

Unstructured CES Using SRTS and PVCs in a Cisco 3600 Platform

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Introduction

This document provides a sample configuration of unstructured Circuit Emulation Services (CES) using Synchronous Residual Time Stamp (SRTS) and Permanent Virtual Circuits (PVCs) on Cisco 3600 Router platforms. Unstructured service means that both SRTS and PVCs utilizes the entire T1/E1 bandwidth. The ATM switch doesn't look into the T1/E1, but simply reproduces a stream of bits with clocking from the receiving port to the target port. This example uses SRTS for clocking. In this asynchronous clocking method, SRTS measures the difference between the service clock (received on the CBR interface) and the network-wide reference clock. This difference is the Residual Time Stamp (RTS). For a more detailed explanation on SRTS, please read *An Introduction to Circuit Emulation Services*.

Hardware and Software Versions

To configure CES on a Cisco 3600 router series, the following is required:

- An ATM OC-3 network module with voice processing deck (NM-1A-OC3SMI-1V or NM-1A-OC3MM-1V).
- A one or two port T1 or E1 multiflex trunk interface card for a voice connection.

Note: To install a multiflex trunk interface card in a network module, see the *WAN Interface Cards Hardware Installation Guide*.

The part numbers of the possible T1 or E1 cards are:

- VWIC-1MFT-T1=
- VWIC-1MFT-E1=
- VWIC-2MFT-T1=
- VWIC-2MFT-E1=
- VWIC-2MFT-T1-DI=
- VWIC-2MFT-E1-DI=

The ATM OC-3 network module with voice processing deck requires Cisco IOS® Release 12.1(2)T, 12.2, 12.2T or later.

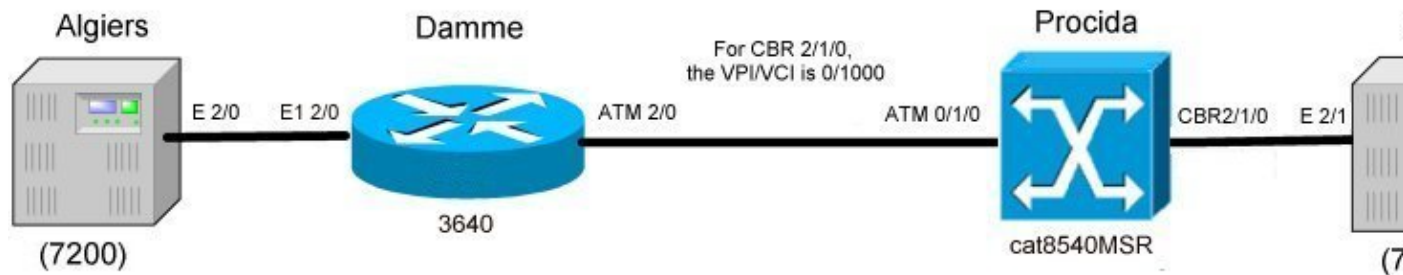
All Cisco 3600 router series support CES between the E1/T1 VWIC and the ATM interface located on the same module. In addition, the Cisco 3660 router series is capable of running CES across network modules if the following criteria is met:

- Cisco IOS Release is 12.2(4)T and above.
- A multiservice interchange card, also called a MIX module (MIX-3660-64), is installed. Click here for more information.

This document assumes that the E1 VWIC is located on the ATM network module.

Network Diagram

The following network topology will be used:

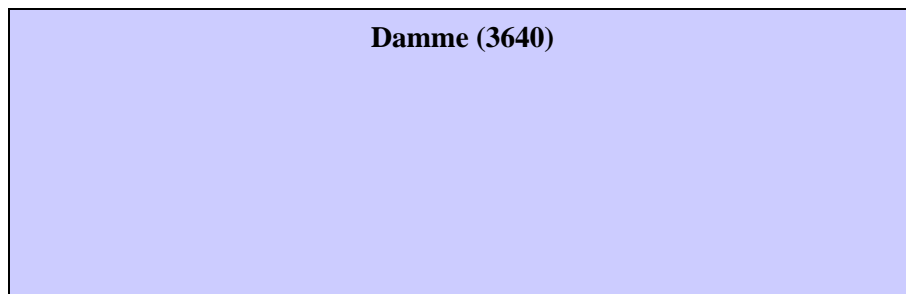


Notes:

- Algiers is a Cisco 7200 router series with a two port channelized E1 card that is used as an edge device on both ends of the network.
- Damme is a Cisco 3640 router series with NM-1A-OC3MM-1V and VWIC-2MFT-E1 network modules running Cisco IOS Release 12.1(2)T.
- Procida is a Catalyst 8540MSR switch with a CES port running Cisco IOS Release 12.1(7a)EY1.
- PVC 0/1000 is for the ATM connection between the Cisco 3640 router and the Catalyst 8540MSR.

Configurations

Shown below are the relevant portions of the configuration for CES in the Cisco 3640 router (Damme) and the Catalyst 8540MSR (Procida). The configuration of the Cisco 7200 router (Algiers) is not displayed since the configuration provides nothing relevant to CES. The hyperlinks shown in the configuration below provide a more detailed explanation of each command.



```

hostname Damme
!
!
ces 2/0
  clock-select 1 ATM2/0
!
controller E1 2/0
  tdm-group 0 unstructured
  ces-clock srts
!
interface ATM2/0
  pvc 0/1000 ces
!
connect test ATM2/0 0/1000 E1 2/0 0

```

Procida (cat8540MSR)

```

hostname Procida
!
network-clock-select 1 ATM0/1/0
!
interface CBR2/1/0
  no ip address
  ces dsx1 framing E1_CRC_MF_LT
  ces aall clock Srts
  ces circuit 0 circuit-name test
  ces PVC 0 interface ATM0/1/0 vpi 0 vci 1000

```

Notice that the E1 framing used above is E1 CRC4 no-CAS and is used on both sides.

Verifying the Configuration

This section provides a set of useful commands to help confirm that the configuration is working properly.

The show ip interface brief command displays the status of the interfaces used as the edge device (Cisco 7200). In this configuration, interface Serial2/0:0 is connected to the Cisco 3640 router, and interface Serial 2/1:0 is connected to the Catalyst 8540MSR. Note that the status of both interfaces are **up**.

```

Algiers#show ip interface brief
Interface                IP-Address      OK? Method Status      Protocol
Serial2/0:0              unassigned     YES unset   up          up
Serial2/1:0              unassigned     YES unset   up          up

```

Another useful command is show cdp neighbors, which displays detailed information about neighboring devices discovered using Cisco Discovery Protocol (CDP).

Algiers#show cdp neighbors

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
S - Switch, H - Host, I - IGMP, r - Repeater

Device ID	Local Intrfce	Holdtme	Capability	Platform	Port ID
Algiers.atm.ciscoSer	2/0:0	143	R	7202	Ser 2/1:0
Algiers.atm.ciscoSer	2/1:0	143	R	7202	Ser 2/0:0

Show Commands for the Cisco 3640 Router

The CES connection status can be checked on the Cisco 3640 router (Damme) by using the show ces 2/0 command. The CES connection below shows a normal state using SRTS. Most of the output given by this command is shown below with the exception of the last portion which does not provide relevant CES information. This output below shows the clocking mode, SRTS in this case, the VPI/VCI (1/1000) and the Line coding (hdb3) in bold type.

Damme#show ces 2/0

CURRENT VPD CES CLOCK: Set to ATM
ATM CLOCKING: Clock Source is Line

VPD BASE ADDRESS->(0x3D600000)

Single Mode Long VPD Installed

VIC/WIC PRESENT-> 1 port E1 humvee installed

CONTROLLER CLOCKING-> PORT[0]: Clock Source is Line

DCU [0]:

port State: active alarm State: **normal** Loop Type: noloop

Clocking Mode: srts Data Mode: clearChannel Framing Type: e1-crc

Line Coding: hdb3 t1Cas: off tsInUse:

00000000

VPI/VCI 0/1000 CES AAL1 Input cells 3076428 CES AAL1 Output cells 3076428

implicitRestart 1 overflow 0

[snip]

The show connect all command indicates whether or not the ATM connections on the Cisco 3640 router are UP.

