

N+1 Alta disponibilidade de configurações de amostra

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Introdução

Este documento fornece exemplos de configuração e informação para diversas encenações N+1.

Nota: Mantenha na mente que gosta de cartões deve suportar como cartões.

Cenário 1

Configurações de amostra da Alta disponibilidade (HA) com dois Switch RF (configuração 3x10) em 4+1 modos, em cinco VXR, em vinte placas de linha MC28C, e em três chassis do VCom HD4040, que contêm quarenta módulos.

O layout físico é mostrado em [figura 1](#). Refira a [expedição de cabogramas do Cisco RF Switch ao uBR7246VXR de Cisco](#).

Figura 1 – 4+1 com cartões MC28C e 2 Switch RF

Este empilhamento do exame é suposto, com atribuições IP que começam com 192.168.1.2 na parte superior e continuam para baixo. Porque estará nos 4+1 modo, o Switch RF 1 é considerado ser dois Switches: a e b, onde a é os entalhes 1 a 4 e b são os entalhes 5 com 8. que o Switch RF 2 é considerado igualmente dois Switches: a e B.

Configuração VXR1 de trabalho

```
version 12.2
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname "WorkingVXR1"
!
boot system disk0:ubr7200-ik8s-mz.BC.28July03
no logging console
enable secret 5 $1$5YHG$mquxabcqzFoUUKhp/c9WT4/
```

```
!  
cab modem remote-query 10 public  
cab modulation-prof 2 request 0 16 0 8 qpsk scrambler  
152 no-diff 64 fixed uw8  
cab modulation-prof 2 initial 5 34 0 48 qpsk scrambler  
152 no-diff 128 fixed uw16  
cab modulation-prof 2 station 5 34 0 48 qpsk scrambler  
152 no-diff 128 fixed uw16  
cab modulation-prof 2 short 4 76 6 8 qpsk scrambler  
152 no-diff 72 short uw8  
cab modulation-prof 2 long 8 220 0 8 qpsk scrambler  
152 no-diff 80 short uw8  
cab modulation-prof 3 request 0 16 0 8 qpsk scrambler  
152 no-diff 64 fixed uw16  
cab modulation-prof 3 initial 5 34 0 48 qpsk scrambler  
152 no-diff 128 fixed uw16  
cab modulation-prof 3 station 5 34 0 48 qpsk scrambler  
152 no-diff 128 fixed uw16  
cab modulation-prof 3 short 7 76 7 8 16qam scrambler  
152 no-diff 144 short uw16  
cab modulation-prof 3 long 9 220 0 8 16qam scrambler  
152 no-diff 160 short uw16  
no cable qos permission create  
no cable qos permission update  
cable qos permission modems  
no cable clock source-midplane  
no cable clock force primary  
no cable clock force secondary  
!  
cable config-file docsis.cm  
frequency 453000000  
service-class 1 max-upstream 10000  
service-class 1 max-downstream 10000  
service-class 1 max-burst 1522  
!  
ip subnet-zero  
ip cef  
!  
ip host protect 192.168.1.7  
ip host work2 192.168.1.6  
ip name-server 171.68.226.120  
!  
ip dhcp pool MODEMS1  
network 192.168.3.0 255.255.255.0  
bootfile docsis.cm  
next-server 192.168.3.5  
default-router 192.168.3.5  
option 7 ip 192.168.3.5  
option 4 ip 192.168.3.5  
option 2 hex 0000.0000  
lease 2 3 4  
!  
ip dhcp pool PC  
network 10.11.12.0 255.255.255.0  
default-router 10.11.12.1  
dns-server 171.68.226.120  
lease 10 1 11  
!  
packetcable element_id 35417  
!  
interface FastEthernet0/0  
ip address 192.168.1.7 255.255.255.0  
no keepalive  
speed auto
```

```

full-duplex
!--- This interface is used for Hot Standby Connection-
to-Connection Protocol (HCCP) !--- traffic. ! interface
FastEthernet0/1 ip address 192.168.2.7 255.255.255.0
keepalive 1 !--- This is set to 1 second so that, if the
cable is disconnected, then this !--- interface will
failover within 3 seconds. speed auto full-duplex !
interface Cable3/0 ip address 10.11.12.1 255.255.255.0
secondary ip address 192.168.3.5 255.255.255.0 load-
interval 30 keepalive 1 !--- The keepalive time is in
seconds, and the default is 10 seconds for HCCP code.
load-interval 30 cable downstream channel-id 0 cable
bundle 1 master !--- Interface bundling is supported, as
are subinterfaces. !--- Note: Bundles failover together.
cable downstream annex B cable downstream modulation
64qam cable downstream interleave-depth 32 cable
downstream frequency 453000000 !--- This is the
downstream (DS) frequency, which used to be
informational only when !--- you are using an external
UPx. This must be set when you are using the MC28U cards
!--- with internal UPxs or when you are doing N+1 with
MC28C cards, so that the Protect !--- UPx knows what
frequency to use. cable upstream 0 frequency 24000000 !-
-- If you are doing dense mode combining, the upstream
(US) frequencies must be !--- different. If no two US
ports are shared, then the same frequency can be used.
cable upstream 0 power-level 0 cable upstream 0 channel-
width 3200000 cable upstream 0 minislot-size 2 cable
upstream 0 data-backoff automatic cable upstream 0
modulation-profile 3 no cable upstream 0 shutdown cable
dhcp-giaddr policy !--- This tells the cable modems
(CMs) to get an IP address from the primary scope, and
!--- it tells the customer premises equipment (CPE) to
use the secondary scope. hccp 1 working 1 !--- This is
the Working first group, member 1. hccp 1 channel-switch
1 rfswwa rfswwa-group 192.168.1.5 44440400 1 !--- This
is the IP address of the Switch, and it is protecting
member 1 in the !--- left side of Switch slot 1. hccp 1
channel-switch 1 uc31 wavecom-hd 192.168.1.2 1
192.168.1.4 1 !--- This is the IP address of the
upconverter, and it is module 1 (A) that is backing !---
module 1 (A) of another upconverter. This shows that one
upconverter could have !--- a module that backs up a
module in a different chassis with a different IP
address, !--- if need be. If this statement is not
present when you are using Cisco IOS® Software !---
Release 15(BC2) or later, then IF-Muting is assumed, and
an external upconverter !--- with Simple Network
Management Protocol (SNMP) capability is not needed.
hccp 1 track FastEthernet0/1 !--- Tracking is enabled
for the egress port, in the event that the WAN-backhaul
is !--- disrupted. This cable interface will failover to
the Protect. hccp 1 reverttime 120 !--- This is the time
in minutes (plus a 2 minute suspend) for the card to
switch back !--- to normal mode, if the fault has
cleared. If there is a fault on the Protect card, !---
then it will revert back after the suspend time, and it
will not wait for the full !--- revert time. The default
setting is 30 minutes. ! interface Cable3/1 hccp 2
working 1 hccp 2 channel-switch 1 rfswwa rfswwa-group
192.168.1.5 11110100 1 !--- This is the IP address of
the Switch, and it is protecting member 1 in the !---
right side of Switch slot 1. hccp 2 channel-switch 1
uc31 wavecom-hd 192.168.1.2 2 192.168.1.4 2 hccp 2

```

```

reverttime 120 ! interface Cable4/0 hccp 3 working 1
hccp 3 channel-switch 1 rfswlb rfs-switch-group
192.168.1.5 88880800 1 !--- This is the IP address of
the Switch, and it is protecting member 1 in the !---
left side of Switch slot 5. Because the RF Switch is in
4+1 mode, slot 5 is !--- considered to be slot 1 again.
hccp 3 channel-switch 1 uc31 wavecom-hd 192.168.1.2 3
192.168.1.4 3 hccp 3 reverttime 120 ! interface Cable
4/1 hccp 4 working 1 hccp 4 channel-switch 1 rfswlb
rfs-switch-group 192.168.1.5 22220200 1 !--- This is the
IP address of the Switch, and it is protecting member 1
in the !--- right side of Switch slot 5. Because the RF
Switch is in 4+1 mode, slot 5 is !--- considered to be
slot 1 again. hccp 4 channel-switch 1 uc31 wavecom-hd
192.168.1.2 4 192.168.1.4 4 hccp 4 reverttime 120 !
interface Cable5/0 hccp 5 working 1 hccp 5 channel-
switch 1 rfsw2a rfs-switch-group 192.168.1.6 44440400 1
hccp 5 channel-switch 1 uc31 wavecom-hd 192.168.1.2 5
192.168.1.4 5 hccp 5 reverttime 120 ! interface Cable
5/1 hccp 6 working 1 hccp 6 channel-switch 1 rfsw2a
rfs-switch-group 192.168.1.6 11110100 1 hccp 6 channel-
switch 1 uc31 wavecom-hd 192.168.1.2 6 192.168.1.4 6
hccp 6 reverttime 120 ! interface Cable 6/0 hccp 7
working 1 hccp 7 channel-switch 1 rfsw2b rfs-switch-group
192.168.1.6 88880800 1 hccp 7 channel-switch 1 uc31
wavecom-hd 192.168.1.2 7 192.168.1.4 7 hccp 7 reverttime
120 ! interface Cable 6/1 hccp 8 working 1 hccp 8
channel-switch 1 rfsw2b rfs-switch-group 192.168.1.6
22220200 1 hccp 8 channel-switch 1 uc31 wavecom-hd
192.168.1.2 8 192.168.1.4 8 hccp 8 reverttime 120 !
router eigrp 2500 network 10.11.12.0 0.0.0.255 network
192.168.1.0 network 192.168.3.0 no auto-summary no eigrp
log-neighbor-changes ! ip classless ip route 0.0.0.0
0.0.0.0 192.168.1.254 ip route 192.168.1.0 255.255.255.0
FastEthernet0/0 ip route 192.168.2.0 255.255.255.0
FastEthernet0/1 no ip http server ! cdp run ! snmp-
server community private RW !--- Unless it is deleted,
this does not affect the HCCP communications between !--
- the upconverter, the Switch, and the 7200. snmp-server
community public RO snmp-server enable traps tty snmp-
server manager tftp-server disk0: tftp-server disk1:
alias exec shb show hccp brief alias exec shd show hccp
detail alias exec scm show cable modem alias exec scr
show cable modem remote alias exec sm show cab modu
alias exec sch show cab hop alias exec sc300 show cont
c3/0 u0 alias exec sint300 show int c3/0 u0 alias exec
scs show cable spec

```

Proteja a Configuração do VXR

```

version 12.2
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname "ProtectVXR"
!
boot system disk0:ubr7200-ik8s-mz.BC.28July03
no logging console
enable secret 5 $1$5YHG$mquxabcqzFoUUKhp/c9WT4/
!
cab modem remote-query 10 public
cab modulation-prof 2 request 0 16 0 8 qpsk scrambler
152 no-diff 64 fixed uw8
cab modulation-prof 2 initial 5 34 0 48 qpsk scrambler

