Network Audit -Timing

Maintaining the Integrity of your Network

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Introduction

Legacy PDH and NGN 1588-2008, PTP and SyncE equipment must interwork with SDH/SONET transmission infrastructure. Wireless networks must utilise fixed network transport across electrical and optical networks and as a result synchronisation incompatibilities are common.

As networks evolve and technical personnel change; synchronisation network design may no longer be optimised. It may be failing to deliver the synchronisation performance throughout the network.

Chronos' Network Audit-Timing is a bespoke testing service specifically designed to troubleshoot and characterise the frequency sync performance of telecom networks and network elements. It provides recommendations on how to improve areas of concern such as how to measure poor sync, or poor design that could result in potential issues and failure scenarios; how to improve sync availability and redundancy and how to increase visibility of sync health.

Using commercially available specialist test equipment, our sync audit experts conduct a thorough assessment which will pinpoint any problems and analyse networks and equipment, verify their compliance to the latest Standards and locate problems. Recommended solutions are proposed providing the information necessary to achieve a quick and efficient fix.

Chronos has developed its audit services to be flexible, offering a number of specific applications suitable for either telecom equipment manufacturers, carriers or private network operators.

Key Benefits

- Efficient frequency sync testing
- Swift isolation of network or equipment problems
- Tangible evidence of synchronisation
- Provides instant awareness of sync issues
- Adaptable to multiple deployments and budget scenarios

Manufacturers

- Testing of compliance to equipment Standards
- Provides test results to verify compliance with bid documentation
- Identification of design limitations
- Measurement of equipment noise transfer characteristics
- Equipment installation, commissioning and diagnostics testing

Carriers & Private Networks

- Identify the link between service performance problems and poor network sync provision
- Verify your network conforms to the Standards
- Identify poor sync feeds from interconnect partners
- Identify problematic or noisy network elements
- Track down phase transients and non-systematic noise
- Evaluate manufacturers' equipment in tenders
- Prioritise sync feeds at important nodes within the network
- Network planning support
- Equipment installation and commissioning testing
- Fault finding and sync loop tracking
- Resolve contention and interworking issues between different manufacturers' equipment

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CTLds132 r1.3 Feb 2021

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Typical Network Audit—Timing Tests

- Packet network delay measurement, profiling and analysis
- Frequency and phase (TIE) measurements on SyncE/SDH/SONET/OTN elements
- GNSS receiver resilience to spoofing/jamming and holdover test
- Spot check or 24x7 (long term) monitoring
- Equipment and network limit compliance testing for PRTC/PRC, SSU and EEC/SEC outputs & PDH distribution outputs
- Noise generation testing for PRTC/PRCs, SSUs and EEC/SECs
- Phase response during input reference switching and holdover
- Frequency stability
- Phase transients
- Jitter testing

In general, Chronos adheres to the guidelines for wander measurements given in Appendix II of O.172 (03/99). These include:

Synchronised Wander Measurements
In this test, the equipment under test is provided with the same reference clock as the sync test set.

This enables wander generation of the equipment or Network to be analysed.

Non-Synchronised Wander Measurements
This test normally applies where there is a need to examine the short to medium term network performance.

O.172 states that the stability of the two clocks has to be at least one order of magnitude better than the quality to be measured. Frequency difference between the two clocks can be seen as a slope on the TIE graph and can be removed with some types of post processing software.

Equipment Assessed
Networks and equipment assessed and qualified for Standards compliance and interworking include switching, transmission, wireless and synchronisation products from many of the major manufacturers.

Chronos tailors each sync audit to the specific requirements of the customer. Each audit follows a similar phased procedure; a preliminary meeting to discuss the scope and objectives of the project; a testing period, normally determined through discussion (from a couple of days to a month or more); and report preparation, presentation and results analysis with recommendations.

The final report will compare test results against the Standards and make recommendations regarding network planning, architecture and solutions for improving the transport quality and making the network more resilient. Chronos can also provide network planning advice and consultancy following the sync audit.

Worldwide Availability
Chronos sync audits have been conducted globally and our sync audit test experts are able to travel to site at short notice ensuring a fast, efficient service, no matter where in the world you need us.

Network sync audits can either be carried out on a trouble-shooting or planned basis. Chronos also offers it as an annual or biannual Health Check. This is an excellent way of pre-empting possible fault conditions. Sync architecture must evolve as the network grows and changes and a regular Sync Health Check will highlight changes necessary.

The new challenge of integrating new technology into core and access network infrastructure means that there are many potential pit falls from a sync perspective. The sync audit consultancy testing service not only identifies problems, but offers solutions as well. Chronos has been actively engaged in carrying out sync audits for over 30 years and has unrivalled expertise in this discipline. We deliver practical real world solutions and not just theoretical responses.