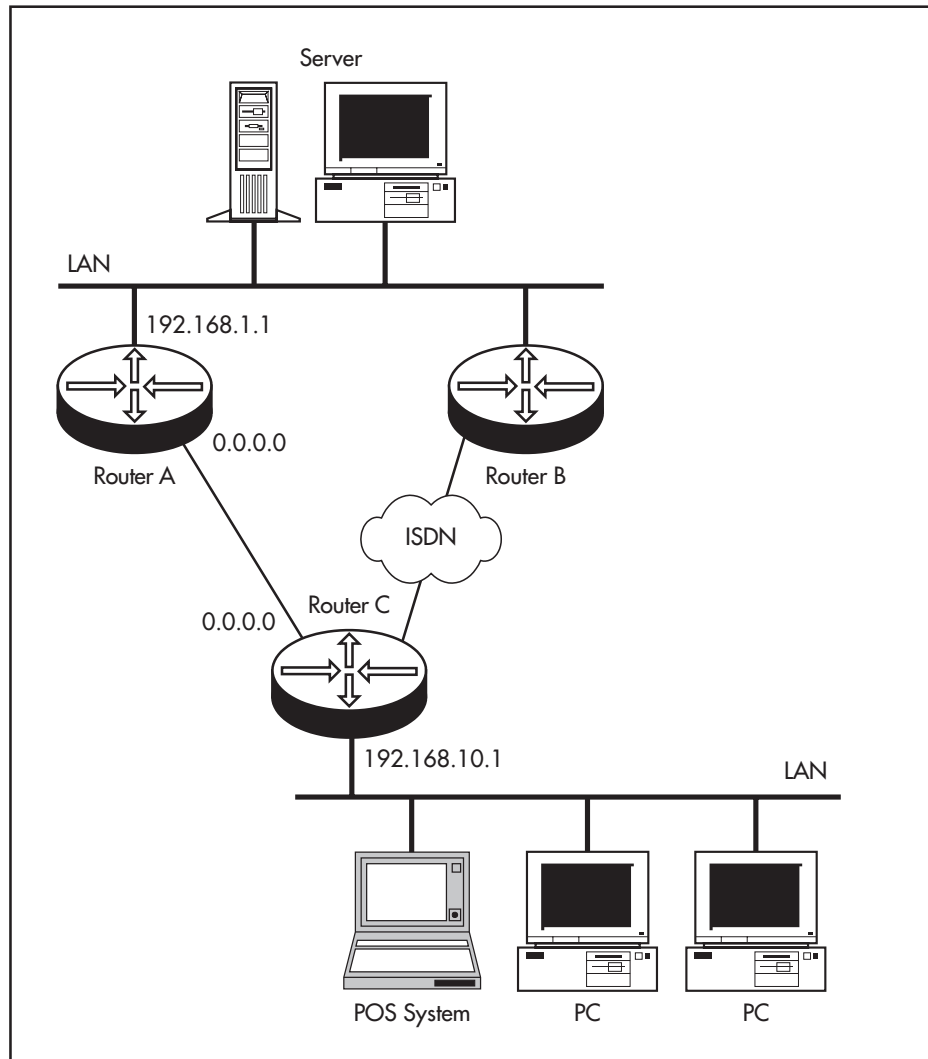
A trigger is an ordered sequence of scripts to be executed when a certain event occurs. A script is a sequence of router commands stored as a plain text files in the router's file subsystem, either in NVS or FLASH memory. Each trigger may reference multiple scripts and any script may be used by any trigger. Various types of triggers are supported, each activated in a different way. For more detailed information about triggers, see *Chapter 20, Trigger Facility* in the *AR Series Router Reference Manual*.

This example illustrates how to configure a set of triggers to enable one router to automatically backup another router *and* a WAN link. The triggers configured here ensure that if the main link fails, or Router A is unavailable (e.g. the power is switched off or maintenance is required), then Router B will automatically take over Router A's operation without disruption to service.

The sequence of events is:

1. If Router A goes down or the DDS link between Router A and Router C goes down:
 - Router C will detect that it is no longer receiving PPP keepalive packets from Router A. It takes down the PPP link, activates the ISDN call to Router B, and starts sending RIP over that link.
 - When Router B detects that the ISDN call from Router C has come up, it starts sending RIP over the ISDN call, and configures an IP address on its Ethernet port. It then becomes the gateway out of the central LAN.
2. When Router A comes up again, or the DDS link is restored:
 - Router C detects that it is getting PPP packets again from Router A. It deactivates the ISDN call to Router B and starts sending RIP over the DDS link again.
 - Router B detects that the ISDN call to Router C has gone down, so it stops sending RIP over that link, and removes the IP address from its Ethernet port. Router A is then once again the gateway out of the Central LAN.

