

Independent T1 Timing

This configuration guide describes the Independent T1 Timing feature available on certain NetVanta units. This guide explains the differences in configuration settings on all the NetVanta platforms on which the feature is available. It also contains specific configuration examples on those platforms using the ADTRAN Operating System (AOS) command line interface (CLI) and the Graphical User Interface (GUI).

This guide consists of the following sections:

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Overview

In order to facilitate high-speed voice and data networks, T1 lines require a timing source to ensure that packets are delivered and assembled properly. Independent T1 timing is an AOS feature that allows multiple timing sources on different interfaces within a single NetVanta unit. Different NetVanta platforms vary in the number of timing sources that can be used for voice and data T1 interfaces, as well as in the specific commands required for configuration.

Hardware and Software Requirements and Limitations

The Independent T1 Timing feature is available on the NetVanta 6240 and 644.

The NetVanta 644 does not support data T1s.

The NetVanta 6240 can have a single voice timing domain and up to four independent data timing sources.

Configuring Independent T1 Timing on the NetVanta 644 using the CLI

The NetVanta 644 can have one or two timing domains. Interfaces T1 0/1 and T1 0/2 can be timed independently from T1 0/3 and T1 0/4, or all four interfaces can be timed via a single timing domain. If all four T1 interfaces are not timed from timing domain 1, then both T1 0/3 and T1 0/4 must be timed from domain 2.

Example 1: NetVanta 644 with Two Timing Domains

The following example illustrates how to set up two timing domains on the NetVanta 644.

Figure 1 on page 3 shows a NetVanta 644 connected to four separate private branch exchanges (PBXs). PBX 1 and 4 are both connected to the public switched telephone network (PSTN). It is possible to obtain timing from either or both of these PBXs. In this example, we will configure the NetVanta 644 to obtain timing from the PBX connected to interface T1 0/1 for the first timing domain and from the PBX connected to interface T1 0/1 for the first timing domain and from the PBX connected to interface T1 0/4 for the second timing domain.



Figure 1. NetVanta 644 with Two Timing Domains

To configure the NetVanta 644 using the CLI, follow these steps:

1. Telnet to the unit (telnet <ip address>). For example:

telnet 10.10.10.1



If during the unit's setup process you have changed the default IP address (10.10.10.1), use the configured IP address.

2. Enter your user name and password at the prompt.

NOTE

The AOS default user name is **admin** and the default password is **password**. If your product no longer has the default user name and password, contact your system administrator for the appropriate user name and password.

- 3. Enter the Enable mode by entering **enable** at the prompt as follows: >enable
- 4. Enter your Enable mode password at the prompt.

- Enter the Global Configuration mode as follows:
 #configure terminal
- 6. Enter the configuration mode for interface **t1 0/1**: (config)**#interface t1 0/1**
- 7. Enter the desired clock source, **line** in this scenario, for the interface using the **clock source** command: (config-t1 0/1)**#clock source line**
- 8. Set interface **t1 0/1** as the **primary** timing source for the first timing domain using the **system-timing primary** command:

(config-t1 0/1)#system-timing primary

- Enter the no shutdown command to activate the interface: (config-t1 0/1)#no shutdown
- Enter the exit command to leave the current interface and return to configuration mode: (config-t1 0/1)#exit
- 11. Enter the configuration mode for interface t1 0/4:

```
(config)#interface t1 0/4
```

- 12. Enter the desired clock source, **line** in this scenario, for the interface using the **clock source** command: (config-t1 0/4)**#clock source line**
- 13. Move interface **t1 0/4** to timing domain **2** using the **timing-domain** command:

(config-t1 0/4)#timing-domain 2

14. Set interface **t1 0/4** as the **primary** timing source for timing domain 2 using the **system-timing primary** command:

(config-t1 0/4)#system-timing primary

15. Enter the **no shutdown** command to activate the interface:

(config-t1 0/4)#no shutdown

- Enter the exit command to leave the current interface and return to Global Configuration mode: (config-t1 0/4)#exit
- 17. Enter the configuration mode for interface **t1 0/3**:

```
(config)#interface t1 0/3
```

