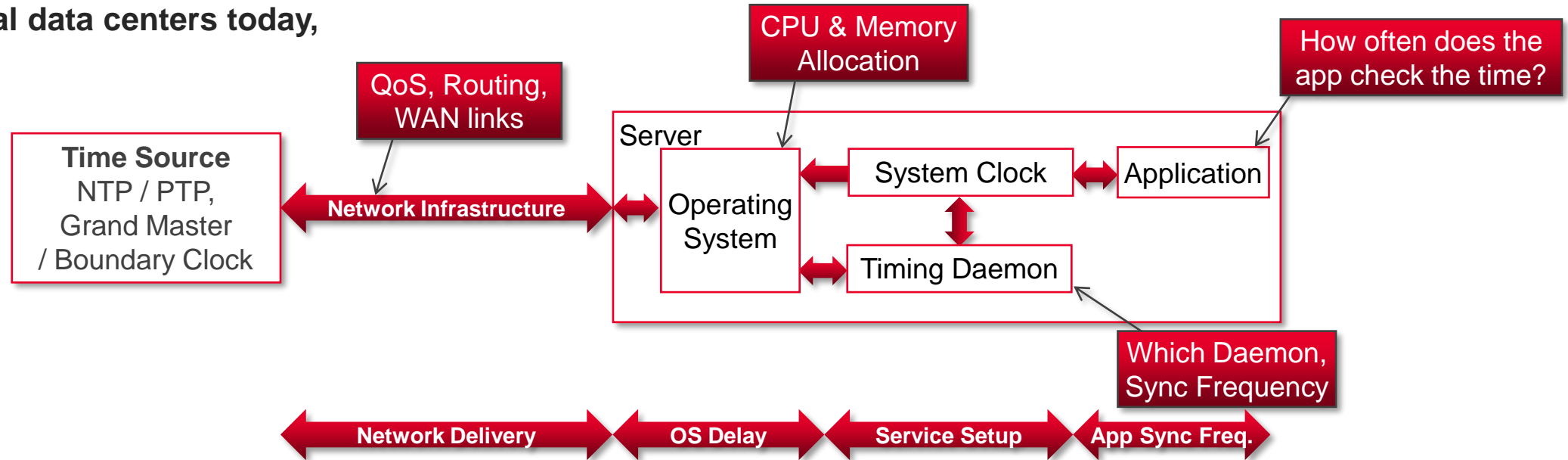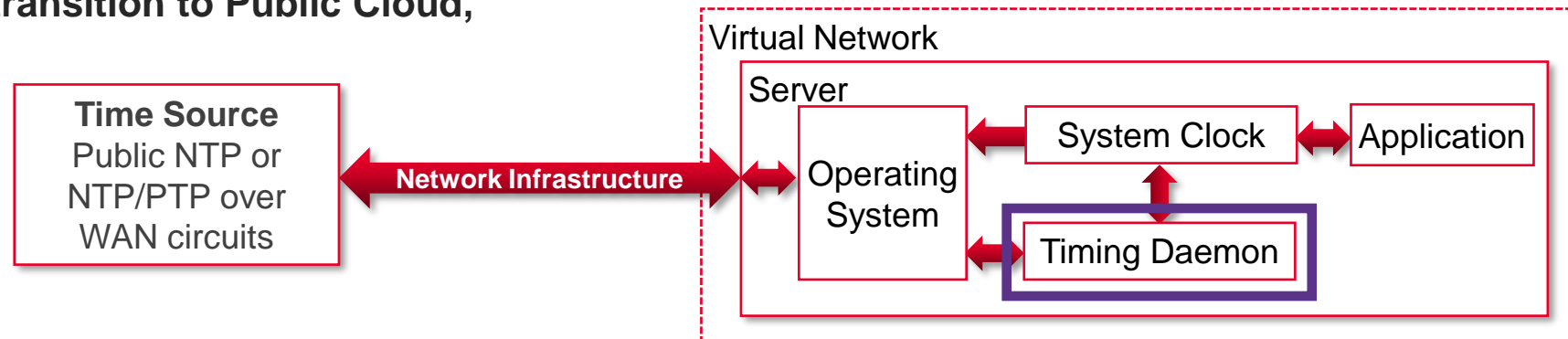**KEYSIGHT**

"Three blind mice?....See how they run"
A comparison of three different time synchronization daemons in public cloud environments

It can be a challenge to know your servers are synchronisation their clocks accurately 100% of the time,

Physical data centers today,

CPU & Memory Allocation

How often does the app check the time?

