

云平台网络设备无法选择CVM服务器作为优选时钟源的问题案例

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组网及说明

云平台设置CVM作为主用时钟服务器，同时把另外一台核心网络设备作为备用时钟服务器。云平台的所有设备计划与它们同步时间，CVM服务器作为主用时钟源，核心网络设备作为备用时钟源。

问题描述

作为NTP客户端的网络设备通过以下配置把CVM服务器（地址是：19.202.189.245）作为优选时钟源，核心网络设备（地址是：19.202.191.254）作为备用时钟源：

```
<ZHSD-YJS-ZWYW-S10516-001&002>display cur | include ntp
clock protocol ntp mdc 1
ntp-service enable
ntp-service unicast-server 19.202.189.245 vpn-instance management priority
ntp-service unicast-server 19.202.191.254 vpn-instance management
```

但是客户端上看到的NTP会话信息显示，并没有把CVM服务器作为优选时钟源：

```
<ZHSD-YJS-ZWYW-S10516-001&002>display ntp-service session
source          reference      stra reach poll now offset delay disper
*****
[245]19.202.189.245 127.127.1.0 5 255 64 14 -74438 1.8615 2.5177
[12345]19.202.191.254 127.127.1.0 3 255 64 61 0.0289 2.1667 3.6621
Notes: 1 source(master), 2 source(peer), 3 selected, 4 candidate, 5 configured.
Total sessions:
```

过程分析

一、NTP协议里面规定，时钟层数越小，精度越高。所以当有多个时钟源设备的时候，首先优选的设备是时钟层数小的设备。只有当两个时钟源的时钟层数一致的时候，客户端才会根据命令行配置的优先级关键字“priority”优选对应的时钟源：

```
<ZHSD-YJS-ZWYW-S10516-001&002>display ntp-service session
source          reference      stra reach poll now offset delay disper
*****
[245]19.202.189.245 127.127.1.0 5 255 64 14 -74438 1.8615 2.5177
[12345]19.202.191.254 127.127.1.0 3 255 64 61 0.0289 2.1667 3.6621
Notes: 1 source(master), 2 source(peer), 3 selected, 4 candidate, 5 configured.
Total sessions:
```

二、从上述客户端的NTP会话看到，当前从核心网络设备获取的时钟层数是3，这个参数是在设备上做了手动指定生成的：

```
<ZHSD-YJS-ZW-S5130S-005&006>display cur | include ntp
ntp-service enable
ntp-service refclock-master 3
```

我们设备作为时钟源的时候，缺省时钟层数是8。

三、当指定了CVM服务器作为NTP时钟源之后：



我们在CVM服务器后台看到对应的NTP配置文件，缺省采用的时钟层数是4：

```

filegen peerstats file peerstats type day enable
filegen clockstats file clockstats type day enable

# Specify one or more NTP servers.

# Use servers from the NTP Pool Project. Approved by Ubuntu Technical Board
# on 2011-02-08 (LP: #104525). See http://www.pool.ntp.org/join.html for
# more information.

# Use Ubuntu's ntp server as a fallback.

# Access control configuration; see /usr/share/doc/ntp-doc/html/acconfig.html for
# details. The web page <http://support.ntp.org/bin/view/Support/AccessRestrictions>
# might also be helpful.

# Note that "restrict" applies to both servers and clients, so a configuration
# that might be intended to block requests from certain clients could also end
# up blocking replies from your own upstream servers.

# By default, exchange time with everybody, but don't allow configuration.
restrict -4 default kod notrap nomodify nopeer noquery limited
restrict -6 default kod notrap nomodify nopeer noquery limited

# Local users may interrogate the ntp server more closely.
restrict 127.0.0.1
restrict ::1

# Needed for adding pool entries
restrict source notrap nomodify noquery

# Clients from this (example!) subnet have unlimited access, but only if
# cryptographically authenticated.
#restrict 192.168.123.0 mask 255.255.255.0 notrust

# If you want to provide time to your local subnet, change the next line.
# (Again, the address is an example only.)
#broadcast 192.168.123.255

# If you want to listen to time broadcasts on your local subnet, de-comment the
# next lines. Please do this only if you trust everybody on the network!
#disable auth
#broadcastclient

#Changes required to use pps synchronisation as explained in documentation:
#http://www.ntp.org/ntpfaq/ntp-s-config-adv.htm#AEN3918
#server 127.127.8.1 mode 135 prefer # Meinberg GPS167 with PPS
#fudge 127.127.8.1 time1 0.0042 # relative to PPS for my hardware

#server 127.127.22.1 # ATOM(PPS)
#fudge 127.127.22.1 time1 0.0042 # enable PPS API
#fudge 127.127.1.0 stratum 4
#server 127.127.1.0 burst minpoll 4 maxpoll 4 prefer
#server 19.202.189.157 burst minpoll 4 maxpoll 4
#room@zhsh-135-zw-04900-040:~$
  
```

根据Linux系统的NTPD服务规定，NTPD服务从本地设备获取了时钟源，对外再发布时钟的时候，会把时钟层数加1。所以在客户端设备看到CVM服务器的时钟层数是5。

四、通过以上分析，确认客户端无法选择CVM服务器作为首选时钟源，是由于当前备用时钟源设备手动调整了时钟层数，较CVM服务器的缺省层数要优先导致的。

解决方法

方法一、在备用时钟源设备上把时钟层数调小：

```

[ZHSD-YJS-ZW-S5130S-005&006]display cur | include ntp
ntp-service enable
ntp-service refclock-master 6
  
```

客户端设备通过比较时钟层数优先级，选择指向CVM服务器作为优选时钟源：

```

<ZHSD-YJS-ZWYW-S10516-001&002>display ntp-service session
source          reference      stra reach poll  now offset  delay disper
*****
[12345]19.202.189.245 127.127.1.0    5 255 64 25 -0.122 1.5106 0.0152
[25]19.202.191.254 127.127.1.0    6 255 64 -0.0000 0.0000 16000
Notes: 1 source(master), 2 source(peer), 3 selected, 4 candidate, 5 configured.
Total sessions: 2
  
```

方法二、把备用时钟源设备上的时钟层数调整与CVM服务器一致，依靠客户端配置时钟服务器添加的关键字“priority”确保优选CVM服务器作为主用时钟源：

```

<ZHSD-YJS-ZWYW-S10516-001&002>display cur | include ntp
clock protocol ntp mdc 1
ntp-service enable
ntp-service unicast-server 19.202.189.245 vpn-instance management priority
ntp-service unicast-server 19.202.191.254 vpn-instance management
  
```

<ZHSD-YJS-HLYW-S10516-001&002>display ntp-service sessions

source reference stra reach poll now offset delay disper



[12345]	19.202.130.245	127.127.1.0	5	255	64	49	-0.477	1.5258	4.1503
[245]	19.202.128.254	127.127.1.0	5	255	64	2	129531	2.2430	2.1209