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T1 Configuration



```
DUT1/configure# show module configuration all
```

T1 #	Framing	Coding	ClkSrc	LBO-CableLength	State	Alarm	Mode
0/1/0	esf	b8zs	line	csu/0db	up	N/A	NO-CAS
0/1/1	esf	b8zs	line	csu/0db	up	N/A	NO-CAS

● T1 Numbering

- 0/1/0~1, 0/3/0~1

● T1 Module Configuration

- configure/module/t1 #



● Configure options: timing, framing, line coding etc.

- Under “module” subcommand tree
- DUT1/configure/module/t1 (0/1/0)# ?

```
alarms                To configure Alarms
circuitId             Assign a circuit Id to the T1 interface
clock_source        To configure clock source for T1. (default: line)
contactInfo           Enter contact information for the T1 interface
description           Enter a description for the T1 interface
enable              To enable T1.(default: enabled)
exit                  Exit from module mode
framing               To configure framing for T1. (default: esf)
linecode              To configure linecode for T1. (default: b8zs)
linemode              To configure Line Mode,LBO/Cable Length for T1. (default: csu,
db_zero)
    loopback_framing  Configure insertion or overwriting of in-band loopcode
framing.(default:overwrite)
    name              Enter name for the T1 interface
    yellow_alarm      To configure yellow alarm for T1. (default: disable)
```

T1 configure commands



● Enable

- To disable a specific T1 port, use “no enable”
- When disabled, the LED would be switched OFF.

● Clock_source

- internal or loop timing (line)

🟡 show module commands

```
DUT1/configure# show module ?
```

alarms	display alarms.
ansistats	access ANSI statistics commands
attstats	access ATT statistics commands
configuration	display configuration.
ietfstats	access IETF statistics commands
test	display test Configuration & status info.
thresholds	display configured thresholds.
userstats	access user statistics commands

T1 show commands



- show module configuration all
- show module alarms t1 0/1/0
- show module ietfstatistics t1 0/1/0
- show module ansistats t1 0/1/0

```
DUT1/configure# show module configuration all
```

T1 #	Framing	Coding	ClkSrc	LBO-CableLength	State	Alarm	Mode
0/1/0	esf	b8zs	line	csu/0db	up	N/A	NO-CAS
0/1/1	esf	b8zs	line	csu/0db	up	N/A	NO-CAS



● Testing options: loopback & bert

```
DUT1/test/t1 (0/1/0)# ?  
bert          Configure T1 interface for bert test  
exit          Exit from t1 mode  
loopback      Configure T1 interface for loopback tests
```

● Loopback options

```
DUT1/test/t1 (0/1/0)# loopback ?  
line          Configure T1 interface for local line loopback  
payload       Configure T1 interface for local payload loopback  
remote        Configure T1 interface for remote loopback tests
```


Serial Module Configuration

```
Ubigate# show module configuration all  
Serial interface 0/3/0 is NOT ENABLED  
Serial interface 0/1/0 is NOT ENABLED  
Serial interface 0/1/1 is NOT ENABLED
```

● Serial Numbering

- 0/1/0~1, 0/3/0~1

● Serial Module Configuration

- configure/module/serial#

● Configure options: mode selection and configuration of selected mode type configuration.

- Ubigate/configure/module/serial (0/1/0)# ?

```
Ubigate/configure/module/serial (0/1/0)# ?
```

S232	configure 232 interface and its components
S449	configure 449 interface and its components
S530	configure 530 interface and its components
S530A	configure 530A interface and its components
exit	Exit from module mode
mode	To configure mode of operation for Serial Interface
v35	configure V.35 interface and its components
x21	configure X.21 interface and its components

Serial Module Port Configure Commands



Mode

- To configure mode of operation for Serial Module Port
- Ubigate/configure/module/serial (0/1/0)# mode ?

```
Ubigate/configure/module/serial (0/1/0)# mode ?
X.21          X.21 mode of operation
V.35          V.35 mode of operation
S232          232 mode of operation
S449          449 mode of operation
S530          530 mode of operation
S530A         530A mode of operation
```

Serial Module Port Configuration



● Module port configuration options: clock rate, clock source, etc.

● Ubigate/configure/module/serial (0/1/0)/x21# ?

```
Ubigate/configure/module/serial (0/1/0)/x21# ?
```

clock_rate	To configure clock rate for X21
clock_source	To configure clock source for X.21 (Rx clock for DCE, Tx
clock for DTE)	
crc	To configure CRC for X21
data_mode	To configure data mode for X.21
exit	Exit from x21 mode
flow_control	To configure hardware flow control for X21
mode	To configure Operational Mode for X21
invert_clock	To configure invert clock for X21
name	Enter name for the X.21 interface

● **clock_rate**

- To configure clock rate for serial interface
- 1200 ~ 8000000 Hz

● **clock_source**

- To configure clock source for serial interface
- internal/line

🟡 show module commands

```
Ubigate# show module ?
```

alarms	display alarms.
configuration	display configuration.
test	display test Configuration & status info.
userstats	access user statistics commands
<cr>	

Serial Module Port Show Commands



- show module configuration all
- show module alarms serial 0/1/0
- show module test serial 0/1/0
- show module userstats serial 0/1/0

```
Ubigate# show module alarms serial 0/1/0
```

```
      SERIAL 0/1/0 Alarms
```

```
DTR : OFF    DSR : OFF    ST : OFF
CTS : OFF    RTS : OFF
```


● Testing options: dce_loop and dte_loop

```
Ubigate/test/serial (0/1/0)# ?
```

dce_loop	Configure serial for loopback
dte_loop	Configure serial for loopback
exit	Exit from serial mode