QoS, Routing, WAN links

Time Source
NTP / PTP, Grand Master / Boundary Clock

Network Infrastructure

Server

Operating System

System Clock

Application

Timing Daemon

Which Daemon, Sync Frequency

Network Delivery → OS Delay → Service Setup → App Sync Freq.

As we transition to Public Cloud,

Time Source
Public NTP or NTP/PTP over WAN circuits

Network Infrastructure

Virtual Network

Server

Operating System

System Clock

Application

Timing Daemon

KEYSIGHT

Timing Daemon Selection in Public Cloud Environments

Accuracy and Scalability

- Can the solution be easily deployed across hundreds or thousands of servers with different Operating Systems. Does it synchronize accurately?

Resilience

- Support for Multiple Time Sources with Automatic Failover

Reporting

- Ensure that there are no breaks in synchronisation and that tolerances are within boundaries.

Anomaly Detection

- Monitor your time sources and ensure if an anomaly occurs that it doesn't affect operations
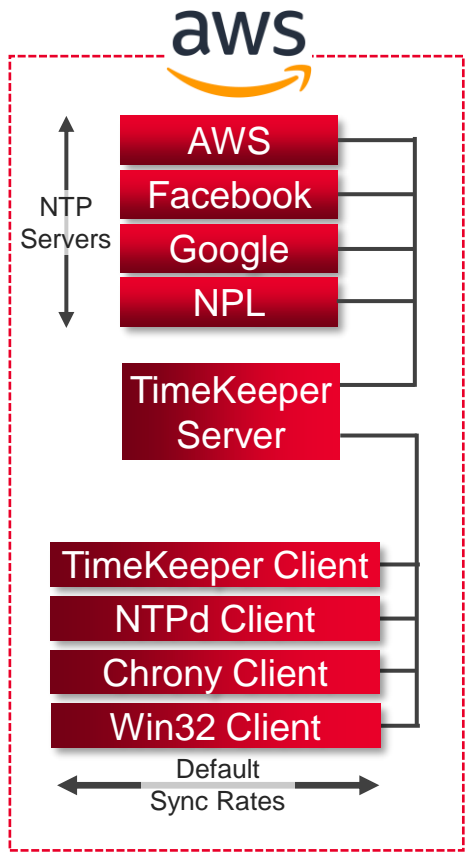
Audit Trail

- Is your time really coming from where you expect it to be coming through and can you prove it

