APPLICATION BULLETIN

Orbit Traffic Failover

Introduction

This document was created to assist customers with configuring failover on the Orbit Platform. Failover in this configuration will have traffic switch routes from the Licensed Narrowband or Unlicensed RF interface to the Cellular interface.

Note: This document assumes basic knowledge of the Orbit Platform. GE recommends reviewing the available YouTube videos below:
   https://www.youtube.com/watch?v=OcWSG4xERcY&list=PLrbxqFUR561iSD9i6MHBtA6Z692sYr-rq

Scope

This bulletin is intended for system engineers and end users who are familiar with the Orbit command line interface (CLI) and interested in setting up a configuration capable of a failover. Please refer to Orbit MCR technical manual for details on how to access Orbit CLI or Web UI.

Firmware Compatibility

This is bulletin is applicable to Orbit MCR devices running firmware version 6.1.2 or greater.

Terms

CLI   Command Line Interface
GRE   Generic Routing Encapsulation
NHRP Next Hop Resolution Protocol
SRC   Source
DST   Destination
BGP   Border Gateway Protocol
NAT   Network Address Translation

Failover Configuration Concept

This configuration is based on sending traffic through a Primary interface then failing over to a secondary interface dynamically from the remote unit's perspective. Additionally, Source NAT will be used to masquerade traffic on the Primary and Secondary interfaces so from the user's perspective the same IP address will be reached regardless of what interface is used during failover.
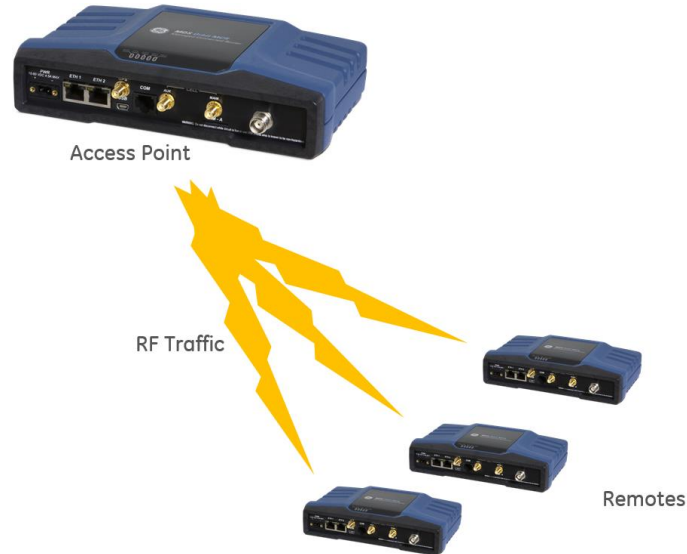
The RF network represents the Licensed Narrowband or Nx915 Unlicensed traffic and the primary path traffic would travel in normal conditions.
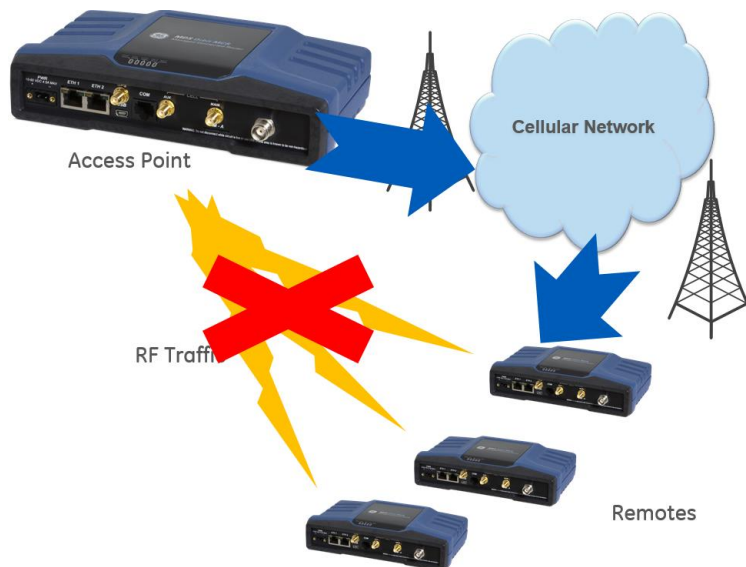
If a failure event occurs that prevents communication over the RF Network traffic would automatically be sent over the cellular network.