● Loopback options

```
Ubigate/test/serial (0/1/0)# dce_loop ?
```

line	line test
cable	cable test
remote	remote test

Point to Point Protocol



● Configuring a PPP bundle on a T1 link

● A Side

```
Ubigate#conf t
Ubigate/configure/#interface bundle wan1
Ubigate/configure/interface/bundle wan1#link t1 0/1/0
Ubigate/configure/interface/bundle wan1#encap ppp
Ubigate/configure/interface/bundle wan1#ip address 20.20.20.1 24
Ubigate/configure/interface/bundle wan1#end
Ubigate#show interface bundle wan1
```

● B Side

```
Ubigate#conf t
Ubigate/configure/#interface bundle wan1
Ubigate/configure/interface/bundle wan1#link t1 0/1/0
Ubigate/configure/interface/bundle wan1#encap ppp
Ubigate/configure/interface/bundle wan1#ip address 20.20.20.2 24
Ubigate/configure/interface/bundle wan1#end
Ubigate#show interface bundle wan1
```

- **Configuring a PPP bundle on a serial link**
 - A Side (DTE)

```
Ubigate#conf t
Ubigate/configure# module serial 0/1/0
Ubigate/configure/module/serial (0/1/0)# mode X.21
Ubigate/configure/module/serial (0/1/0)# x21
Ubigate/configure/module/serial (0/1/0)/x21# mode dte
Ubigate/configure/module/serial (0/1/0)/x21# clock_rate 2000000
Ubigate/configure/module/serial (0/1/0)/x21# exit 2
Ubigate/configure/#interface bundle wan1
Ubigate/configure/interface/bundle wan1#link serial 0/1/0
Ubigate/configure/interface/bundle wan1#encap ppp
Ubigate/configure/interface/bundle wan1#ip address 20.20.20.1 24
Ubigate/configure/interface/bundle wan1#end
Ubigate#show interface bundle wan1
```



● Configuring a PPP bundle on a serial link

● B Side (DCE)

```
Ubigate#conf t
Ubigate/configure# module serial 0/1/0
Ubigate/configure/module/serial (0/1/0)# mode X.21
Ubigate/configure/module/serial (0/1/0)# x21
Ubigate/configure/module/serial (0/1/0)/x21# mode dce
Ubigate/configure/module/serial (0/1/0)/x21# clock_rate 2000000
Ubigate/configure/module/serial (0/1/0)/x21# exit 2
Ubigate/configure/#interface bundle wan1
Ubigate/configure/interface/bundle wan1#link serial 0/1/0
Ubigate/configure/interface/bundle wan1#encap ppp
Ubigate/configure/interface/bundle wan1#ip address 20.20.20.2 24
Ubigate/configure/interface/bundle wan1#end
Ubigate#show interface bundle wan1
```



● Configuring a fractional PPP T1 Link

● A Side

```
Ubigate#configure term
Ubigate/configure#Interface bundle wan1
Ubigate/configure/interface/bundle wan1#link t1 0/1/1:1-2
Ubigate/configure/interface/bundle wan1#encap ppp
Ubigate/configure/interface/bundle wan1#ip address 2.2.2.1 24
Ubigate/configure/interface/bundle wan1#exit
Ubigate/configure #exit
```

● B Side

```
Ubigate#configure term
Ubigate/configure#Interface bundle wan1
Ubigate/configure/interface/bundle wan1#link t1 0/1/1:1-2
Ubigate/configure/interface/bundle wan1#encap ppp
Ubigate/configure/interface/bundle wan1#ip address 2.2.2.2 24
Ubigate/configure/interface/bundle wan1#exit
Ubigate/configure #exit
```

Use channel 1 to 2

Configure PPP Authentication

● Enables PAP authentication.

● Client Side

```
Ubigate/configure/interface/bundle wan1# ppp pap sent-username Admin Networks
```

● Server Side

```
Ubigate/configure/interface/bundle wan1# ppp authentication pap  
Ubigate/configure/interface/bundle wan1# ppp pap peer-name Admin Networks  
Ubigate/configure/interface/bundle wan1# ppp authentication-database local
```


Configure PPP Authentication



● Enable PAP authentication with RADIUS server.

- Configure RADIUS server's IP address.

```
Ubigate#configure term
Ubigate/configure#aaa
Ubigate/configure/aaa#radius
Ubigate/configure/aaa/radius# primary_server 100.1.1.10
Ubigate/configure/aaa/radius# shared_key 3333
Ubigate/configure# aaa enable
```

- Enable the PAP authentication

```
Ubigate/configure/bundle wan1# ppp authentication-database
radius
Ubigate/configure/bundle wan1# ppp authentication pap
```

Configure PPP Authentication

● Enables CHAP authentication.

● Client Side

```
Ubigate#configure term
Ubigate/configure#interface bundle wan1
Ubigate/configure/interface bundle wan1# ppp chap sent-username Admin
handy
```

● Server Side

```
Ubigate#configure term
Ubigate/configure#interface bundle wan1
Ubigate/configure/interface/bundle wan1# ppp authentication chap
Ubigate/configure/interface/bundle wan1# ppp chap peer-name Admin
handy
Ubigate/configure/interface/bundle wan1# ppp chap sent-username Admin2
handy2
```

Configure PPP Authentication

● Enable CHAP authentication with RADIUS server.

