



# **ZebOS-XP®**

## **Network Platform**

**Version 1.4**  
**Extended Performance**

**Precision Time Protocol  
Configuration Guide**

**December 2015**

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# Preface

---

This guide describes how to configure Precision Time Protocol (PTP) in ZebOS-XP.

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## Audience

This guide is intended for network administrators and other engineering professionals who configure PTP.

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## Conventions

Table P-1 shows the conventions used in this guide.

**Table P-1: Conventions**

Convention	Description
<i>Italics</i>	Emphasized terms; titles of books
Note:	Special instructions, suggestions, or warnings
<code>monospaced type</code>	Code elements such as commands, functions, parameters, files, and directories

---

## Contents

This guide contains these chapters:

- [Chapter 1](#), *Ordinary Clock Configuration*
- [Chapter 2](#), *Boundary Clock Configuration*
- [Chapter 3](#), *Transparent Clock Configuration*
- [Chapter 4](#), *Synchronization*

---

## Related Documents

Use this guide with these command references for details about the commands used in the configurations:

- *Precision Time Protocol Command Reference*
- *Network Services Module Command Reference*

Note: All ZebOS-XP technical manuals are available to licensed customers at [http://www.ipinfusion.com/support/document\\_list](http://www.ipinfusion.com/support/document_list).

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## Chapter Organization

The chapters in this guide are organized into these major sections:

- An overview that explains a configuration in words
- Topology with a diagram that shows the devices and connections used in the configuration
- Configuration steps in a table for each device where the left-hand side shows the commands you enter and the right-hand side explains the actions that the commands perform
- Validation which shows commands and their output that verify the configuration

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## Support

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## CHAPTER 1 Ordinary Clock Configuration

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This chapter shows how to configure an ordinary clock over Ethernet, IPv4, and IPv6.

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### Topology



Figure 1-1: PTP ordinary clock

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## Ordinary Clock Configuration over Ethernet

This section shows how to set up an ordinary clock on Ethernet.

---

### Zebos1

<code>#configure terminal</code>	Enter Configure mode
<code>(config)#bridge 1 protocol mstp</code>	Create bridge 1 as an MSTP bridge (this step is not mandatory, but is a good practice to avoid layer 2 loops)
<code>(config)#ptp-clk ordinary transport-type ethernet delay-mechanism p2p</code>	Configure PTP ordinary clock over Ethernet; to use the end-to-end delay mechanism, give the following command: <code>ptp-clk ordinary transport-type ethernet delay-mechanism e2e</code>
<code>(config-ptp-clk)#exit</code>	Exit PTP Configure mode
<code>(config)#interface eth1</code>	Configure interface eth1
<code>(config-if)#switchport</code>	Configure eth1 as Layer 2 port
<code>(config-if)#bridge-group 1</code>	Configure eth1 in bridge group 1
<code>(config-if)#clock-port</code>	Configure eth1 as clock port
<code>(config-clk-port)#exit</code>	Exit Port Configure mode

---

### Validation

1. Verify the default data set on Zebos1.

```
#show ptp data default
CLOCK(Ordinary)
```

```
Two Step Flag :Yes
Clock Identity : ff:fe:52:54:0:ed:a9:5
Number Of Ports:1
Priority1 :128
Priority2:128
Domain Number:0
Slave Only:No
Clock Quality:
Class: 248
Accuracy:254
Offset (log variance):ffff
```

### 2. Verify the current data set on Zebos1.

```
#show ptp data current
CLOCK(Ordinary Clock)
  Steps Removed:0
  Offset From Master: 0
  Mean Path Delay: 0
```

### 3. Verify the parent data set on Zebos1.

```
#show ptp data parent
CLOCK(Ordinary Clock)
  Parent Port ID:[ff:fe:52:54:0:ed:a9:5]: 0
  Parent Stats:No
  Observed Parent Offset (log variance): 0
  Observed Parent Clock Phase Change Rate: 0
  Grandmaster Clock:Identity: ff:fe:52:54:0:ed:a9:5
  Priority1: 128
  Priority2: 128
  Clock Quality:Class: 248
  Accuracy:254
  Offset (log variance): ffff
```

### 4. Verify the port state on Zebos1.

The initial state of the port is LISTENING before it moves to MASTER.

```
#sh ptp port
=====

PORT State [PTP_LISTENING]
Port Clock Identity: ff:fe:52:54:0:ed:a9:5:
Port Number: 2
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2

#sh ptp port
```



```
=====

PORT State [PTP_MASTER]
Port Clock Identity: ff:fe:52:54:0:ed:a9:5:
Port Number: 2
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
```

## Ordinary Clock Configuration over UDP IPv4

This section shows how to set up an ordinary clock over UDP on IPv4.

### Zebos1

#configure terminal	Enter Configure mode
(config)#ptp-clk ordinary transport-type udp v4 delay-mechanism p2p	Configure PTP ordinary clock over UDP; IPv4 addresses must be configured on the interfaces
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth1	Configure interface eth1
(config)#ip address 1.1.1.1/24	Configure the IP address for the interface eth1
(config-if)#clock-port	Configure eth1 as clock port
(config-clk-port)#exit	Exit Port Configure mode

### Validation

1. Verify the default data set on Zebos1.

```
#show ptp data default
CLOCK(Ordinary)
  Two Step Flag :Yes
  Clock Identity : ff:fe:52:54:0:ed:a9:5
  Number Of Ports:1
  Priority1 :128
  Priority2:128
  Domain Number:0
  Slave Only:No
  Clock Quality:
  Class: 248
  Accuracy:254
  Offset (log variance):ffff
```

2. Verify the current data set on Zebos1.

```
#show ptp data current
CLOCK(Ordinary Clock)
  Steps Removed:0
  Offset From Master: 0
  Mean Path Delay: 0
```

### 3. Verify the parent data set on Zebos1.

```
#show ptp data parent
CLOCK(Ordinary Clock)
  Parent Port ID:[ff:fe:52:54:0:ed:a9:5]: 0
  Parent Stats:No
  Observed Parent Offset (log variance): 0
  Observed Parent Clock Phase Change Rate: 0
  Grandmaster Clock:Identity: ff:fe:52:54:0:ed:a9:5
  Priority1: 128
  Priority2: 128
  Clock Quality:Class: 248
  Accuracy:254
  Offset (log variance): ffff
```

### 4. Verify the port state on Zebos1.

The initial state of the port is LISTENING before it moves to MASTER.

```
#show ptp port
=====

PORT State [PTP_LISTENING]
Port Clock Identity: ff:fe:52:54:0:ed:a9:5:
Port Number: 2
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
```

```
#show ptp port
=====

PORT State [PTP_MASTER]
Port Clock Identity: ff:fe:52:54:0:ed:a9:5:
Port Number: 2
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
```

PTP version: 2

## Ordinary Clock Configuration over UDP IPv6

This section shows how to set up an ordinary clock over UDP on IPv6.