Support

- Commercially Supported Product

KEYSIGHT

The are lots of daemons / software packages which you can use to synchronize the clock on your server,
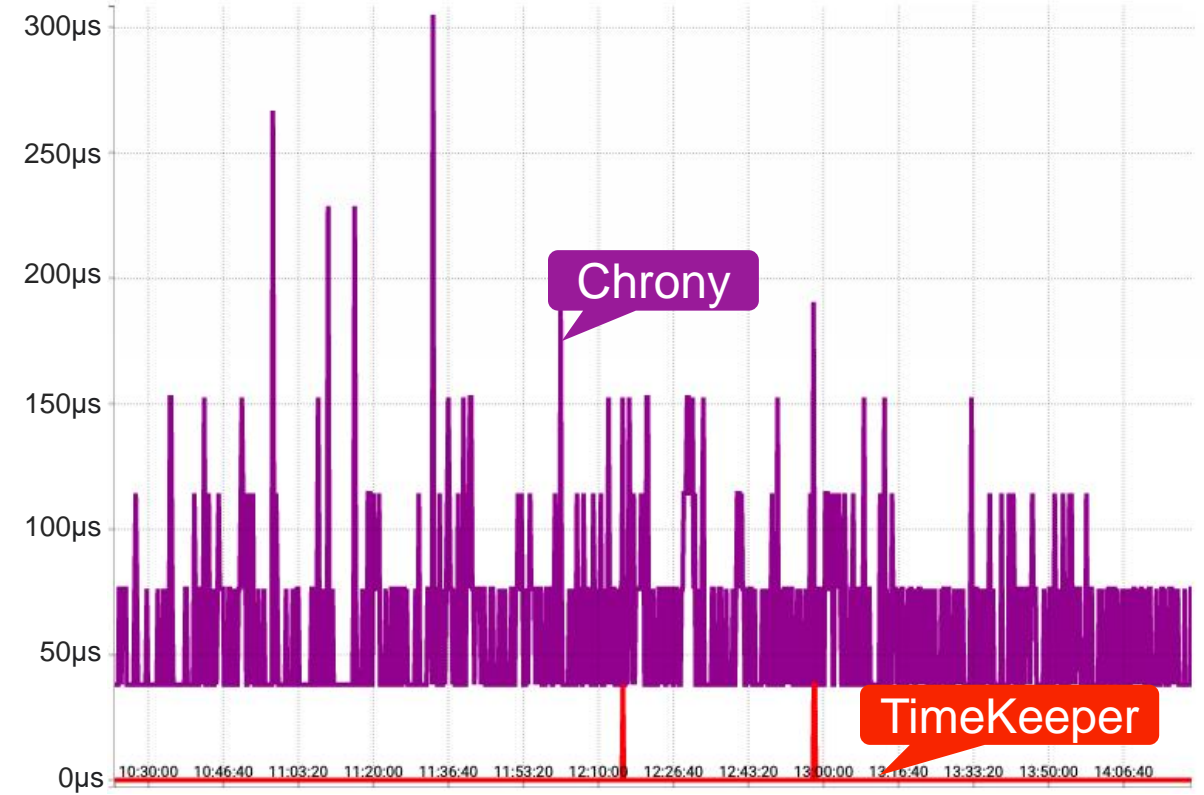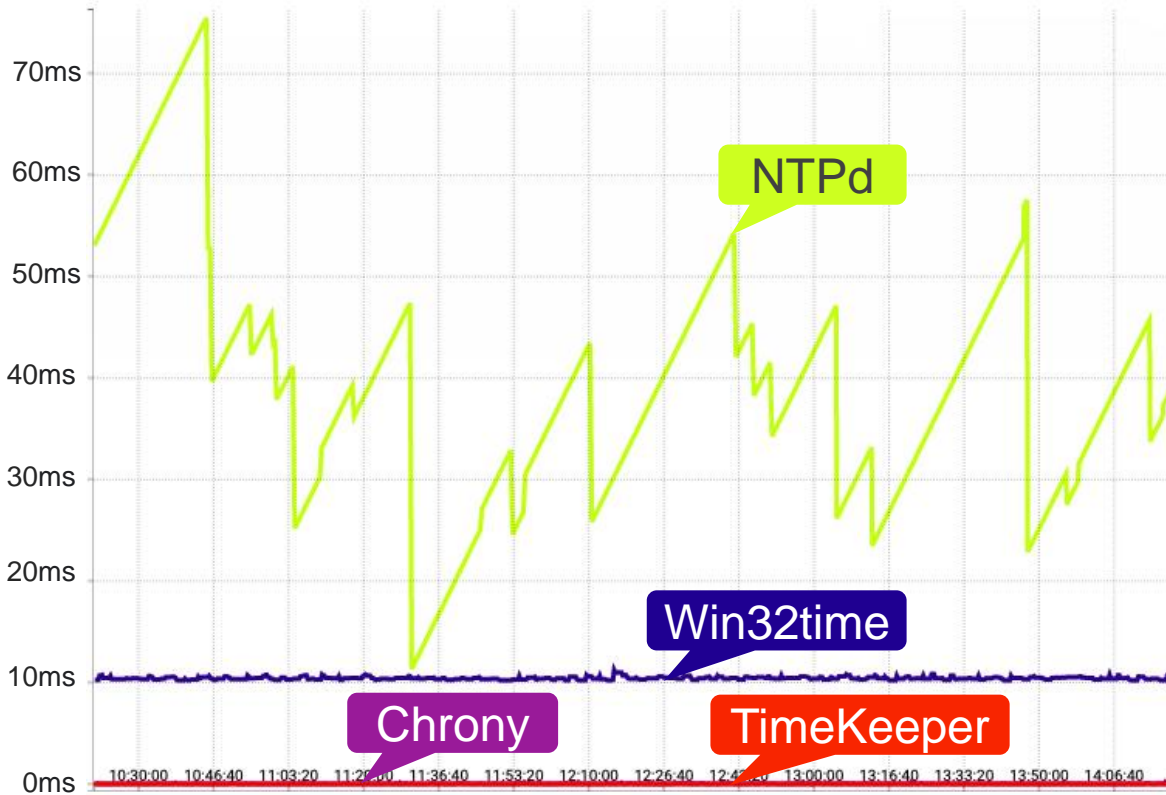
We took three different NTP clients (plus NTPd) and compared the accuracy with their default settings,