- Configure the CHAP sent-username on A side.

```
Ubigate/configure term#  
Ubigate/configure#interface bundle wan1  
Ubigate/configure/interface/bundle wan1#ppp chap sent-username Admin  
handy
```

- Configure radius server's ip address on B side.

```
Ubigate#configure term  
Ubigate/configure#aaa  
Ubigate/configure/aaa#radius  
Ubigate/configure/aaa/radius#primary_server 100.1.1.10  
Ubigate/configure/aaa/radius# shared_key 3333  
Ubigate/configure# aaa enable
```

- Configure username and password on the radius server.
- Enable the CHAP authentication on B side.

```
Ubigate/configure/interface/bundle wan1#ppp authentication-database  
radius  
Ubigate/configure/interface/bundle wan1#ppp authentication chap  
Ubigate/configure/interface/bundle wan1#ppp chap sent-username Admin2  
handy2
```



● show interface configuration information

```
Ubigate/configure/interface/bundle wan1# show interface bundle wan1
bundle wan1
-----
status                        down, ipcp not in open state
number of links                1
total bandwidth               1536 kbps

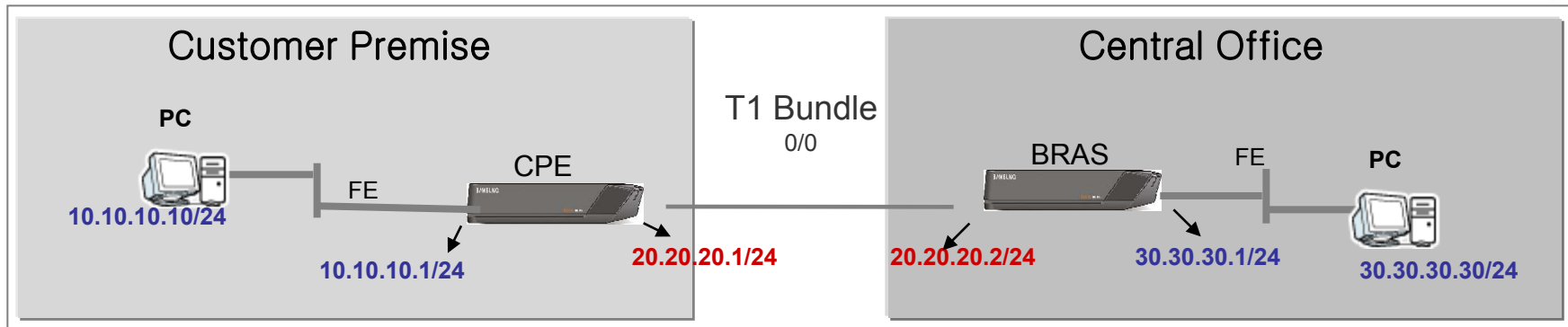
link          speed  bw    inverted  status      diffdelay(msec)
----          -
t1 0/1/0      64     1536  no        down        -
                                           ppp negotiation failed

encapsulation                ppp
  mtu                        64-1500-4500
  mru                        64-1500-4500
  magic_check                enable

Negotiated ppp bundle values
  negotiated mru              1500
  negotiated mtu              1500

Authentication parameters
  authentication-database -- local
  accept pap-request -- yes
  send  pap-request -- yes
  accept chap-challenge -- yes
  send  chap-challenge -- no
```

Exercise : Configure a PPP link



● Configure PPP (over HDLC) on 1xT1

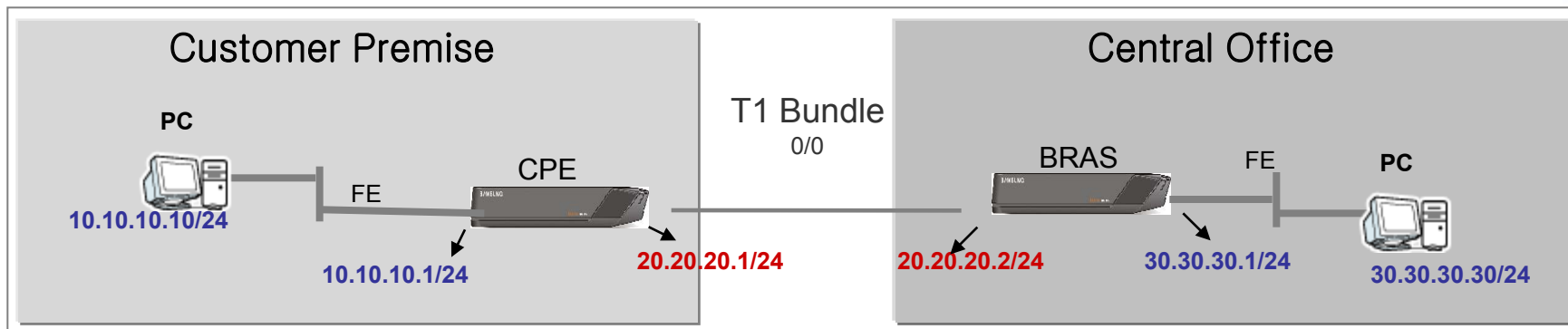
- On CO side, create wanppp using t1 0/1/0
- On CPE side, create wanppp using t1 0/1/0

● CO side configuration

```
DUT3/configure# interface bundle wanppp
DUT3/configure/interface/bundle wanppp# link t1 0/1/0
DUT3/configure/interface/bundle wanppp# encapsulation ppp
DUT3/configure/interface/bundle wanppp# ip address 20.20.20.2/24
DUT3/configure/interface/bundle wanppp#
DUT3/configure/interface/bundle wanppp# show ip interfaces br
```

Interface	Type	IP-Address/Mask	Status
ethernet0/0	ETHERNET (802.3)	30.30.30.1/24	Up
ethernet0/1	ETHERNET (802.3)	105.52.35.102/24	Up
wanppp	PT2PT	20.20.20.2/24	Down