```

```
152 no-diff 128 fixed uw16
cab modulation-prof 2 station 5 34 0 48 qpsk scrambler
152 no-diff 128 fixed uw16
cab modulation-prof 2 short 4 76 6 8 qpsk scrambler
152 no-diff 72 short uw8
cab modulation-prof 2 long 8 220 0 8 qpsk scrambler
152 no-diff 80 short uw8
cab modulation-prof 3 request 0 16 0 8 qpsk scrambler
152 no-diff 64 fixed uw16
cab modulation-prof 3 initial 5 34 0 48 qpsk scrambler
152 no-diff 128 fixed uw16
cab modulation-prof 3 station 5 34 0 48 qpsk scrambler
152 no-diff 128 fixed uw16
cab modulation-prof 3 short 7 76 7 8 16qam scrambler
152 no-diff 144 short uw16
cab modulation-prof 3 long 9 220 0 8 16qam scrambler
152 no-diff 160 short uw16
```

```
!--- Be sure to pre-configure all global configurations
on the Protect, such as !--- modulation profiles,
spectrum groups, load balancing, and so forth. no cable
qos permission create no cable qos permission update
cable qos permission modems no cable clock source-
midplane no cable clock force primary no cable clock
force secondary ! cable config-file docsis.cm frequency
453000000 service-class 1 max-upstream 10000 service-
class 1 max-downstream 10000 service-class 1 max-burst
1522 ! ip subnet-zero ip cef ! ip host protect
192.168.1.7 ip host work2 192.168.1.6 ip name-server
171.68.226.120 ! ip dhcp pool MODEMS1 network
192.168.3.0 255.255.255.0 bootfile docsis.cm next-server
192.168.3.5 default-router 192.168.3.5 option 7 ip
192.168.3.5 option 4 ip 192.168.3.5 option 2 hex
0000.0000 lease 2 3 4 ! ip dhcp pool PC network
10.11.12.0 255.255.255.0 default-router 10.11.12.1 dns-
server 171.68.226.120 lease 10 1 11 ! packetcable
element_id 35417 ! interface FastEthernet0/0 ip address
192.168.1.11 255.255.255.0 no keepalive speed auto full-
duplex no cdp enable ! interface FastEthernet0/1 ip
address 192.168.2.11 255.255.255.0 keepalive 1 speed
auto full-duplex no cdp enable ! interface Cable3/0 no
ip address !--- There is no need to set the IP address,
because it will come from the Working card !--- via
SNMP. no keepalive !--- This defaults to 10 seconds with
the N+1 Cisco IOS code, but it is recommended that !---
you disable it on the Protect interface or set it to a
relatively high value. cable downstream annex B cable
downstream modulation 64qam cable downstream interleave-
depth 32 !--- The DS modulation, annex mode, and
interleave must be same on the Protect and on !--- the
Working of the same group. no shut !--- The interface
must be activated to start HCCP functionality. Do this
last. cable upstream 0 shutdown !--- This will
automatically become "no shut" when a failover occurs.
hccp 1 protect 1 192.168.1.7 !--- This is the Protect
for the first group. Remember to configure the Protect
!--- interface(s) last, after the Working interfaces are
configured. This is the HCCP !--- first group and it is
protecting member 1 with member 1's FastEthernet (FE) IP
!--- address. hccp 1 channel-switch 1 rfswl1 rfswitch-
group 192.168.1.5 44440400 1 !--- This is the IP address
of the Switch, and it is protecting member 1, which has
a !--- bitmap of 44440400 in Switch slot 1. hccp 1
channel-switch 1 uc31 wavecom-hd 192.168.1.2 1
192.168.1.4 1 !--- This is the IP address of the
```

upconverter, and it is module 1 (A) that is backing !---
module 1 (A) of another upconverter. This shows that one
upconverter could have !--- a module that backs up a
module in a different chassis with a different IP
address, !--- if need be. If this statement is not
present when you are using Cisco IOS Software !---
Release 15(BC2) or later, then IF-Muting is assumed, and
an external upconverter !--- with SNMP capability is not
needed. hccp 1 protect 2 192.168.1.8 !--- This is the
HCCP first group, and it is protecting member 2 with its
IP address. hccp 1 channel-switch 2 rfswwa rfswwa-
group 192.168.1.5 44440400 2 hccp 1 channel-switch 2
uc31 wavecom-hd 192.168.1.2 1 192.168.1.4 9 hccp 1
protect 3 192.168.1.9 hccp 1 channel-switch 3 rfswwa
rfswwa-group 192.168.1.5 44440400 3 hccp 1 channel-
switch 3 uc32 wavecom-hd 192.168.1.2 1 192.168.1.3 1
hccp 1 protect 4 192.168.1.10 hccp 1 channel-switch 4
rfswwa rfswwa-group 192.168.1.5 44440400 4 hccp 1
channel-switch 4 uc32 wavecom-hd 192.168.1.2 1
192.168.1.3 9 hccp 1 timers 666 2000 !--- hccp 1 timers
<hellotime> <holdtime> !--- This is for inter-chassis
communication. ! interface Cable3/1 hccp 2 protect 1
192.168.1.7 hccp 2 channel-switch 1 rfswwa rfswwa-
group 192.168.1.5 11110100 1 hccp 2 channel-switch 1
uc31 wavecom-hd 192.168.1.2 2 192.168.1.4 2 hccp 2
protect 2 192.168.1.8 hccp 2 channel-switch 2 rfswwa
rfswwa-group 192.168.1.5 11110100 2 hccp 2 channel-
switch 2 uc31 wavecom-hd 192.168.1.2 2 192.168.1.4 10
hccp 2 protect 3 192.168.1.9 hccp 2 channel-switch 3
rfswwa rfswwa-group 192.168.1.5 11110100 3 hccp 2
channel-switch 3 uc32 wavecom-hd 192.168.1.2 2
192.168.1.3 2 hccp 2 protect 4 192.168.1.10 hccp 2
channel-switch 4 rfswwa rfswwa-group 192.168.1.5
11110100 4 hccp 2 channel-switch 4 uc32 wavecom-hd
192.168.1.2 2 192.168.1.3 10 hccp 2 timers 666 2000 !
interface Cable4/0 hccp 3 protect 1 192.168.1.7 hccp 3
channel-switch 1 rfswwb rfswwb-group 192.168.1.5
88880800 1 hccp 3 channel-switch 1 uc31 wavecom-hd
192.168.1.2 3 192.168.1.4 3 hccp 3 protect 2 192.168.1.8
hccp 3 channel-switch 2 rfswwb rfswwb-group
192.168.1.5 88880800 2 hccp 3 channel-switch 2 uc31
wavecom-hd 192.168.1.2 3 192.168.1.4 11 hccp 3 protect 3
192.168.1.9 hccp 3 channel-switch 3 rfswwb rfswwb-
group 192.168.1.5 88880800 3 hccp 3 channel-switch 3
uc32 wavecom-hd 192.168.1.2 3 192.168.1.3 3 hccp 3
protect 4 192.168.1.10 hccp 3 channel-switch 4 rfswwb
rfswwb-group 192.168.1.5 88880800 4 hccp 3 channel-
switch 4 uc32 wavecom-hd 192.168.1.2 3 192.168.1.3 11
hccp 3 timers 666 2000 ! interface Cable4/1 hccp 4
protect 1 192.168.1.7 hccp 4 channel-switch 1 rfswwb
rfswwb-group 192.168.1.5 22220200 1 hccp 4 channel-
switch 1 uc31 wavecom-hd 192.168.1.2 4 192.168.1.4 4
hccp 4 protect 2 192.168.1.8 hccp 4 channel-switch 2
rfswwb rfswwb-group 192.168.1.5 22220200 2 hccp 4
channel-switch 2 uc31 wavecom-hd 192.168.1.2 4
192.168.1.4 12 hccp 4 protect 3 192.168.1.9 hccp 4
channel-switch 3 rfswwb rfswwb-group 192.168.1.5
22220200 3 hccp 4 channel-switch 3 uc32 wavecom-hd
192.168.1.2 4 192.168.1.3 4 hccp 4 protect 4
192.168.1.10 hccp 4 channel-switch 4 rfswwb rfswwb-
group 192.168.1.5 22220200 4 hccp 4 channel-switch 4
uc32 wavecom-hd 192.168.1.2 4 192.168.1.3 12 hccp 4
timers 666 2000 ! interface Cable5/0 hccp 5 protect 1
192.168.1.7 hccp 5 channel-switch 1 rfswwa rfswwa-

```
group 192.168.1.6 44440400 1 hccp 5 channel-switch 1
uc31 wavecom-hd 192.168.1.2 5 192.168.1.4 5 hccp 5
protect 2 192.168.1.8 hccp 5 channel-switch 2 rfs2a
rfs2a rfs2a-group 192.168.1.6 44440400 2 hccp 5 channel-
switch 2 uc31 wavecom-hd 192.168.1.2 5 192.168.1.4 13
hccp 5 protect 3 192.168.1.9 hccp 5 channel-switch 3
rfs2a rfs2a-group 192.168.1.6 44440400 3 hccp 5
channel-switch 3 uc32 wavecom-hd 192.168.1.2 5
192.168.1.3 5 hccp 5 protect 4 192.168.1.10 hccp 5
channel-switch 4 rfs2a rfs2a-group 192.168.1.6
44440400 4 hccp 5 channel-switch 4 uc32 wavecom-hd
192.168.1.2 5 192.168.1.3 13 hccp 5 timers 666 2000 !
interface Cable5/1 hccp 6 protect 1 192.168.1.7 hccp 6
channel-switch 1 rfs2a rfs2a-group 192.168.1.6
11110100 1 hccp 6 channel-switch 1 uc31 wavecom-hd
192.168.1.2 6 192.168.1.4 6 hccp 6 protect 2 192.168.1.8
hccp 6 channel-switch 2 rfs2a rfs2a-group
192.168.1.6 11110100 2 hccp 6 channel-switch 2 uc31
wavecom-hd 192.168.1.2 6 192.168.1.4 14 hccp 6 protect 3
192.168.1.9 hccp 6 channel-switch 3 rfs2a rfs2a-
group 192.168.1.6 11110100 3 hccp 6 channel-switch 3
uc32 wavecom-hd 192.168.1.2 6 192.168.1.3 6 hccp 6
protect 4 192.168.1.10 hccp 6 channel-switch 4 rfs2a
rfs2a-group 192.168.1.6 11110100 4 hccp 6 channel-
switch 4 uc32 wavecom-hd 192.168.1.2 6 192.168.1.3 14
hccp 6 timers 666 2000 ! interface Cable6/0 hccp 7
protect 1 192.168.1.7 hccp 7 channel-switch 1 rfs2b
rfs2a-group 192.168.1.6 88880800 1 hccp 7 channel-
switch 1 uc31 wavecom-hd 192.168.1.2 7 192.168.1.4 7
hccp 7 protect 2 192.168.1.8 hccp 7 channel-switch 2
rfs2b rfs2a-group 192.168.1.6 88880800 2 hccp 7
channel-switch 2 uc31 wavecom-hd 192.168.1.2 7
192.168.1.4 15 hccp 7 protect 3 192.168.1.9 hccp 7
channel-switch 3 rfs2b rfs2a-group 192.168.1.6
88880800 3 hccp 7 channel-switch 3 uc32 wavecom-hd
192.168.1.2 7 192.168.1.3 7 hccp 7 protect 4
192.168.1.10 hccp 7 channel-switch 4 rfs2b rfs2a-
group 192.168.1.6 88880800 4 hccp 7 channel-switch 4
uc32 wavecom-hd 192.168.1.2 7 192.168.1.3 15 hccp 7
timers 666 2000 ! interface Cable6/1 hccp 8 protect 1
192.168.1.7 hccp 8 channel-switch 1 rfs2b rfs2a-
group 192.168.1.6 22220200 1 hccp 8 channel-switch 1
uc31 wavecom-hd 192.168.1.2 8 192.168.1.4 8 hccp 8
protect 2 192.168.1.8 hccp 8 channel-switch 2 rfs2b
rfs2a-group 192.168.1.6 22220200 2 hccp 8 channel-
switch 2 uc31 wavecom-hd 192.168.1.2 8 192.168.1.4 16
hccp 8 protect 3 192.168.1.9 hccp 8 channel-switch 3
rfs2b rfs2a-group 192.168.1.6 22220200 3 hccp 8
channel-switch 3 uc32 wavecom-hd 192.168.1.2 8
192.168.1.3 8 hccp 8 protect 4 192.168.1.10 hccp 8
channel-switch 4 rfs2b rfs2a-group 192.168.1.6
22220200 4 hccp 8 channel-switch 4 uc32 wavecom-hd
192.168.1.2 8 192.168.1.3 16 hccp 8 timers 666 2000 !
router eigrp 2500 network 10.11.12.0 0.0.0.255 network
10.11.13.0 0.0.0.255 network 192.168.1.0 network
192.168.3.0 network 192.168.5.0 no auto-summary no eigrp
log-neighbor-changes ! ip classless ip route 0.0.0.0
0.0.0.0 192.168.1.254 ip route 192.168.1.0 255.255.255.0
FastEthernet0/0 ip route 192.168.2.0 255.255.255.0
FastEthernet0/1 no ip http server ! cdp run ! snmp-
server community private RW snmp-server community public
RO snmp-server enable traps tty snmp-server enable traps
cable snmp-server manager alias exec shb show hccp brief
alias exec shd show hccp detail alias exec scm show
```

```
cable modem alias exec scr show cable modem remote
```

Cenário 2

Configurações de amostra da Alta disponibilidade com dois Switch RF (configuração 3x10) em 4+1 modos, em cinco VXR, e em vinte placas de linha MC28U.

O layout físico é mostrado em [figura 1](#), mas ignora os conversores ascendentes na parte superior. Refira a [expedição de cabogramas do Cisco RF Switch ao uBR7246VXR de Cisco](#) para um documento de expedição de cabogramas que use as placas de linha 28C. A expedição de cabogramas para placas de linha MC28U consiste em um pacote de dez cabos que vão de cada placa de linha a cada encabeçamento do Switch RF. Refira o documento HA que se refere esta solução N+1.

