# NTP for .nz

Josh Simpson

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# What is NTP?

- Network Time Protocol (NTP) is a networking protocol for clock synchronization between computer systems over packet-switched, variable-latency data networks.
- In operation since before 1985, NTP is one of the oldest Internet protocols in use.
- NTP is intended to synchronize all participating computers to within a few milliseconds of Coordinated Universal Time (UTC)
- NTPv4 is defined in RFC5905

# Why Provide NTP Services?

Requirement to have all internal NZRS systems be dependant on a accurate, redundant NZ based time source.

- .nz authoritative name servers
- Shared Registry Sytem (SRS)
- Provide a service to the New Zealand internet community, another source of local accurate time data.

# How NTP Works

NTP servers are tiered in strata

- **Stratum 0** is a high quality time source such as atomic clock, GPS clock or radio clock
- **Stratum 1** are computers with system clocks that are synchronised to a stratum 0 source
- **Stratum 2-15** are systems that synchronise via a packet network to the stratum above, time accuracy decreases the higher the stratum number

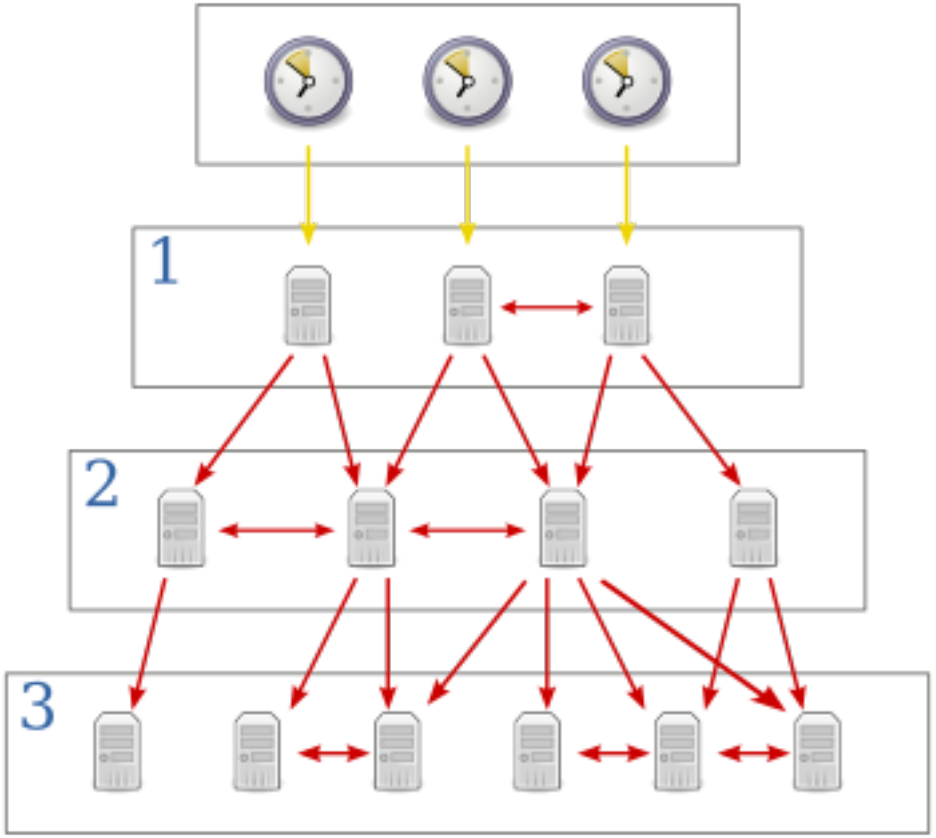


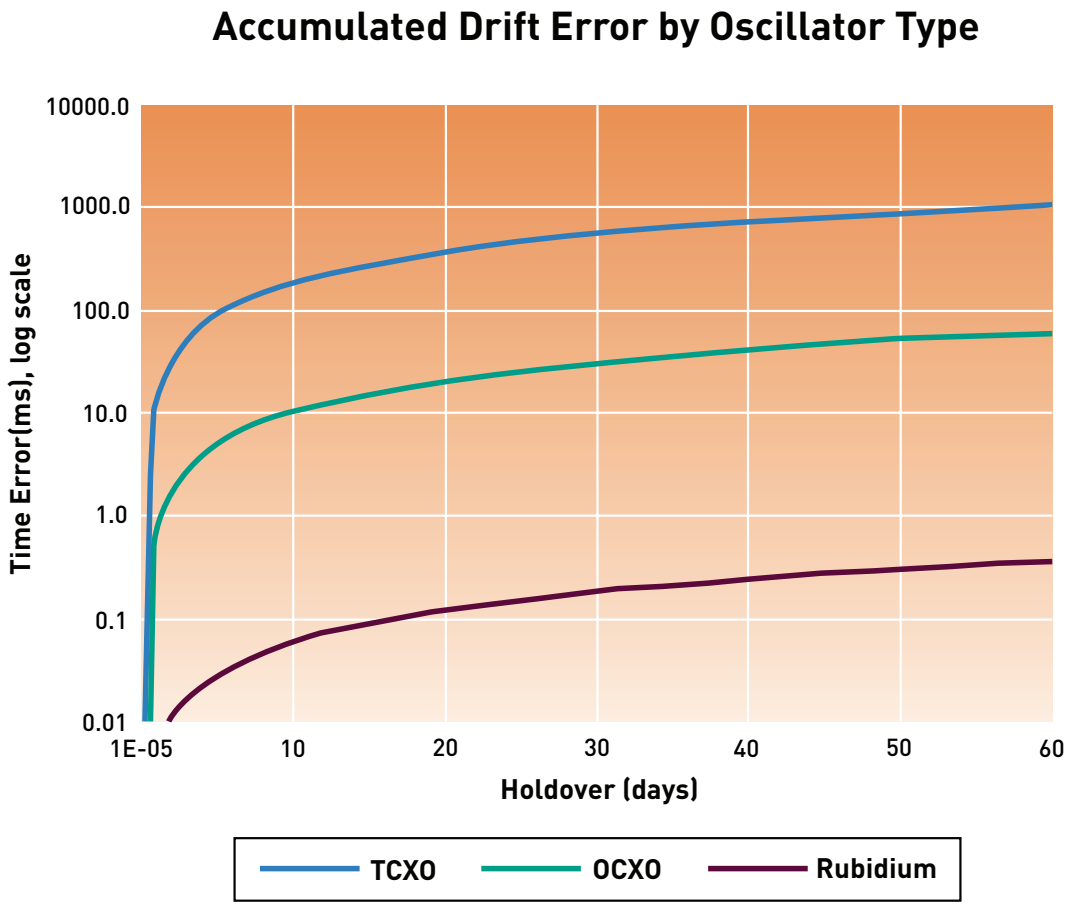

Image source Wikipedia

# Hardware


The initial three NTP servers that NZRS deployed in 2010 were SyncServer S300's from Microsemi

- GPS Source
- 7000 NTP requests per second
- Rubidium oscillator upgrade
- 1 Gigabit port,  3 100mbps ports

# Oscillator Drift & Holdover




If we loose GPS signal the appliance internal clock will start to drift away from the GPS Reference clock.

To slow down this drift we have opted to upgrade to a Rubidium oscillator.

This allows us to maintain Stratum 1 holdover for up to 140 days, compared with 24 Hours for the normal TXCO oscillator

Image source Microsemi

# Where are they?

NTP1 and NTP2 are located In Auckland, on the North Shore and in the CBD

NTP3 is currently located in the Wellington CBD



