

W H I T E P A P E R

About *Peering and Stratum 2*

EndRun NTP Servers are primarily designed for Stratum 1 operation, but also support Stratum 2. The best use for a Stratum 1 time server is as an **INDEPENDENT** source of reliable & accurate time. EndRun products can be configured for peering but we don't recommend it for Stratum 1 Time Servers. This paper explains why. It also explains the difference between Stratum 2 mode and peering, and a couple of recommended network configurations that ensure the best time.

OVERVIEW

The Network Time Protocol (NTP) was designed to use Stratum 1 servers as the time authorities on a network. A Stratum 1 server is designed to operate with a reference clock that obtains time from a radio clock signal such as GPS or CDMA. Read the [NTP Stratum 1](#) webpage for details.

WHAT'S WRONG WITH PEERING?

Stratum 1 time servers are intended to be independent sources of time that are directly obtained from a radio clock. With peering, you are allowing your Stratum 1 time server, even while locked to a radio signal, to be influenced by other time servers on the network. This does not make sense.

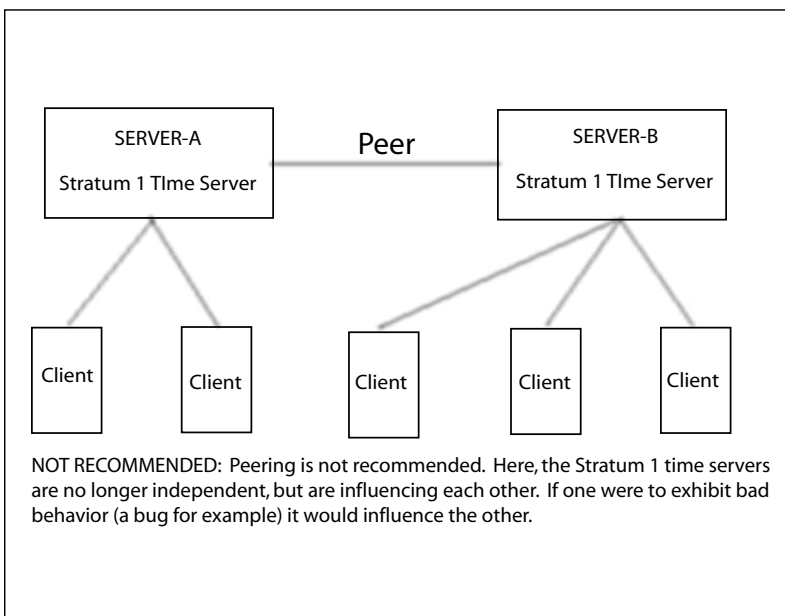
1. With peering, you have granted the potential of a bad time server corrupting a good time server, and in subtle, hard to diagnose ways. If Server-A misbehaves, it will negatively affect Server-B, even if Server-B is locked to a radio signal.

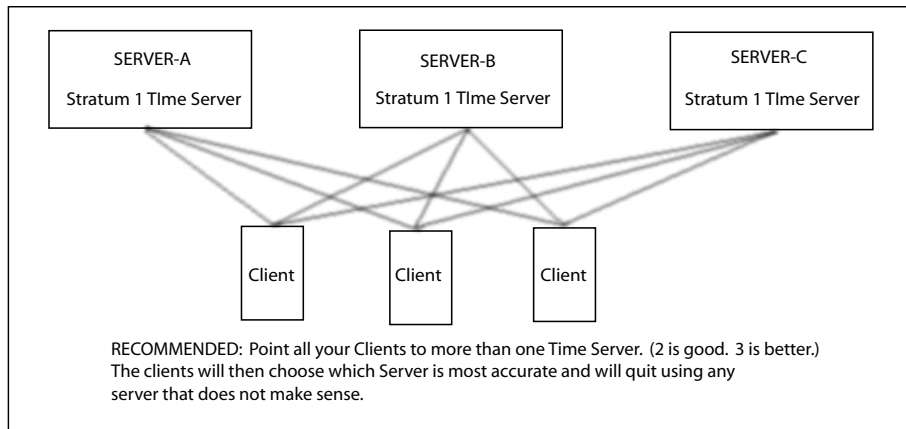
2. It is better to trust the Stratum 1 radio clock (sometimes called reference clock), than to bring another time server into the mix and expose your Stratum 1 time server to any weaknesses (bugs) in the peering algorithms, or to bugs in the other time server(s).

3. While peering may make some sense for lower level Stratum time servers (such as Stratum 3 or 4), in our opinion, it defeats the purpose of a Stratum 1 time server.

SOMETIMES SIMPLE IS BEST

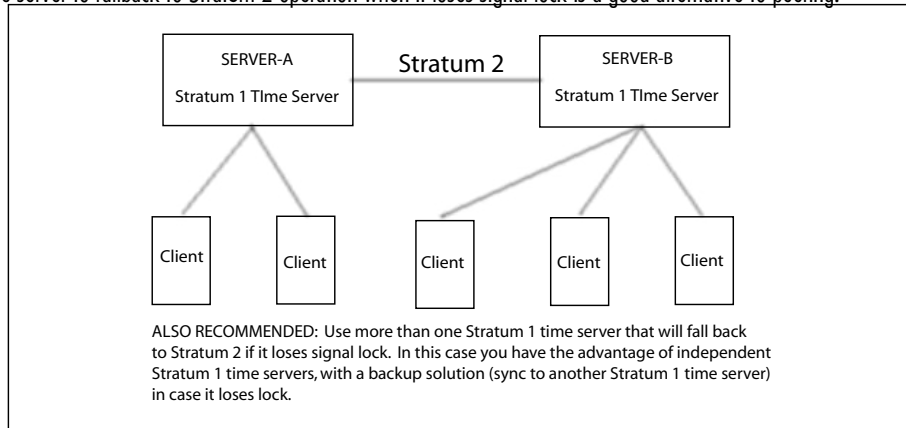
Peering is an over-complicated way to try and ensure that all NTP clients on the network receive the most accurate time possible. However, the objective can be better achieved if you configure your NTP clients to point to more than one time server (three is best). That way, each client can choose the most accurate time server among the three. Here is a diagram:





ABOUT STRATUM 2

Configuring a Stratum 1 time server to fallback to Stratum 2 operation when it loses signal lock is a good alternative to peering.



Configuring for Stratum 2 operation is simple and described in the [Stratum 2 Product Note](#). Briefly, you must point Stratum 1 Server-A (for example) to Stratum 1 Server-B by editing the `ntp.conf` file of Server-A and adding a line such as this:

```
server 192.168.1.1    (Stratum 2 is recommended.)
```

In this case, Server-B is at address 192.168.1.1. Operation of Server-A will occur like this:

1. As long as Server-A is locked to a radio signal such as GPS or CDMA, it will behave as an independent Stratum 1 server. This is good.
2. If/when Server-A loses the radio signal it will start to drift away from "perfect" time. Eventually it will reach an unlocked condition. For an EndRun time server this could take 24 hours, 35 days, or 140 days (depending on the installed oscillator). Once Server-A has gone unlocked then it will switch to Stratum 2 operation, using Server-B as its reference. This works well and makes sense in most network environments.

FINAL WORDS ON PEERING

Configuring a time server for peering is similar to configuration for Stratum 2. You edit the `ntp.conf` file and add a line such as this:

```
peer 192.168.1.1    (Peering is NOT recommended.)
```

In this case, as long as Server-A is locked to a radio signal, it will behave as a Stratum 1 server except that it will also use Server-B as an additional timing reference. This defeats the independence and autonomy of a Stratum 1 time server. Therefore, we do not recommend peering.