Instance Size: T3 Medium. Sync Accuracy mirrored on larger sized instances.

4 hour window

Peaks often as a result of instance migration

From the server
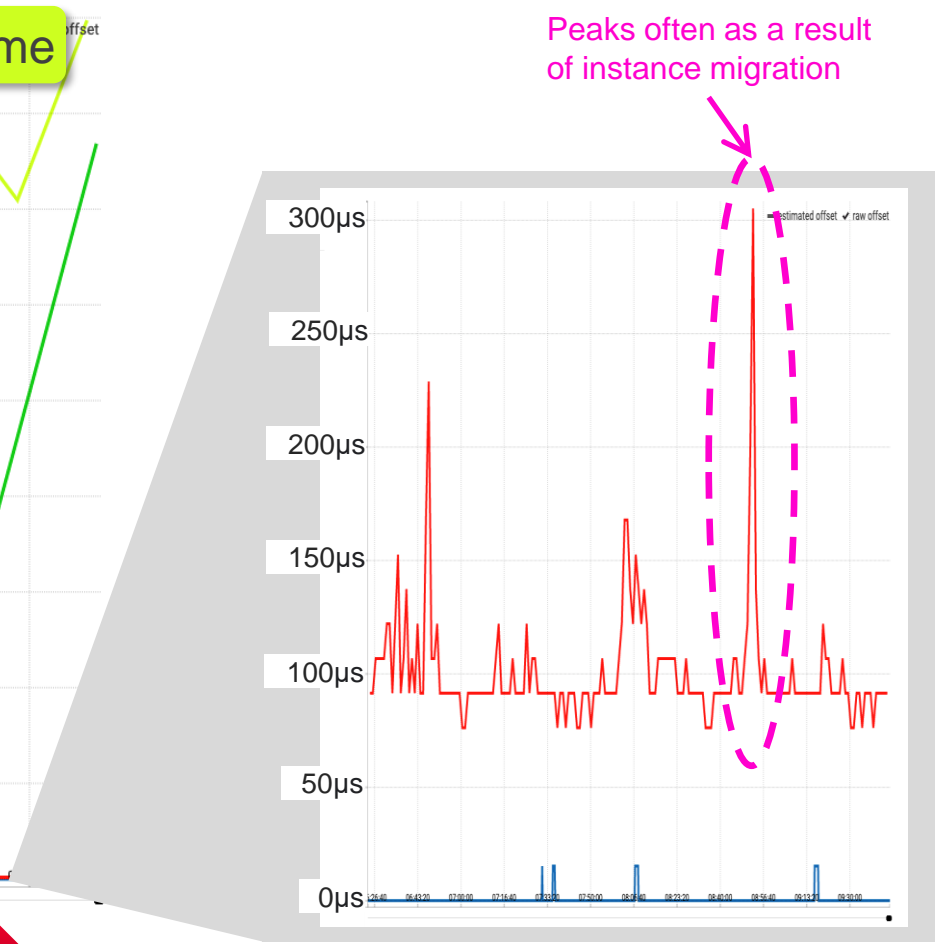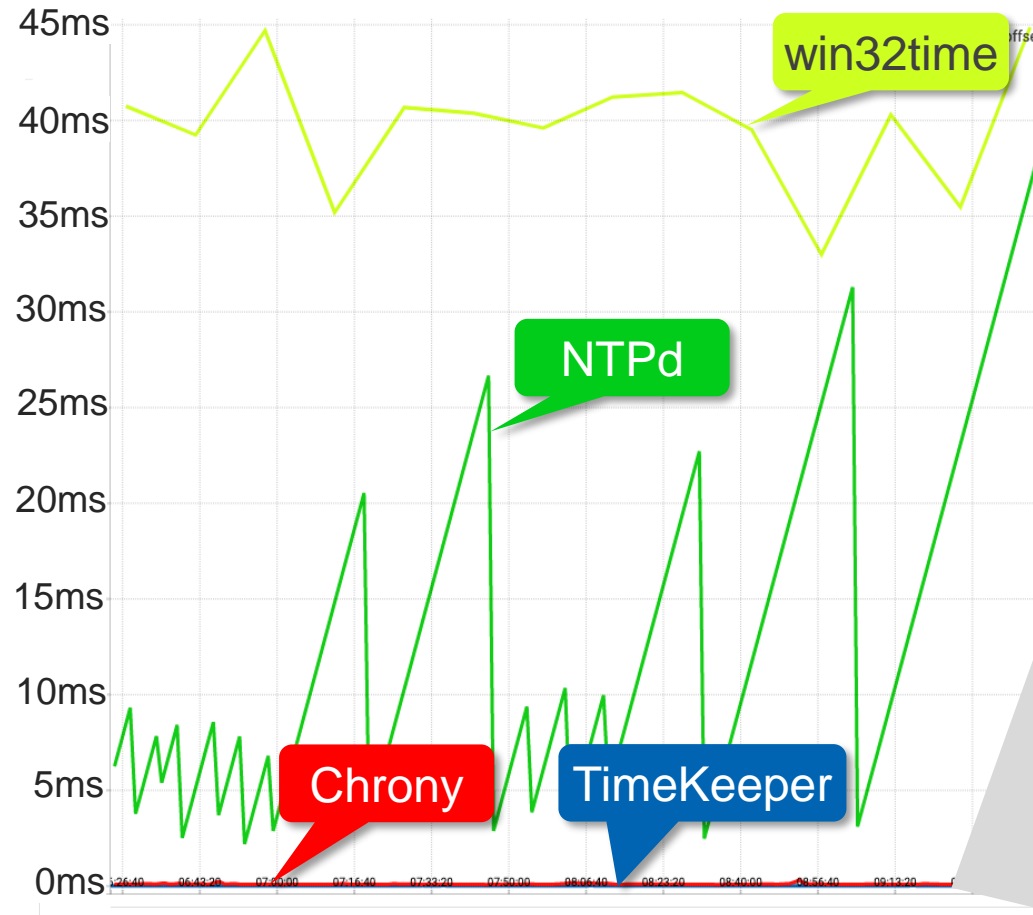
What happens when we tune the sync frequency

Client / Sync Frequency	Seconds per Sync	
	Default	Tuned
NTPd	64	8
Chrony	64	0.125[1]
TimeKeeper	1.1	0.125[1]
Win32Time	900	16

Not STAC benchmarks

1 – Can be configured to sync more frequently but accuracy reduced in testing.

KEYSIGHT

Conclusion

Timing in public cloud:

• There are lots of to think about when deploying timing in the public cloud.

Feature / Client	NTPd	Chrony	TimeKeeper
Accuracy and Scalability	★★	★★★★	★★★★
Resilience	★★★★	★★★★	★★★★★
Reporting	★★	★★	★★★★
Anomaly Detection	★	★★	★★★★★
Audit Trail – FINRA-MIFID	★	★	★★★★★
Support	★	★★	★★★★★

KEYSIGHT