Exercise : Configure a PPP Link



CPE configuration

```
Ubigate/configure# interface bundle wanppp
```

```
Ubigate/configure/interface/bundle wanppp# link t1 0/1/0
```

```
Ubigate/configure/interface/bundle wanppp# encapsulation ppp
```

```
Ubigate/configure/interface/bundle wanppp# ip address 20.20.20.1/24
```

```
*Nov 26,2008,11:08:45 #IPMUXc-notification: <samsung> IP address(20.20.20.1) is added <OK>
```

```
Ubigate/configure/interface/bundle wanppp#
```

```
Ubigate/configure/interface/bundle wanppp# show ip interfaces br
```

Interface	Type	IP-Address/Mask	Status
ethernet0/0	ETHERNET (802.3)	10.10.10.1/24	Up
ethernet0/1	ETHERNET (802.3)	105.52.35.101/24	Up
wanppp	PT2PT	20.20.20.1/24	Up

```
Ubigate/configure/interface/bundle wanppp#
```

```
Ubigate/configure/interface/bundle wanppp# ping 20.20.20.2
```

Exercise : Configure a PPP Link



- **show ip interfaces brief**
- **show interface bundle wanppp**
- **show ip route**
- **add routes**
 - **ip route command**
- **ping**

Frame Relay

● Configuring a FR bundle on a T1 link

● A Side

```
Ubigate#conf t
Ubigate/configure/#interface bundle wan1
Ubigate/configure/interface/bundle wan1#link t1 0/1/0
Ubigate/configure/interface/bundle wan1# encapsulation fr
Ubigate/configure/interface/bundle wan1# fr
Ubigate/configure/interface/bundle wan1/fr# intf_type dte
Ubigate/configure/interface/bundle wan1/fr# pvc 16
Ubigate/configure/interface/bundle wan1/fr/pvc 16# ip address 21.21.21.1/24
Ubigate/configure/interface/bundle wan1/fr/pvc 16# end
Ubigate#show interface bundle wan1
```

● B Side

```
Ubigate#conf t
Ubigate/configure/#interface bundle wan1
Ubigate/configure/interface/bundle wan1#link t1 0/1/0
Ubigate/configure/interface/bundle wan1# encapsulation fr
Ubigate/configure/interface/bundle wan1# fr
Ubigate/configure/interface/bundle wan1/fr# intf_type dce
Ubigate/configure/interface/bundle wan1/fr# pvc 16
Ubigate/configure/interface/bundle wan1/fr/pvc 16# ip address 21.21.21.2/24
Ubigate/configure/interface/bundle wan1/fr/pvc 16# end
Ubigate#show interface bundle wan1
```

● Configuring a FR bundle on a serial link

● A Side (DTE)

```
Ubigate#conf t
Ubigate/configure# module serial 0/1/0
Ubigate/configure/module/serial (0/1/0)# mode X.21
Ubigate/configure/module/serial (0/1/0)# x21
Ubigate/configure/module/serial (0/1/0)/x21# mode dte
Ubigate/configure/module/serial (0/1/0)/x21# clock_rate 2000000
Ubigate/configure/module/serial (0/1/0)/x21# exit 2
Ubigate/configure/#interface bundle wan1
Ubigate/configure/interface/bundle wan1#link serial 0/1/0
Ubigate/configure/interface/bundle wan1# encapsulation fr
Ubigate/configure/interface/bundle wan1# fr
Ubigate/configure/interface/bundle wan1/fr# intf_type dte
Ubigate/configure/interface/bundle wan1/fr# pvc 16
Ubigate/configure/interface/bundle wan1/fr/pvc 16# ip address 21.21.21.1/24
Ubigate/configure/interface/bundle wan1/fr/pvc 16# end
Ubigate#show interface bundle wan1
```

● Configuring a FR bundle on a serial link

● B Side (DCE)

```
Ubigate#conf t
Ubigate/configure# module serial 0/1/0
Ubigate/configure/module/serial (0/1/0)# mode X.21
Ubigate/configure/module/serial (0/1/0)# x21
Ubigate/configure/module/serial (0/1/0)/x21# mode dce
Ubigate/configure/module/serial (0/1/0)/x21# clock_rate 2000000
Ubigate/configure/module/serial (0/1/0)/x21# exit 2
Ubigate/configure/#interface bundle wan1
Ubigate/configure/interface/bundle wan1#link serial 0/1/0
Ubigate/configure/interface/bundle wan1# encapsulation fr
Ubigate/configure/interface/bundle wan1# fr
Ubigate/configure/interface/bundle wan1/fr# intf_type dce
Ubigate/configure/interface/bundle wan1/fr# pvc 16
Ubigate/configure/interface/bundle wan1/fr/pvc 16# ip address 21.21.21.2/24
Ubigate/configure/interface/bundle wan1/fr/pvc 16# end
Ubigate#show interface bundle wan1
```