The following sections review additional components to make this failover configuration work as described.

Template Pre-Install Instructions

Please follow these instructions. This configuration will be done from the CLI not web gui.
- Open a terminal server client like Putty. If you don't have one you can download it here
  http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html
- Log into your Orbit device via ssh with the ip address of the unit
- Once logged in Enter "configure" to enter configure mode
- Copy all of the configuration script below and then right click in the putty window. This will paste the configuration into the orbit.
- Cycle power to ensure configuration is synchronized

NOTE: Configuration should be applied ONLY to a factory defaulted unit.

Access-Point

This section will list failover configurations for the Access point Orbit MCR / ECR unit.

Access-Point Configuration Script:

This section will list a generic configuration for an Access-point. It is recommended to follow the pre-defined IP addresses. RF interface will not be configured by this script due to variables like channel and frequency.

- This configuration requires Multiple changes **[HIGHLIGHTED]** below.
  - **[DESTINATION-SUBNET]**, defined as your network address of the polling application (example. 10.10.1.0/24
  - **[NEXT-HOP]**, defined as the first IP address the AP will need to send traffic out of the network.
  - For every remote added a new BGP configuration will need to be added to the access-point configuration to connect.
    - **[REMOTEnumber]** – This defines the BGP configuration for a new remote and must be a unique name. Private autonomous system (AS) numbers which range from 64512 to 65535 are used to conserve globally unique AS numbers.
    - **[REMOTE-GRE-ADDRESS]** – This defines the remote orbit GRE IP address. (recommended IP address subnet to use is 172.16.0.0/24)
    - **[REMOTE-AS]** – This defines the BGP configuration AS number which will increment from. Private autonomous system (AS) numbers which range from 64512 to 65535 are used to conserve globally unique AS numbers.

  - BGP remote addition script:

    #START SCRIPT
    set routing bgp neighbor **[REMOTEnumber]** peer-address **[REMOTE-GRE-ADDRESS]**

```
set routing bgp neighbor [REMOTEnumber] local-address 172.16.0.1
set routing bgp neighbor [REMOTEnumber] enabled true
set routing bgp neighbor [REMOTEnumber] export-filter Default
set routing bgp neighbor [REMOTEnumber] local-as 10000
set routing bgp neighbor [REMOTEnumber] peer-as [REMOTE-AS]
set routing bgp neighbor [REMOTEnumber] next-hop-self true
set routing bgp neighbor [REMOTEnumber] hold-time 30
set routing bgp neighbor [REMOTEnumber] keepalive-time 10
set routing bgp neighbor [REMOTEnumber] connect-retry-time 30
```

