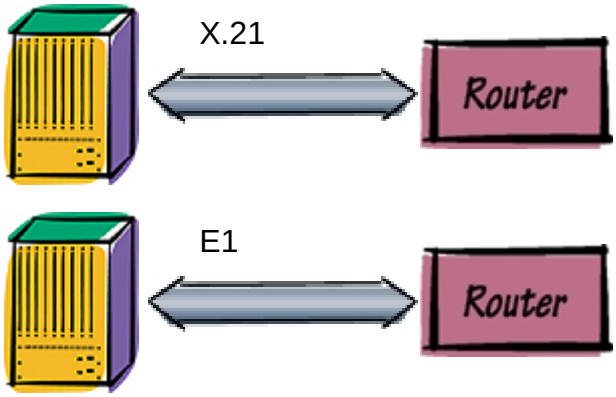
PPP Link between Cisco and Xylan OmniSwitch

The content of this document is a configuration example for an Alcatel Omniswitch or Omniswitch/Router and Cisco router, how to establish a WAN connection and how to setup each WAN-interface.

I consider two cases. One, using a X.21 serial connection. One, using a G.704 E1 connection

Testequipment :
OSR5 mit XOS 4.1.3.26B with DTE X.21Cabel and G.703 Cable
Cisco 2610 router with IOS 12.0 ip-ipx with DCE X.21 Cabel and G.703 Cable



1. Alcatel Omniswitch/Router Config without PPP-Authentification

```
/ % slot
Module-Type       Adm-Status    HW      Board          Mfg            Firmware-Version
Slot Part-Number  Oper-Status   Rev     Serial #       Date           Base-MAC-Address
---- ----------- ----------- ----- ---------- -------- -----------------
1*          MPX   Enabled       B9     94920381       12/23/99       4.1.2 GA
       05019326   Operational                                        00:d0:95:19:4a:e0

 2       GSX/FM_4  Enabled       B      90581031       03/25/99       4.1.2 GA
       05021526   Operational                                        00:20:da:cc:0b:90
                                                                     00:20:da:cc:0b:a0
                                                                     00:20:da:cc:0b:b0
                                                                     00:20:da:cc:0b:c0

3        ESX-C32  Enabled        A12    90230988       01/21/99       4.1.2 GA
       05023306  Operational                                        00:20:da:bf:f9:a0
                                                                     00:20:da:bf:f9:b0

4           HSX  Enabled        A3     92131133       05/27/99       4.1.2 GA
       05022406  Operational                                        00:d0:95:0d:92:90
                                                                     00:d0:95:0d:92:a0

4-1       WSMPRI_E1             A11    92481670       06/22/99       4.1.2.00  (PR 1.11)
       05014808                 REV D                 12/01/99       0dbf
4-2       WSMPRI_E1             A11    92481629       06/22/99       4.1.2.00  (PR 1.11)
        05014808                REV D                 12/01/99       0dbf
5          Empty

/ % wps
Slot/Port PortType Intf. Type State  Protocol BPS     Clocking
========= ======== ========== ====== ======== ======= ========
  4/1     E1       E1         UP/DN  FR       2048000 Local
  4/2     Serial   X21DTE     UP/UP  FR       EXT CLK External
  4/3     E1       E1         UP/DN  FR       2048000 Local
  4/4     Serial   *NONE*     UP/DN  FR       EXT CLK External

/ % wpm 4/2
1)  Admin Status ..................................... UP
    {(U)p, (D)own}
2)  Speed in BPS ..................................... 2048000
    {9600, 19200, 56000, 64000, 128000, 256000, 512000, 768000}
    {1024000, 1544000, 2048000}
3)  Clocking ......................................... External
    {(I)nternal, (E)xternal, (S)plit}
4)  Protocol Type .................................... Frame Relay
    {(F)rame Relay, (P)PP(Point to Point)}
(save/quit/cancel)
   : 2=64000
   : 4=p

1)  Admin Status ..................................... UP
    {(U)p, (D)own}
2)  Speed in BPS ..................................... 64000
    {9600, 19200, 56000, 64000, 128000, 256000, 512000, 768000}
    {1024000, 1544000, 2048000}
3)  Clocking ......................................... External
    {(I)nternal, (E)xternal, (S)plit}
4)  Protocol Type .................................... Point to Point
    {(F)rame Relay, (P)PP(Point to Point)}
  : save
```

Default PPP Entry: 1 created.