Configuring FRAME RELAY



● Configuring a fractional FR T1 link

● A Side

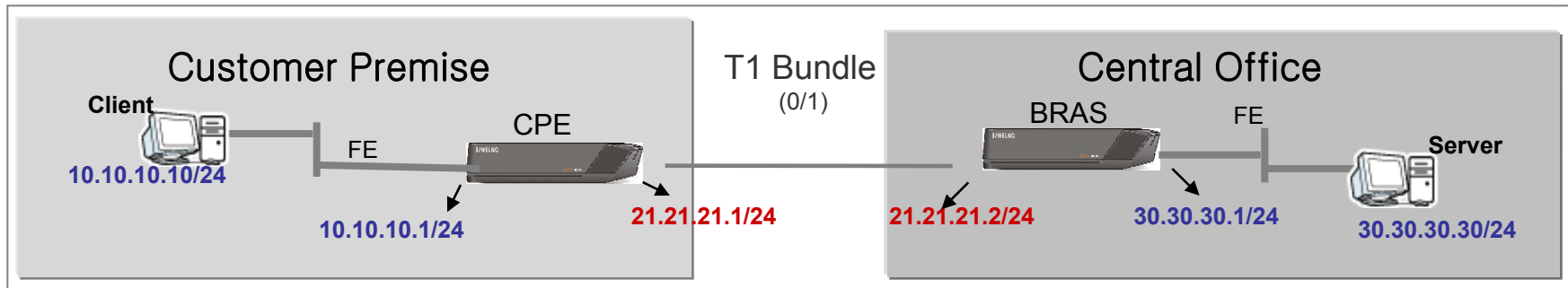
```
Ubigate#configure term
Ubigate/configure#Interface bundle wan1
Ubigate/configure/interface/bundle wan1#link t1 0/1/1:1-2
Ubigate/configure/interface/bundle wan1# encapsulation fr
Ubigate/configure/interface/bundle wan1# fr
Ubigate/configure/interface/bundle wan1/fr# intf_type dte
Ubigate/configure/interface/bundle wan1/fr# pvc 16
Ubigate/configure/interface/bundle wan1/fr/pvc 16# ip address
21.21.21.1/24
Ubigate/configure/interface/bundle wan1/fr/pvc 16# end
Ubigate#show interface bundle wan1
```

Use channel 1 to 2

● B Side

```
Ubigate#configure term
Ubigate/configure#Interface bundle wan1
Ubigate/configure/interface/bundle wan1#link t1 0/1/1:1-2
Ubigate/configure/interface/bundle wan1# encapsulation fr
Ubigate/configure/interface/bundle wan1# fr
Ubigate/configure/interface/bundle wan1/fr# intf_type dce
Ubigate/configure/interface/bundle wan1/fr# pvc 16
Ubigate/configure/interface/bundle wan1/fr/pvc 16# ip address
21.21.21.2/24
Ubigate/configure/interface/bundle wan1/fr/pvc 16# end
Ubigate#show interface bundle wan1
```

Exercise : Configure a Frame Relay Link



● Configure FR on 1xT1

- On CO side, create wanfr1 using t1 0/1/0
 - As DCE
- On CPE side, create wanfr1 using t1 0/1/0
 - As DTE

● show ip interfaces brief

● show interface bundle wanfr1

● show ip route

Configure a Frame Relay



● Configuring a Frame Relay bundle on a T1 line.

- Configure FR bundle on CO Router with the connected link and interface type as DCE.

```
CO-BRAS/configure# interface bundle wanfr1
CO-BRAS/configure/interface/bundle wanfr1# link t1 0/1/0
CO-BRAS/configure/interface/bundle wanfr1# encapsulation fr
CO-BRAS/configure/interface/bundle wanfr1# fr
CO-BRAS/configure/interface/bundle wanfr1/fr# intf_type dce
CO-BRAS/configure/interface/bundle wanfr1/fr# pvc 16
CO-BRAS/configure/interface/bundle wanfr1/fr/pvc 16# ip address 21.21.21.2/24
CO-BRAS/configure/interface/bundle wanfr1/fr/pvc 16# exit
```

- Configure a FR bundle on the Ubigate CPE with interface type DTE.

```
Ubigate/configure# interface bundle wanfr1
Ubigate/configure/interface/bundle wanfr1# link t1 0/1/0
Ubigate/configure/interface/bundle wanfr1# encapsulation fr
Ubigate/configure/interface/bundle wanfr1# fr
Ubigate/configure/interface/bundle wanfr1/fr# pvc 16
Ubigate/configure/interface/bundle wanfr1/fr/pvc 16# ip address 21.21.21.1/24
Ubigate/configure/interface/bundle wanfr1/fr/pvc 16# exit
Ubigate/configure/interface/bundle wanfr1/fr/pvc 16# show ip interfaces br
```


Configure a Frame Relay (continued)



● Verification

```
Ubigate# show interface bundle wanfr1
```

● Test

```
Ubigate# ping 21.21.21.2
```

Configure a Frame Relay (continued)



