

Information Note

Guidance for the transport of data in an All-IP Telephony world

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Foreword

This NICC Information Note has been produced by NICC All-IP Task Group

1 Scope

This Information Note has been compiled to provide guidance to industry sectors outside of the telecommunications sector on the network migration to IP and the actions that may be taken to limit the impact on the transport of data within their sectors.

2 References

NICC has produced a number of Documents (NDs), to help both Communications Providers and CPE manufactures to optimise their networks in such a way as to minimise the impact of the transition to IP for example:-

ND1704 End-to-End Network Performance Rules

This ND aims to provide Communication Providers with guidance on the metrics that should be applied to provide a good voice service at the same time as minimising the effects of migration to IP.

ND1431 Guidance on CPE Compatibility

This document contains guidance on the potential issues associated with the operation and compatibility of Voice Band Data (VBD) Customer Premises Equipment (CPE) and voice CPE on All-IPT (All-IP Telephony) networks.

ND1445 All-IP Telephony Industry Guidance and Lessons Learnt

This ND seeks to capture the lessons the industry has learnt from migrations undertaken so far, thereby hopefully helping avoid the issues encountered.

3 Abbreviations

CPE	Customer Premises Equipment
HTTP	Hypertext Transfer Protocol
IP	Internet Protocol
TDM	Time Division Multiplexing
PSTN	Public Switched Telephone Network
VBD	Voice Band Data
VoIP	Voice over IP

4 Overview

Voice over IP (VoIP) involves a fundamental change in the way a voice call is transmitted.

In the legacy TDM PSTN a dedicated path (voice circuit) is established for digitised voice to be transmitted in a continuous uninterrupted stream.

An IP network operates very differently. Information is broken down to fit into packets of defined sizes. Each packet, containing an origination address and a destination address, is then transmitted over the IP network, passed from one node to the next until it reaches its destination. Individual packets may take completely different paths through the network depending on physical connectivity, bandwidth availability and the impact of congestion.

For a voice service to be supported in an IP environment, the voice signal is first digitised, then packetised for transmission. At the destination, the packets may arrive in a different order and will need to be reordered before being converted back to voice.

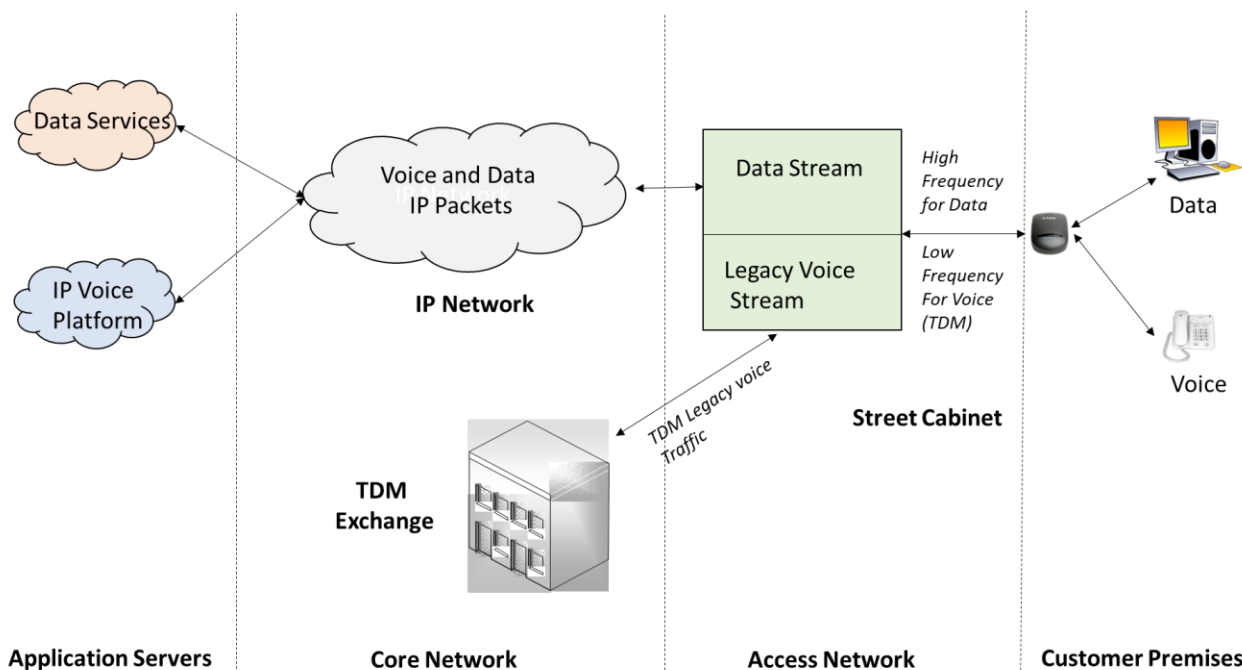


Figure 1 – An example of TDM and IP network current architecture

Currently, the UK has a number of legacy TDM based networks coexisting with IP networks (see figure 1). In simple terms, voice traffic served over legacy access technologies will move from being conveyed as baseband analogue signals over twisted pairs to being conveyed as VoIP instead.

For a number of years, existing network providers have been introducing IP into their networks and parts of the legacy network have already closed. New entrants to the telecommunications sector in the UK now only use the new IP technology. However, as individual service and communication providers are not regulated to change their equipment by a certain date, this change is being phased

in to fit with each provider's commercial and business plans. The change to IP is now almost complete. The final date for full IP implementation will be provider dependant but the major UK providers are aiming to complete this before the end of 2025.

The NICC All-IP Task Group has been made aware of the concerns of three particular industry sectors - Telecare, Alarm & Security and Payment Card services - that provide telecare alarm pendants, fire and security alarms, bank card readers (i.e. payment machines) at retail outlets etc. Typically, these services use Voice Band Data (VBD) to connect sessions/calls from the customer to respective serving nodes. When transmitted over All-IP Telephony these VBD services have proven to either not work at all or be less reliable than over legacy TDM based networks.

During early migrations certain call types that had been routed over the legacy PSTN for decades were beginning to fail when part of the TDM call was interworked with IP, and possibly back to TDM again. Re-routing to avoid IP conversions/interworking has been successfully used to overcome these issues but this will only be possible while there are end-to-end TDM paths available in the UK network. As network migrations from TDM to IP continue, this will be increasingly difficult and ultimately impossible to support.

End customers using VBD services and choosing to move between communications providers are increasingly likely to move to a native IP network and are, therefore, more likely to encounter the issues highlighted above. This is equally applicable for end customers moving between IP Communication Providers, where there are likely to be different IP network characteristics.

5 Guidance

For the transmission of data NICC recommends the use of native IP protocols (such as HTTP) rather than VBD as they are specifically designed to operate in IP networks. In contrast, legacy devices using VBD (telecare pendants, alarms terminals, etc.) were designed in a time before codec choice, packet loss, latency and jitter became an issue in voice networks. Consequently, some legacy devices either will not work or will struggle to perform when using VBD over All-IP Telephony. For most cases the risk is that the transaction, session, connection, or call will fail. Some devices will simply retry and may subsequently work, however there are some devices that will never work.

NICC recommends that all legacy devices using VBD be identified and replaced, addressing the replacement of life critical devices with the utmost urgency.

History

Document history		
V1.1.1	21 st November 2022	Initial publication