This technical document has been created and evaluated by myself and a colleque of mine with the purpose to help friends to get into new technology and installations. There is no financial interest, however, please respect the copyright.

```
/ % gp
Group                                  Network Address  Proto/
 ID          Group Description        (IP Subnet Mask)  Encaps
(:VLAN ID)                            or (IPX Node Addr)
===== ============================== ============== ========
    1 Default GROUP (#1)              192.168.10.1      IP  /
                                                (ff.ff.ff.00 )   ETH2
/ % crgp
    GROUP Number (  2) :
    Description (no quotes) : wan
    Enable WAN Routing? (n): y
    Enable IP (y) :
       IP Address                              : 192.168.20.1
       IP Subnet Mask              (0xffffff00) :
       IP Broadcast Address (192.168.20.255  ) :
       Description (30 chars max)              :
       Configure as Loopback?               (n) :
       Disable routing?                     (n) :
       Enable NHRP?                         (n) :
       IP RIP mode {Deaf(d),
         Silent(s),
         Active(a),
         Inactive(i)}                  (a) :
    Enable IPX? (y): n
GROUP 2 has been added to the system.

/ % pppg
PPP Global Configuration:
1)  Default Authentication Type ........................... PAP
    {(N)one, (P)AP, (C)HAP}
2)  Global User ID sent to remote for Authentication .......
    {16 characters userid}
3)  Global Password sent to remote for Authentication ......
    {16 characters password}
4)  Default Compression Type .............................. STAC-LZS
    {(N)one, STAC-(L)ZS}
5)  Default Bridge Config Admin Status .................... Disabled
    {(E)nable, (D)isable}
6)  Default IP Config Admin Status ........................ Enabled
    {(E)nable, (D)isable}
7)  Default IPX Config Admin Status ....................... Disabled
    {(E)nable, (D)isable}

(save/quit/cancel)

   : 4=n
1)  Default Authentication Type ........................... PAP
    {(N)one, (P)AP, (C)HAP}
2)  Global User ID sent to remote for Authentication .......
    {16 characters userid}
3)  Global Password sent to remote for Authentication ......
    {16 characters password}
4)  Default Compression Type .............................. None
    {(N)one, STAC-(L)ZS}
5)  Default Bridge Config Admin Status .................... Disabled
    {(E)nable, (D)isable}
6)  Default IP Config Admin Status ........................ Enabled
    {(E)nable, (D)isable}
7)  Default IPX Config Admin Status ....................... Disabled
    {(E)nable, (D)isable}
   : save
```