#END SCRIPT

o   MAIN Access-point Script:

```
#START SCRIPT
set routing route-filter Default rule 1 match dest-prefix 0.0.0.0/0
set routing route-filter Default rule 1 actions action accept
set routing static-routes ipv4 route 8 outgoing-interface LnRadio
set routing static-routes ipv4 route 8 preference 201
#
#172.25.7.0/24 is the Loopback subnet used to mask both remote interfaces within this subnet.
set routing static-routes ipv4 route 8 dest-prefix 172.25.7.0/24
set routing static-routes ipv4 route 9 dest-prefix [DESTINATION-SUBNET]
set routing static-routes ipv4 route 9 next-hop [NEXT-HOP]
#
#
#
set routing bgp
set routing bgp preference 200
set routing bgp neighbor REMOTE1 peer-address 172.16.0.2
set routing bgp neighbor REMOTE1 local-address 172.16.0.1
set routing bgp neighbor REMOTE1 enabled true
set routing bgp neighbor REMOTE1 export-filter Default
set routing bgp neighbor REMOTE1 local-as 10000
set routing bgp neighbor REMOTE1 peer-as 10001
set routing bgp neighbor REMOTE1 next-hop-self true
set routing bgp neighbor REMOTE1 hold-time 30
set routing bgp neighbor REMOTE1 keepalive-time 10
set routing bgp neighbor REMOTE1 connect-retry-time 30
#
#
set services nhrp enabled true
set services nhrp interface GRE1
set services firewall enabled true
set services firewall address-set CELL-IP
set services firewall filter IN_UNTRUSTED rule 4 match protocol gre
set services firewall filter IN_UNTRUSTED rule 4 actions
set services firewall filter IN_UNTRUSTED rule 4 actions action accept
```

```
set services firewall filter OUT_UNTRUSTED rule 1 match protocol all
set services firewall filter OUT_UNTRUSTED rule 1 match src-address
set services firewall filter OUT_UNTRUSTED rule 1 match src-address address-set CELL-IP
set services firewall filter OUT_UNTRUSTED rule 1 match src-address add-interface-address true
#
#
#
#
set interfaces interface GRE1 type gre
set interfaces interface GRE1 enabled true
set interfaces interface GRE1 gre-config
set interfaces interface GRE1 gre-config mode ip-over-gre
set interfaces interface GRE1 gre-config src-address 0.0.0.0
set interfaces interface GRE1 gre-config dst-address 0.0.0.0
set interfaces interface GRE1 gre-config key 10000
set interfaces interface GRE1 ipv4
set interfaces interface GRE1 ipv4 address 172.16.0.1 prefix-length 24
set interfaces interface GRE1 filter input IN_TRUSTED
set interfaces interface GRE1 filter output OUT_TRUSTED
set interfaces interface LnRadio type ln
set interfaces interface LnRadio enabled true
set interfaces interface LnRadio ipv4
set interfaces interface LnRadio ipv4 address 172.25.15.5 prefix-length 24
set interfaces interface LnRadio filter input IN_TRUSTED
set interfaces interface LnRadio filter output OUT_TRUSTED
set system name ACCESS-POINT
commit
quit
^m
```

REMOTE

This section will list failover configurations for the REMOTE Orbit MCR / ECR unit.

REMOTE Configuration Script:

This section will list a generic configuration for a REMOTE. It is recommended to follow the pre-defined IP addresses. RF interface will not be configured by this script due to variables like channel and frequency.

- This configuration requires Multiple changes [HIGHLIGHTED] below.
  - [CELL-IP-ADDRESS] – This defines the cellular IP address of this unit.
  - [REMOTE-LOCAL-GRE-ADDRESS] – This defines the GRE IP address of this unit.
  - [REMOTE-LOCAL-AS] – This defines the BGP AS number which is used for failover. This must be unique per unit and increment from 10001.
  - [AP-CELL-IP] – This defines the cellular IP address of the access-point unit.
  - [LNRADIO-IP-ADDRESS] – This defines the IP address of the LnRadio interface and must be unique from other units.
  - [LOOPBACK-IP-ADDRESS] – This defines the loopback interface which is used to masquerade the GRE tunnel and LnRadio subnets.