### Zebos1

#configure terminal	Enter Configure mode
(config)#ptp-clk ordinary transport-type udp v6 delay-mechanism p2p	Configure PTP ordinary clock over UDP; an IPv6 link local address must be configured; you do not need to configure a global address
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth1	Configure interface eth1
(config-if)#clock-port	Configure eth1 as clock port
(config-clk-port)#exit	Exit Port Configure mode

## Validation

### 1. Verify the default data set on Zebos1.

```
#show ptp data default
CLOCK(Ordinary)
  Two Step Flag :Yes
  Clock Identity : ff:fe:52:54:0:ed:a9:5
  Number Of Ports:1
  Priority1 :128
  Priority2:128
  Domain Number:0
  Slave Only:No
  Clock Quality:
  Class: 248
  Accuracy:254
  Offset (log variance):ffff
```

### 2. Verify the current data set on Zebos1.

```
#show ptp data current
CLOCK(Ordinary Clock)
  Steps Removed:0
  Offset From Master: 0
  Mean Path Delay: 0
```

### 3. Verify the parent data set on Zebos1.

```
#show ptp data parent
CLOCK(Ordinary Clock)
  Parent Port ID:[ff:fe:52:54:0:ed:a9:5]: 0
  Parent Stats:No
  Observed Parent Offset (log variance): 0
  Observed Parent Clock Phase Change Rate: 0
  Grandmaster Clock:Identity: ff:fe:52:54:0:ed:a9:5
  Priority1: 128
  Priority2: 128
  Clock Quality:Class: 248
  Accuracy:254
  Offset (log variance): ffff
```

### 4. Verify the port state on Zebos1.

The initial state of the port is LISTENING before it moves to MASTER.

```
#show ptp port
=====

PORT State [PTP_LISTENING]
Port Clock Identity: ff:fe:52:54:0:ed:a9:5:
Port Number: 2
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
```

```

Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2

#show ptp port
=====

PORT State [PTP_MASTER]
Port Clock Identity: ff:fe:52:54:0:ed:a9:5:
Port Number: 2
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2

```

## Unicast PTP Configuration

### Zebos1

#configure terminal	Enter Configure Mode.
(config)#bridge 1 protocol mstp	Create bridge 1 as an MSTP bridge*
(config)#ptp-clk ordinary transport-type ethernet delay-mechanism p2p	Configure PTP ordinary clock over Ethernet (this step is not mandatory, but is a good practice to avoid layer 2 loops)
(config-ptp-clk)#priority1 1	Configure priority 1
(config-ptp-clk)#priority2 1	Configure priority 2
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth1	Configure interface eth1
(config-if)#switchport	Configure eth1 as Layer 2 port
(config-if)#bridge-group 1	Configure eth1 in bridge group 1
(config-if)#clock-port	Configure eth1 as clock port
(config-clk-port)#unicast-neighbor-add addr-type ethernet 5254.fe00.ce45	Adding unicast neighbor
(config-clk-port)#ptp-unicast-enable max-table-size 5	Enabling unicast on interface eth1
(config-clk-port)#ptp-unicast-disable	Disable unicast on interface eth1
(config-clk-port)#unicast-neighbor-del addr-type ethernet 4545.89e4.8765	Deleting the unicast neighbor
(config-clk-port)#exit	Exit Port Configure mode

### Validation

#### 1. Verify priority in default data set on Zebos1.

```
#show ptp data default
CLOCK(Ordinary)
Two Step Flag :Yes
Clock Identity : ff:fe:52:54:0:ed:a9:5
Number Of Ports:1
Priority1 :1
Priority2:1
Domain Number:0
Slave Only:No Clock Quality: Class: 248
Accuracy:254
Offset (log variance):ffff
```

#### 2. Verify message intervals in port data set on Zebos1.

```
#show ptp port
=====

PORT State [PTP_LISTENING]
Port Clock Identity: ff:fe:52:54:0:ed:a9:5:
Port Number: 2
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 3
Announce Receipt Timeout: 3
Sync Interval (log base 2):1
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 3
PTP version: 2
```

#### 3. Verify Unicast neighbors added.

```
#show ptp unicast-neighbors
=====

% INTERFACE eth1
PTP Unicast: Enable
Configured Unicast Neighbors are :
  5454.23e4.edfc
=====
```

# CHAPTER 2    Boundary Clock Configuration

---

This chapter shows how to configure a boundary clock over Ethernet, IPv4, and IPv6. You configure a boundary clock with more than one port.

---

## Topology

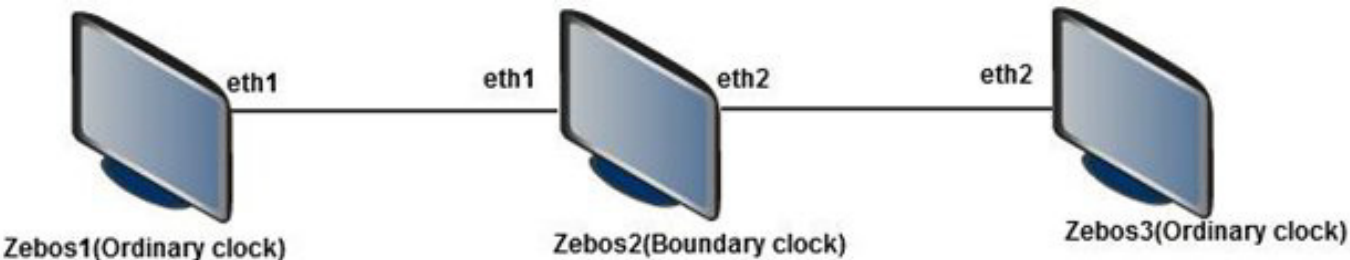


Figure 2-1: Configuration Topology

In this example, all devices are running PTP.

---

## Boundary Clock Configuration over Ethernet

This section shows how to set up a boundary clock over Ethernet.

---

### Zebos1 (ordinary clock)

#configure terminal	Enter Configure mode
(config)#bridge 1 protocol mstp	Create bridge 1 as an MSTP bridge (this step is not mandatory, but is a good practice to avoid layer 2 loops)
(config)#ptp-clk ordinary transport-type ethernet delay-mechanism p2p	Configure PTP ordinary clock over Ethernet; to use the end-to-end delay mechanism, give the following command: ptp-clk ordinary transport-type ethernet delay-mechanism e2e
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth1	Configure interface eth1
(config-if)#switchport	Configure eth1 as Layer 2 port
(config-if)#bridge-group 1	Configure eth1 in bridge group 1
(config-if)#clock-port	Configure eth1 as clock port
(config-clk-port)#exit	Exit Port Configure mode

## Zebos2 (boundary clock)

#configure terminal	Enter Configure mode
(config)#bridge 1 protocol mstp	Create bridge 1 as an MSTP bridge (this step is not mandatory, but is a good practice to avoid layer 2 loops)
(config)#ptp-clk boundary transport-type ethernet delay-mechanism p2p	Configure PTP boundary clock over Ethernet
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth1	Configure interface eth1
(config-if)#switchport	Configure eth1 as Layer 2 port
(config-if)#bridge-group 1	Configure eth1 in bridge group 1
(config-if)#clock-port	Configure eth1 as clock port
(config-clk-port)#exit	Exit Port Configure mode
(config-if)#exit	Exit Interface mode
(config)#interface eth2	Configure interface eth2
(config-if)#switchport	Configure eth2 as Layer 2 port
(config-if)#bridge-group 1	Configure eth2 in bridge group 1
(config-if)#clock-port	Configure eth2 as clock port
(config-clk-port)#exit	Exit Port Configure mode

## Zebos3 (ordinary clock)

#configure terminal	Enter Configure mode
(config)#bridge 1 protocol mstp	Create bridge 1 as an MSTP bridge (this step is not mandatory, but is a good practice to avoid layer 2 loops)
(config)#ptp-clk ordinary transport-type ethernet delay-mechanism p2p	Configure PTP ordinary clock over Ethernet
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth2	Configure interface eth2
(config-if)#switchport	Configure eth2 as Layer 2 port
(config-if)#bridge-group 1	Configure eth2 in bridge group 1
(config-if)#clock-port	Configure eth2 as clock port
(config-clk-port)#exit	Exit Port Configure mode

## Validation

### Zebos1

1. Verify the default data set on Zebos1.

```
#show ptp data default
CLOCK(Ordinary)
  Two Step Flag :Yes
  Clock Identity : ff:fe:52:54:0:e6:5f:11
```



```

Number Of Ports:1
Priority1 :128
Priority2:128
Domain Number:0
Slave Only:No Clock Quality: Class: 248
Accuracy:254
Offset (log variance):ffff

```

## 2. Verify the current data set on Zebos1.

```

#show ptp data current
CLOCK(Ordinary Clock)
  Steps Removed:0
  Offset From Master: 0
  Mean Path Delay: 0

```

## 3. Verify the parent data set on Zebos1.

```

#show ptp data parent
CLOCK(Ordinary Clock)
  Parent Port ID:[ff:fe:52:54:0:e6:5f:11]: 0
  Parent Stats:No
  Observed Parent Offset (log variance): 0
  Observed Parent Clock Phase Change Rate: 0
  Grandmaster Clock:Identity: ff:fe:52:54:0:e6:5f:11
  Priority1: 128
  Priority2: 128
  Clock Quality:Class: 248
  Accuracy:254
  Offset (log variance): ffff