/Interface/WAN/LINK % pppa

Add PPP configuration record. Please specify a unique ID number to identify this record and the remote Peer to communicate with.

```
Peer ID (1) :

Adding PPP configuration record for Peer ID: 1
Enter PPP parameters:


1)  Description: Entry PeerID 1
    {Enter text up to 30 characters}
2)  Adminstrative Status ................................ Enabled
    {(E)nable, (D)isable}
3)  PPP Mode ............................................ Normal
    {(N)ormal, (M)ultilink}
4)  Compression Type .................................... None
    {(N)one, STAC-(L)ZS}
5)  Bridging Group ...................................... 1
    {1-65535 or 0 for no Bridging}
       50) Bridge Config Admin Status ..................... Enabled
           {(E)nable, (D)isable}
       51) PPP Bridging Mode ............................. Bridge All
           {Bridge (A)ll, (E)thernet Only}
           {(AN)Bridge All No FCS, (EN) Ethernet Only No FCS}
6)  Routing Group ....................................... 0
    {1-65535 or 0 for no Routing}
7)  Authentication Type ................................. NONE
    {(N)one, (P)AP, (C)HAP}
8)  Max Failure Counter ................................. 3
    {Max Failure Counter 1..65535}
9)  Max Configure Counter ............................... 3
    {Max Configure Counter 1..65535}
10) Max Terminate Counter ............................... 3
    {Max Terminate Counter 1..65535}
11) Retry Timeout Value ................................. 10
    {Retry Timeout in Second(s) 1..65535}
 (save/quit/cancel)

   : 50=0
Enter PPP parameters:

1)  Description: Entry PeerID 1
    {Enter text up to 30 characters}
2)  Adminstrative Status ................................ Enabled
    {(E)nable, (D)isable}
3)  PPP Mode ............................................ Normal
    {(N)ormal, (M)ultilink}
4)  Compression Type .................................... None
    {(N)one, STAC-(L)ZS}
5)  Bridging Group ...................................... 0
    {1-65535 or 0 for no Bridging}
6)  Routing Group ....................................... 0
    {1-65535 or 0 for no Routing}
7)  Authentication Type ................................. NONE
    {(N)one, (P)AP, (C)HAP}
8)  Max Failure Counter ................................. 3
    {Max Failure Counter 1..65535}
9)  Max Configure Counter ............................... 3
    {Max Configure Counter 1..65535}
```

```
10) Max Terminate Counter ................................ 3
    {Max Terminate Counter 1..65535}
11) Retry Timeout Value .................................. 10
    {Retry Timeout in Second(s) 1..65535}
   : 6=2
Enter PPP parameters:

1)  Description: Entry PeerID 1
    {Enter text up to 30 characters}
2)  Adminstrative Status ................................. Enabled
    {(E)nable, (D)isable}
3)  PPP Mode ............................................. Normal
    {(N)ormal, (M)ultilink}
4)  Compression Type ..................................... None
    {(N)one, STAC-(L)ZS}
5)  Bridging Group ....................................... 0
    {1-65535 or 0 for no Bridging}
6)  Routing Group ........................................ 2
    {1-65535 or 0 for no Routing}
       60) IP Config Admin Status ........................ Enabled
           {(E)nable, (D)isable}
       61) Remote IP Address (Only valid if IP is enabled) . 0.0.0.0
           {Valid IP address notation e.g., x.x.x.x}
       62) IPX Config Admin Status ....................... Disabled
           {(E)nable, (D)isable}
7)  Authentication Type .................................. NONE
8)  Max Failure Counter .................................. 3
    {Max Failure Counter 1..65535}
9)  Max Configure Counter ................................ 3
    {Max Configure Counter 1..65535}
10) Max Terminate Counter ................................ 3
    {Max Terminate Counter 1..65535}
11) Retry Timeout Value .................................. 10
    {Retry Timeout in Second(s) 1..65535}
   : 61=192.168.20.254

1)  Description: Entry PeerID 1
    {Enter text up to 30 characters}
2)  Adminstrative Status ................................. Enabled
    {(E)nable, (D)isable}
3)  PPP Mode ............................................. Normal
    {(N)ormal, (M)ultilink}
4)  Compression Type ..................................... None
    {(N)one, STAC-(L)ZS}
5)  Bridging Group ....................................... 0
    {1-65535 or 0 for no Bridging}
6)  Routing Group ........................................ 2
    {1-65535 or 0 for no Routing}
       60) IP Config Admin Status ........................ Enabled
           {(E)nable, (D)isable}
       61) Remote IP Address (Only valid if IP is enabled) . 192.168.20.254
           {Valid IP address notation e.g., x.x.x.x}
       62) IPX Config Admin Status ....................... Disabled
           {(E)nable, (D)isable}
7)  Authentication Type .................................. NONE
    {(N)one, (P)AP, (C)HAP}
8)  Max Failure Counter .................................. 3
    {Max Failure Counter 1..65535}
9)  Max Configure Counter ................................ 3
    {Max Configure Counter 1..65535}
10) Max Terminate Counter ................................ 3
    {Max Terminate Counter 1..65535}
11) Retry Timeout Value .................................. 10
    {Retry Timeout in Second(s) 1..65535}
```

```
:save
Normal (non-multilink) PPP configuration record created.

Do you wish to define the link at this time y/n (y)    :
Adding Link for Peer ID 1, Link Index: 1:

1)  Description: Link Entry: 1, Peer ID: 1
    {Enter text up to 30 characters}
2)  Adminstrative Status ................................ Enabled
    {(E)nable, (D)isable}
3)  Link Type ........................................... ISDN call
    {(W)SM Port, (I)SDN call}
4)  Link Slot ........................................... 0
    {Slot number}
5)  Link Port ........................................... 0
    {Port number}
(save/quit/cancel)

   : 30=w
   : ?
1)  Description: Link Entry: 1, Peer ID: 1
    {Enter text up to 30 characters}
2)  Adminstrative Status ................................ Enabled
    {(E)nable, (D)isable}
3)  Link Type ........................................... WSM Port
    {(W)SM Port, (I)SDN call}
4)  Link Slot ........................................... 0
    {Slot number}
5)  Link Port ........................................... 0
    {Port number}
   : 4=4
   : 5=2
   : ?
1)  Description: Link Entry: 1, Peer ID: 1
    {Enter text up to 30 characters}
2)  Adminstrative Status ................................ Enabled
    {(E)nable, (D)isable}
3)  Link Type ........................................... WSM Port
    {(W)SM Port, (I)SDN call}
4)  Link Slot ........................................... 4
    {Slot number}
5)  Link Port ........................................... 2
    {Port number}
   : save

Calling add link: ifIndex: 402;

/Interface/WAN/LINK % pppv

Peer  Admin            Authen-  Compres- Bridging Routing
ID    Status Mode      tication sion     Group    Group
===== ====== ========= ======== ======== ======== ========
1     UP     Normal    None     None            0        2

/Interface/WAN/LINK % linkv
List of ISDN Port Type:

Peer Link Link Link Link Outgoing    Incoming    Peer  Inac. Min/Max Call
Id   Idx  Mode Slot Port Called Num. Caller Id.  Speed Timer Dur.    Retry
==== ==== ==== ==== ==== =========== =========== ===== ===== ======= =====
List of WSM PORT Type:
Peer   Link   Link Link
Id     Index  Slot Port
=====  =====  ==== ====
```

```
    1      1     4    2

/Interface/WAN/LINK % ppps p1

PPP statistics for Peer ID:  1
              IP    IPX   BCP   CCP
Admin         Oper  Oper  Oper  Oper
Status Mode   state state state state
====== ====== ===== ===== ===== =====
UP     Normal Open  Close Close Close
LCP Pkts IPCP Pkts IPX Pkts BCP Pkts CCP Pkts
IN/OUT   IN/OUT    IN/OUT   IN/OUT   IN/OUT
======== ========= ======== ======== ========
  7/6      47/2      0/0      0/1      0/0
           Packets    Packets    Packets    Octets     Octets
           In         Out        In+Out     In         Out          %In    %Out
           ========== ========== ========== ========== ==========   ====   ====
Total               0          0          0          0          0
Ethernet            0          0          0          0          0      0      0
8025                0          0          0          0          0      0      0
FDDI                0          0          0          0          0      0      0
IP                  0          0          0          0          0      0      0
IPX                 0          0          0          0          0      0      0
BPDU                0          0          0          0          0      0      0


/Interface/WAN/LINK % linkv l1
View ISDN Call record configuration. Peer ID: 1 Link Index: 1
Type: WSM port Slot: 4, Port:
1)  Link Description: Link Entry: 1, Peer ID: 1
2)  Link Adminstrative Status ................................... Enabled
```