Este empilhamento do exame é suposto, com atribuições IP que começam com 192.168.1.5 na parte superior e continuam para baixo. Porque estará nos 4+1 modo, o Switch RF 1 é considerado ser dois Switches: a e b, onde a é os entalhes 1 a 4 e b são os entalhes 5 com 8. que o Switch RF 2 é considerado igualmente dois Switches: a e B.

Configuração VXR1 de trabalho

```
version 12.2
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname "WorkingVXR1"
!
boot system disk0:ubr7200-ik8s-mz.BC...
no logging console
enable secret 5 $1$5YHG$mquxabcqzFoUUKhp/c9WT4/
!
cab modem remote-query 10 public
!--- This is an easy way to track modem transmit and
receive levels, especially after a !--- failover. You
might want to increase the time period or remove this
command, after !--- you have confirmed that everything
is OK.
cable modulation-profile 41 request 0 16 0 8 qpsk
scrambler 152 no-diff 64 fixed cable modulation-profile
41 initial 5 34 0 48 qpsk scrambler 152 no-diff 128
fixed cable modulation-profile 41 station 5 34 0 48 qpsk
scrambler 152 no-diff 128 fixed cable modulation-profile
41 short 3 78 35 25 qpsk scrambler 152 no-diff 100 short
cable modulation-profile 41 long 9 232 0 137 qpsk
scrambler 152 no-diff 80 short cable modulation-profile
42 request 0 16 0 8 qpsk scrambler 152 no-diff 64 fixed
cable modulation-profile 42 initial 5 34 0 48 qpsk
scrambler 152 no-diff 128 fixed cable modulation-profile
42 station 5 34 0 48 qpsk scrambler 152 no-diff 128
fixed cable modulation-profile 42 short 3 78 17 10 16qam
scrambler 152 no-diff 136 short cable modulation-profile
42 long 9 232 0 77 16qam scrambler 152 no-diff 216 short
no cable qos permission create no cable qos permission
update cable qos permission modems no cable clock
source-midplane no cable clock force primary no cable
clock force secondary ! cable config-file docsis.cm
frequency 453000000 service-class 1 max-upstream 10000
service-class 1 max-downstream 10000 service-class 1
max-burst 1522 ! ip subnet-zero ip cef ! ip name-server
```



```
171.68.226.120 ! ip dhcp pool MODEMS1 network
192.168.3.0 255.255.255.0 bootfile docsis.cm next-server
192.168.3.5 default-router 192.168.3.5 option 7 ip
192.168.3.5 option 4 ip 192.168.3.5 option 2 hex
0000.0000 lease 2 3 4 ! ip dhcp pool PC network
10.11.12.0 255.255.255.0 default-router 10.11.12.1 dns-
server 171.68.226.120 lease 10 1 11 ! packetcable
element_id 35417 ! interface FastEthernet0/0 ip address
192.168.1.7 255.255.255.0 no keepalive speed auto full-
duplex !--- This interface is used for HCCP traffic. !
interface FastEthernet0/1 ip address 192.168.2.7
255.255.255.0 keepalive 1 !--- This is set to 1 second
so that, if the cable is disconnected, this interface !-
-- will failover within 3 seconds. speed auto full-
duplex ! interface Cable3/0 ip address 10.11.12.1
255.255.255.0 secondary ip address 192.168.3.5
255.255.255.0 load-interval 30 cable dynamic-secret mark
nocrypt cable map-advance dynamic 500 1000 keepalive 1
!--- The keepalive time is in seconds, and the default
is 10 seconds for HCCP code. cable downstream channel-id
0 cable bundle 1 master !--- Interface bundling is
supported, as are subinterfaces. !--- Note: Bundles
failover together. cable downstream annex B cable
downstream modulation 256qam cable downstream
interleave-depth 32 no cable downstream rf-shutdown
cable downstream frequency 453000000 !--- This is the DS
frequency, which used to be informational only when you
are using !--- an external UPx. This must be set when
using the MC28U cards with internal UPxs. cable upstream
0 frequency 24000000 !--- If you are doing dense mode
combining, the US frequencies must be different. !--- If
no two US ports are shared, the same frequency can be
used. cable upstream 0 ingress-noise-cancellation 200
cable upstream 0 power-level 0 cable upstream 0 channel-
width 3200000 3200000 cable upstream 0 minislots-size 4
cable upstream 0 fragment-force 3500 3 cable upstream 0
range-backoff 2 6 cable upstream 0 data-backoff 3 5
cable upstream 0 modulation-profile 42 no cable upstream
0 shutdown cable dhcp-giaddr policy !--- This tells the
CMs to get an IP address from the primary scope, and it
tells the !--- CPE to use the secondary scope. hccp 1
working 1 !--- This is the Working first group, member
1. hccp 1 channel-switch 1 rfs1a rfs1a-switch-group
192.168.1.5 44440400 1 !--- This is the IP address of
the Switch, and it is protecting member 1 in the !---
left side of Switch slot 1. hccp 1 track FastEthernet0/1
!--- Tracking is enabled for the egress port, in the
event that the WAN-backhaul is !--- disrupted. This
cable interface will failover to the Protect. hccp 1
reverttime 120 !--- This is the time in minutes (plus a
2 minute suspend) for the card to switch back !--- to
normal mode, if the fault has cleared. If there is a
fault on the Protect card, !--- then it will revert back
after the suspend time, and it will not wait for the
full !--- revert time. ! interface Cable3/1 hccp 2
working 1 hccp 2 channel-switch 1 rfs1a rfs1a-switch-group
192.168.1.5 11110100 1 !--- This is the IP address of
the Switch, and it is protecting member 1 in the !---
right side of Switch slot 1. hccp 2 reverttime 120 !
interface Cable4/0 hccp 3 working 1 hccp 3 channel-
switch 1 rfs1b rfs1b-switch-group 192.168.1.5 88880800 1 !-
-- This is the IP address of the Switch, and it is
protecting member 1 in the !--- left side of Switch slot
5. Because the RF Switch is in 4+1 mode, slot 5 is !---
```

```

considered to be slot 1 again. hccp 3 reverttime 120 !
interface Cable 4/1 hccp 4 working 1 hccp 4 channel-
switch 1 rfswlb rfswitch-group 192.168.1.5 22220200 1 !-
-- This is the IP address of the Switch, and it is
protecting member 1 in the !--- right side of Switch
slot 5. Because the RF Switch is in 4+1 mode, slot 5 is
!--- considered to be slot 1 again. hccp 4 reverttime
120 ! interface Cable5/0 hccp 5 working 1 hccp 5
channel-switch 1 rfsw2a rfswitch-group 192.168.1.6
44440400 1 hccp 5 reverttime 120 ! interface Cable 5/1
hccp 6 working 1 hccp 6 channel-switch 1 rfsw2a
rfswitch-group 192.168.1.6 11110100 1 hccp 6 reverttime
120 ! interface Cable 6/0 hccp 7 working 1 hccp 7
channel-switch 1 rfsw2b rfswitch-group 192.168.1.6
88880800 1 hccp 7 reverttime 120 ! interface Cable 6/1
hccp 8 working 1 hccp 8 channel-switch 1 rfsw2b
rfswitch-group 192.168.1.6 22220200 1 hccp 8 reverttime
120 ! router eigrp 2500 network 10.11.12.0 0.0.0.255
network 192.168.1.0 network 192.168.3.0 no auto-summary
no eigrp log-neighbor-changes !--- Open Shortest Path
First (OSPF) may be the best routing protocol, with its
new !--- fast-hellos. ip classless ip route 0.0.0.0
0.0.0.0 192.168.1.254 ip route 192.168.1.0 255.255.255.0
FastEthernet0/0 ip route 192.168.2.0 255.255.255.0
FastEthernet0/1 no ip http server ! cdp run ! snmp-
server community private RW !--- This does not affect
the HCCP communications between the Switch and the VXR,
but !--- it must be set to Private on the RF Switch.
snmp-server community public RO snmp-server enable traps
tty snmp-server manager tftp-server disk0: tftp-server
disk1: tftp-server disk1:rfsw250-fl-1935030e tftp-server
disk1:rfsw250-bf-1935022d alias exec shb show hccp brief
alias exec shd show hccp detail alias exec scm show
cable modem alias exec scr show cable modem remote alias
exec sm show cab modu alias exec sch show cab hop alias
exec sc300 show cont c3/0 u0 alias exec sint300 show int
c3/0 u0 alias exec scs show cable spec

```

Proteja Configurações do VXR

```

version 12.2
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname "ProtectVXR"
!
boot system disk0:ubr7200-ik8s-mz.BC.28July03
no logging console
enable secret 5 $1$5YHG$mquxabcqzFoUUKhp/c9WT4/
!
cab modem remote-query 10 public
cable modulation-profile 41 request 0 16 0 8 qpsk
scrambler 152 no-diff 64 fixed
cable modulation-profile 41 initial 5 34 0 48 qpsk
scrambler 152 no-diff 128 fixed
cable modulation-profile 41 station 5 34 0 48 qpsk
scrambler 152 no-diff 128 fixed
cable modulation-profile 41 short 3 78 35 25 qpsk
scrambler 152 no-diff 100 short
cable modulation-profile 41 long 9 232 0 137 qpsk
scrambler 152 no-diff 80 short
cable modulation-profile 42 request 0 16 0 8 qpsk
scrambler 152 no-diff 64 fixed
cable modulation-profile 42 initial 5 34 0 48 qpsk

```

```

scrambler 152 no-diff 128 fixed
cable modulation-profile 42 station 5 34 0 48 qpsk
scrambler 152 no-diff 128 fixed
cable modulation-profile 42 short 3 78 17 10 16qam
scrambler 152 no-diff 136 short
cable modulation-profile 42 long 9 232 0 77 16qam
scrambler 152 no-diff 216 short
  !--- Be sure to pre-configure all global configurations
  on the Protect, such as !--- modulation profiles,
  spectrum groups, load balancing, and so forth. no cable
  qos permission create no cable qos permission update
  cable qos permission modems no cable clock source-
  midplane no cable clock force primary no cable clock
  force secondary ! cable config-file docsis.cm frequency
  453000000 service-class 1 max-upstream 10000 service-
  class 1 max-downstream 10000 service-class 1 max-burst
  1522 ! ip subnet-zero ip cef ! ip name-server
  171.68.226.120 ! ip dhcp pool MODEMS1 network
  192.168.3.0 255.255.255.0 bootfile docsis.cm next-server
  192.168.3.5 default-router 192.168.3.5 option 7 ip
  192.168.3.5 option 4 ip 192.168.3.5 option 2 hex
  0000.0000 lease 2 3 4 ! ip dhcp pool PC network
  10.11.12.0 255.255.255.0 default-router 10.11.12.1 dns-
  server 171.68.226.120 lease 10 1 11 ! packetcable
  element_id 35417 ! interface FastEthernet0/0 ip address
  192.168.1.11 255.255.255.0 no keepalive speed auto full-
  duplex no cdp enable !--- This interface is used for
  HCCP traffic. ! interface FastEthernet0/1 ip address
  192.168.2.11 255.255.255.0 keepalive 1 speed auto full-
  duplex no cdp enable ! interface Cable3/0 no ip address
  !--- There is no need to set the IP address, because it
  will come from the Working card !--- via SNMP. no
  keepalive !--- This defaults to 10 seconds with the N+1
  Cisco IOS code, but it is recommended that !--- you
  disable it on the Protect interface or set it to a
  relatively high value. cable downstream annex B cable
  downstream modulation 64qam cable downstream interleave-
  depth 32 !--- The DS modulation, annex mode, and
  interleave must be pre-configured and must be !--- the
  same on the Protect and on the Working of the same
  group. no shut !--- The interface must be activated to
  start HCCP functionality. Do this last. cable upstream 0
  shutdown !--- This will automatically become "no shut"
  when a failover occurs. hccp 1 protect 1 192.168.1.7 !---
  - This is the Protect for the first group. Remember to
  configure the Protect !--- interface(s) last, after the
  Working interfaces are configured. This is the HCCP !---
  first group, and it is protecting member 1 with member
  1's FE IP address. hccp 1 channel-switch 1 rfsvla
  rfswitch-group 192.168.1.5 44440400 1 !--- This is the
  IP address of the Switch, and it is protecting member 1,
  which has a !--- bitmap of 44440400 in Switch slot 1.
  hccp 1 protect 2 192.168.1.8 !--- This is the HCCP first
  group, and it is protecting member 2 with its IP
  address. hccp 1 channel-switch 2 rfsvla rfswitch-group
  192.168.1.5 44440400 2 hccp 1 protect 3 192.168.1.9 hccp
  1 channel-switch 3 rfsvla rfswitch-group 192.168.1.5
  44440400 3 hccp 1 protect 4 192.168.1.10 hccp 1 channel-
  switch 4 rfsvla rfswitch-group 192.168.1.5 44440400 4
  hccp 1 timers 666 2000 !--- hccp 1 timers <hellotime>
  <holdtime> !--- This is for inter-chassis communication.
  ! interface Cable3/1 hccp 2 protect 1 192.168.1.7 hccp 2
  channel-switch 1 rfsvla rfswitch-group 192.168.1.5
  11110100 1 hccp 2 protect 2 192.168.1.8 hccp 2 channel-