```

## 4. Verify the port state on Zebos1.

The initial state of the port is LISTENING before it moves to MASTER.

```

#sh ptp port
=====

PORT State [PTP_MASTER]
Port Clock Identity: ff:fe:52:54:0:e6:5f:11:
Port Number: 1
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2

```

## Zebos2

### 1. Verify the default data set on Zebos2.

```

2#show ptp data default
CLOCK(Boundary Clock)

```

```
Two Step Flag :Yes
Clock Identity : ff:fe:52:54:0:ed:a9:5
Number Of Ports:2
Priority1 :128
Priority2:128
Domain Number:0
Slave Only:No
Clock Quality:
Class: 248
Accuracy:254
Offset (log variance):ffff
```

### 2. Verify the current data set on Zebos2.

```
#show ptp data current
CLOCK(Boundary Clock)
  Steps Removed:1
  Offset From Master: 0
  Mean Path Delay: 0
```

### 3. Verify the parent data set on Zebos2.

```
#show ptp data parent
CLOCK(Boundary Clock)
  Parent Port ID:[ff:fe:52:54:0:e6:5f:11]: 1
  Parent Stats:No
  Observed Parent Offset (log variance): ffff
  Observed Parent Clock Phase Change Rate: 7fffffff
  Grandmaster Clock:Identity: ff:fe:52:54:0:e6:5f:11
  Priority1: 128
  Priority2: 128
  Clock Quality:Class: 248
  Accuracy:254
  Offset (log variance): ffff
```

### 4. Verify the port state on Zebos2.

The state of port 1 is SLAVE and port2 is MASTER.

```
#show ptp port
=====

PORT State [PTP_SLAVE]
Port Clock Identity: ff:fe:52:54:0:e6:5f:11:
Port Number: 1
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
=====
```

```

PORT State [PTP_MASTER]
Port Clock Identity: ff:fe:52:54:0:e6:5f:11:
Port Number: 2
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2

```

## Zebos3

### 1. Verify the default data set on Zebos3.

```

#show ptp data default
CLOCK(Ordinary)
  Two Step Flag :Yes
  Clock Identity : ff:fe:52:54:0:2d:fe:38
  Number Of Ports:1
  Priority1 :128
  Priority2:128
  Domain Number:0
  Slave Only:No
  Clock Quality:
  Class: 248
  Accuracy:254
  Offset (log variance):ffff

```

### 2. Verify the current data set on Zebos3.

```

#show ptp data current
CLOCK(Ordinary Clock)
  Steps Removed:0
  Offset From Master: 0
  Mean Path Delay: 0

```

### 3. Verify the parent data set on Zebos3.

```

#show ptp data parent
CLOCK(Ordinary Clock)
  Parent Port ID:[ff:fe:52:54:0:e6:5f:11]: 0
  Parent Stats:No
  Observed Parent Offset (log variance): 0
  Observed Parent Clock Phase Change Rate: 0
  Grandmaster Clock:Identity: ff:fe:52:54:0:e6:5f:11
  Priority1: 128
  Priority2:128
  Clock Quality:Class: 248
  Accuracy:254
  Offset (log variance): ffff

```

### 4. Verify the port state on Zebos3.

The initial state of the port is LISTENING before it moves to SLAVE.

```
#sh ptp port
=====

PORT State [PTP_SLAVE]
Port Clock Identity: ff:fe:52:54:0:e6:5f:11:
Port Number: 1
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
```

---

## Boundary Clock Configuration over UDP IPv4

This section show setting up a boundary clock over IPv4.

---

### Zebos1 (ordinary clock)

#configure terminal	Enter Configure mode
(config)#ptp-clk ordinary transport-type udp v4 delay-mechanism p2p	Configure PTP ordinary clock over UDP; IPv4 addresses must be configured on the interfaces
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth1	Configure interface eth1
(config)#ip address 1.1.1.1/24	Configure the IP address for the interface eth1
(config-if)#clock-port	Configure eth1 as clock port
(config-clk-port)#exit	Exit Port Configure mode

---

### Zebos2 (boundary clock)

#configure terminal	Enter Configure mode
(config)#ptp-clk boundary transport-type udp v4 delay-mechanism p2p	Configure PTP boundary clock over UDP
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth1	Configure interface eth1
(config)#ip address 1.1.1.2/24	Configure the IP address for the interface eth1
(config-if)#clock-port	Configure eth1 as clock port
(config-clk-port)#exit	Exit Port Configure mode
(conig-if)#exit	Exit Interface mode
(config)#interface eth2	Configure interface eth2
(config)#ip address 2.1.1.1/24	Configure the IP address for the interface eth2

(config-if)#clock-port	Configure eth2 as clock port
(config-clk-port)#exit	Exit Port Configure mode

## Zebos3 (ordinary clock)

#configure terminal	Enter Configure mode
(config)#ptp-clk ordinary transport-type udp v4 delay-mechanism p2p	Configure PTP ordinary clock over UDP
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth2	Configure interface eth2
(config)#ip address 2.1.1.2/24	Configure the IP address for the interface eth2
(config-if)#clock-port	Configure eth2 as clock port
(config-clk-port)#exit	Exit Port Configure mode

## Validation

### Zebos1

#### 1. Verify the default data set on Zebos1.

```
#show ptp data default
CLOCK(Ordinary)
  Two Step Flag :Yes
  Clock Identity : ff:fe:52:54:0:e6:5f:11
  Number Of Ports:1
  Priority1 :128
  Priority2:128
  Domain Number:0
  Slave Only:No
  Clock Quality:
  Class: 248
  Accuracy:254
  Offset (log variance):ffff
```

#### 2. Verify the current data set on Zebos1.

```
#show ptp data current
CLOCK(Ordinary Clock)
  Steps Removed:0
  Offset From Master: 0
  Mean Path Delay: 0
```

#### 3. Verify the parent data set on Zebos1.

```
#show ptp data parent
CLOCK(Ordinary Clock)
  Parent Port ID:[ff:fe:52:54:0:e6:5f:11]: 0
  Parent Stats:No
  Observed Parent Offset (log variance): 0
  Observed Parent Clock Phase Change Rate: 0
```

```
Grandmaster Clock:Identity: ff:fe:52:54:0:e6:5f:11
Priority1: 128
Priority2: 128
Clock Quality:Class: 248
Accuracy:254
Offset (log variance): ffff
```

#### 4. Verify the port state on Zebos1.

The initial state of the port is LISTENING before it moves to MASTER.

```
#sh ptp port
```

```
=====
```

```
PORT State [PTP_MASTER]
Port Clock Identity: ff:fe:52:54:0:e6:5f:11:
Port Number: 1
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
```

### Zebos2

#### 1. Verify the default data set on Zebos2.

```
#sh ptp data default
CLOCK(Boundary Clock)
  Two Step Flag :Yes
  Clock Identity : ff:fe:52:54:0:ed:a9:5
  Number Of Ports:2
  Priority1 :128
  Priority2:128
  Domain Number:0
  Slave Only:No
  Clock Quality:
  Class: 248
  Accuracy:254
  Offset (log variance):ffff
```

#### 2. Verify the current data set on Zebos2.

```
#sh ptp data current
CLOCK(Boundary Clock)
  Steps Removed:1
  Offset From Master: 0
  Mean Path Delay: 0
```

#### 3. Verify the parent data set on Zebos2.

```
#sh ptp data parent
CLOCK(Boundary Clock)
```

```

Parent Port ID:[ff:fe:52:54:0:e6:5f:11]: 1
Parent Stats:No
Observed Parent Offset (log variance): ffff
Observed Parent Clock Phase Change Rate: 7fffffff
Grandmaster Clock:Identity: ff:fe:52:54:0:e6:5f:11
Priority1: 128
Priority2: 128
Clock Quality:Class: 248
Accuracy:254
Offset (log variance): ffff