18. Move interface **t1 0/3** to timing domain **2** using the **timing-domain** command:

```
(config-t1 0/3)#timing-domain 2
```

The resulting configuration will look like this:

```
interface t1 0/1
clock source line
timing-domain 1
system-timing primary
no shutdown
!
interface t1 0/2
timing-domain 1
```

no shutdown ! interface t1 0/3 timing-domain 2 no shutdown ! interface t1 0/4 clock source line timing-domain 2 system-timing primary no shutdown

NOTE

By default all interfaces are set to internal timing, so the remaining interfaces will receive their timing from the primary timing sources set in their respective timing domains without entering any further commands.



Example 2: NetVanta 644 Using Internal Clock Source

Figure 2. NetVanta 644 Using Internal Clock Source

In Configuration Example 2, all the PBXs are taking their timing from the NetVanta 644. The resulting configuration looks like this:

```
interface t1 0/1
clock source internal
timing-domain 1
!
interface t1 0/2
clock source internal
timing-domain 1
!
interface t1 0/3
clock source internal
timing-domain 1
!
interface t1 0/4
clock source internal
timing-domain 1
```

Example 3: Timing provided from PSTN Through PBX on Interface T1 0/1



Figure 3. Timing Provided from PSTN Through PBX on Interface T1 0/1

In Configuration Example 3, PBX 1 is taking its timing from the PSTN and providing it to the NetVanta 644. PBXs 2, 3, and 4 are taking their timing from the NetVanta 644. The resulting configuration will look like this:

```
interface t1 0/1
 clock source line
 system-timing primary
 timing-domain 1
!
interface t1 0/2
 clock source internal
 timing-domain 1
l
interface t1 0/3
 clock source internal
 timing-domain 1
!
interface t1 0/4
 clock source internal
 timing-domain 1
```



Example 4: All Interfaces Provided Timing by PSTN

Figure 4. All Interfaces Provided Timing by PSTN

In Configuration Example 4, all four T1s from the PSTN are providing the same timing to the NetVanta 644. The resulting configuration will look like this:

```
interface t1 0/1
 clock source line
 system-timing primary
 timing-domain 1
L
interface t1 0/2
 clock source line
 system-timing secondary
 timing-domain 1
1
interface t1 0/3
 clock source line
 system-timing secondary
 timing-domain 1
!
interface t1 0/4
 clock source line
 system-timing secondary
 timing-domain 1
```



Example 5: Timing Source Provided by Two PSTNs

Figure 5. Timing Source Provided by Two PSTNs

In Configuration Example 5, T1 0/1 and T1 0/2 from the PSTN are providing one timing source to the NetVanta 644, and T1 0/3 and T1 0/4 are providing a different timing source. The resulting configuration will look like this:

```
interface t1 0/1
 clock source line
 system-timing primary
 timing-domain 1
!
interface t1 0/2
 clock source line
 system-timing secondary
 timing-domain 1
ļ
interface t1 0/3
 clock source line
 system-timing primary
 timing-domain 2
!
interface t1 0/4
 clock source line
 system-timing secondary
 timing-domain 2
```

Configuring Independent T1 Timing on the NetVanta 644 using the GUI



The following configuration example is based on Figure 1 on page 3.

- 1. Open a new page in your Internet browser.
- 2. Enter your NetVanta 644's IP address in the browser's address field in the following form: http://<ip>

http://10.10.10.1

3. Enter your User name and Password in the appropriate fields and select OK.



Figure 6. NetVanta 644 Login

NOTE	The default user name is admin , and the default password is password .
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4. Select **Physical Interfaces** from the menu on the left. Then select the **t1 0/1** interface hyperlink from the list of physical interfaces.