```

```
switch 2 rfwsla rfswitch-group 192.168.1.5 11110100 2
hccp 2 protect 3 192.168.1.9 hccp 2 channel-switch 3
rfwsla rfswitch-group 192.168.1.5 11110100 3 hccp 2
protect 4 192.168.1.10 hccp 2 channel-switch 4 rfwsla
rfswitch-group 192.168.1.5 11110100 4 hccp 2 timers 666
2000 ! interface Cable4/0 hccp 3 protect 1 192.168.1.7
hccp 3 channel-switch 1 rfwslb rfswitch-group
192.168.1.5 88880800 1 hccp 3 protect 2 192.168.1.8 hccp
3 channel-switch 2 rfwslb rfswitch-group 192.168.1.5
88880800 2 hccp 3 protect 3 192.168.1.9 hccp 3 channel-
switch 3 rfwslb rfswitch-group 192.168.1.5 88880800 3
hccp 3 protect 4 192.168.1.10 hccp 3 channel-switch 4
rfwslb rfswitch-group 192.168.1.5 88880800 4 hccp 3
timers 666 2000 ! interface Cable4/1 hccp 4 protect 1
192.168.1.7 hccp 4 channel-switch 1 rfwslb rfswitch-
group 192.168.1.5 22220200 1 hccp 4 protect 2
192.168.1.8 hccp 4 channel-switch 2 rfwslb rfswitch-
group 192.168.1.5 22220200 2 hccp 4 protect 3
192.168.1.9 hccp 4 channel-switch 3 rfwslb rfswitch-
group 192.168.1.5 22220200 3 hccp 4 protect 4
192.168.1.10 hccp 4 channel-switch 4 rfwslb rfswitch-
group 192.168.1.5 22220200 4 hccp 4 timers 666 2000 !
interface Cable5/0 hccp 5 protect 1 192.168.1.7 hccp 5
channel-switch 1 rfw2a rfswitch-group 192.168.1.6
44440400 1 hccp 5 protect 2 192.168.1.8 hccp 5 channel-
switch 2 rfw2a rfswitch-group 192.168.1.6 44440400 2
hccp 5 protect 3 192.168.1.9 hccp 5 channel-switch 3
rfw2a rfswitch-group 192.168.1.6 44440400 3 hccp 5
protect 4 192.168.1.10 hccp 5 channel-switch 4 rfw2a
rfswitch-group 192.168.1.6 44440400 4 hccp 5 timers 666
2000 ! interface Cable5/1 hccp 6 protect 1 192.168.1.7
hccp 6 channel-switch 1 rfw2a rfswitch-group
192.168.1.6 11110100 1 hccp 6 protect 2 192.168.1.8 hccp
6 channel-switch 2 rfw2a rfswitch-group 192.168.1.6
11110100 2 hccp 6 protect 3 192.168.1.9 hccp 6 channel-
switch 3 rfw2a rfswitch-group 192.168.1.6 11110100 3
hccp 6 protect 4 192.168.1.10 hccp 6 channel-switch 4
rfw2a rfswitch-group 192.168.1.6 11110100 4 hccp 6
timers 666 2000 ! interface Cable6/0 hccp 7 protect 1
192.168.1.7 hccp 7 channel-switch 1 rfw2b rfswitch-
group 192.168.1.6 88880800 1 hccp 7 protect 2
192.168.1.8 hccp 7 channel-switch 2 rfw2b rfswitch-
group 192.168.1.6 88880800 2 hccp 7 protect 3
192.168.1.9 hccp 7 channel-switch 3 rfw2b rfswitch-
group 192.168.1.6 88880800 3 hccp 7 protect 4
192.168.1.10 hccp 7 channel-switch 4 rfw2b rfswitch-
group 192.168.1.6 88880800 4 hccp 7 timers 666 2000 !
interface Cable6/1 hccp 8 protect 1 192.168.1.7 hccp 8
channel-switch 1 rfw2b rfswitch-group 192.168.1.6
22220200 1 hccp 8 protect 2 192.168.1.8 hccp 8 channel-
switch 2 rfw2b rfswitch-group 192.168.1.6 22220200 2
hccp 8 protect 3 192.168.1.9 hccp 8 channel-switch 3
rfw2b rfswitch-group 192.168.1.6 22220200 3 hccp 8
protect 4 192.168.1.10 hccp 8 channel-switch 4 rfw2b
rfswitch-group 192.168.1.6 22220200 4 hccp 8 timers 666
2000 ! router eigrp 2500 network 10.11.12.0 0.0.0.255
network 10.11.13.0 0.0.0.255 network 192.168.1.0 network
192.168.3.0 network 192.168.5.0 no auto-summary no eigrp
log-neighbor-changes !--- OSPF may be the best routing
protocol, with its new fast-hellos. ! ip classless ip
route 0.0.0.0 0.0.0.0 192.168.1.254 ip route 192.168.1.0
255.255.255.0 FastEthernet0/0 ip route 192.168.2.0
255.255.255.0 FastEthernet0/1 no ip http server ! cdp
run ! snmp-server community private RW snmp-server
```

```
community public RO snmp-server enable traps tty snmp-
server enable traps cable snmp-server manager alias exec
shb show hccp brief alias exec shd show hccp detail
alias exec scm show cable modem alias exec scr show
cable modem remote
```

Cenário 3

configuração de exemplo do uBR10K N+1 com placas de linha MC28C.