```

#### 4. Verify the port state on Zebos2.

Port 1 is SLAVE and port2 is MASTER.

```
#sh ptp port
```

```

=====

PORT State [PTP_SLAVE]
Port Clock Identity: ff:fe:52:54:0:e6:5f:11:
Port Number: 1
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
=====

```

```

PORT State [PTP_MASTER]
Port Clock Identity: ff:fe:52:54:0:e6:5f:11:
Port Number: 2
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2

```

### Zebos3

#### 1. Verify the default data set on Zebos3.

```

#show ptp data default
CLOCK(Ordinary)
  Two Step Flag :Yes
  Clock Identity : ff:fe:52:54:0:2d:fe:38
  Number Of Ports:1
  Priority1 :128
  Priority2:128

```

```
Domain Number:0
Slave Only:No
Clock Quality:
Class: 248
Accuracy:254
Offset (log variance):ffff
```

### 2. Verify the current data set on Zebos3.

```
#show ptp data current
CLOCK(Ordinary Clock)
  Steps Removed:0
  Offset From Master: 0
  Mean Path Delay: 0
```

### 3. Verify the parent data set on Zebos3.

```
#show ptp data parent
CLOCK(Ordinary Clock)
  Parent Port ID:[ff:fe:52:54:0:e6:5f:11]: 0
  Parent Stats:No
  Observed Parent Offset (log variance): 0
  Observed Parent Clock Phase Change Rate: 0
  Grandmaster Clock:Identity: ff:fe:52:54:0:e6:5f:11
  Priority1: 128
  Priority2: 128
  Clock Quality:Class: 248
  Accuracy:254
  Offset (log variance): ffff
```

### 4. Verify the port state on Zebos3.

The initial state of the port is LISTENING before it moves to SLAVE.

```
1#sh ptp port
=====

PORT State [PTP_SLAVE]
Port Clock Identity: ff:fe:52:54:0:e6:5f:11:
Port Number: 1
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 3
Announce Receipt Timeout: 6
Sync Interval (log base 2):1
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 3
PTP version: 2
```

---

## Boundary Clock Configuration over UDP IPv6

This section show setting up a boundary clock over IPv6.



---

## Zebos1 (ordinary clock)

#configure terminal	Enter Configure mode
(config)#ptp-clk ordinary transport-type udp v6 delay-mechanism p2p	Configure PTP ordinary clock over UDP; an IPv6 link local address must be configured; you do not need to configure a global address
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth1	Configure interface eth1
(config-if)#clock-port	Configure eth1 as clock port
(config-clk-port)#exit	Exit Port Configure mode

---

## Zebos2 (boundary clock)

#configure terminal	Enter Configure mode
(config)#ptp-clk boundary transport-type udp v6 delay-mechanism p2p	Configure PTP boundary clock over UDP; an IPv6 link local address must be configured; you do not need to configure a global address
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth1	Configure interface eth1
(config-if)#clock-port	Configure eth1 as clock port
(config-clk-port)#exit	Exit Port Configure mode
(config-if)#exit	Exit Interface mode
(config)#interface eth2	Configure interface eth2
(config-if)#clock-port	Configure eth2 as clock port
(config-clk-port)#exit	Exit Port Configure mode

---

## Zebos3 (ordinary clock)

#configure terminal	Enter Configure mode
(config)#ptp-clk ordinary transport-type udp v6 delay-mechanism p2p	Configure PTP ordinary clock over UDP; an IPv6 link local address must be configured; you do not need to configure a global address
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth2	Configure interface eth2
(config-if)#clock-port	Configure eth2 as clock port
(config-clk-port)#exit	Exit Port Configure mode

---

## Validation

### Zebos1

1. Verify the default data set on Zebos1.

```
#show ptp data default
CLOCK(Ordinary)
  Two Step Flag :Yes
  Clock Identity : ff:fe:52:54:0:e6:5f:11
  Number Of Ports:1
  Priority1 :128
  Priority2:128
  Domain Number:0
  Slave Only:No
  Clock Quality:
  Class: 248
  Accuracy:254
  Offset (log variance):ffff
```

### 2. Verify the current data set on Zebos1.

```
#show ptp data current
CLOCK(Ordinary Clock)
  Steps Removed:0
  Offset From Master: 0
  Mean Path Delay: 0
```

### 3. Verify the parent data set on Zebos1.

```
#show ptp data parent
CLOCK(Ordinary Clock)
  Parent Port ID:[ff:fe:52:54:0:e6:5f:11]: 0
  Parent Stats:No
  Observed Parent Offset (log variance): 0
  Observed Parent Clock Phase Change Rate: 0
  Grandmaster Clock:Identity: ff:fe:52:54:0:e6:5f:11
  Priority1: 128
  Priority2: 128
  Clock Quality:Class: 248
  Accuracy:254
  Offset (log variance): ffff
```

### 4. Verify the port state on Zebos1.

The initial state of the port is LISTENING before it moves to MASTER.

```
#sh ptp port
=====

PORT State [PTP_MASTER]
Port Clock Identity: ff:fe:52:54:0:e6:5f:11:
Port Number: 1
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
```

## Zebos2

### 1. Verify the default data set on Zebos2.

```
#sh ptp data default
CLOCK(Boundary Clock)
  Two Step Flag :Yes
  Clock Identity : ff:fe:52:54:0:ed:a9:5
  Number Of Ports:2
  Priority1 :128
  Priority2:128
  Domain Number:0
  Slave Only:No
  Clock Quality:
  Class: 248
  Accuracy:254
  Offset (log variance):ffff
```

### 2. Verify the current data set on Zebos2.

```
#sh ptp data current
CLOCK(Boundary Clock)
  Steps Removed:1
  Offset From Master: 0
  Mean Path Delay: 0
```

### 3. Verify the parent data set on Zebos2.

```
#sh ptp data parent
CLOCK(Boundary Clock)
  Parent Port ID:[ff:fe:52:54:0:e6:5f:11]: 1
  Parent Stats:No
  Observed Parent Offset (log variance): ffff
  Observed Parent Clock Phase Change Rate: 7fffffff
  Grandmaster Clock:Identity: ff:fe:52:54:0:e6:5f:11
  Priority1: 128
  Priority2: 128
  Clock Quality:Class: 248
  Accuracy:254
  Offset (log variance): ffff
```

### 4. Verify the port state on Zebos2.

Port 1 is SLAVE and port2 is MASTER.

```
#sh ptp port
```

```
=====

PORT State [PTP_SLAVE]
Port Clock Identity: ff:fe:52:54:0:e6:5f:11:
Port Number: 1
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
```

```
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
=====
```

```
PORT State [PTP_MASTER]
Port Clock Identity: ff:fe:52:54:0:e6:5f:11:
Port Number: 2
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
```

### Zebos3

#### 1. Verify the default data set on Zebos3.

```
#show ptp data default
CLOCK(Ordinary)
  Two Step Flag :Yes
  Clock Identity : ff:fe:52:54:0:2d:fe:38
  Number Of Ports:1
  Priority1 :128
  Priority2:128
  Domain Number:0
  Slave Only:No
  Clock Quality:
  Class: 248
  Accuracy:254
  Offset (log variance):ffff
```

#### 2. Verify the current data set on Zebos3.

```
#show ptp data current
CLOCK(Ordinary Clock)
  Steps Removed:0
  Offset From Master: 0
  Mean Path Delay: 0
```

#### 3. Verify the parent data set on Zebos3.

```
#show ptp data parent
CLOCK(Ordinary Clock)
  Parent Port ID:[ff:fe:52:54:0:e6:5f:11]: 0
  Parent Stats:No
  Observed Parent Offset (log variance): 0
  Observed Parent Clock Phase Change Rate: 0
  Grandmaster Clock:Identity: ff:fe:52:54:0:e6:5f:11
  Priority1: 128
  Priority2: 128
  Clock Quality:Class: 248
```

```
Accuracy:254
Offset (log variance): ffff
```

#### 4. Verify the port state on Zebos3.

The initial state of the port is LISTENING before it moves to SLAVE.

```
1#sh ptp port
=====

PORT State [PTP_SLAVE]
Port Clock Identity: ff:fe:52:54:0:e6:5f:11:
Port Number: 1
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 3
Announce Receipt Timeout: 6
Sync Interval (log base 2):1
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 3
PTP version: 2
```

## Priority and Message Interval Configuration

This section shows how to set the priorities and message intervals for a boundary clock.