■System					
System Summary					
Physical Interfaces	Physical Int	erfaces			
Passwords IP Services DHCP Server Hostname / DNS	This is a list of all the physical interfaces that are either physically tied to the product or connected via a plug-in module. View or edit the configuration of an interface by clicking its name.				
LLDP	Name	Logical Interface	Line Status	Туре	
SNMP	<u>t1 0/1</u>	none	TxYellow, Red, LOS	WAN-T1	
	<u>t1 0/2</u>	none	TxYellow, Red, LOS	WAN-T1	
• Voice	<u>t1 0/3</u>	none	TxYellow, Red, LOS	WAN-T1	
E Data	<u>t1 0/4</u>	none	TxYellow, Red, LOS	WAN-T1	
Monitoring	<u>giga-eth 0/1</u>	none	100Mbps/full	Gigabit Ethernet	
■ Utilities	giga-eth 0/2	none	Interface Disabled	Gigabit Ethernet	
	Statistics Rate	Interval: 300 🗸	Statistics Rate Interv	al (in seconds)	



5. Select the **Line** option from the **Clocking** drop-down menu.

System	Physical Interfaces >	t1 0/1	
System Summary Physical Interfaces	Configuration fo	or "t1 0/1"	
IP Services	Basic configuration	for the T1 interface.	
Hostname / DNS LLDP	Description:		Description label (optional)
SNMP	Enable:		Enable or disable this interface
Voice Data	Clocking:	Internal 💌	Set the clock source for this interface
Monitoring Utilities	System Timing:	Internal vone v	Set the system timing configuration
	Timing Domain:	1 •	Set the timing domain this interface belongs to
	Framing:	ESF 🗸	Select the framing that matches the network provider framing format
	Coding:	B8ZS 👻	Select the coding that matches the network provider line coding
	FDL:	ANSI 🗸	Select the format for the facility data link 🕜 channel
		Reset Apply	

Figure 8. Clocking Drop-Down Menu

6. Select **Primary** from the **System Timing** drop-down menu.

System	<u>Physical Interfaces > t1 0/1</u>	
System Summary		
Physical Interfaces	Configuration for "ht 0/1"	
Passwords	Configuration for t1 0/1	
IP Services	Basic configuration for the T1 interface.	
DHCP Server		
Hostname / DNS	Description:	Description label (optional)
LLDP		(optional)
SNMP	Enable: 🔽	Enable or disable this interface
■Voice ■Data	Clocking: Line 🗸	Set the clock source for this interface
■ Monitoring	System Timing: None	Set the system timing configuration
	Timing Domain:	Set the timing domain this interface belongs to
	Framing: ESF 🗸	Select the framing that matches the network provider framing format
	Coding: B8ZS 👻	Select the coding that matches the network provider line coding
	FDL: ANSI 🗸	Select the format for the facility data link 🕜 channel
	Reset Apply]

Figure 9. System Timing Drop-Down Menu

- 7. Ensure that the **Timing Domain** is set to **1**, this is the default setting. Select **Apply** to save the changes.
- 8. Repeat Steps 4 and 7 using interface **T1 0/3**, selecting timing domain **2** in step 7.
- 9. Repeat Steps 4 through 7 using interface **T1 0/4**, selecting timing domain **2** in step 7.

Configuring Independent T1 Timing on the NetVanta 6240 Using the CLI

The NetVanta 6240 can have a single voice timing domain and up to four independent data timing sources.

Example 1: One Voice and Two Data Timing Sources

The following example illustrates how to set up the voice timing domain and set up two data T1s with two separate timing sources.

Figure 10 on page 12 shows two data T1s connected to separate ISPs receiving services that provide timing on interfaces T1 0/1 and T1 0/2. Interface T1 0/4 is connected to a PBX receiving timing from the PSTN.



Figure 10. One Voice and Two Data Timing Sources

To configuring Example 1 on the NetVanta 6240 using the CLI, follow these steps:

1. Telnet to the unit (**telnet** *<ip address>*). For example:

telnet 10.10.10.1



If during the unit's setup process you have changed the default IP address (10.10.10.1), use the configured IP address.