Figura 2 – Belden 1855A (co-axial mini-RG-59) com f ou conectores de BNC

configuração do uBR10K

```
uBR10012-1# show run Current configuration : 8567 bytes
! version 12.2 no parser cache no service single-slot-
reload-enable no service pad service timestamps debug
uptime service timestamps log uptime no service
password-encryption ! hostname uBR10k ! boot system
flash slot0: ubr10k-k8p6-mz.122-4.BClb logging rate-
limit console all 10 except critical enable secret 5
$1$.Dvy$fcPOhshUNjyfePH73FHRG. ! no cable qos permission
create no cable qos permission update cable qos
permission modems cable time-server ! cable config-file
docsis.cm frequency 453000000 service-class 1 max-
upstream 10000 service-class 1 max-downstream 10000
service-class 1 max-burst 1522 ! redundancy main-cpu
auto-sync standard facility-alarm intake-temperature
major 49 facility-alarm intake-temperature minor 40
facility-alarm core-temperature major 53 facility-alarm
core-temperature minor 45 card 1/0 1gigetherne-1 card
1/1 2cable-tccplus card 2/0 1gigetherne-1 card 2/1
2cable-tccplus card 5/0 2cable-mc28c card 5/1 2cable-
mc28c card 6/0 2cable-mc28c card 6/1 2cable-mc28c card
7/0 2cable-mc28c card 7/1 2cable-mc28c card 8/0 2cable-
mc28c card 8/1 2cable-mc28c ip subnet-zero ip host
rfs witch 2001 10.10.10.1 !--- This is set for console
access from the 10K to the Switch. The IP address is for
!--- Loopback0. ip dhcp pool MODEMS1 network 172.25.1.0
255.255.255.0 bootfile docsis.cm next-server 172.25.1.1
default-router 172.25.1.1 option 7 ip 172.25.1.1 option
4 ip 172.25.1.1 option 2 hex 0000.0000 lease 2 3 4 ! ip
dhcp pool MODEMS2 network 172.25.2.0 255.255.255.0
bootfile docsis.cm next-server 172.25.2.1 default-router
172.25.2.1 option 7 ip 172.25.2.1 option 4 ip 172.25.2.1
option 2 hex 0000.0000 lease 2 3 4 ! ip dhcp-client
network-discovery informs 2 discovers 2 period 15 !---
An internal DHCP server was used for testing, instead of
external servers (cable !--- helper, Time-of-Day [ToD],
TFTP, and so forth). External servers are recommended !-
-- in a "real" production network. ! interface Loopback0
ip address 10.10.10.1 255.255.255.252 ! interface
FastEthernet0/0/0 ip address 10.97.1.8 255.255.255.0 ip
rip receive version 2 no ip split-horizon no keepalive !
interface GigabitEthernet1/0/0 no ip address negotiation
auto ! interface GigabitEthernet2/0/0 no ip address
negotiation auto ! interface Cable5/1/0 !--- This is the
Protect for the first group. Remember to configure the
Protect !--- interface(s) last, after the Working
interfaces are configured. no ip address !--- There is
no need to set the IP address because it will come from
the Working card !--- via SNMP. no keepalive !--- This
```

```
defaults to 10 seconds with the N+1 Cisco IOS code, but
it is recommended !--- that you disable it on the
Protect interface or set it to a relatively high value.
cable downstream annex B cable downstream modulation
64qam cable downstream interleave-depth 32 !--- The DS
modulation, annex mode, and interleave must be same on
the Protect and on !--- the Working of the same group.
cable upstream 0 shutdown !--- This will automatically
become "no shut" when a failover occurs. cable upstream
1 shutdown cable upstream 2 shutdown cable upstream 3
shutdown cable dhcp-giaddr policy hccp 1 protect 1
10.10.10.1 !--- This is the HCCP first group, and it is
protecting member 1 with member 1's FE IP !--- address.
If it is intra-chassis, you can use the Loopback0 IP
address. hccp 1 channel-switch 1 uc wavecom-hd
10.97.1.21 2 10.97.1.21 16 !--- This is the IP address
of the upconverter, and it is module 2 (B) that is
backing !--- module 16 (P) of the upconverter. This
shows that one upconverter could have a !--- module that
backs up a module in a different chassis with a
different IP address, !--- if need be. If this statement
is not present when you are using Cisco IOS Software !--
- Release 15(BC2) or later, then IF-Muting is assumed,
and an external upconverter !--- with SNMP capability is
not needed. hccp 1 channel-switch 1 rfswitch rfswitch-
group 10.97.1.20 AA200000 1 !--- This is the IP address
of the Switch, and it is protecting member 1, which has
a !--- bitmap of AA200000 in Switch slot 1. hccp 1
protect 2 10.10.10.1 !--- This is the HCCP first group,
and it is protecting member 2 with its IP address. hccp
1 channel-switch 2 uc wavecom-hd 10.97.1.21 2 10.97.1.21
14 !--- This is the IP address of the upconverter, and
it is module 2 (B) that is backing !--- module 14 (N).
hccp 1 channel-switch 2 rfswitch rfswitch-group
10.97.1.20 AA200000 2 !--- This is the IP address of the
Switch, and it is protecting member 2, with a bitmap !--
- of AA200000 in Switch slot 2. hccp 1 protect 3
10.10.10.1 hccp 1 channel-switch 3 uc wavecom-hd
10.97.1.21 2 10.97.1.21 12 hccp 1 channel-switch 3
rfswitch rfswitch-group 10.97.1.20 AA200000 3 hccp 1
protect 4 10.10.10.1 hccp 1 channel-switch 4 uc wavecom-
hd 10.97.1.21 2 10.97.1.21 10 hccp 1 channel-switch 4
rfswitch rfswitch-group 10.97.1.20 AA200000 4 hccp 1
protect 5 10.10.10.1 hccp 1 channel-switch 5 uc wavecom-
hd 10.97.1.21 2 10.97.1.21 8 hccp 1 channel-switch 5
rfswitch rfswitch-group 10.97.1.20 AA200000 5 hccp 1
protect 6 10.10.10.1 hccp 1 channel-switch 6 uc wavecom-
hd 10.97.1.21 2 10.97.1.21 6 hccp 1 channel-switch 6
rfswitch rfswitch-group 10.97.1.20 AA200000 6 hccp 1
protect 7 10.10.10.1 hccp 1 channel-switch 7 uc wavecom-
hd 10.97.1.21 2 10.97.1.21 4 hccp 1 channel-switch 7
rfswitch rfswitch-group 10.97.1.20 AA200000 7 hccp 1
timers 5000 15000 !--- hccp 1 timers <hellotime>
<holdtime> !--- This is for inter-chassis communication,
so set high for the 10K. ! interface Cable5/1/1 !---
This is the Protect for the second group. no ip address
no keepalive cable downstream annex B cable downstream
modulation 64qam cable downstream interleave-depth 32
cable upstream 0 shutdown cable upstream 1 shutdown
cable upstream 2 shutdown cable upstream 3 shutdown
cable dhcp-giaddr policy ! hccp 2 protect 1 10.10.10.1
hccp 2 channel-switch 1 uc wavecom-hd 10.97.1.21 1
10.97.1.21 15 hccp 2 channel-switch 1 rfswitch rfswitch-
group 10.97.1.20 55100000 1 !--- Because this MAC domain
```

```
is on right side of header, the bitmap in hexadecimal
code !--- is 55100000. hccp 2 protect 2 10.10.10.1 hccp
2 channel-switch 2 uc wavecom-hd 10.97.1.21 1 10.97.1.21
13 hccp 2 channel-switch 2 rfswitch rfswitch-group
10.97.1.20 55100000 2 hccp 2 protect 3 10.10.10.1 hccp 2
channel-switch 3 uc wavecom-hd 10.97.1.21 1 10.97.1.21
11 hccp 2 channel-switch 3 rfswitch rfswitch-group
10.97.1.20 55100000 3 hccp 2 protect 4 10.10.10.1 hccp 2
channel-switch 4 uc wavecom-hd 10.97.1.21 1 10.97.1.21 9
hccp 2 channel-switch 4 rfswitch rfswitch-group
10.97.1.20 55100000 4 hccp 2 protect 5 10.10.10.1 hccp 2
channel-switch 5 uc wavecom-hd 10.97.1.21 1 10.97.1.21 7
hccp 2 channel-switch 5 rfswitch rfswitch-group
10.97.1.20 55100000 5 hccp 2 protect 6 10.10.10.1 hccp 2
channel-switch 6 uc wavecom-hd 10.97.1.21 1 10.97.1.21 5
hccp 2 channel-switch 6 rfswitch rfswitch- group
10.97.1.20 55100000 6 hccp 2 protect 7 10.10.10.1 hccp 2
channel-switch 7 uc wavecom-hd 10.97.1.21 1 10.97.1.21 3
hccp 2 channel-switch 7 rfswitch rfswitch-group
10.97.1.20 55100000 7 hccp 2 timers 5000 15000 !
interface Cable8/1/0 !--- This is the Working for the
first group. ip address 10.192.5.1 255.255.255.0
secondary ip address 172.25.1.1 255.255.255.0 !---
Interface bundling is supported, as are subinterfaces.
ip rip send version 2 ip rip receive version 2 keepalive
1 !--- The keepalive time is in seconds, and the default
is 10 seconds for HCCP code. cable downstream annex B
cable downstream modulation 64qam cable downstream
interleave-depth 32 cable downstream frequency 453000000
!--- This is the DS frequency, which used to be
informational only when you are using !--- an external
upconverter. This must be set when doing N+1, so the
Protect !--- upconverter knows what frequency to use.
cable upstream 0 frequency 24000000 !--- If you are
doing dense mode combining, the US frequencies must be
different. !--- If no two US ports are shared, the same
frequency can be used. cable upstream 0 power-level 0 no
cable upstream 0 shutdown cable upstream 1 power-level 0
cable upstream 1 shutdown cable upstream 2 power-level 0
cable upstream 2 shutdown cable upstream 3 power-level 0
cable upstream 3 shutdown cable dhcp-giaddr policy !---
This tells the CMs to get an IP address from the primary
scope, and it tells the !--- CPE to use the secondary
scope. hccp 1 working 1 !--- This is Working member 1 of
HCCP Group 1. hccp 1 channel-switch 1 uc wavecom-hd
10.97.1.21 2 10.97.1.21 16 !--- This is the IP address
of the upconverter, and it is module 2 (B) that is
backing !--- module 16 (P). hccp 1 channel-switch 1
rfswitch rfswitch-group 10.97.1.20 AA200000 1 !--- This
is the IP address of the Switch and of member 1, which
has a bitmap of !--- AA200000 in Switch slot 1. hccp 1
reverttime 120 !--- This is the time in minutes (plus a
2 minute suspend) for the card to switch back !--- to
normal mode, if the fault has cleared. If a fault is
initiated by a keepalive !--- and you have a fault on
the Protect card, then it will revert back after the !---
- suspend time, and it will not wait for the full revert
time. ! interface Cable8/1/1 !--- This is the Working
interface for the second HCCP group. ip address
10.192.5.1 255.255.255.0 secondary ip address 172.25.2.1
255.255.255.0 ip rip send version 2 ip rip receive
version 2 keepalive 1 cable downstream annex B cable
downstream modulation 64qam cable downstream interleave-
depth 32 cable downstream frequency 453000000 cable
```

```

upstream 0 frequency 24000000 cable upstream 0 power-
level 0 no cable upstream 0 shutdown cable upstream 1
power-level 0 cable upstream 1 shutdown cable upstream 2
power-level 0 cable upstream 2 shutdown cable upstream 3
power-level 0 cable upstream 3 shutdown cable dhcp-
giaddr policy hccp 2 working 1 !--- This is Working
member 1 of HCCP Group 2. hccp 2 channel-switch 1 uc
wavecom-hd 10.97.1.21 1 10.97.1.21 15 hccp 2 channel-
switch 1 rfs witch rfs witch-group 10.97.1.20 55100000 1
!--- This is the IP address of the Switch and of member
1 of Group 2, which has a !--- bitmap of 55100000 in
Switch slot 1. hccp 2 reverttime 120 ! ip classless no
ip http server ! no cdp run snmp-server community
private RW !--- This does not affect the HCCP
communications between the upconverter, the Switch, !---
and the 10K. snmp-server enable traps cable no cdp run
snmp-server manager tftp-server server tftp-server
ios.cf alias ios.cf ! line con 0 logging synchronous
line aux 0 no exec transport input all !--- The previous
three lines are used to console from the Auxiliary port
of the 10K to !--- the Switch. line vty 0 4 session-
timeout 400 password xx login endBuilding
configuration...

```

Encenação 4

Configuração de exemplo para as placas de linha 5x20 no modo 8+1.

Figura 3 – Co-axial de Belden mini-RG-59 com conectores MCX

configuração do uBR10K

```

uBR10012-1# show run Current configuration : 8567 bytes
! version 12.2 no parser cache no service single-slot-
reload-enable no service pad service timestamps debug
uptime service timestamps log uptime no service
password-encryption ! hostname uBR10k ! boot system
flash slot0: ubr10k-k8p6-mz.122-15.BC1 logging rate-
limit console all 10 except critical enable secret 5
$1$.Dvy$fcPOhshUNjyfePH73FHRG cable modulation-profile
21 request 0 16 0 22 qpsk scrambler 152 no-diff 32 fixed
cable modulation-profile 21 initial 5 34 0 48 qpsk
scrambler 152 no-diff 64 fixed cable modulation-profile
21 station 5 34 0 48 qpsk scrambler 152 no-diff 64 fixed
cable modulation-profile 21 short 3 76 12 22 qpsk
scrambler 152 no-diff 64 shortened cable modulation-
profile 21 long 7 231 0 22 qpsk scrambler 152 no-diff 64
shortened !--- Advanced time division multiplex access
(ATDMA) Cisco IOS has different !--- modulation profiles
and requirements. ! no cable qos permission create no
cable qos permission update cable qos permission modems
cable time-server ! cable config-file docsis.cm
frequency 453000000 service-class 1 max-upstream 10000
service-class 1 max-downstream 10000 service-class 1
max-burst 1522 ! redundancy main-cpu auto-sync standard
facility-alarm intake-temperature major 49 facility-
alarm intake-temperature minor 40 facility-alarm core-
temperature major 53 facility-alarm core-temperature
minor 45 card 1/0 lgigether net-1 card 1/1 2cable-tccplus
card 2/0 lgigether net-1 card 2/1 2cable-tccplus card 5/0
5cable-mc520s-d card 5/1 5cable-mc520s-d card 6/0
5cable-mc520s-d card 6/1 5cable-mc520s-d card 7/0