### Zebos1

#configure terminal	Enter Configure Mode
(config)#bridge 1 protocol mstp	Create bridge 1 as an MSTP bridge
(config)#ptp-clk boundary transport-type ethernet delay-mechanism p2p	Configure PTP boundary clock over Ethernet
(config-ptp-clk)#priority1 1	Configure priority 1
(config-ptp-clk)#priority2 1	Configure priority 2
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth1	Configure interface eth1
(config-if)#switchport	Configure eth1 as Layer 2 port
(config-if)#bridge-group 1	Configure eth1 in bridge group 1
(config-if)#clock-port	Configure eth1 as clock port
(config-clk-port)#announce interval 3	Configure announce interval as 3 on clock port
(config-clk-port)#sync interval 1	Configure sync interval as 1 on clock port
(config-clk-port)#delay-req-interval 3	Configure delay request interval as 3 on clock port
(config-clk-port)#announce timeout-interval 3	Configure announce timeout interval as 3 on clock port
(config-clk-port)#exit	Exit Port Configure mode
(conig-if)#exit	Exit Interface mode

(config)#interface eth2	Configure interface eth2
(config-if)#switchport	Configure eth2 as Layer 2 port
(config-if)#bridge-group 1	Configure eth2 in bridge group 1
(config-if)#clock-port	Configure eth2 as clock port
(config-clk-port)#announce interval 3	Configure announce interval as 3 on clock port
(config-clk-port)#sync interval 1	Configure sync interval as 1 on clock port
(config-clk-port)#delay-req-interval 3	Configure delay request interval as 3 on clock port
(config-clk-port)#announce timeout-interval 3	Configure announce timeout interval as 3 on clock port
(config-clk-port)#exit	Exit Port Configure mode

## Validation

### 1. Verify the priority in the default data set on Zebos2.

```
#show ptp data default
CLOCK(Ordinary)
  Two Step Flag :Yes
  Clock Identity : ff:fe:52:54:0:ed:a9:5
  Number Of Ports:1
  Priority1 :1
  Priority2:1
  Domain Number:0
  Slave Only:No Clock Quality: Class: 248
  Accuracy:254
  Offset (log variance):ffff
```

### 2. Verify the message intervals in the port data set on Zebos2.

```
#show ptp port
=====

PORT State [PTP_LISTENING]
Port Clock Identity: ff:fe:52:54:0:ed:a9:5:
Port Number: 2
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 3
Announce Receipt Timeout: 3
Sync Interval (log base 2):1
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 3
PTP version: 2

#show ptp port
=====

PORT State [PTP_LISTENING]
Port Clock Identity: ff:fe:52:54:0:ed:a9:5:
Port Number: 3
```

Min Delay Req Interval (log base 2): 0  
Peer Mean Path Delay:0  
Announce interval (log base 2): 3  
Announce Receipt Timeout: 3  
Sync Interval (log base 2):1  
Delay Mechanism: Peer to peer  
Delay Request Interval (log base 2): 3  
PTP version: 2





# CHAPTER 3    Transparent Clock Configuration

---

This chapter shows how to configure peer-to-peer transparent clocks. You configure a transparent clock with more than one port.

Note:    ZebOS-XP does not support end-to-end transparent clocks.

---

## Topology

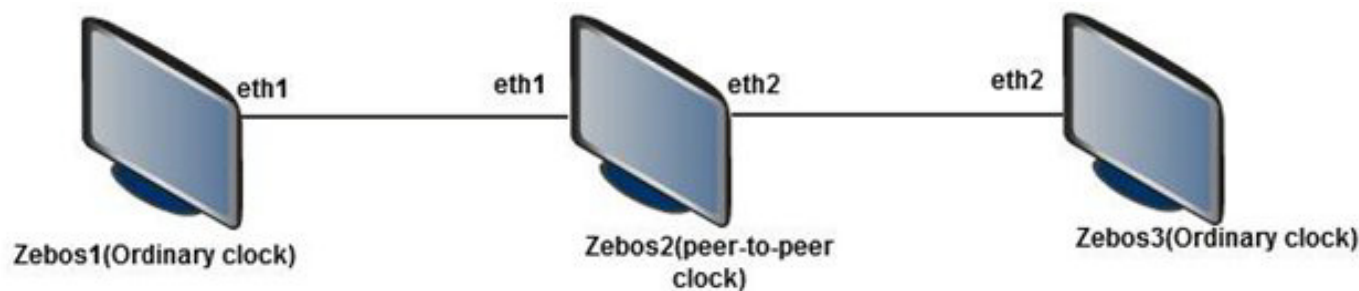


Figure 3-1: Configuration Topology

In this example, all devices are running PTP.

---

## Peer-to-Peer Transparent Clock Configuration over Ethernet

This section shows how to set up a transparent clock over Ethernet.

---

### Zebos1 (ordinary clock)

#configure terminal	Enter Configure mode
(config)#bridge 1 protocol mstp	Create bridge 1 as an MSTP bridge (this step is not mandatory, but is a good practice to avoid layer 2 loops)
(config)#ptp-clk ordinary transport-type ethernet delay-mechanism p2p	Configure PTP ordinary clock over Ethernet; to use the end-to-end delay mechanism, give the following command: ptp-clk ordinary transport-type ethernet delay-mechanism e2e
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth1	Configure interface eth1
(config-if)#switchport	Configure eth1 as Layer 2 port
(config-if)#bridge-group 1	Configure eth1 in bridge group 1
(config-if)#clock-port	Configure eth1 as clock port
(config-clk-port)#exit	Exit Port Configure mode

## Zebos2 (transparent clock)

#configure terminal	Enter Configure mode
(config)#bridge 1 protocol mstp	Create bridge 1 as an MSTP bridge (this step is not mandatory, but is a good practice to avoid layer 2 loops)
(config)#ptp-clk transparent transport-type ethernet delay-mechanism p2p	Configure PTP transparent clock over Ethernet
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth1	Configure interface eth1
(config-if)#switchport	Configure eth1 as Layer 2 port
(config-if)#bridge-group 1	Configure eth1 in bridge group 1
(config-if)#clock-port	Configure eth1 as clock port
(config-clk-port)#exit	Exit Port Configure mode
(config-if)#exit	Exit Interface mode
(config)#interface eth2	Configure interface eth2
(config-if)#switchport	Configure eth2 as Layer 2 port
(config-if)#bridge-group 1	Configure eth2 in bridge group 1
(config-if)#clock-port	Configure eth2 as clock port
(config-clk-port)#exit	Exit Port Configure mode

## Zebos3 (ordinary clock)

#configure terminal	Enter Configure mode
(config)#bridge 1 protocol mstp	Create bridge 1 as an MSTP bridge (this step is not mandatory, but is a good practice to avoid layer 2 loops)
(config)#ptp-clk ordinary transport-type ethernet delay-mechanism p2p	Configure PTP ordinary clock over Ethernet; to use the end-to-end delay mechanism, give the following command: ptp-clk ordinary transport-type ethernet delay-mechanism e2e
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth2	Configure interface eth2
(config-if)#switchport	Configure eth2 as Layer 2 port
(config-if)#bridge-group 1	Configure eth2 in bridge group 1
(config-if)#clock-port	Configure eth2 as clock port
(config-clk-port)#exit	Exit Port Configure mode

## Validation

### Zebos1

1. Verify the default data set on Zebos1.

```
#show ptp data default
CLOCK(Ordinary)
  Two Step Flag :Yes
```

```

Clock Identity : ff:fe:52:54:0:e6:5f:11
Number Of Ports:1
Priority1 :128
Priority2:128
Domain Number:0
Slave Only:No
Clock Quality:
Class: 248
Accuracy:254
Offset (log variance):ffff

```

## 2. Verify the current data set on Zebos1.

```

#show ptp data current
CLOCK(Ordinary Clock)
  Steps Removed:0
  Offset From Master: 0
  Mean Path Delay: 0