2. Enter your user name and password at the prompt.



The AOS default user name is **admin** and the default password is **password**. If your product no longer has the default user name and password, contact your system administrator for the appropriate user name and password.

- 3. Enter the Enable mode by entering **enable** at the prompt as follows: >enable
- 4. Enter your Enable mode password at the prompt.
- Enter the Global Configuration mode as follows:
 #configure terminal
- 6. Enter the global timing source command to indicate that voice timing is being provided by interface **t1 0/4**:

(config)#timing source 0/4

- Enter the configuration mode for interface t1 0/4: (config)#interface t1 0/4
- 8. Enter the desired clock source, **line** in this scenario, for the interface using the **clock source** command: (config-t1 0/4)**#clock source line**
- 9. Enter the **no shutdown** command to activate the interface:
 - (config-t1 0/4)#no shutdown
- Enter the exit command to leave the current interface and return to Global Configuration mode: (config-t1 0/4)#exit
- 11. Enter the configuration mode for interface **t1 0/1**:

(config)#interface t1 0/1

- 12. Enter the desired clock source, **line** in this scenario, for the interface using the **clock source** command: (config-t1 0/1)**#clock source line**
- Enter the **no shutdown** command to activate the interface: (config-t1 0/1)#no shutdown
- 14. Enter the **exit** command to leave the current interface and return to Global Configuration mode: (config-t1 0/1)#**exit**

- 15. Enter the configuration mode for interface **t1 0/2**: (config)**#interface t1 0/2**
- 16. Enter the desired clock source, **line** in this scenario, for the interface using the **clock source** command:
- 17. (config-t1 0/2)#clock source line

The resulting configuration will look like this:

```
interface t1 0/1
clock source line
no shutdown
!
interface t1 0/2
clock source line
no shutdown
!
interface t1 0/4
clock source line
no shutdown
!
```

```
timing-source t1 0/4
```

Configuring Independent T1 Timing on the NetVanta 6240 using the GUI

- 1. Open a new page in your Internet browser.
- Enter your NetVanta 6240's IP address in the browser's address field in the following form: http://<ip address>, for example:

http://10.10.10.1

3. Enter your User name and Password in the appropriate fields and select OK.

Authentica	ation Re	equired X
0	4	A username and password are being requested by http://10.200.1.124. The site says: "Netvanta 6240"
User Na	ime:	admin
Passw	ord:	•••••
		OK Cancel

Figure 11. NetVanta 6240 Login



4. Select **System Summary** from the menu on the left. Then select the **Current System Clock Source** hyperlink.

System		
Physical Interfaces Passwords	System Information	
IP Services	Firmware Version	A5.01.01.E
DHCP Server	Part Number	1700204G2
LLDP	Serial Number	LBADTN1122AC546
SNMP	System Uptime	5 weeks, 4 days, 5 hours, 41 minutes, 15 seconds
• Voice	System Time	12:52:55 PM CST
∎ Data	System Date	October 25, 2011
Monitoring	Current System Clock Source	Internal (Primary clock source unavailable)
Utilities	Memory	Total Heap: 495,881,200 Bytes Free Heap: 448,371,696 Bytes
	CPU Utilization	System Load: 5.46% 1 Min Avg Load: 9.85% 5 Min Avg Load: 8.78% Min Load: 0% Max Load: 100% Context Switch Load: 0.13%
	File System	Total: 116,539,392 Bytes Used: 37,720,064 Bytes Free: 78,819,328 Bytes
	SNTP Time Server	ntp.adtran.com
	SNTP Last Sync	08:12:44 AM CST on 10/25/2011
	WARNING!! A problem has been d troubleshooting page for more de	letected with your system. Please go to the tail.
		Clear CPU Max Load
	Refresh in 2 seconds	

Figure 12. System Summary Menu

5. Select the **t1 0/4** interface from the **Primary Clock Source** drop-down menu. Select **Apply** to save the changes.