2. Cisco Config ohne PPP-Authentification

wri t
Building configuration...

Current configuration:
!
version 11.0
service udp-small-servers
service tcp-small-servers
!
hostname router-a
!
enable password xxx
!
!
interface Ethernet0

 no ip address
 shutdown
!
interface Serial0
ip address 192.168.20.254 255.255.255.0

```
 encapsulation ppp
 no fair-queue
 clockrate 64000
(This is for Back-To-Back test, in real life clock comes from DCE)!
 interface Serial1
 no ip address
 shutdown
!
interface BRI0
 no ip address
 shutdown
!
snmp-server community public RO
!
line con 0
line aux 0
 transport input all
line vty 0 4
 password holt-sup
 login
!
end
```

3. OSR Konfig with PAP PPP- Authentification

```
pppm p1
Modify PPP for communication to Peer ID: 1
Enter PPP parameters:
1)  Description: Entry PeerID 1
    {Enter text up to 30 characters}
2)  Adminstrative Status ..... Enabled
    {(E)nable, (D)isable}
3)  PPP Mode ..... Normal
    {(N)ormal, (M)ultilink}
4)  Compression Type ..... None
    {(N)one, STAC-(L)ZS}
5)  Bridging Group ..... 0
    {1-65535 or 0 for no Bridging}
6)  Routing Group ..... 2
    {1-65535 or 0 for no Routing}
      60) IP Config Admin Status ..... Enabled
          {(E)nable, (D)isable}
      61) Remote IP Address (Only valid if IP is enabled) . 192.168.20.254
          {Valid IP address notation e.g., x.x.x.x}
      62) IPX Config Admin Status ..... Disabled
```