Damme#show connect all

ID	Name	Segment 1	Segment 2	State
5	test	ATM2/0 PVC 0/1000	E1 2/0 00	UP

The show dcu leds command confirms the status of the CES port LEDs. As seen in the output below, the "Current State" is UP and the router is using the ATM 2/0 and E1 2/0 segments.

Damme#show dcu leds

2/0 [0]: Normal

Damme#sh connect name test

Connection: 5 - test

Current State: UP

Segment 1: ATM2/0 PVC 0/1000

Segment 2: E1 2/0 00

TDM timeslots in use: 1-31 (31 total)

Internal Switching Elements: VPD

Show Commands for the Catalyst 8540MSR

To verify that there are no clocking slips, use the show ces interface cbr x/y/z command on the Catalyst Switch 8540MSR to see if the underflows or overflows are increasing. This command also displays the

following:

- Line state and all T1/E1 error counters (the definition of all counters are in RFC 1406).
- Port and service configuration. Make sure that the line-code and framing configured on the switch is configured the same as configured on the CPE devices. See the sample output below:

```
Procida#show ces int cbr 2/1/0
Interface:      CBR2/1/0          Port-type:E1-120ohms-DCU
IF Status:   UP                Admin Status: UP
Channels in use on this port: 1-31
LineType: E1_CRC_MF_LT LineCoding: HDB3 LoopConfig: NoLoop
SignalMode: NoSignalling  XmtClockSrc: network-derived
DataFormat: UnStructured  AAL1 Clocking Mode: Srts          LineLength: 0_110
e1InternationalBits 0x3, e1NationalBits 0x1F, e1MultiFrameBits 0xB
LineState: NoAlarm
Errors in the Current Interval:
  PCVs      0  LCVs      0  ESSs      0  SESs      0  SEFSs      0
  UASs      0  CSSs      0  LESSs     0  BESSs     0  DMs        0
Errors in the last 24Hrs:
  PCVs      0  LCVs     1532  ESSs      19  SESs      0  SEFSs      0  UASs
Output Counters: 3702066 cells, 173997102 bytes

Procida#sh dcu leds
CBR2/1/0 [20]: Normal
```

Known Issues

Cisco bug ID CSCdv38148 resolves a problem with a continuous Alarm Indication Signal (AIS) being reported on the T1 port of a VWIC-2MFT-T1 when used with the NM-1A CES module. In this condition, the ATM PVCs are up and passing traffic normally. This problem was introduced in Cisco IOS Release 12.1(5)T and resolved in Cisco IOS interim Release 12.2(7.4). Customers with a CCO account can access the Bug Toolkit for further details.

Cisco bug ID CSCdw36564 resolves a problem with rev B0 of the NM-1A-OC3SML-1V. When used with a VWIC-1MFT-E1, a CES circuit is unable to recover from a red alarm (loss of signal). Use the **show diag** command to determine your board revision. The following output was captured on a WIC with board revision B0:

```
Damme#show diag
[snip]
Slot 1:

      ATM OC3, long reach single mode with Voice Processor Port adapter, 1 port
Port adapter is analyzed
Port adapter insertion time unknown
EEPROM contents at hardware discovery:
Hardware Revision      : 1.0
Top Assy. Part Number  : 800-03705-01
Board Revision        : B0
Deviation Number       : 0-0
Fab Version             : 04
PCB Serial Number      : JAB04320BYG
RMA Test History       : 00
RMA Number              : 0-0-0-0
RMA History            : 00
[snip]
```

Related Information

- **An Introduction to Circuit Emulation Services**
 - **ATM Switch Router Command Reference**
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