● show FR interface

```
Ubigate# show interface bundle wanfr1

bundle wanfr1
-----
status                        down
number of links               1
total bandwidth               1536 kbps, utilized : 1536 kbps

link          speed  bw    inverted  status      diffdelay(msec)
----          -
t1 0/1/0      64     1536  no        down        -
                                     fr negotiation failed

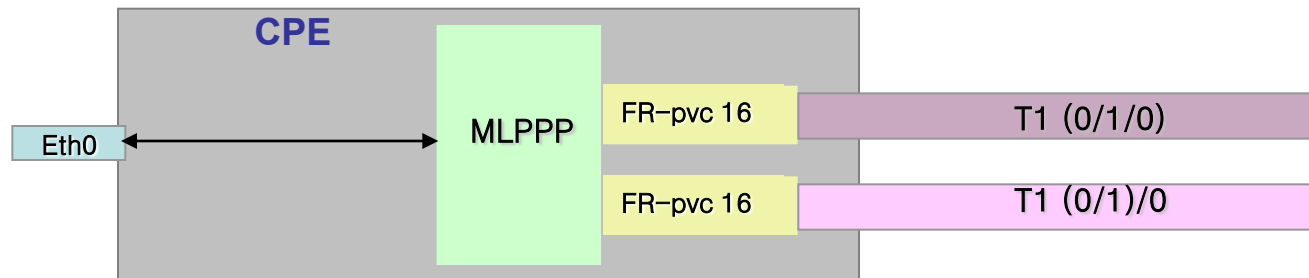
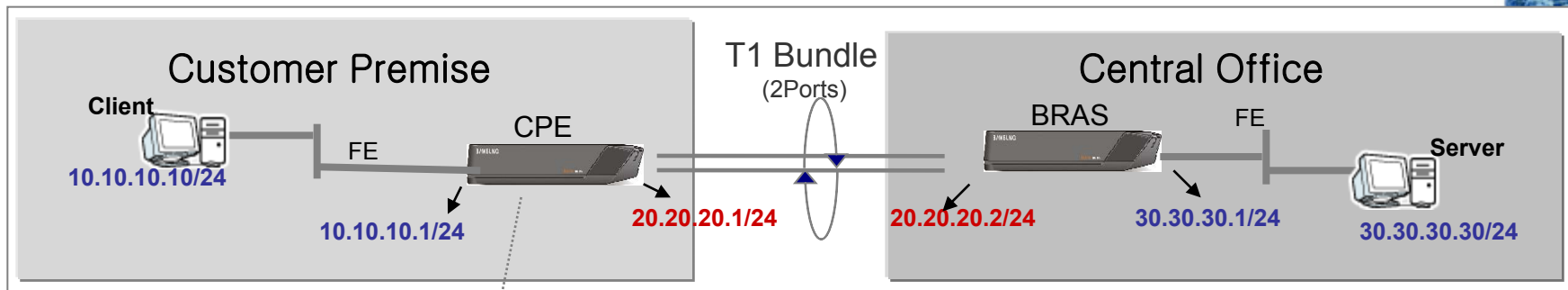
encapsulation                frame relay
  mtu                        1500
  RFC1490 fragmentation      enabled
  LMI                        ansi(ANSI T1.617 Annex D)
                             keepalive(t392) 15  n392 9  n393 10
  interface type              DCE

Bundle/Interface Counters since last boot/clear
  Rx Frames                   0      Rx Invalid Frames      0
  Rx FECNS                    0      Rx BECNs                 0
  Rx Short Frames             0      Rx Long Frames           0
Press any key to continue (q : quit | enter : next line) :
```



MLPPP over FR (2xT1)

MLPPP over FR (2 x T1)



Remove all bundles

- show ip interfaces brief
- no interface bundle <bundle-name>

Create MLPPP over FR

- Create **wanfr0** – pvc 16
- Create **wanfr1** – pvc 16
- Create MLPPP over FR **wanpppfr** linking wanfr0 and wanfr1

ping 20.20.20.2

MLPPP over FR : Create 2 FR Links



```
interface bundle wanfr0
```



Create first FR link

```
link t1 0/1/0
```

```
encapsulation relay
```

```
fr
```

```
intf_type dte
```

```
lmi ansi
```

```
exit lmi
```

```
pvc 16
```

```
exit pvc
```

```
exit fr
```

```
exit bundle
```

```
interface bundle wanfr1
```



Create second FR link

```
link t1 0/1/1
```

```
encapsulation relay
```

```
fr
```

```
intf_type dte
```

```
lmi ansi
```

```
exit lmi
```

```
pvc 16
```

```
exit pvc
```

```
exit fr
```

```
exit bundle
```

MLPPP over FR: Create PPP Bundle



```
interface pppofr wanpppfr
```

```
add_vc 16 wanfr0
```



Add first FR link

```
add_vc 16 wanfr1
```



Add second FR link

```
ppp_type mlppp
```

```
mlppp seg_threshold 1500
```

```
ip address 20.20.20.1/24
```

```
ip primary_dns_request
```

```
ip secondary_dns_request
```

```
exit pppofr
```

MLPPP over FR (2 x T1)



- **show ip interfaces brief**
- **show interface bundle wanfr0**
- **show interface bundle wanfr1**
- **show interface pppofr wanpppfr**
- **show ip route**

MLPPP over FR (2 x T1)

- CO side configuration : Create FR links
- **First delete all existing bundles**
 - show ip interfaces brief
 - no interface bundle <name>

```
CO-BRAS/configure# interface bundle wanfr0
CO-BRAS/configure/interface/bundle wanfr0# link t1 0/1/0
CO-BRAS/configure/interface/bundle wanfr0# encapsulation fr
CO-BRAS/configure/interface/bundle wanfr0# fr
CO-BRAS/configure/interface/bundle wanfr0/fr# intf_type dce
CO-BRAS/configure/interface/bundle wanfr0/fr# pvc 16
CO-BRAS/configure/interface/bundle wanfr0/fr/pvc 16# exit
CO-BRAS/configure/interface/bundle wanfr0/fr# exit
CO-BRAS/configure/interface/bundle wanfr0# exit
CO-BRAS/configure#
CO-BRAS/configure# interface bundle wanfr1
CO-BRAS/configure/interface/bundle wanfr1# link t1 0/1/1
CO-BRAS/configure/interface/bundle wanfr1# encapsulation fr
CO-BRAS/configure/interface/bundle wanfr1# fr
CO-BRAS/configure/interface/bundle wanfr1/fr# intf_type dce
CO-BRAS/configure/interface/bundle wanfr1/fr# pvc 16
CO-BRAS/configure/interface/bundle wanfr1/fr/pvc 16# exit
CO-BRAS/configure/interface/bundle wanfr1/fr# exit
CO-BRAS/configure/interface/bundle wanfr1# exit
CO-BRAS/configure#
CO-BRAS/configure# show ip interfaces br
```


MLPPP over FR (2 x T1)