{(E)nable, (D)isable}
7) Authentication Type ..... PAP
{(N)one, (P)AP, (C)HAP}
70) User ID received from remote for Authentication . router
{16 characters userid}
71) Password rcvd from remote for Authentication .... router
{16 characters password}
72) User ID sent to remote for Authentication ..... router
{16 characters userid}
73) Password sent to remote for Authentication ..... router
{16 characters password}
8) Max Failure Counter 3
{Max Failure Counter 1..65535}
9) Max Configure Counter 3
{Max Configure Counter 1..65535}
10) Max Terminate Counter 3
{Max Terminate Counter 1..65535}
11) Retry Timeout Value 10
{Retry Timeout in Second(s) 1..65535}

4. Cisco Konfig with PAP PPP- Authentification

…
```
username router password 7 131718071F0916
!
interface Serial0
 ip address 192.168.20.254 255.255.255.0
 encapsulation ppp
 no fair-queue
clockrate 64000
 ppp authentication pap
 ppp chap hostname router
 ppp chap password router
```
…

5. OSR Konfig with Chap PPP- Authentification

pppm p1
Modify PPP for communication to Peer ID: 1
Enter PPP parameters:
1) Description: Entry PeerID 1
{Enter text up to 30 characters}
2) Adminstrative Status ..... Enabled
{(E)nable, (D)isable}
3) PPP Mode ..... Normal
{(N)ormal, (M)ultilink}
4) Compression Type ..... None
{(N)one, STAC-(L)ZS}
5) Bridging Group 0

{1-65535 or 0 for no Bridging}
6) Routing Group 2
{1-65535 or 0 for no Routing}
60) IP Config Admin Status ..... Enabled
{(E)nable, (D)isable}
61) Remote IP Address (Only valid if IP is enabled) . 192.168.20.254
{Valid IP address notation e.g., x.x.x.x}
62) IPX Config Admin Status ..... Disabled
{(E)nable, (D)isable}
7) Authentication Type ..... CHAP
{(N)one, (P)AP, (C)HAP}
70) User ID received from remote for Authentication . router
{16 characters userid}
71) Password rcvd from remote for Authentication .... router
{16 characters password}
72) User ID sent to remote for Authentication ..... router
{16 characters userid}
73) Password sent to remote for Authentication ..... router
{16 characters password}
8) Max Failure Counter 3
{Max Failure Counter 1..65535}
9) Max Configure Counter 3
{Max Configure Counter 1..65535}
10) Max Terminate Counter 3
{Max Terminate Counter 1..65535}
11) Retry Timeout Value 10
{Retry Timeout in Second(s) 1..65535}

6. Cisco Konfig with Chap PPP- Authentification

```
…
username router password router
!
interface Serial0
 ip address 192.168.20.254 255.255.255.0
 encapsulation ppp
 no fair-queue
 clockrate 64000
 ppp authentication CHAP
 ppp chap hostname router
 ppp chap password router
```

7. OSR Config with E1 interfaces G.704

```
temod 5/1

E1 Port Configuration for slot 5, port 1
```

```
1) Circuit Identifier (30 chars max) : Alcatel E1 Circuit
2) Frame Format { E1 (4), E1-CRC (5), E1-MF (6),
                  E1-CRC-MF (7), unframed (9) }          : E1-CRC
3) Not FAS { enabled (1), disabled (2) }                 : disabled
4) Line Build Out { short(1), long(2) }                  : short
          40) Cable Type { 75 Ohm (1), 120 Ohm (2) }     : 75 Ohm
5) Line Coding { HDB3 (3), AMI (5) }                     : HDB3
6) Transmit Clock Source { loopTiming (1),
                           localTiming (2) }             : localTiming
7) Loopback Mode { none (1), payload (2), line (3),
                   inward (5) }                          : none
8) Signaling { none (1), CAS (2), CCS (3) }              : none
9) Trap Generation { enabled (1), disabled (2) }         : disabled
10) Yellow Alarm Detection { enabled (1), disabled (2) } : enabled


/ % wpw 5/1

1)  Admin Status ..................................... UP
    {(U)p, (D)own}
2)  Speed in BPS ..................................... 2048000
3)  Clocking ......................................... Loop
4)  Protocol Type .................................... Point to Point
    {(F)rame Relay, (P)PP(Point to Point)}
5)  E1 Starting Time Slot ............................ 1
    {E1 (1..31) }
6)  E1 Number of Time Slots .......................... 30
    {E1 (1..31) }
```