```



```
5cable-mc520s-d card 7/1 5cable-mc520s-d card 8/0
5cable-mc520s-d card 8/1 5cable-mc520s-d ip subnet-zero
ip host rfs witch 2001 10.10.10.1 !--- This is set for
console access from the 10K to the Switch. The IP
address is for !--- Loopback0. ip dhcp pool MODEMS1
network 172.25.1.0 255.255.255.0 bootfile docsis.cm
next-server 172.25.1.1 default-router 172.25.1.1 option
7 ip 172.25.1.1 option 4 ip 172.25.1.1 option 2 hex
0000.0000 lease 2 3 4 ! ip dhcp pool MODEMS2 network
172.25.2.0 255.255.255.0 bootfile docsis.cm next-server
172.25.2.1 default-router 172.25.2.1 option 7 ip
172.25.2.1 option 4 ip 172.25.2.1 option 2 hex 0000.0000
lease 2 3 4 ! ip dhcp-client network-discovery informs 2
discovers 2 period 15 !--- An internal DHCP server was
used for testing instead of external servers (cable !---
helper, ToD, TFTP, and so forth). External servers are
recommended in a "real" !--- production network. !
interface Loopback0 ip address 10.10.10.1
255.255.255.252 ! interface FastEthernet0/0/0 ip address
10.97.1.8 255.255.255.0 ip rip receive version 2 no ip
split-horizon no keepalive ! interface
GigabitEthernet1/0/0 no ip address negotiation auto !
interface GigabitEthernet2/0/0 no ip address negotiation
auto !--- This assumes rfs w2 is on the top, as shown in
the cable reference guide. Other !--- interfaces will be
the same, except they will have a different member
number !--- for each HCCP group. interface Cable5/1/0 !-
- This is the Protect for the first group. It may be
best to configure the Protect !--- interface(s) last,
after the Working interfaces are configured, or keep the
!--- interface "shut" until you are finished with all
configurations. no ip address !--- There is no need to
set the IP address, because it will come from the
Working card !--- via SNMP. no keepalive !--- This
defaults to 10 seconds with the N+1 Cisco IOS code, but
it is recommended !--- that you disable it on the
Protect interface or set it to a relatively high value.
cable downstream annex B cable downstream modulation
64qam cable downstream interleave-depth 32 !--- The DS
modulation and interleave must be the same on the
Protect and on the !--- Working of the same group. The
Protect interface itself must be "no shut" for !--- HCCP
to activate. cable downstream rf-shutdown cable upstream
0 shutdown !--- These will automatically become "no
shut" when a failover occurs. cable upstream 1 shutdown
cable upstream 2 shutdown cable upstream 3 shutdown hccp
1 protect 1 10.10.10.1 !--- This is the HCCP first
group, and it is protecting member 1 with member 1's FE
IP !--- address. If it is intra-chassis, you can use the
Loopback0 IP address. hccp 1 channel-switch 1 rfs w2
rfs witch-group 10.97.1.20 AA200000 1 !--- This is the IP
address of the Switch, and it is protecting member 1,
which has a !--- bitmap of AA200000 in Switch slot 1.
hccp 1 protect 2 10.10.10.1 !--- This is the HCCP first
group, and it is protecting member 2 with the loopback
IP !--- address. hccp 1 channel-switch 2 rfs w2 rfs witch-
group 10.97.1.20 AA200000 2 !--- This is the IP address
of the Switch, and it is protecting member 2, with a
bitmap !--- of AA200000 in Switch slot 2. hccp 1 protect
3 10.10.10.1 hccp 1 channel-switch 3 rfs w2 rfs witch-
group 10.97.1.20 AA200000 3 hccp 1 protect 4 10.10.10.1
hccp 1 channel-switch 4 rfs w2 rfs witch-group 10.97.1.20
AA200000 4 hccp 1 protect 5 10.10.10.1 hccp 1 channel-
switch 5 rfs w2 rfs witch-group 10.97.1.20 AA200000 5 hccp
```

```
1 protect 6 10.10.10.1 hccp 1 channel-switch 6 rfs2
rfs2switch-group 10.97.1.20 AA200000 6 hccp 1 protect 7
10.10.10.1 hccp 1 channel-switch 7 rfs2 rfs2switch-group
10.97.1.20 AA200000 7 !--- These channel-switch
configurations can be copied and pasted into their
respective !--- Working interfaces. hccp 1 timers 5000
15000 !--- hccp 1 timers <hellotime> <holdtime> !---
This is mostly for inter-chassis communication, so set
it high for the 10K, as !--- this can create extra CPU
load. no hccp 1 revertive ! interface Cable5/1/1 !---
This is the Protect for the second group. no ip address
no keepalive cable downstream annex B cable downstream
modulation 64qam cable downstream interleave-depth 32
cable downstream rf-shutdown cable upstream 0 shutdown
cable upstream 1 shutdown cable upstream 2 shutdown
cable upstream 3 shutdown ! hccp 2 protect 1 10.10.10.1
hccp 2 channel-switch 1 rfs2 rfs2switch-group 10.97.1.20
55100000 1 !--- Because this MAC domain is on right side
of header, the bitmap in hexadecimal code !--- is
55100000. hccp 2 protect 2 10.10.10.1 hccp 2 channel-
switch 2 rfs2 rfs2switch-group 10.97.1.20 55100000 2 hccp
2 protect 3 10.10.10.1 hccp 2 channel-switch 3 rfs2
rfs2switch-group 10.97.1.20 55100000 3 hccp 2 protect 4
10.10.10.1 hccp 2 channel-switch 4 rfs2 rfs2switch-group
10.97.1.20 55100000 4 hccp 2 protect 5 10.10.10.1 hccp 2
channel-switch 5 rfs2 rfs2switch-group 10.97.1.20
55100000 5 hccp 2 protect 6 10.10.10.1 hccp 2 channel-
switch 6 rfs2 rfs2switch-group 10.97.1.20 55100000 6 hccp
2 protect 7 10.10.10.1 hccp 2 channel-switch 7 rfs2
rfs2switch-group 10.97.1.20 55100000 7 hccp 2 timers 5000
15000 no hccp 2 revertive ! interface Cable5/1/2 !---
This is the Protect for the third group. no ip address
no keepalive cable downstream annex B cable downstream
modulation 64qam cable downstream interleave-depth 32
cable downstream rf-shutdown cable upstream 0 shutdown
cable upstream 1 shutdown cable upstream 2 shutdown
cable upstream 3 shutdown hccp 3 protect 1 10.10.10.1
hccp 3 channel-switch 1 rfs1 rfs2switch-group 10.97.1.19
00C80000 1 hccp 3 channel-switch 1 rfs2 rfs2switch-group
10.97.1.20 00C00000 1 !--- Because the third MAC domain
will traverse both Switches, two statements are !---
needed. The 00 in front of the bitmaps will be dropped,
when the running !--- configuration is viewed. no hccp 3
revertive ! interface Cable5/1/3 !--- This is the
Protect for the fourth group. hccp 4 protect 1
10.10.10.1 hccp 4 channel-switch 1 rfs1 rfs2switch-group
10.97.1.19 AA200000 1 hccp 4 protect 2 10.10.10.1 hccp 4
channel-switch 2 rfs1 rfs2switch-group 10.97.1.19
AA200000 2 hccp 4 protect 3 10.10.10.1 hccp 4 channel-
switch 3 rfs1 rfs2switch-group 10.97.1.19 AA200000 3 hccp
4 protect 4 10.10.10.1 hccp 4 channel-switch 4 rfs1
rfs2switch-group 10.97.1.19 AA200000 4 hccp 4 protect 5
10.10.10.1 hccp 4 channel-switch 5 rfs1 rfs2switch-group
10.97.1.19 AA200000 5 hccp 4 protect 6 10.10.10.1 hccp 4
channel-switch 6 rfs1 rfs2switch-group 10.97.1.19
AA200000 6 hccp 4 protect 7 10.10.10.1 hccp 4 channel-
switch 7 rfs1 rfs2switch-group 10.97.1.19 AA200000 7 no
hccp 4 revertive ! interface Cable5/1/4 !--- This is the
Protect for the fifth group. hccp 5 protect 1 10.10.10.1
hccp 5 channel-switch 1 rfs1 rfs2switch-group 10.97.1.19
55100000 1 hccp 5 protect 2 10.10.10.1 hccp 5 channel-
switch 2 rfs1 rfs2switch-group 10.97.1.19 55100000 2 hccp
5 protect 3 10.10.10.1 hccp 5 channel-switch 3 rfs1
rfs2switch-group 10.97.1.19 55100000 3 hccp 5 protect 4
```

```
10.10.10.1 hccp 5 channel-switch 4 rfswl rfswitch-group
10.97.1.19 55100000 4 hccp 5 protect 5 10.10.10.1 hccp 5
channel-switch 5 rfswl rfswitch-group 10.97.1.19
55100000 5 hccp 5 protect 6 10.10.10.1 hccp 5 channel-
switch 6 rfswl rfswitch-group 10.97.1.19 55100000 6 hccp
5 protect 7 10.10.10.1 hccp 5 channel-switch 7 rfswl
rfswitch-group 10.97.1.19 55100000 7 !--- Output
suppressed. ! interface Cable8/1/0 !--- This is the
Working for the first group. ip address 10.192.5.1
255.255.255.0 secondary ip address 172.25.1.1
255.255.255.0 !--- Interface bundling is supported, as
are subinterfaces. ip rip send version 2 ip rip receive
version 2 keepalive 1 !--- The keepalive time is in
seconds, and the default is 10 seconds for HCCP code. !-
-- Only set this after the modems have stabilized. cable
downstream annex B cable downstream modulation 64qam
cable downstream interleave-depth 32 cable downstream
frequency 453000000 !--- This is the DS frequency, which
must be set for the internal upconverter to !---
operate. cable downstream channel-id 0 no cable
downstream rf-shutdown !--- This is needed to turn on
the DS RF output. cable upstream 0 frequency 24000000 !-
-- If you are doing dense mode combining, the US
frequencies must be different. !--- If no two US ports
are shared, the same frequency can be used. cable
upstream 0 power-level 0 cable upstream 0 connector 0 !-
-- This is a new command for virtual interfaces, where
USs can be used for different !--- DS MAC domains. cable
upstream 0 channel-width 3200000 cable upstream 0
minislot-size 2 cable upstream 0 modulation-profile 22
no cable upstream 0 shutdown !--- Output suppressed.
cable dhcp-giaddr policy !--- This tells the the CMs to
get an IP address from the primary scope, and it tells
!--- the CPE to use the secondary scope. hccp 1 working
1 !--- This is Working member 1 of HCCP Group 1. hccp 1
channel-switch 1 rfsw2 rfswitch-group 10.97.1.20
AA200000 1 !--- This is the IP address of the Switch and
of member 1, which has a bitmap of !--- AA200000 in
Switch slot 1. hccp 1 reverttime 120 !--- This is the
time in minutes (plus a 2 minute suspend) for the card
to switch back !--- to normal mode, if the fault has
cleared. If a fault is initiated by a keepalive !--- and
you have a fault on the Protect card, then it will
revert back after the !--- suspend time, and it will not
wait for the full revert time. ! interface Cable8/1/1 !-
-- This is the Working interface for the second HCCP
group. ip address 10.192.5.1 255.255.255.0 secondary ip
address 172.25.2.1 255.255.255.0 ip rip send version 2
ip rip receive version 2 keepalive 1 cable downstream
annex B cable downstream modulation 64qam cable
downstream interleave-depth 32 cable downstream
frequency 453000000 cable downstream channel-id 1 no
cable downstream rf-shutdown cable upstream 0 frequency
24000000 cable upstream 0 power-level 0 cable upstream 0
connector 4 cable upstream 0 channel-width 3200000 cable
upstream 0 minislot-size 22 cable upstream 0 modulation-
profile 2 no cable upstream 0 shutdown !--- Output
suppressed. cable dhcp-giaddr policy hccp 2 working 1 !-
-- This is Working member 1 of HCCP Group 2. hccp 2
channel-switch 1 rfsw2 rfswitch-group 10.97.1.20
55100000 1 !--- This is the IP address of the Switch and
of member 1 of Group 2, which has a !--- bitmap of
55100000 in Switch slot 1. hccp 2 reverttime 120 !
interface Cable8/1/2 !--- This is the Working interface
```

```

for the third HCCP group. ip address 10.192.5.1
255.255.255.0 secondary ip address 172.25.3.1
255.255.255.0 ip rip send version 2 ip rip receive
version 2 keepalive 1 cable downstream annex B cable
downstream modulation 64qam cable downstream interleave-
depth 32 cable downstream frequency 453000000 cable
downstream channel-id 2 no cable downstream rf-shutdown
cable upstream 0 frequency 24000000 cable upstream 0
power-level 0 cable upstream 0 connector 8 cable
upstream 0 channel-width 3200000 cable upstream 0
minislot-size 2 cable upstream 0 modulation-profile 22
no cable upstream 0 shutdown cable dhcp-giaddr policy !-
-- Output suppressed. hccp 3 working 1 !--- This is
Working member 1 of HCCP Group 3. hccp 3 channel-switch
1 rfs1 rfs1-switch-group 10.97.1.19 00c80000 1 hccp 3
channel-switch 1 rfs2 rfs2-switch-group 10.97.1.20
00c00000 1 hccp 3 reverttime 120 ! interface Cable8/1/3
!--- This is the Working interface for the fourth HCCP
group. hccp 4 working 1 hccp 4 channel-switch 1 rfs1
rfs1-switch-group 10.97.1.19 AA200000 1 hccp 4 reverttime
120 ! interface Cable8/1/4 !--- This is the Working
interface for the fifth HCCP group. hccp 5 working 1
hccp 5 channel-switch 1 rfs1 rfs1-switch-group 10.97.1.19
55100000 1 hccp 5 reverttime 120 ! ip classless no ip
http server ! no cdp run snmp-server community private
RW !--- This does not affect the HCCP communications
between the Switch and 10K. snmp-server enable traps
cable no cdp run snmp-server manager tftp-server server
tftp-server ios.cf alias ios.cf ! alias exec t configure
terminal alias exec scm show cable modem alias exec scr
sh cab mode remote alias exec shb sh hccp br alias exec
shd sh hccp detail alias exec shc sh hccp chan ! line
con 0 logging synchronous line aux 0 no exec transport
input all !--- The three previous lines are used to
console from the Auxiliary port of the 10K !--- to the
Switch. line vty 0 4 session-timeout 400 password xx
login endBuilding configuration...

```

Encenação 5

Configuração de exemplo para as placas de linha 5x20 no modo 4+1 com um Switch RF.

Figura 4 – uBR10K com MC5x20 e 1 Switch RF (4+1) Switch de RF

Endereço IP	10.1.1.10	
A comunidade SNMP	Privado	
Modo de proteção	4	
Bitmap	Grupo1	0x44440400
	Grupo2	0x11110100
	Group3	0x00005000
	Group4	0x0000a080
	Group5	0x88880800
	Group6	0x22220200

Figura 5 – Bitmap

A configuração de exemplo seguinte é para 4+1 que a Alta disponibilidade para cinco cartões do

MC5x20 com o um UBR-RFSW nos 4+1 protege o modo. O modo de proteção afeta os bitmaps do interruptor e da configuração de cable modem termination system (CMTS). Se você adiciona um mais 5x20, o tudo isto deve ser mudado.

Refira a expedição de cabogramas em [cabografar Switch RF do uBR 3x10 de Cisco às placas de linha da interface de cabo de Cisco uBR10-MC5X20S/U em um Cisco uBR10012 CMTS](#).

1. Tome o encabeçamento que diz o Switch RF 2 (interruptor superior) e saa-o nos entalhes 1, 2,3, e 4.
2. Tome o encabeçamento que diz o Switch RF 1 e o lugar nos entalhes 5, 6, 7, e 8 do Switch RF 2.
3. Tome a proteção do Switch RF 2 e põe-na protegem dentro 2.
4. Tome a proteção do Switch RF 1 e põe-na protegem dentro 1 do Switch RF 2.
5. Uma vez que você obtém a cinco cartões 5x20 de trabalho, a configuração do bitmap deve ser mudada e os encabeçamentos devem ser movidos ao redor, de um Switch RF para o outro. Por exemplo, o encabeçamento do entalhe 5 do Switch RF 2 mover-se-á para o encabeçamento do slot1 do Switch RF 1.