Figure 1: Setup Diagram



Configuration Script for Router A [ex12a.scp]

1. Enable the IP module.


```
enable ip
```
2. Assign an IP address to the Ethernet interface.


```
add ip int=eth0 ip=192.168.1.1
```
3. Create a PPP link over the first synchronous port. Set the LQR timer very low so that the router can react quickly to any loss of service over the link.


```
create ppp=0 over=syn0 lqr=5
```
4. Assign an IP address to the PPP link. To save IP addresses, make this an addressless interface.


```
add ip int=ppp0 ip=0.0.0.0
```
5. Enable RIP on the PPP link.


```
add ip rip int=ppp0
```
6. Enable the trigger module.


```
enable trigger
```

7. Create a trigger that executes the script ex12a0dn.scp when the PPP link goes down.

```
create trigger=1 int=ppp0 event=down scr=ex12a0dn.scp
```

8. Create a trigger that executes the script ex12a0up.scp when the PPP link comes up.

```
create trigger=2 int=ppp0 event=up scr=ex12a0up.scp
```

Trigger Script ex12a0dn.scp on Router A

1. Delete the IP address from the Ethernet interface.

```
del ip int=eth0
```

Trigger Script ex12a0up.scp on Router A

1. Assign the IP address to the Ethernet interface.

```
add ip int=eth0 ip=192.168.1.1
```

Configuration Script for Router B [ex12b.scp]

1. Enable the IP module.

```
enable ip
```

2. Create an ISDN call definition that will only answer incoming calls. The parameters are:

- `number=0` specifies a placeholder ISDN phone number for the call. The call will never be used for dialling out so it does not matter what number is configured, but every ISDN call definition must have an ISDN number.
- `direction=in` specifies the call definition will only accept incoming calls, and can never be used for outgoing calls.
- `precedence=in` is a required parameter used to resolve conflicts between incoming and outgoing calls. It is not actually relevant to this call, as it is an incoming call only.
- `searchsub=local` specifies that the call will only answer incoming calls that have the string "backup" in the subaddress field of the call setup packet.

```
add isdn call=backup num=0 dir=in prec=in searchsub=local
```

3. Create a PPP link over the ISDN call.

```
create ppp=0 over=isdn-backup
```

4. Assign an IP address to the PPP link. To save IP addresses, make this an addressless interface.

```
add ip int=ppp0 ip=0.0.0.0
```

5. Enable the trigger module.

```
enable trigger
```

6. Create a trigger to execute the script ex12b0up.scp when the PPP link comes up.

```
create trigger=1 int=ppp0 event=up scr=ex12b0up.scp
```

7. Create a trigger to execute the script ex12b0dn.scp when the PPP link goes down.

```
create trigger=2 int=ppp0 event=down scr=ex12b0dn.scp
```

Trigger Script ex12b0up.scp on Router B

1. Assign an IP address to the Ethernet interface.

```
add ip int=eth0 ip=192.168.1.1
```

2. Enable RIP on the PPP link so that Router C will learn that the route to the central LAN is now via the ISDN call.

```
add ip rip int=ppp0
```

Trigger Script ex12b0dn.scp on Router B

1. Disable RIP on the PPP link.

```
del ip rip int=ppp0
```

2. Delete the IP address on the Ethernet interface.

```
del ip int=eth0
```

Configuration Script for Router C [ex12c.scp]

1. Enable the IP module.

```
enable ip
```

2. Create an ISDN call definition that will make outgoing calls. The parameters are:

- number=12345 specifies the ISDN phone number of the ISDN connection to Router B.
- direction=out specifies that the call definition will only make outgoing calls, and can never accept incoming calls.
- precedence=out is a required parameter used to resolve conflicts between incoming and outgoing calls. It is not actually relevant to this call, as the call is outgoing only.
- outsub=local specifies that the call will put the string "backup" in the subaddress field of the call setup packet.

```
add isdn call=backup num=12345 dir=out prec=out
outsub=local
```

3. Disable the ISDN call so that it won't activate accidentally.

```
disable isdn call=backup
```

4. Create a PPP link over the first synchronous port. Set the LQR timer very low so that the router can react quickly to loss of service over the PPP link.

```
create ppp=0 over=syn0 lqr=5
```

5. Create a PPP link over the ISDN call.

```
create ppp=1 over=isdn-backup
```

6. Assign an IP address to the first PPP link. To save IP addresses, make this an addressless interface.

```
add ip int=ppp0 ip=0.0.0.0
```

7. Assign an IP address to the second PPP link. To save IP addresses, make this an addressless interface.

```
add ip int=ppp1 ip=0.0.0.0
```

8. Assign an IP address to the Ethernet port.

```
add ip int=eth0 ip=192.168.10.1
```

9. Enable RIP on the first PPP link.

```
add ip rip int=ppp0
```

10. Enable the trigger module.

```
enable trigger
```

11. Create a trigger that executes the script ex12c0up.scp when the first PPP link comes up.

```
create trigger=1 int=ppp0 event=up scr=ex12c0up.scp
```

12. Create a trigger that executes the script ex12c0dn.scp when the first PPP link goes down.

```
create trigger=1 int=ppp0 event=down scr=ex12c0dn.scp
```

Trigger Script ex12c0up.scp on Router C

1. Disable RIP on the PPP link.

```
del ip rip int=ppp1
```

2. If the ISDN call is up, deactivate it.

```
deact isdn call=backup
```

3. Disable the ISDN call so it won't activate accidentally.

```
disable isdn call=backup
```

Trigger Script ex12c0dn.scp on Router C

1. Enable the ISDN call.

```
enable isdn call=Backup
```

2. Activate the ISDN call.

```
act isdn call=backup
```

3. Enable RIP on the second PPP link.

```
add ip rip int=ppp1
```