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Technical Report

Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; Release Definition; TIPHON Release 3 Definition

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Foreword

This Technical Report (TR) has been produced by ETSI Project Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON).

The present document describes the scope of the TIPHON Release 3 and shows the relevant documents and their inter-relationships.

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1 Scope

The present document provides a description of the content of TIPHON Release 3 and shows the relevant documents and their inter-relationships.

Each TIPHON release builds upon and extends the previous release. In this manner Release N contains and extends Release N-1, and is itself extended by Release N+1.

The present document is structured as follows:

- clause 4 introduces the release plan documentation set;
- clause 5 defines the content and capabilities of TIPHON Release 3.

The present document does not provide solutions for the technical issues that are identified therein.

The present document is prepared in accordance with the TIPHON project method defined in TR 101 835 [1] and fulfils the requirements of STEP A.

In addition, the present document contains a comprehensive overview and description of the technical aspects of TIPHON Release 3.

2 References

For the purposes of this Technical Report (TR) the following references apply:

- [1] ETSI TR 101 835: "Telecommunications and Internet Protocol Harmonization over Networks (TIPHON); Project method definition".
- [2] ETSI TR 101 300: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON); Description of Technical Issues".
- [3] ETSI TS 101 882: "Telecommunications and Internet protocol Harmonization Over Networks (TIPHON) Release 3; Protocol Framework Definition and Interface Requirement Definition; General (meta-protocol)".
- [4] ETSI TS 101 314: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; Abstract Architecture and Reference Points Definition; Network Architecture and Reference Points".
- [5] ETSI TR 101 326: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON); The procedure for determining IP addresses for routing packets on interconnected IP networks that support public telephony".
- [6] ETSI TR 101 858: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON); Number portability and its implications for TIPHON networks".
- [7] ETSI TR 101 329-1: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; End-to-end Quality of Service in TIPHON systems; Part 1: General aspects of Quality of Service (QoS)".
- [8] ITU-T Recommendation E.600: "Terms and definitions of traffic engineering".
- [9] ITU-T Recommendation G.107: "The E-Model, a computational model for use in transmission planning".
- [10] ITU-T Recommendation P.310: "Transmission characteristics for telephone-band (300 - 3 400 Hz) digital telephones".
- [11] ETSI TS 101 329-5: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; End-to-end Quality of Service in TIPHON systems; Part 5: Quality of Service (QoS) measurement methodologies".

- [12] ETSI TS 101 329-2: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; End-to-end Quality of Service in TIPHON systems; Part 2: Definition of speech Quality of Service (QoS) classes".
- [13] ETSI TR 101 329-7: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; End-to-end Quality of Service in TIPHON systems; Part 7: Design guide for elements of a TIPHON connection from an end-to-end speech transmission performance point of view".
- [14] ETSI TS 101 329-3: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; End-to-end Quality of Service in TIPHON systems; Part 3: Signalling and control of end-to-end Quality of Service (QoS)".
- [15] IETF RFC 2401: "Security Architecture for the Internet Protocol".
- [16] IETF RFC 2246: "The TLS Protocol Version 1.0", T. Dierks, C. Allen".
- [17] ITU-T Recommendation H.235: "Security and encryption for H-Series (H.323 and other H.245 based) multimedia terminals".
- [18] ETSI TR 101 877: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON); Requirements Definition Study; Scope and Requirements for a Simple call".
- [19] ETSI TR 101 311: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; Service Independent requirements definition; Transport Plane".
- [20] ETSI TS 101 878: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; Service Capability Definition; Service Capabilities for a simple call".
- [21] ETSI TS 101 315: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; Functional Entities, Information Flow and Reference Point Definitions; For application of TIPHON functional architecture to inter-domain services".
- [22] ETSI ETR 298: "Methods for Testing and Specification (MTS); Specification of protocols and services; Handbook for SDL, ASN.1 and MSC development".
- [23] ITU-T Recommendation H.225.0: "Media stream packetization and synchronization on non-guaranteed quality of service LANs".
- [24] ITU-T Recommendation H.245: "Control protocol for multimedia communication".
- [25] ITU-T Recommendation H.248: "Gateway control protocol".
- [26] IETF RFC 2327: "SDP: Session Description Protocol", Handley, M. and V. Jacobson".
- [27] IETF RFC 2543: "SIP: Session Initiation Protocol".
- [28] IETF RFC 3015: "Megaco Protocol Version 1.0".
- [29] ETSI TS 101 883: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; Technology Mapping; Implementation of TIPHON architecture using H.323".
- [30] ETSI TS 101 884: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; Technology Mapping; Implementation of TIPHON architecture using SIP".
- [31] ETSI TS 101 885: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; Technology Mapping; Implementation of TIPHON architecture using H.248".
- [32] ETSI TR 102 008: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; Terms and Definitions".
- [33] ITU-T Recommendation H.323: "Packet-based multimedia communications systems".
- [34] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".