A configuração é etiquetada `rfswa`, porque se refere os entalhes 1 a 4 e seu slot de proteção respectivo, que é proteja 2. protegem os entalhes 5 de 1 tampa com 8 no Switch RF, e está etiquetado `rfswb`. No modo 4+1, os entalhes 5 do Switch RF com 8 são considerados ser os entalhes 1 a 4 para propósitos de configuração.

Substitua seu endereço IP de Um ou Mais Servidores Cisco ICM NT do Switch RF para esse que é mostrado no exemplo seguinte (10.10.10.10).

Configuração em funcionamento 4+1

```
interface c7/1/0
hccp 1 working 1
hccp 1 channel-switch 1 rfswa rfs witch-group 10.10.10.10
44440400 1
interface c7/1/1
hccp 2 working 1
hccp 2 channel-switch 1 rfswa rfs witch-group 10.10.10.10
11110100 1
interface c7/1/2
hccp 3 working 1
hccp 3 channel-switch 1 rfswa rfs witch-group 10.10.10.10
00005000 1
hccp 3 channel-switch 1 rfswb rfs witch-group 10.10.10.10
0000a080 1
!--- Prepended 0s will not show up when you execute a
show run !--- command. Do not blindly copy and paste an
interface !--- configuration. interface c7/1/3 hccp 4
working 1 hccp 4 channel-switch 1 rfswb rfs witch-group
10.10.10.10 88880800 1 interface c7/1/4 hccp 5 working 1
hccp 5 channel-switch 1 rfswb rfs witch-group 10.10.10.10
22220200 1 -----
----- interface c6/0/0 hccp 1 working 2
hccp 1 channel-switch 2 rfswa rfs witch-group 10.10.10.10
44440400 2 interface c6/0/1 hccp 2 working 2 hccp 2
channel-switch 2 rfswa rfs witch-group 10.10.10.10
11110100 2 interface c6/0/2 hccp 3 working 2 hccp 3
channel-switch 2 rfswa rfs witch-group 10.10.10.10
00005000 2 hccp 3 channel-switch 2 rfswb rfs witch-group
10.10.10.10 0000a080 2 interface c6/0/3 hccp 4 working 2
hccp 4 channel-switch 2 rfswb rfs witch-group 10.10.10.10
```

```

88880800 2 interface c6/0/4 hccp 5 working 2 hccp 5
channel-switch 2 rfswb rfs witch-group 10.10.10.10
22220200 2 -----
----- interface c6/1/0 hccp 1 working 3
hccp 1 channel-switch 3 rfs wa rfs witch-group 10.10.10.10
44440400 3 interface c6/1/1 hccp 2 working 3 hccp 2
channel-switch 3 rfs wa rfs witch-group 10.10.10.10
11110100 3 interface c6/1/2 hccp 3 working 3 hccp 3
channel-switch 3 rfs wa rfs witch-group 10.10.10.10
00005000 3 hccp 3 channel-switch 3 rfs wb rfs witch-group
10.10.10.10 0000a080 3 interface c6/1/3 hccp 4 working 3
hccp 4 channel-switch 3 rfs wb rfs witch-group 10.10.10.10
88880800 3 interface c6/1/4 hccp 5 working 3 hccp 5
channel-switch 3 rfs wb rfs witch-group 10.10.10.10
22220200 3 -----
----- interface c5/0/0 hccp 1 working 4
hccp 1 channel-switch 4 rfs wa rfs witch-group 10.10.10.10
44440400 4 interface c5/0/1 hccp 2 working 4 hccp 2
channel-switch 4 rfs wa rfs witch-group 10.10.10.10
11110100 4 interface c5/0/2 hccp 3 working 4 hccp 3
channel-switch 4 rfs wa rfs witch-group 10.10.10.10
00005000 4 hccp 3 channel-switch 4 rfs wb rfs witch-group
10.10.10.10 0000a080 4 interface c5/0/3 hccp 4 working 4
hccp 4 channel-switch 4 rfs wb rfs witch-group 10.10.10.10
88880800 4 interface c5/0/4 hccp 5 working 4 hccp 5
channel-switch 4 rfs wb rfs witch-group 10.10.10.10
22220200 4

```

Proteja configurações da interface

```

interface c5/1/0
hccp 1 protect 1 10.10.10.1
hccp 1 channel-switch 1 rfs wa rfs witch-group 10.10.10.10
44440400 1
hccp 1 protect 2 10.10.10.1
hccp 1 channel-switch 2 rfs wa rfs witch-group 10.10.10.10
44440400 2
hccp 1 protect 3 10.10.10.1
hccp 1 channel-switch 3 rfs wa rfs witch-group 10.10.10.10
44440400 3
hccp 1 protect 4 10.10.10.1
hccp 1 channel-switch 4 rfs wa rfs witch-group 10.10.10.10
44440400 4
-----
-----
interface c5/1/1
hccp 2 protect 1 10.10.10.1
hccp 2 channel-switch 1 rfs wa rfs witch-group 10.10.10.10
11110100 1
hccp 2 protect 2 10.10.10.1
hccp 2 channel-switch 2 rfs wa rfs witch-group 10.10.10.10
11110100 2
hccp 2 protect 3 10.10.10.1
hccp 2 channel-switch 3 rfs wa rfs witch-group 10.10.10.10
11110100 3
hccp 2 protect 4 10.10.10.1
hccp 2 channel-switch 4 rfs wa rfs witch-group 10.10.10.10
11110100 4
-----
-----
interface c5/1/2
hccp 3 protect 1 10.10.10.1
hccp 3 channel-switch 1 rfs wa rfs witch-group 10.10.10.10
00005000 1
hccp 3 channel-switch 1 rfs wb rfs witch-group 10.10.10.10

```

```

0000a080 1
hccp 3 protect 2 10.10.10.1
hccp 3 channel-switch 2 rfswa rfswhitch-group 10.10.10.10
00005000 2
hccp 3 channel-switch 2 rfswb rfswhitch-group 10.10.10.10
0000a080 2
hccp 3 protect 3 10.10.10.1
hccp 3 channel-switch 3 rfswa rfswhitch-group 10.10.10.10
00005000 3
hccp 3 channel-switch 3 rfswb rfswhitch-group 10.10.10.10
0000a080 3
hccp 3 protect 4 10.10.10.1
hccp 3 channel-switch 4 rfswa rfswhitch-group 10.10.10.10
00005000 4
hccp 3 channel-switch 4 rfswb rfswhitch-group 10.10.10.10
0000a080 4
-----
interface c5/1/3
hccp 4 protect 1 10.10.10.1
hccp 4 channel-switch 1 rfswb rfswhitch-group 10.10.10.10
88880800 1
hccp 4 protect 2 10.10.10.1
hccp 4 channel-switch 2 rfswb rfswhitch-group 10.10.10.10
88880800 2
hccp 4 protect 3 10.10.10.1
hccp 4 channel-switch 3 rfswb rfswhitch-group 10.10.10.10
88880800 3
hccp 4 protect 4 10.10.10.1
hccp 4 channel-switch 4 rfswb rfswhitch-group 10.10.10.10
88880800 4
-----
interface c5/1/4
hccp 5 protect 1 10.10.10.1
hccp 5 channel-switch 1 rfswb rfswhitch-group 10.10.10.10
22220200 1
hccp 5 protect 2 10.10.10.1
hccp 5 channel-switch 2 rfswb rfswhitch-group 10.10.10.10
22220200 2
hccp 5 protect 3 10.10.10.1
hccp 5 channel-switch 3 rfswb rfswhitch-group 10.10.10.10
22220200 3
hccp 5 protect 4 10.10.10.1
hccp 5 channel-switch 4 rfswb rfswhitch-group 10.10.10.10
22220200 4

```

Estas configurações são para Failover da relação MAC, mas mantêm-se na mente que um PATÍBULO inteiro ([ASIC] dos circuitos integrados do aplicativo específicos) falhará junto. A parte DS 0 e 1 o mesmo ASIC, DS 2 e 3 compartilha do mesmo ASIC, e o DS4 está em seu próprio ASIC. Se uma relação não tem o HCCP configurado, a seguir não Failover, mesmo se compartilha do mesmo ASIC.

Se você configura **anfitriões máximos ascendentes do táxi x** e ou **conector y do táxi u4**, a seguir você configurou um VI (interface virtual), igualmente sabido como domínios MAC configuráveis. Agora, a placa de linha inteira Failover como um pacote quando você tem toda a falha da relação. Se os comandos do conector são suprimidos, a única maneira de desabotoar a influência da interface virtual em Failover é recarregar o roteador.

8+1 configurações de exemplo

```

uBR10012-1# show run Current configuration : 8567 bytes
! version 12.2 no parser cache no service single-slot-
reload-enable no service pad service timestamps debug
uptime service timestamps log uptime no service
password-encryption ! hostname uBR10k ! boot system
flash slot0: ubr10k-k8p6-mz.122-15.BC1 logging rate-
limit console all 10 except critical enable secret 5
$1$.Dvy$fcPOhshUNjyfePH73FHRG cable modulation-profile
21 request 0 16 0 22 qpsk scrambler 152 no-diff 32 fixed
cable modulation-profile 21 initial 5 34 0 48 qpsk
scrambler 152 no-diff 64 fixed cable modulation-profile
21 station 5 34 0 48 qpsk scrambler 152 no-diff 64 fixed
cable modulation-profile 21 short 3 76 12 22 qpsk
scrambler 152 no-diff 64 shortened cable modulation-
profile 21 long 9 232 0 22 qpsk scrambler 152 no-diff 64
shortened ! no cable qos permission create no cable qos
permission update cable qos permission modems cable
time-server ! cable config-file docsis.cm frequency
453000000 service-class 1 max-upstream 10000 service-
class 1 max-downstream 10000 service-class 1 max-burst
1522 ! redundancy main-cpu auto-sync standard facility-
alarm intake-temperature major 49 facility-alarm intake-
temperature minor 40 facility-alarm core-temperature
major 53 facility-alarm core-temperature minor 45 card
1/0 lgigethernet-1 card 1/1 2cable-tccplus card 2/0
lgigethernet-1 card 2/1 2cable-tccplus card 5/0 5cable-
mc520s-d card 5/1 5cable-mc520s-d card 6/0 5cable-
mc520s-d card 6/1 5cable-mc520s-d card 7/0 5cable-
mc520s-d card 7/1 5cable-mc520s-d card 8/0 5cable-
mc520s-d card 8/1 5cable-mc520s-d ip subnet-zero ip host
rfswitch 2001 10.10.10.1 !--- This is set for console
access from the 10K to the Switch. !--- The IP address
is for Loopback0. ip dhcp pool MODEMS1 network
172.25.1.0 255.255.255.0 bootfile docsis.cm next-server
172.25.1.1 default-router 172.25.1.1 option 7 ip
172.25.1.1 option 4 ip 172.25.1.1 option 2 hex 0000.0000
lease 2 3 4 ! ip dhcp pool MODEMS2 network 172.25.2.0
255.255.255.0 bootfile docsis.cm next-server 172.25.2.1
default-router 172.25.2.1 option 7 ip 172.25.2.1 option
4 ip 172.25.2.1 option 2 hex 0000.0000 lease 2 3 4 ! ip
dhcp-client network-discovery informs 2 discovers 2
period 15 !--- An internal DHCP server was used for
testing instead of external servers !--- (cable helper,
TOD, TFTP, and so forth). External servers are
recommended !--- in a "real" production network. !
interface Loopback0 ip address 10.10.10.1
255.255.255.252 ! interface FastEthernet0/0/0 ip address
10.97.1.8 255.255.255.0 ip rip receive version 2 no ip
split-horizon no keepalive ! interface
GigabitEthernet1/0/0 no ip address negotiation auto !
interface GigabitEthernet2/0/0 no ip address negotiation
auto !