```

## 3. Verify the parent data set on Zebos1.

```

#show ptp data parent
CLOCK(Ordinary Clock)
  Parent Port ID:[ff:fe:52:54:0:e6:5f:11]: 0
  Parent Stats:No
  Observed Parent Offset (log variance): 0
  Observed Parent Clock Phase Change Rate: 0
  Grandmaster Clock:Identity: ff:fe:52:54:0:e6:5f:11
  Priority1: 128
  Priority2: 128
  Clock Quality:Class: 248
  Accuracy:254
  Offset (log variance): ffff

```

## 4. Verify the port state on Zebos1.

The initial state of the port is LISTENING before it moves to MASTER.

```

#show ptp port
=====

PORT State [PTP_LISTENING]
Port Clock Identity: ff:fe:52:54:0:e6:5f:11:
Port Number: 1
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2

```

```

#show ptp port
=====

```

```
PORT State [PTP_MASTER]
Port Clock Identity: ff:fe:52:54:0:e6:5f:11:
Port Number: 1
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
```

### Zebos2

#### 1. Verify the default data set on Zebos2.

```
#show ptp data transparent
CLOCK(TRANSPARENT)
Clock Identity   : ff:fe:52:54:0:ed:a9:5
Number Of Ports : 2
Delay Mechanism  : Peer to Peer
Primary Domain   : 0
```

#### 2. Verify the port state on Zebos2.

The initial state of the port is LISTENING before it moves to MASTER.

```
#show ptp port
=====
% Transparent clock
Clock Identity: ff:fe:52:54:0:ed:a9:5
Port Number: 3
Delay Request Interval (log base 2): 1
Peer Mean Path Delay:0
Faulty Flag: 0
=====
% Transparent clock
Clock Identity: ff:fe:52:54:0:ed:a9:5
Port Number: 4
Delay Request Interval (log base 2): 1
Peer Mean Path Delay:0
Faulty Flag: 0
```

### Zebos3

#### 1. Verify the default data set on Zebos3.

```
#show ptp data default
CLOCK(Ordinary)
  Two Step Flag :Yes
  Clock Identity : ff:fe:52:54:0:2d:fe:38
  Number Of Ports:1
  Priority1 :128
  Priority2:128
```

```

Domain Number:0
Slave Only:No
Clock Quality:
Class: 248
Accuracy:254
Offset (log variance):ffff

```

## 2. Verify the current data set on Zebos3.

```

#show ptp data current
CLOCK(Ordinary Clock)
  Steps Removed:1
  Offset From Master: 0
  Mean Path Delay: 0

```

## 3. Verify the parent data set on Zebos3.

```

#show ptp data parent
CLOCK(Ordinary Clock)
  Parent Port ID:[ff:fe:52:54:0:e6:5f:11]: 1
  Parent Stats:No
  Observed Parent Offset (log variance): 0
  Observed Parent Clock Phase Change Rate: 0
  Grandmaster Clock:Identity: ff:fe:52:54:0:e6:5f:11
  Priority1: 128
  Priority2: 128
  Clock Quality:Class: 248
  Accuracy:254
  Offset (log variance): ffff

```

## 4. Verify the port state on Zebos3.

The initial state of the port is LISTENING before it moves to SLAVE.

```

#show ptp port
=====

PORT State [PTP_LISTENING]
Port Clock Identity: ff:fe:52:54:0:2d:fe:38:
Port Number: 2
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2

```

```

#show ptp port
=====

PORT State [PTP_SLAVE]
Port Clock Identity: ff:fe:52:54:0:2d:fe:38:
Port Number: 2

```

```
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
```

---

## Peer-to-Peer Transparent Clock Configuration over UDP IPv4

This section show how to set up a transparent clock over IPv4.

---

### Zebos1 (ordinary clock)

#configure terminal	Enter Configure mode
(config)#ptp-clk ordinary transport-type udp v4 delay-mechanism p2p	Configure PTP ordinary clock over UDP; IPv4 addresses must be configured on the interfaces
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth1	Configure interface eth1
(config)#ip address 1.1.1.1/24	Configure the IP address for the interface eth1
(config-if)#clock-port	Configure eth1 as clock port
(config-clk-port)#exit	Exit Port Configure mode

---

### Zebos2 (transparent clock)

#configure terminal	Enter Configure mode
(config)#ptp-clk transparent transport-type udp v4 delay-mechanism p2p	Configure PTP transparent clock over UDP
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth1	Configure interface eth1
(config)#ip address 1.1.1.2/24	Configure the IP address for the interface eth1
(config-if)#clock-port	Configure eth1 as clock port
(config-clk-port)#exit	Exit Port Configure mode
(conig-if)#exit	Exit Interface mode
(config)#interface eth2	Configure interface eth2
(config)#ip address 2.1.1.1/24	Configure the IP address for the interface eth2
(config-if)#clock-port	Configure eth2 as clock port
(config-clk-port)#exit	Exit Port Configure mode

## Zebos3 (ordinary clock)

#configure terminal	Enter Configure mode
(config)#ptp-clk ordinary transport-type udp v4 delay-mechanism p2p	Configure PTP ordinary clock over UDP
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth2	Configure interface eth2
(config)#ip address 2.1.1.2/24	Configure the IP address for the interface eth2
(config-if)#clock-port	Configure eth2 as clock port
(config-clk-port)#exit	Exit Port Configure mode

## Validation

### Zebos1

1. Verify the default data set on Zebos1.

```
#show ptp data default
CLOCK(Ordinary)
  Two Step Flag :Yes
  Clock Identity : ff:fe:52:54:0:e6:5f:11
  Number Of Ports:1
  Priority1 :128
  Priority2:128
  Domain Number:0
  Slave Only:No
  Clock Quality:
  Class: 248
  Accuracy:254
  Offset (log variance):ffff
```

2. Verify the current data set on Zebos1.

```
#show ptp data current
CLOCK(Ordinary Clock)
  Steps Removed:0
  Offset From Master: 0
  Mean Path Delay: 0
```

3. Verify the parent data set on Zebos1.

```
#show ptp data parent
CLOCK(Ordinary Clock)
  Parent Port ID:[ff:fe:52:54:0:e6:5f:11]: 0
  Parent Stats:No
  Observed Parent Offset (log variance): 0
  Observed Parent Clock Phase Change Rate: 0
  Grandmaster Clock:Identity: ff:fe:52:54:0:e6:5f:11
  Priority1: 128
  Priority2: 128
  Clock Quality:Class: 248
```

```
Accuracy:254
Offset (log variance): ffff
```

#### 4. Verify the port state on Zebos1.

The initial state of the port is LISTENING before it moves to MASTER.

```
#show ptp port
=====

PORT State [PTP_LISTENING]
Port Clock Identity: ff:fe:52:54:0:e6:5f:11:
Port Number: 2
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
```

```
#show ptp port
=====

PORT State [PTP_MASTER]
Port Clock Identity: ff:fe:52:54:0:e6:5f:11:
Port Number: 2
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
```

### Zebos2

#### 1. Verify the default data set on Zebos2.

```
#show ptp data transparent
CLOCK(TRANSPARENT)
Clock Identity   : ff:fe:52:54:0:ed:a9:5
Number Of Ports : 2
Delay Mechanism  : Peer to Peer
Primary Domain   : 0
```

#### 2. Verify the port state on Zebos2.

```
#show ptp port
=====

% Transparent clock
Clock Identity: ff:fe:52:54:0:ed:a9:5
Port Number: 5
```



```

Delay Request Interval (log base 2): 1
Peer Mean Path Delay:0
Faulty Flag: 0
=====
% Transparent clock
Clock Identity: ff:fe:52:54:0:ed:a9:5
Port Number: 6
Delay Request Interval (log base 2): 1
Peer Mean Path Delay:0
Faulty Flag: 0