  - Main Remote Configuration Script:

```
#START SCRIPT
set routing route-filter LO1 rule 1 match outgoing-interface LO1
set routing route-filter LO1 rule 1 actions action accept
set routing static-routes ipv4 route 2 preference 200
set routing static-routes ipv4 route 2 dest-prefix 0.0.0.0/0
set routing static-routes ipv4 route 2 next-hop 172.25.15.5
set routing static-routes ipv4 route 3 outgoing-interface Cell
set routing static-routes ipv4 route 3 dest-prefix [CELL-IP-ADDRESS]
set routing bgp
set routing bgp preference 201
set routing bgp neighbor PollingRemote peer-address 172.16.0.1
set routing bgp neighbor PollingRemote local-address [REMOTE-LOCAL-GRE-ADDRESS]
set routing bgp neighbor PollingRemote enabled true
set routing bgp neighbor PollingRemote export-filter LO1
set routing bgp neighbor PollingRemote local-as [REMOTE-LOCAL-AS]
set routing bgp neighbor PollingRemote peer-as 10000
set routing bgp neighbor PollingRemote hold-time 30
set routing bgp neighbor PollingRemote keepalive-time 10
set routing bgp neighbor PollingRemote connect-retry-time 30
set services dhcp enabled false
#
set services firewall address-set CELL-IP
set services firewall filter IN_UNTRUSTED rule 4 match protocol gre
set services firewall filter IN_UNTRUSTED rule 4 actions
set services firewall filter IN_UNTRUSTED rule 4 actions action accept
set services firewall filter OUT_UNTRUSTED rule 1 match protocol all
set services firewall filter OUT_UNTRUSTED rule 1 match src-address
```

set services firewall filter OUT_UNTRUSTED rule 1 match src-address address-set CELL-IP
set services firewall filter OUT_UNTRUSTED rule 1 match src-address add-interface-address true
set services firewall filter OUT_UNTRUSTED rule 10 match protocol all
set services firewall filter OUT_UNTRUSTED rule 10 actions
set services firewall filter OUT_UNTRUSTED rule 10 actions action drop
set services firewall nat source rule-set MASQ rule 1 source-nat interface
set services firewall nat source rule-set MASQ_MIRROR rule 1 source-nat address [LOOPBACK-IP-ADDRESS]
#
set services nhrp enabled true
set services nhrp interface GRE1 map PollingRemote protocol-address 172.16.0.1
set services nhrp interface GRE1 map PollingRemote protocol-netmask 255.255.255.0
set services nhrp interface GRE1 map PollingRemote nbma-address [AP-CELL-IP]
set services nhrp interface GRE1 map PollingRemote register true
set services nhrp interface GRE1 holding-time 900
#
delete interfaces interface Bridge ipv4 192.168.1.1
set interfaces interface Bridge ipv4 address 10.0.1.2 prefix-length 24
set interfaces interface Cell nat source MASQ
set interfaces interface ETH1 type ethernet
set interfaces interface ETH2 type ethernet
set interfaces interface GRE1 type gre
set interfaces interface GRE1 gre-config
set interfaces interface GRE1 gre-config mode ip-over-gre
set interfaces interface GRE1 gre-config src-address 0.0.0.0
set interfaces interface GRE1 gre-config dst-address 0.0.0.0
set interfaces interface GRE1 gre-config key 10000
set interfaces interface GRE1 filter input IN_TRUSTED
set interfaces interface GRE1 filter output OUT_TRUSTED
set interfaces interface GRE1 nat source MASQ_MIRROR
set interfaces interface GRE1 ipv4
set interfaces interface GRE1 ipv4 address [REMOTE-LOCAL-GRE-ADDRESS] prefix-length 24
set interfaces interface LO1 type loopback
set interfaces interface LO1 filter input IN_TRUSTED
set interfaces interface LO1 filter output OUT_TRUSTED
set interfaces interface LO1 ipv4
set interfaces interface LO1 ipv4 address [LOOPBACK-IP-ADDRESS] prefix-length 32
#
set interfaces interface LnRadio nat source MASQ_MIRROR
set interfaces interface LnRadio nat destination Port_Forwarding
set interfaces interface LnRadio ipv4
set interfaces interface LnRadio ipv4 address [LNRADIO-IP-ADDRESS] prefix-length 24
set system name FAILOVER-REMOTE
commit
quit
#END SCRIPT

GE Technical Services

Please contact GE Technical Services for any issues with your configurations.
~ENERGY Digital Energy MDS Technical Support <GEMDS.techsupport@ge.com>

OR

Call +1 585.241.5510 (Technical Services Help Line)

Content Sources

1. Orbit Tech manual REVG – gemds.com
2. Custom Created content - GE MDS tech services

End of application bulletin.