8. Cisco Config with E1 interfaces G.704

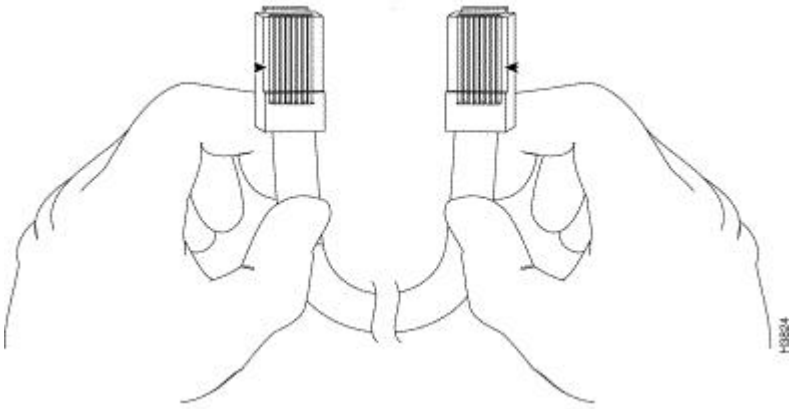
```
!
controller E1 1/0
 channel-group 0 timeslots 1-30
!
interface Serial1/0:0
 ip address 192.168.2.1 255.255.255.252
 no ip directed-broadcast
 encapsulation ppp
 ip mroute-cache
 no keepalive
!
```

9**. Cabeling**

Pinout DB15 <-> RJ45 Connection for G.704 (G.703)

D15 Stecker	RJ45
2-or	2
9-ws/or	1
8-bl	4
15-ws/bl	5

Pinout RJ45 <-> RJ45 Connection for G.704 (G.703)



RJ45	RJ45
1	3
2	6
3	4
5	5

10. How to check the connection + Gotchas

-to be sure, that the config changes take effect reboot the box, especially when you changes the t1/e1 settings.

-the Alcatel WSM or WSX Modul only supports the use of 31 channels of the G.704 line instead of 32. Channel 0 is reserved for serialisation, channel 1 to 30 can be used. You have to configure the cisco to use only 30 channels for data.

```
/ % pps
                        IP      IPX     BCP     CCP
Peer  Admin             Oper    Oper    Oper    Oper
ID    State  Mode       State   State   State   State
===== ====== ========= ======= ======= ======= =======
1     UP     Normal     Open    Close   Close   Close

/ % vas
                                    Services
Slot Oper             Service                                    Service
Port Sta. VCs  Groups Number  Vport Description                    Type
==== ==== ==== ====== ======= ===== ================================ =========
5/1  UP   PPP       2       1    19 PPP-Routing                    Routing

/ % pps p1
PPP statistics for Peer ID:  1
              IP    IPX   BCP   CCP
Admin         Oper  Oper  Oper  Oper
Status Mode   state state state state
====== ====== ===== ===== ===== =====
UP     Normal Open  Close Close Close

LCP Pkts IPCP Pkts IPX Pkts BCP Pkts CCP Pkts
IN/OUT   IN/OUT    IN/OUT   IN/OUT   IN/OUT
======== ========= ======== ======== ========
  7/738     4/4      0/0      0/0      0/0
           Packets    Packets    Packets    Octets     Octets
           In         Out        In+Out     In         Out          %In    %Out
           ========== ========== ========== ========== ==========   ====   ====
Total           1069        863       1932     577953      54989
Ethernet           0          0          0          0          0      0      0
8025               0          0          0          0          0      0      0
FDDI               0          0          0          0          0      0      0
IP              1069        863       1932     577953      54989    100    100
IPX                0          0          0          0          0      0      0
BPDU               0          0          0          0          0      0      0
```