- **CO side configuration : Create MLPPP over FR bundle**
- **First delete all existing bundles**
 - show ip interfaces brief
 - no interface bundle <name>

```
CO-BRAS/configure# interface pppofr wanpppfr
CO-BRAS/configure/interface/pppofr wanpppfr# add_vc 16 wanfr0
CO-BRAS/configure/interface/pppofr wanpppfr# add_vc 16 wanfr1
CO-BRAS/configure/interface/pppofr wanpppfr# ppp_type mlppp
CO-BRAS/configure/interface/pppofr wanpppfr# ip address 20.20.20.2/24
CO-BRAS/configure/interface/pppofr wanpppfr#
CO-BRAS/configure/interface/pppofr wanpppfr# show ip interfaces br
```

MLPPP over FR (2 x T1)



● CPE side configuration : Create FR links

```
Ubigate/configure# interface bundle wanfr0
Ubigate/configure/interface/bundle wanfr0# link t1 0/1/0
Ubigate/configure/interface/bundle wanfr0# encapsulation fr
Ubigate/configure/interface/bundle wanfr0# fr
Ubigate/configure/interface/bundle wanfr0/fr# pvc 16
Ubigate/configure/interface/bundle wanfr0/fr/pvc 16# exit
Ubigate/configure/interface/bundle wanfr0/fr# exit
Ubigate/configure/interface/bundle wanfr0# exit
Ubigate/configure#
Ubigate/configure# interface bundle wanfr1
Ubigate/configure/interface/bundle wanfr1# link t1 0/1/1
Ubigate/configure/interface/bundle wanfr1# encapsulation fr
Ubigate/configure/interface/bundle wanfr1# fr
Ubigate/configure/interface/bundle wanfr1/fr# pvc 16
Ubigate/configure/interface/bundle wanfr1/fr/pvc 16# exit
Ubigate/configure/interface/bundle wanfr1/fr# exit
Ubigate/configure/interface/bundle wanfr1# exit
Ubigate/configure#
Ubigate/configure# show ip interfaces br
```

MLPPP over FR (2 x T1)



● CPE Side Configuration: Create MLPPP over FR bundle

```
Ubigate/configure# interface pppofr wanpppfr
Ubigate/configure/interface/pppofr wanpppfr#
Ubigate/configure/interface/pppofr wanpppfr# add_vc 16 wanfr0
Ubigate/configure/interface/pppofr wanpppfr# add_vc 16 wanfr1
Ubigate/configure/interface/pppofr wanpppfr# ppp_type mlppp
Ubigate/configure/interface/pppofr wanpppfr# ip address 20.20.20.1/24
Ubigate/configure/interface/pppofr wanpppfr# exit
```

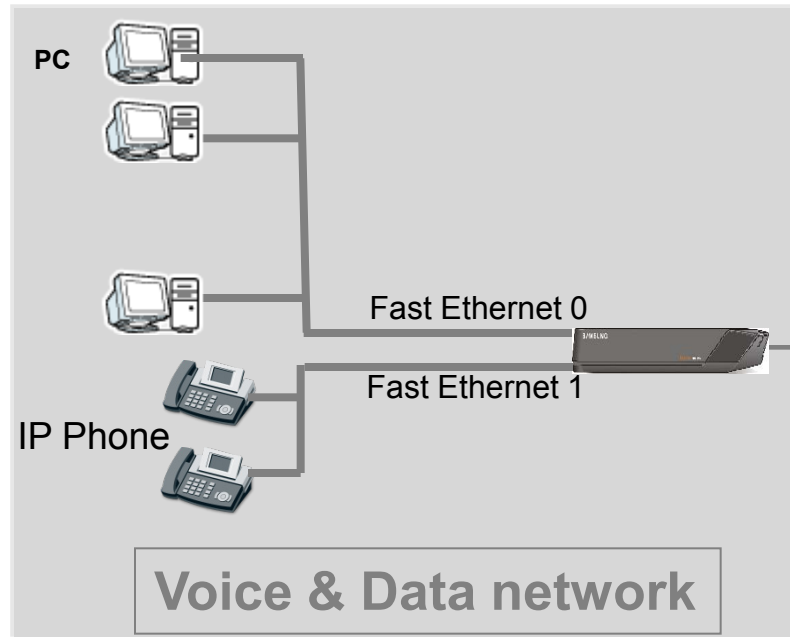


PPP Over FR (1xT1)

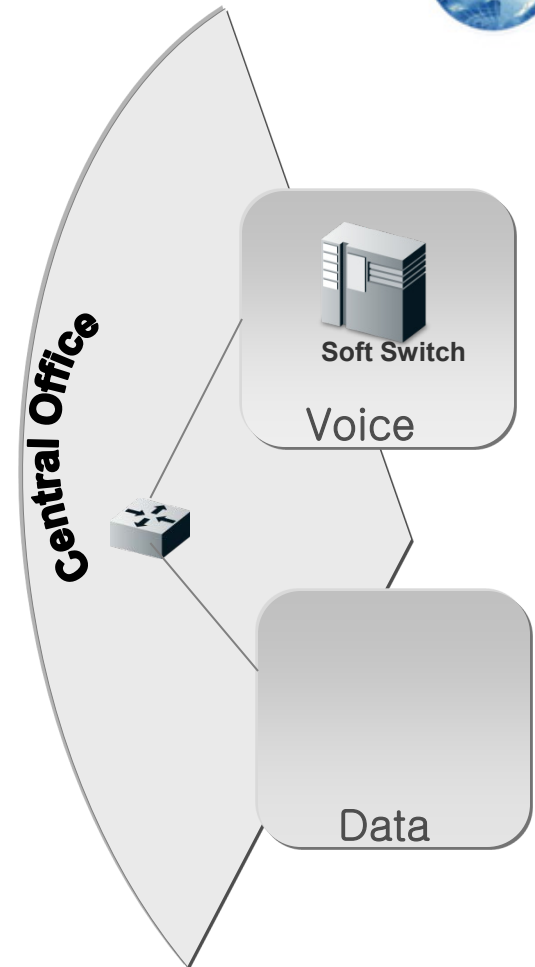
Standard Voice/Data Convergence Deployment