```

Configuração da interface da amostra N+1

```

!--- This assumes rfs2 is on the top, as shown in the
cable reference guide. !--- Other interfaces will be the
same, except a different member number for each !---
HCCP group. interface Cable5/1/0 !--- This is the
Protect for the first group. It may be best to configure
the Protect !--- interface(s) last, after the Working
interfaces are configured, or keep the !--- interface
"shut" until finished with all configurations. no ip
address !-- No need to set the IP address because it

```



```
will come from the Working card via SNMP. no keepalive
!--- This defaults to 10 seconds with the N+1 Cisco IOS
code, but it should be disabled !--- on the Protect
interface or set relatively high. cable downstream annex
B cable downstream modulation 64qam cable downstream
interleave-depth 32 !--- The DS modulation and
Interleave must be the same on Protect and Working !---
of the same group. The Protect interface itself must be
"no shut" for HCCP !--- to activate. cable downstream
rf-shutdown cable upstream 0 shutdown !--- These will
automatically become "no shut" when a failover occurs.
cable upstream 1 shutdown cable upstream 2 shutdown
cable upstream 3 shutdown hccp 1 protect 1 10.10.10.1 !-
-- This is the HCCP first group and it is protecting
member 1 with member one's !--- FE IP address. If it is
intra-chassis, you can use the Loopback0 IP address.
hccp 1 channel-switch 1 rfs2 rfs2switch-group 10.97.1.20
AA200000 1 !--- This is the IP address of the Switch and
it is protecting member 1, !--- which has a bitmap of
AA200000 in Switch slot 1. hccp 1 protect 2 10.10.10.1
!--- This is the HCCP first group and it is protecting
member 2 with the loopback !--- IP address. hccp 1
channel-switch 2 rfs2 rfs2switch-group 10.97.1.20
AA200000 2 !--- This is the IP address of the Switch and
it is protecting member 2, !--- with a bitmap of
AA200000 in Switch slot 2. hccp 1 protect 3 10.10.10.1
hccp 1 channel-switch 3 rfs2 rfs2switch-group 10.97.1.20
AA200000 3 hccp 1 protect 4 10.10.10.1 hccp 1 channel-
switch 4 rfs2 rfs2switch-group 10.97.1.20 AA200000 4 hccp
1 protect 5 10.10.10.1 hccp 1 channel-switch 5 rfs2
rfs2switch-group 10.97.1.20 AA200000 5 hccp 1 protect 6
10.10.10.1 hccp 1 channel-switch 6 rfs2 rfs2switch-group
10.97.1.20 AA200000 6 hccp 1 protect 7 10.10.10.1 hccp 1
channel-switch 7 rfs2 rfs2switch-group 10.97.1.20
AA200000 7 !--- These channel-switch configurations can
be copied and pasted into their !--- respective Working
interfaces. hccp 1 timers 5000 15000 !--- hccp 1 timers
<hellotime> <holdtime> !--- This is mostly for inter
chassis communication, so set it high for the 10K !---
as this can create extra CPU load. no hccp 1 revertive !
interface Cable5/1/1 !--- This is the Protect for the
second group. no ip address no keepalive cable
downstream annex B cable downstream modulation 64qam
cable downstream interleave-depth 32 cable downstream
rf-shutdown cable upstream 0 shutdown cable upstream 1
shutdown cable upstream 2 shutdown cable upstream 3
shutdown ! hccp 2 protect 1 10.10.10.1 hccp 2 channel-
switch 1 rfs2 rfs2switch-group 10.97.1.20 55100000 1 !---
Because this MAC domain is on right side of header, the
bitmap in hexadecimal !--- code is 55100000. hccp 2
protect 2 10.10.10.1 hccp 2 channel-switch 2 rfs2
rfs2switch-group 10.97.1.20 55100000 2 hccp 2 protect 3
10.10.10.1 hccp 2 channel-switch 3 rfs2 rfs2switch-group
10.97.1.20 55100000 3 hccp 2 protect 4 10.10.10.1 hccp 2
channel-switch 4 rfs2 rfs2switch-group 10.97.1.20
55100000 4 hccp 2 protect 5 10.10.10.1 hccp 2 channel-
switch 5 rfs2 rfs2switch-group 10.97.1.20 55100000 5 hccp
2 protect 6 10.10.10.1 hccp 2 channel-switch 6 rfs2
rfs2switch-group 10.97.1.20 55100000 6 hccp 2 protect 7
10.10.10.1 hccp 2 channel-switch 7 rfs2 rfs2switch-group
10.97.1.20 55100000 7 hccp 2 timers 5000 15000 no hccp 2
revertive interface Cable5/1/2 !--- This is the Protect
for the third group. no ip address no keepalive cable
downstream annex B cable downstream modulation 64qam
```

```
cable downstream interleave-depth 32 cable downstream
rf-shutdown cable upstream 0 shutdown cable upstream 1
shutdown cable upstream 2 shutdown cable upstream 3
shutdown hccp 3 protect 1 10.10.10.1 hccp 3 channel-
switch 1 rfswl rfswitch-group 10.97.1.19 00C80000 1 hccp
3 channel-switch 1 rfsw2 rfswitch-group 10.97.1.20
00C00000 1 !--- Because the third MAC domain will
traverse both Switches, two statements are !--- needed.
The "00" in front of the bitmaps will be dropped when
viewing the !--- running configuration. no hccp 3
revertive interface Cable5/1/3 !--- This is the Protect
for the fourth group. hccp 4 protect 1 10.10.10.1 hccp 4
channel-switch 1 rfswl rfswitch-group 10.97.1.19
AA200000 1 hccp 4 protect 2 10.10.10.1 hccp 4 channel-
switch 2 rfswl rfswitch-group 10.97.1. 19 AA200000 2
hccp 4 protect 3 10.10.10.1 hccp 4 channel-switch 3
rfswl rfswitch-group 10.97.1. 19 AA200000 3 hccp 4
protect 4 10.10.10.1 hccp 4 channel-switch 4 rfswl
rfswitch-group 10.97.1. 19 AA200000 4 hccp 4 protect 5
10.10.10.1 hccp 4 channel-switch 5 rfswl rfswitch-group
10.97.1. 19 AA200000 5 hccp 4 protect 6 10.10.10.1 hccp
4 channel-switch 6 rfswl rfswitch-group 10.97.1. 19
AA200000 6 hccp 4 protect 7 10.10.10.1 hccp 4 channel-
switch 7 rfswl rfswitch-group 10.97.1. 19 AA200000 7 no
hccp 4 revertive interface Cable5/1/4 !--- This is the
Protect for the fifth group. hccp 5 protect 1 10.10.10.1
hccp 5 channel-switch 1 rfswl rfswitch-group 10.97.1.19
55100000 1 hccp 5 protect 2 10.10.10.1 hccp 5 channel-
switch 2 rfswl rfswitch-group 10.97.1. 19 55100000 2
hccp 5 protect 3 10.10.10.1 hccp 5 channel-switch 3
rfswl rfswitch-group 10.97.1. 19 55100000 3 hccp 5
protect 4 10.10.10.1 hccp 5 channel-switch 4 rfswl
rfswitch-group 10.97.1. 19 55100000 4 hccp 5 protect 5
10.10.10.1 hccp 5 channel-switch 5 rfswl rfswitch-group
10.97.1. 19 55100000 5 hccp 5 protect 6 10.10.10.1 hccp
5 channel-switch 6 rfswl rfswitch-group 10.97.1. 19
55100000 6 hccp 5 protect 7 10.10.10.1 hccp 5 channel-
switch 7 rfswl rfswitch-group 10.97.1. 19 55100000 7 !---
- Output suppressed. ! interface Cable8/1/0 !--- This is
the Working for the first group. ip address 10.192.5.1
255.255.255.0 secondary ip address 172.25.1.1
255.255.255.0 !--- Interface bundling is supported as
well as subinterfaces. ip rip send version 2 ip rip
receive version 2 keepalive 1 !--- The keepalive time is
in seconds and the default is 10 seconds for HCCP code.
!--- Only set this when modems have stabilized. cable
downstream annex B cable downstream modulation 64qam
cable downstream interleave-depth 32 cable downstream
frequency 453000000 !--- This is DS frequency, which
must be set for the internal upconverter to operate.
cable downstream channel-id 0 no cable downstream rf-
shutdown !--- This is needed to turn on the DS RF
output. cable upstream 0 frequency 24000000 !--- If you
are doing dense mode combining, the upstream frequencies
must be different. !--- If no two US ports are shared,
then the same frequency can be used. cable upstream 0
power-level 0 cable upstream 0 connector 0 !--- This is
a new command for virtual interfaces, where USS can be
used for different !--- DS MAC domains. cable upstream 0
channel-width 3200000 cable upstream 0 minislots-size 2
cable upstream 0 modulation-profile 21 no cable upstream
0 shutdown !--- Output suppressed. cable dhcp-giaddr
policy !--- This tells CMS to get an IP address from the
primary scope and !--- tells CPEs to use the secondary
```

```
scope. hccp 1 working 1 !--- This is Working member 1 of
HCCP Group 1. hccp 1 channel-switch 1 rfs2 rfs2switch-
group 10.97.1.20 AA200000 1 !--- This is the IP address
of Switch and member 1, which has a bitmap of !---
AA200000 in Switch slot 1. hccp 1 reverttime 120 !---
This is the time in minutes (plus 2 minute suspend) for
the card to switch back !--- to normal mode, if the
fault has cleared. If a fault was initiated by a
keepalive !--- and you had a fault on the Protect card,
it would revert back after the suspend !--- time and not
wait the full revert time. ! interface Cable8/1/1 !---
This is the Working interface for the second HCCP group.
ip address 10.192.5.1 255.255.255.0 secondary ip address
172.25.2.1 255.255.255.0 ip rip send version 2 ip rip
receive version 2 keepalive 1 cable downstream annex B
cable downstream modulation 64qam cable downstream
interleave-depth 32 cable downstream frequency 453000000
cable downstream channel-id 1 no cable downstream rf-
shutdown cable upstream 0 frequency 24000000 cable
upstream 0 power-level 0 cable upstream 0 connector 4
cable upstream 0 channel-width 3200000 cable upstream 0
minislot-size 22 cable upstream 0 modulation-profile 21
no cable upstream 0 shutdown !--- Output suppressed.
cable dhcp-giaddr policy hccp 2 working 1 !--- This is
Working member 1 of HCCP Group 2. hccp 2 channel-switch
1 rfs2 rfs2switch-group 10.97.1.20 55100000 1 !--- This
is the IP address of the Switch and Member 1 of Group 2,
which has a bitmap !--- of 55100000 in Switch slot 1.
hccp 2 reverttime 120 ! interface Cable8/1/2 !--- This
is the Working interface for the third HCCP group. ip
address 10.192.5.1 255.255.255.0 secondary ip address
172.25.3.1 255.255.255.0 ip rip send version 2 ip rip
receive version 2 keepalive 1 cable downstream annex B
cable downstream modulation 64qam cable downstream
interleave-depth 32 cable downstream frequency 453000000
cable downstream channel-id 2 no cable downstream rf-
shutdown cable upstream 0 frequency 24000000 cable
upstream 0 power-level 0 cable upstream 0 connector 8
cable upstream 0 channel-width 3200000 cable upstream 0
minislot-size 2 cable upstream 0 modulation-profile 21
no cable upstream 0 shutdown cable dhcp-giaddr policy !-
-- Output suppressed. hccp 3 working 1 !--- This is
Working member 1 of HCCP Group 3. hccp 3 channel-switch
1 rfs1 rfs1switch-group 10.97.1.19 00c80000 1 hccp 3
channel-switch 1 rfs2 rfs2switch-group 10. 97.1.20
00c00000 1 hccp 3 reverttime 120 interface Cable8/1/3 !-
--This is the Working interface for the fourth HCCP
group. hccp 4 working 1 hccp 4 channel-switch 1 rfs1
rfs1switch-group 10.97.1.19 AA200000 1 hccp 4 reverttime
120 interface Cable8/1/4 !--- This is the Working
interface for the fifth HCCP group. hccp 5 working 1
hccp 5 channel-switch 1 rfs1 rfs1switch-group 10.97.1.19
55100000 1 hccp 5 reverttime 120 ! ip classless no ip
http server ! no cdp run snmp-server community private
RW !--- This does not affect the HCCP communications
between the Switch and 10K, !--- unless it is changed.
snmp-server enable traps cable no cdp run snmp-server
manager tftp-server server tftp-server ios.cf alias
ios.cf ! alias exec t configure terminal alias exec scm
show cable modem alias exec scr sh cab mode remote alias
exec shb sh hccp br alias exec shd sh hccp detail alias
exec shc sh hccp chan ! line con 0 logging synchronous
line aux 0 no exec transport input all !--- The three
lines above were used to console from the Auxiliary port
```

```
of the 10K !--- to the Switch. line vty 0 4 session-  
timeout 400 password xx login endBuilding  
configuration...
```

Informações Relacionadas

- [Suporte por tecnologia da Banda larga a cabo](#)
- [Suporte Técnico - Cisco Systems](#)