```

## Zebos3

### 1. Verify the default data set on Zebos3.

```

#show ptp data default
CLOCK(Ordinary)
  Two Step Flag :Yes
  Clock Identity : ff:fe:52:54:0:2d:fe:38
  Number Of Ports:1
  Priority1 :128
  Priority2:128
  Domain Number:0
  Slave Only:No
  Clock Quality:
  Class: 248
  Accuracy:254
  Offset (log variance):ffff

```

### 2. Verify the current data set on Zebos3.

```

#show ptp data current
CLOCK(Ordinary Clock)
  Steps Removed:1
  Offset From Master: 0
  Mean Path Delay: 0

```

### 3. Verify the parent data set on Zebos3.

```

#show ptp data parent
CLOCK(Ordinary Clock)
  Parent Port ID:[ff:fe:52:54:0:e6:5f:11]: 2
  Parent Stats:No
  Observed Parent Offset (log variance): 0
  Observed Parent Clock Phase Change Rate: 0
  Grandmaster Clock:Identity: ff:fe:52:54:0:e6:5f:11
  Priority1: 128
  Priority2: 128
  Clock Quality:Class: 248
  Accuracy:254
  Offset (log variance): ffff

```

### 4. Verify the port state on Zebos3.

The initial state of the port is LISTENING before it moves to SLAVE

```
#show ptp port
=====

PORT State [PTP_LISTENING]
Port Clock Identity: ff:fe:52:54:0:2d:fe:38:
Port Number: 3
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
```

```
#show ptp port
=====

PORT State [PTP_SLAVE]
Port Clock Identity: ff:fe:52:54:0:2d:fe:38:
Port Number: 3
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
```

---

## Peer-to-Peer Transparent Clock Configuration over UDP IPv6

This section show how to set up a transparent clock over IPv6.

---

### Zebos1 (ordinary clock)

#configure terminal	Enter Configure mode
(config)#ptp-clk ordinary transport-type udp v6 delay-mechanism p2p	Configure PTP ordinary clock over UDP; an IPv6 link local address must be configured; you do not need to configure a global address
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth1	Configure interface eth1
(config-if)#clock-port	Configure eth1 as clock port
(config-clk-port)#exit	Exit Port Configure mode

---

## Zebos2 (transparent clock)

#configure terminal	Enter Configure mode
(config)#ptp-clk transparent transport-type udp v6 delay-mechanism p2p	Configure PTP transparent clock over UDP; an IPv6 link local address must be configured; you do not need to configure a global address
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth1	Configure interface eth1
(config-if)#clock-port	Configure eth1 as clock port
(config-clk-port)#exit	Exit Port Configure mode
(config-if)#exit	Exit Interface mode
(config)#interface eth2	Configure interface eth2
(config-if)#clock-port	Configure eth2 as clock port
(config-clk-port)#exit	Exit Port Configure mode

---

## Zebos3 (ordinary clock)

#configure terminal	Enter Configure mode
(config)#ptp-clk ordinary transport-type udp v6 delay-mechanism p2p	Configure PTP ordinary clock over UDP; an IPv6 link local address must be configured; you do not need to configure a global address
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth2	Configure interface eth2
(config-if)#clock-port	Configure eth2 as clock port
(config-clk-port)#exit	Exit Port Configure mode

---

## Validation

### Zebos1

1. Verify the default data set on Zebos1.

```
#show ptp data default
CLOCK(Ordinary)
  Two Step Flag :Yes
  Clock Identity : ff:fe:52:54:0:e6:5f:11
  Number Of Ports:1
  Priority1 :128
  Priority2:128
  Domain Number:0
  Slave Only:No
  Clock Quality:
  Class: 248
  Accuracy:254
  Offset (log variance):ffff
```

### 2. Verify the current data set on Zebos1.

```
#show ptp data current
CLOCK(Ordinary Clock)
  Steps Removed:0
  Offset From Master: 0
  Mean Path Delay: 0
```

### 3. Verify the parent data set on Zebos1.

```
#show ptp data parent
CLOCK(Ordinary Clock)
  Parent Port ID:[ff:fe:52:54:0:e6:5f:11]: 0
  Parent Stats:No
  Observed Parent Offset (log variance): 0
  Observed Parent Clock Phase Change Rate: 0
  Grandmaster Clock:Identity: ff:fe:52:54:0:e6:5f:11
  Priority1: 128
  Priority2: 128
  Clock Quality:Class: 248
  Accuracy:254
  Offset (log variance): ffff
```

### 4. Verify the port state on Zebos1.

The initial state of the port is LISTENING before it moves to MASTER.

```
#show ptp port
=====

PORT State [PTP_LISTENING]
Port Clock Identity: ff:fe:52:54:0:e6:5f:11:
Port Number: 2
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
```

```
#show ptp port
=====

PORT State [PTP_MASTER]
Port Clock Identity: ff:fe:52:54:0:e6:5f:11:
Port Number: 2
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
```

```
Delay Request Interval (log base 2): 1
PTP version: 2
```

## Zebos2

### 1. Verify the default data set on Zebos2.

```
#show ptp data transparent
CLOCK(TRANSPARENT)
Clock Identity : ff:fe:52:54:0:ed:a9:5
Number Of Ports : 2
Delay Mechanism : Peer to Peer
Primary Domain : 0
```

### 2. Verify the port state on Zebos2.

```
#show ptp port
=====
% Transparent clock
Clock Identity: ff:fe:52:54:0:ed:a9:5
Port Number: 5
Delay Request Interval (log base 2): 1
Peer Mean Path Delay:0
Faulty Flag: 0
=====
% Transparent clock
Clock Identity: ff:fe:52:54:0:ed:a9:5
Port Number: 6
Delay Request Interval (log base 2): 1
Peer Mean Path Delay:0
Faulty Flag: 0
```

## Zebos3

### 1. Verify the default data set on Zebos3.

```
#show ptp data default
CLOCK(Ordinary)
  Two Step Flag :Yes
  Clock Identity : ff:fe:52:54:0:2d:fe:38
  Number Of Ports:1
  Priority1 :128
  Priority2:128
  Domain Number:0
  Slave Only:No
  Clock Quality:
  Class: 248
  Accuracy:254
  Offset (log variance):ffff
```

### 2. Verify the current data set on Zebos3.

```
#show ptp data current
CLOCK(Ordinary Clock)
  Steps Removed:1
  Offset From Master: 0
```

Mean Path Delay: 0

### 3. Verify the parent data set on Zebos3.

```
#show ptp data parent
CLOCK(Ordinary Clock)
  Parent Port ID:[ff:fe:52:54:0:e6:5f:11]: 2
  Parent Stats:No
  Observed Parent Offset (log variance): 0
  Observed Parent Clock Phase Change Rate: 0
  Grandmaster Clock:Identity: ff:fe:52:54:0:e6:5f:11
  Priority1: 128
  Priority2: 128
  Clock Quality:Class: 248
  Accuracy:254
  Offset (log variance): ffff
```

### 4. Verify the port state on Zebos3.

The initial state of the port is LISTENING before it moves to SLAVE

```
#show ptp port
=====

PORT State [PTP_LISTENING]
Port Clock Identity: ff:fe:52:54:0:2d:fe:38:
Port Number: 3
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
```

```
#show ptp port
=====

PORT State [PTP_SLAVE]
Port Clock Identity: ff:fe:52:54:0:2d:fe:38:
Port Number: 3
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
```

# CHAPTER 4   Synchronization

This chapter show how to configure PTP to synchronize clocks on devices.