- [35] ITU-T Recommendation Q.931: "ISDN user-network interface layer 3 specification for basic call control".

3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

API	Application Programming Interface
ASN1	Abstract Syntax Notation 1
ATS	Abstract Test Suite
BICC	Bearer Independent Call Control
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
DSS1	Digital Subscriber Signalling 1
GSM	Global System for Mobile communications
ICANN	Internet Corporation for Assigned Names and Numbers
IN	Intelligence Network
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ISUP	Integrated Switched Digital Network User Part
ITSP	IP Telephony Service Provider
MSC	Message Sequence Charts
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
PSTN	Public Switched Telephone Network
PT	Packet Telephony
QoS	Quality of Service
SAP	Service Access Point
SCN	Switched Circuit Network
SDL	Specification and Description Language
SIP	Session Initiation Protocol
TCC	TIPHON Call Control
TCC-SAP	TIPHON Call Control Service Access Point
TLL	TIPHON Lower Layer
TLL-SAP	TIPHON Lower Layer Service Access Point
TLS	Transport Layer Security
TNO	Transport Network Operator
TR	TIPHON Registration
TR-SAP	TIPHON Registration Service Access Point
TSS&TP	Test Suite Structure and Test Purposes
TT	TIPHON Transport
TT-SAP	TIPHON Transport Service Access Point
VoIP	Voice over IP

4 An overview of the TIPHON Approach

Release 3 is the first major edition of TIPHON documentation to be made publicly available and, as such, represents a considerable amount of effort from the members of the TIPHON Project.

Several telephony-related requirements have been identified for the support of simple call i.e. voice calls which are on a par with the PSTN and include:

- Emergency calls;
- CLIP/CLIR;
- Number portability;

- QoS for the calls;
- Privacy;
- Lawful Interception;
- Authentication of users;
- Billing;
- User mobility (roaming);
- Carrier (pre)selection;
- Call forwarding services.

The following are deferred to a subsequent TIPHON release:

- APIs;
- Management;
- 3 party calls;
- Conferencing;
- Multi-media;
- Instant messaging.

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These Key requirements include naming and numbering policies, Quality of Service and security.

4.1 Basic TIPHON Scenarios

In order to establish the requirements for service creation, architecture, signalling and service support in a TIPHON environment, it is necessary to consider four basic scenarios [2] from which all other (more complex) scenarios can be derived. These basic scenarios are:

- **Scenario 1:** simple call from a user in a Voice over IP (VoIP) network to another user in an adjacent Switched Circuit Network (SCN) such as ISDN.
- **Scenario 2:** simple call from a user in a SCN, to another user in an adjacent VoIP network using SIP or a similar protocol.
- **Scenario 3:** call from a user in a SCN to a user in another SCN where the call is routed through one or more transit networks of which at least one is a VoIP network.
 - **Scenario 0:** call from a user in a VoIP network is routed to another user in a different VoIP network.

In each of these scenarios (see figure 1 to 4), the interface between the disparate networks is identified as a "TIPHON Gateway". In real-world implementations this may or may not be a separate item of physical equipment but it is the interoperation of both protocol and media at this point that is a focus of TIPHON standardization.

The other focus of TIPHON is the behaviour within the domains (especially those on IP technology) where the current state of the art is not mature enough that it allows proper interworking with the SCN.

4.1.1 Scenario 1: VoIP call to SCN user

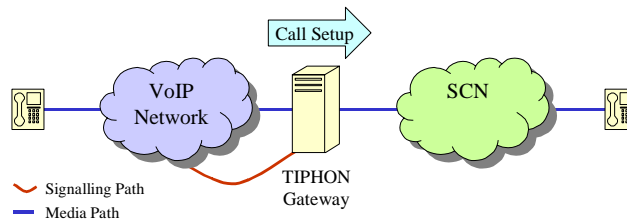


Figure 1: TIPHON Scenario 1

A call arrives at a TIPHON Gateway from a VoIP user and the destination is in an adjacent SCN. Signalling takes place between the VoIP network and the Gateway where the Gateway acts on behalf of the SCN user.

4.1.2 Scenario 2: SCN call to VoIP user

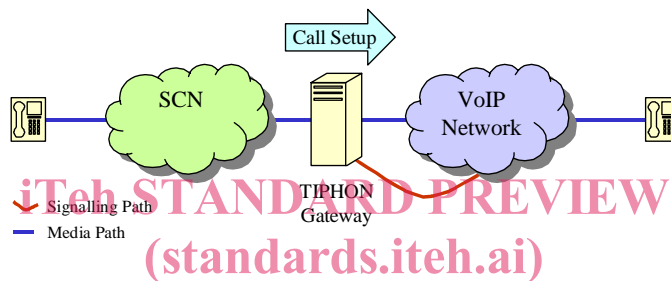


Figure 2: TIPHON Scenario 2

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A call arrives at a TIPHON Gateway from a user in a SCN and the destination is in an adjacent VoIP network. Signalling takes place between the Gateway and the VoIP network with the Gateway acting on behalf of the calling user.