System	<u>System</u> > Clock Source	
Physical Interfaces Passwords	Set Primary / Backup Clock Source	
IP Services DHCP Server Hostname / DNS	The NetVanta should have a Primary Clock or Timin also be selected if more than one source exists, othe as a backup.	g source set. A backup source can erwise, Internal timing will be used
LLDP SNMP	Primary Clock Source: 110/1	Preferred timing source for the system
• Voice	Backup Clock t1 0/1 Source: t1 0/2 t1 0/3	Backup source if the primary source fails
Monitoring Utilities	Backup Clock Source:	Backup source if the previous backup source fails
	Backup Clock Source: Internal 🗸	Backup source if the previous backup source fails
	Cancel Apply	

Figure 13. Clock Source Menu

6. Select **Physical Interfaces** from the menu on the left. Then select the **t1 0/1** interface hyperlink from the list of physical interfaces.

Services ICP Server stname / DNS	This is a list connected vi its name.	of all the physical interfa a a plug-in module. View	ces that are either physically t or edit the configuration of an	ied to the product or i interface by clickin
OP	Name	Logical Interface	Line Status	Туре
MP	t1 0/1	pri 1	TxYellow, Red, LOS	WAN-T1
	t1 0/2	none	TxYellow, Red, LOS	WAN-T1
oice	t1 0/3	none	TxYellow, Red, LOS	WAN-T1
oice	t1 0/4	none	TxYellow, Red, LOS	WAN-T1
ata	eth 0/1	none	100Mbps/full	Ethernet
onitorina	eth 0/2	none	100Mbps/full	Ethernet
tilition	fxs 0/1	none	OnHook	FXS
unues	fxs 0/2	none	OnHook	FXS
	fxs 0/3	none	OnHook	FXS
	fxs 0/4	none	OnHook	FXS
	fxs 0/5	none	OnHook	FXS
	fxs 0/6	none	OnHook	FXS
	fxs 0/7	none	OnHook	FXS
	fxs 0/8	none	OnHook	FXS
	fxs 0/9	none	OnHook	FXS
	fxs 0/10	none	OnHook	FXS
	fxs 0/11	none	OnHook	FXS
	fxs 0/12	none	OnHook	FXS
	fxs 0/13	none	OnHook	FXS
	fxs 0/14	none	OnHook	FXS
	fxs 0/15	none	OnHook	FXS
	fxs 0/16	none	OnHook	FXS
	Statistics Ra	te Interval: 300 🗸	Statistics Rate Interv	al (in seconds)

Figure 14. Physical Interfaces Menu

7. Select the **Line** option from the **Clocking** drop-down menu. Select **Apply** to save the changes.

■ System	Physical Interfaces >	T1 0/1		
System Summary Physical Interfaces Passwords	Configuration fo	or "T1 0/1"		
IP Services DHCP Server	Basic configuration	for the T1 interface.		
Hostname / DNS	Description:		Description label (optional)	
SNMP	Enable:		Enable or disable this interface.	
■ Voice	Clocking:	Internal 👻	Select the source timing for this interface.	
■ Data ■ Monitoring ■ Utilities	Framing:	Internal ESF V	Select the framing that matches the network provider framing format.	0
	Coding:	B8ZS 👻	Select the coding that matches th network provider line coding.	e
	FDL:	ANSI -	Select the format for the facility data link channel.	0
	Data DS0s:	1 • to 24 •	Select the DS0s to map to the Router.	0
	DS0 Speed:	64Kbps 👻	Select the speed for the DS0s in DS0 Map.	the
	Encapsulation:	 PPP Frame Relay HDLC 	Interface connects to a PPP, Frame Relay, or HDLC circuit	0
	Multilink:		Enable multilink for the selected encapsulation.	0
		Reset	Apply	

Figure 15. Clocking Drop-Down Menu

8. Repeat Steps 6 and 7 for interfaces **T1 0/2** and **T1 0/4**.