## Topology

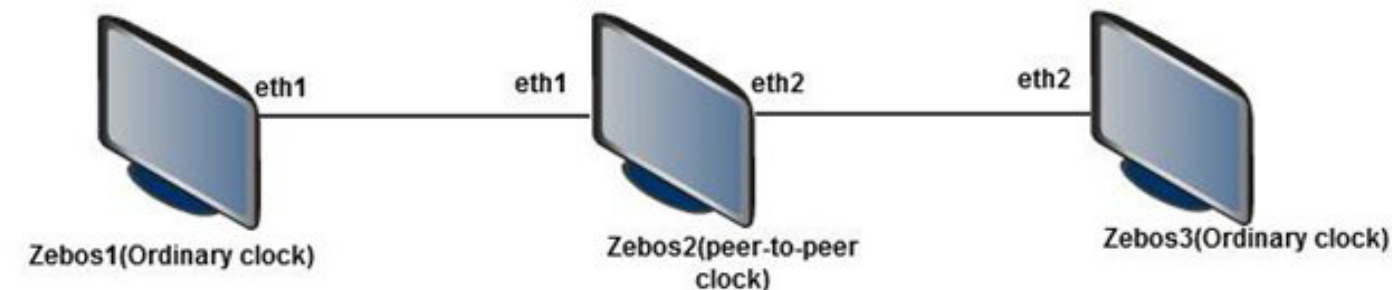


Figure 4-1: Configuration Topology

## Zebos1 (ordinary clock)

#configure terminal	Enter Configure mode
(config)#ptp-clk ordinary transport-type udp v6 delay-mechanism p2p	Configure PTP ordinary clock over UDP
(config-ptp-clk)#priority1 1	Configure priority 1
(config-ptp-clk)#priority2 1	Configure priority 2
(config-ptp-clk)#exit	Exit ptp Configure mode
(config)#interface eth1	Configure interface eth1
(config-if)#clock-port	Configure eth1 as clock port
(config-clk-port)#announce interval 3	Configure announce interval as 3 on clock port
(config-clk-port)#sync interval 1	Configure sync interval as 1 on clock port
(config-clk-port)#delay-req-interval 3	Configure delay request interval as 3 on clock port
(config-clk-port)#exit	Exit Port Configure mode

## Zebos2 (transparent clock)

#configure terminal	Enter Configure mode
(config)#ptp-clk transparent transport-type udp v6 delay-mechanism p2p	Configure PTP transparent clock over UDP
(config-ptp-clk)#exit	Exit PTP Configure mode

(config)#interface eth1	Configure interface eth1
(config-if)#clock-port	Configure eth1 as clock port
(config-clk-port)#delay-req-interval 3	Configure delay request interval as 3 on clock port
(config-clk-port)#exit	Exit Port Configure mode
(conig-if)#exit	Exit Interface mode
(config)#interface eth2	Configure interface eth2
(config-if)#clock-port	Configure eth2 as clock port
(config-clk-port)#delay-req-interval 3	Configure delay request interval as 3 on clock port
(config-clk-port)#exit	Exit Port Configure mode

## Zebos3 (ordinary clock)

#configure terminal	Enter Configure mode
(config)#ptp-clk ordinary transport-type udp v6 delay-mechanism p2p	Configure PTP ordinary clock over UDP
(config-ptp-clk)#exit	Exit PTP Configure mode
(config)#interface eth2	Configure interface eth2
(config-if)#clock-port	Configure eth2 as clock port
(config-clk-port)#announce interval 3	Configure announce interval as 3 on clock port
(config-clk-port)#sync interval 1	Configure sync interval as 1 on clock port
(config-clk-port)#delay-req-interval 3	Configure delay request interval as 3 on clock port
(config-clk-port)#exit	Exit Port Configure mode

## Validation

### Zebos1

1. Verify the default data set on Zebos1.

```
#sh ptp data default
CLOCK(Ordinary)
  Two Step Flag :Yes
  Clock Identity : ff:fe:52:54:0:ed:a9:5
  Number Of Ports:1
  Priority1 :128
  Priority2:128
  Domain Number:0
  Slave Only:No
  Clock Quality:
  Class: 248
  Accuracy:254
  Offset (log variance):ffff
```



2. Verify the current data set on Zebos1.

```
#sh ptp data current
CLOCK(Ordinary Clock)
  Steps Removed:0
  Offset From Master: 0
  Mean Path Delay: 0
```

3. Verify the parent data set on Zebos1.

```
#sh ptp data parent
CLOCK(Ordinary Clock)
  Parent Port ID:[ff:fe:52:54:0:ed:a9:5]: 0
  Parent Stats:No
  Observed Parent Offset (log variance): 0
  Observed Parent Clock Phase Change Rate: 0
  Grandmaster Clock:Identity: ff:fe:52:54:0:ed:a9:5
  Priority1: 128
  Priority2: 128
  Clock Quality:Class: 248
  Accuracy:254
  Offset (log variance): ffff
```

4. Verify the port data set on Zebos1.

```
#sh ptp port  
=====
```

PORT State [PTP_MASTER]	<<<<<<<<<<< Master clock
Port Clock Identity: ff:fe:52:54:0:ed:a9:5:	
Port Number: 3	
Min Delay Req Interval (log base 2): 0	
Peer Mean Path Delay:0	
Announce interval (log base 2): 2	
Announce Receipt Timeout: 6	
Sync Interval (log base 2):0	
Delay Mechanism: Peer to peer	
Delay Request Interval (log base 2): 1	
PTP version: 2	

5. Verify synchronization.

```
#exit
root@localhost:/root/ZebOS-7-9-0-t43/sbin> date
Tue Sep 27 11:43:35 GMT 2011
root@localhost:/root/ZebOS-7-9-0-t43/sbin> date -s "Dec 25 2011 10:00:00"
Sun Dec 25 10:00:00 GMT 2011
root@localhost:/root/ZebOS-7-9-0-t43/sbin> date
Sun Dec 25 10:06:17 GMT 2011
```

## Zebos2

1. Verify the transparent data set on Zebos2.

```
#sh ptp data transparent
CLOCK(TRANSPARENT)
```

```
Clock Identity   : ff:fe:52:54:0:ac:10:9
Number Of Ports : 2
Delay Mechanism  : Peer to Peer
Primary Domain   : 0
```

### 2. Verify the port data set on Zebos2.

```
#sh ptp port
=====
% Transparent clock
Clock Identity: ff:fe:52:54:0:ac:10:9
Port Number: 2
Delay Request Interval (log base 2): 1
Peer Mean Path Delay:0
Faulty Flag: 0
=====
% Transparent clock
Clock Identity: ff:fe:52:54:0:ac:10:9
Port Number: 3
Delay Request Interval (log base 2): 1
Peer Mean Path Delay:0
Faulty Flag: 0
```

---

## Zebos3

### 1. Verify the default data set on Zebos3.

```
#sh ptp data default
CLOCK(Ordinary)
  Two Step Flag :Yes
  Clock Identity : ff:fe:52:54:0:f1:a6:a2
  Number Of Ports:1
  Priority1 :128
  Priority2:128
  Domain Number:0
  Slave Only:No
  Clock Quality:
  Class: 248
  Accuracy:254
  Offset (log variance):ffff
```

### 2. Verify the current data set on Zebos3.

```
#sh ptp data current
CLOCK(Ordinary Clock)
  Steps Removed:1
  Offset From Master: 0
  Mean Path Delay: 0
```

### 3. Verify the parent data set on Zebos3.

```
#sh ptp data parent
CLOCK(Ordinary Clock)
  Parent Port ID:[ff:fe:52:54:0:ed:a9:5]: 3
  Parent Stats:No
```

```
Observed Parent Offset (log variance): ffff
Observed Parent Clock Phase Change Rate: 7fffffff
Grandmaster Clock:Identity: ff:fe:52:54:0:ed:a9:5
Priority1: 128
Priority2: 128
Clock Quality:Class: 248
Accuracy:254
Offset (log variance): ffff
```

4. Verify the port data set on Zebos3.

```
#sh ptp port
```

```
PORT State [PTP_SLAVE] <<<<<<<<<<<<<<< slave clock
Port Clock Identity: ff:fe:52:54:0:f1:a6:a2:
Port Number: 1
Min Delay Req Interval (log base 2): 0
Peer Mean Path Delay:0
Announce interval (log base 2): 2
Announce Receipt Timeout: 6
Sync Interval (log base 2):0
Delay Mechanism: Peer to peer
Delay Request Interval (log base 2): 1
PTP version: 2
```

5. Verify synchronization.

```
#exit  
[root@localhost sbin]# date  
Tue Sep 27 11:43:31 EDT 2011  
[root@localhost sbin]# date  
Sun Dec 25 05:05:52 EST 2011 <<<<<<< slave synchronized to master clock (Zebos1)
```



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