Image source Google Maps

# NTP2 Failure

In early July 2014 NTP2 experienced hardware failure

- Power supply failed causing rack breaker to trip.
- Lab tests showed that in addition to PSU replacement other parts of the system were not functioning correctly.
- Unusual voltage output requirements of the power supply meant it was expensive to replace.

# New Hardware Search

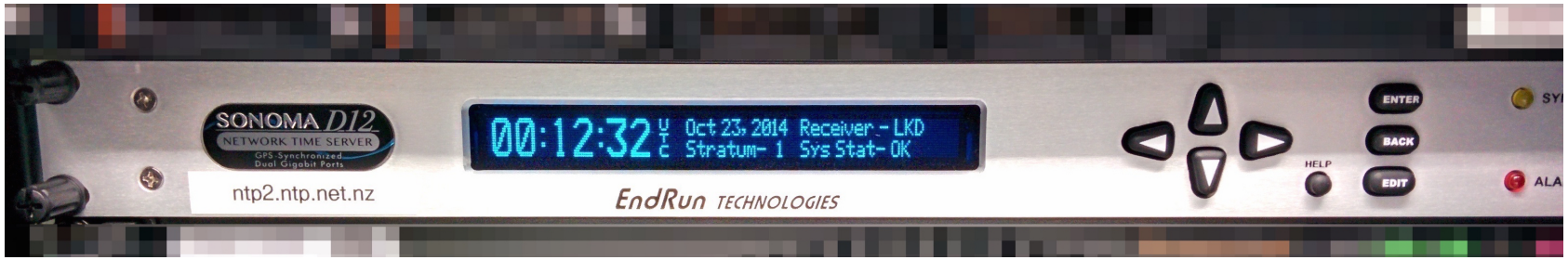
To replace NTP2 we decided to open our hardware search back up due to small issues we encountered with the original appliances.

- Inability to run IPv4 and IPv6 on the same interface
- Response to security vulnerabilities
- Buggy Anykey implementation preventing its use
- Expensive

Requirements of the new hardware

- 1RU Appliance
- Rubidium oscillator
- Active software security releases

# Endrun Technologies
# Sonoma D12




- GPS time source
- Rubidium oscillator upgrade
- Dual power supply upgrade
- 7500 NTP packets per second
- Active and prompt security updates
- Dual gigabit ethernet ports
- NTP2 installed in Auckland, currently undergoing final testing

# Future Plans

## NTP3 Move (2014)

Plans are underway to deploy the second of the new Sonoma D12 appliances to the SRS system in Lower Hutt datacenter as NTP3, shifting from its current home in the NZRS office.

## NTP1 Refresh (2015)

Refresh the last Symetricom S300 in production to a new Sonoma D12

## NTP4 Deploy (2015)

We have plans to deploy an additional appliance, NTP4 to Christchurch conditional on datacenter GPS antenna install.

Image source Google Maps

# Current System Issues

## IPv6 for NTP2

Currently we have an upstream issue and we hope to have this resolved in the next few months as part of the replacement of NTP2

## Anykey

With the deployment of new appliances we hope to begin offering this service again.

# More Info?

We have a website at which details more about the service and configuration recommendations on how to setup your system.

https://www.ntp.net.nz