4.1.3 Scenario 3: SCN call to SCN user via a VoIP network

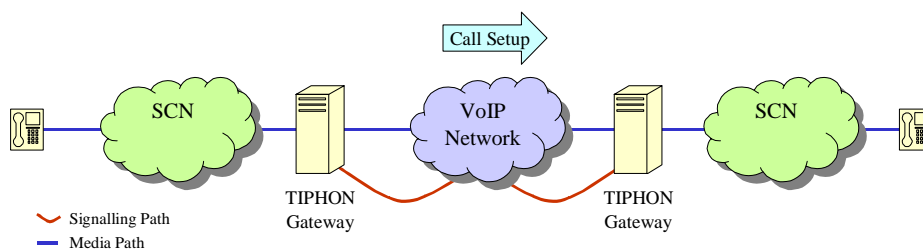


Figure 3: TIPHON Scenario 3

A call from one SCN user to another SCN user passes through at least one VoIP network, transiting a TIPHON gateway at each network interworking boundary. The gateways act on behalf of the SCN users in their negotiations with the VoIP network(s). This scenario is essentially a combination of Scenarios 1 and 2.

4.1.4 Scenario 0: VoIP call to VoIP user

Two VoIP. This scenario is shown in figure 4 and is referred to as TIPHON Scenario 0.

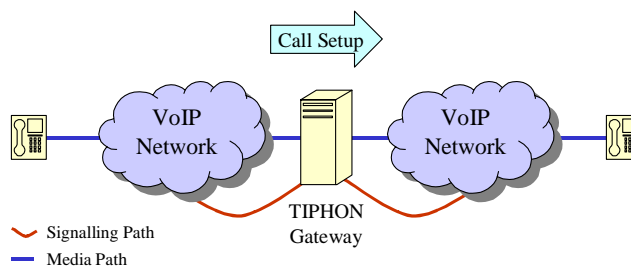


Figure 4: TIPHON Scenario 0

4.2 The TIPHON "Tool Box"

In order to achieve interworking between existing SCN technologies (for example, DSS1) and IP media technologies (for example, SIP [27]) as well as possible future technologies, TIPHON has specified a meta-protocol which provides communication between the two sides of a TIPHON Gateway. Although it is unlikely, and unnecessary, that any TIPHON-compliant equipment will implement the meta-protocol, a protocol that has been mapped to the meta-protocol should also interwork with any other protocol that is also mapped to the meta-protocol. It is these mappings and the profile standards (closing options and identifying limitations) that are the key outputs of the overall TIPHON process. This process, as shown in figure 5, can be viewed as a tool box taking a set of fixed TIPHON requirements and a range of technology-specific inputs to produce mapping and profile standards with their associated test suites.

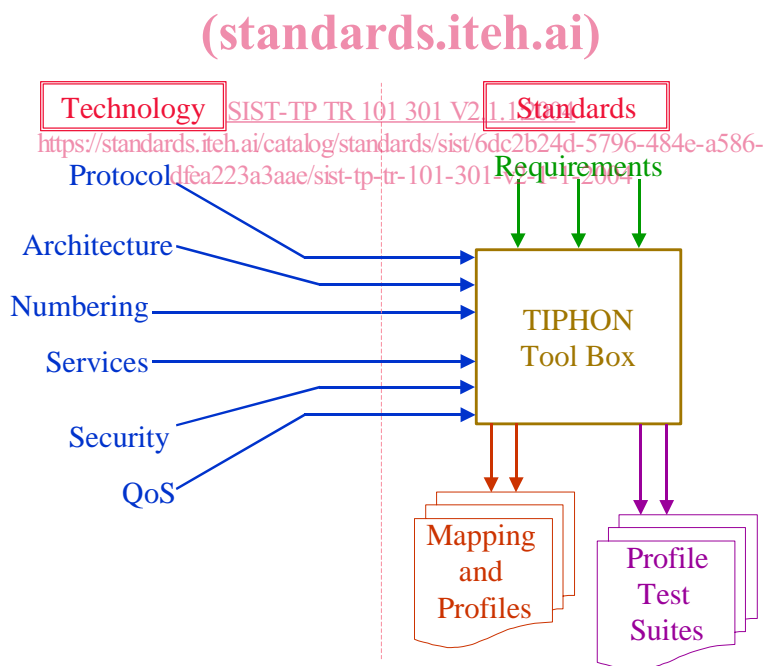


Figure 5: The TIPHON "Tool Box"

Although some mapping and profile standards are included in the TIPHON project deliverables, the meta-protocol is published as an open standard so that any standardization body may prepare TIPHON mapping and profile standards for any communication protocol that they have responsibility for.