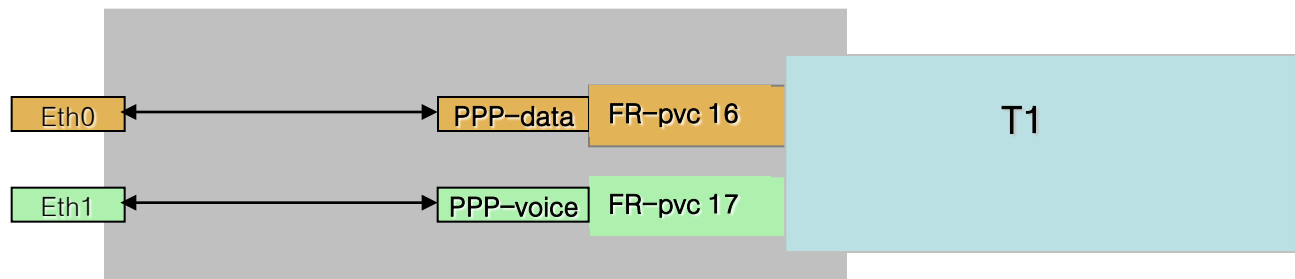
Customer Premises



T1



Standard Voice/Data Convergence Deployment



- **Ethernet Data (Ethernet0/0)**
- **Ethernet Voice (Ethernet0/1)**
- **Frame Relay**
 - PVC 16 – data
 - PVC 17 – voice
- **PPP over FR**
 - PPP-data
 - PPP-voice
- **Using PBR, send voice traffic to ppp-voice**
- **Send data to ppp-data by using default route**

Creating Data & Voice FR PVCs



```
interface bundle wanfr  
link t1 0/1/0  
encapsulation relay  
fr
```

```
intf_type dte
```

```
enable pvc_priority
```



PVC prioritization

```
pvc 16
```

```
priority 2
```



Data PVC : lower priority

```
exit pvc
```

```
pvc 17
```

```
priority 1
```



Voice PVC : highest priority

```
exit pvc
```

```
exit fr
```

```
exit bundle
```

Creating Data & Voice PPP Bundles



```
interface pppofr wanppp0
  add_vc 16 wanfr
  ppp_type ppp
  ppp pap
    sent-username [DATA_USER] [DATA_PASSWORD]
  exit pap
  ip negotiated
  ip primary_dns_request
  ip secondary_dns_request
exit pppofr
```

```
interface pppofr wanppp1
  add_vc 17 wanfr
  ppp_type ppp
  ppp pap
    sent-username [VOICE_USER] [VOICE_PASSWORD]
  exit pap
  ip negotiated
exit pppofr
```


Configuration examples



D:\Enterprise\
mers\Verizon\Ubi

MLPPPoFR configuration



D:\Enterprise\
mers\Verizon\Ubi

Voice/Data Convergence PPPoFR
configuration

● **Single T1**

- PPP over Frame Relay for single T1 deployment (Voice/Data Convergence)
- Frame Relay on single T1

● **T1 Bonding**

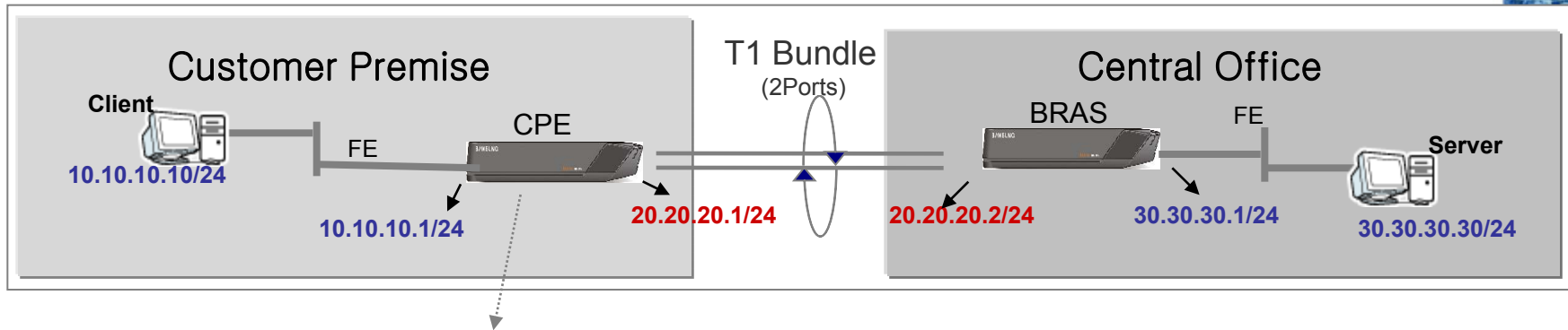
- ML-PPP over Frame Relay
- Multi-link Frame Relay

● **Inter-PVC Priority Queuing**

● **NAT support**

● **PPP over Multi-link Frame Relay**

Software Upgrade over WAN



From CO server

- Telnet to CPE
- `Ubigate# file download 30.30.30.30 iBG1000_advanced_1.1.3.1.Z /cf0/iBG1000_advanced_1.1.3.1.Z ftp`
- `Ubigate#file ls`
- `Ubigate#config t`
- `Ubigate/config#boot_params`
- Reboot & use “show version” command to verify image.

Thank You