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Technical Report

Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON); Requirements Definition Study; Scope and Requirements for a Simple call

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Foreword

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

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1 Scope

The present document defines the TIPHON framework that enables services to be developed which are able to inter-work across multiple communication network domains and diverse network technologies. The framework identifies services, service capabilities and service applications and defines the relationships between them.

The present document:

- considers how Service Capabilities can be combined to develop Service Applications;
- defines the requirements for a Simple Call Service Application.

The content of the present document does not infer any details of the implementation of any of the concepts expressed within it.

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] ITU-T Recommendation I.130: "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN"
- [3] ITU-T Recommendation I.140: "Attribute technique for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [4] ITU-T Recommendation I.210: "Principles of telecommunication services supported by an ISDN and the means to describe them".
<https://standards.iteh.ai/catalog/standards/sist/2ec1e7fb-3cb5-44dc-abf8-4d415581112/sist-2ec1e7fb-3cb5-44dc-abf8-4d415581112>
- [5] ITU-T Recommendation I.112: "Vocabulary of terms for ISDNs".
- [6] ETSI TR 101 287: "Network Aspects (NA); Terms and definitions".
- [7] ITU-T Recommendation E.105: "International telephone service".
- [8] ITU-T Recommendation E.106: "Description of an international emergency preference scheme (IEPS)".
- [9] TINA-C: "TINA Business Model and Reference Points".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

administrative domain: bounded entity within which all encompassed constituent elements are under common ownership, operation and management

domain: result of the application of specific policies to a specific network technology

International Emergency Preference Scheme (IEPS): IEPS enables authorized users to have priority access to telecommunication services and priority processing of communications in support of recovery operations during emergency events

network: telecommunications network that provides telecommunications services

network abstraction LAYER: provides a set of communications capabilities to the Transport Abstraction Layer that are derived from, but independent of, the capabilities of a specific underlying network technology

network operator: entity that is responsible for the development, provisioning and maintenance of telecommunications services and for operating the corresponding networks

public: attribute indicating that the application of an item qualified as "public" is offered to any person
This attribute does not indicate any aspects of ownership.

private: attribute indicating that the application of an item qualified as "private" is offered to a pre-determined set of users
This attribute does not indicate any aspects of ownership.

service: commercial offering to a customer
It comprises functionality - known as a service application - set in a business context. The business context is outside of the scope of TIPHON to consider as it determined by commercial or political concerns.

service abstraction layer: element of the TIPHON Application Plane that provides a modular and extensible set of Service Capabilities for use in the creation of Service Applications

service application: integrated set of one or more Service Capabilities
TIPHON will not specify service applications but may consider such groupings where this contributes to the identification and definition of specific Service Capabilities. The ability to select and combine Service Capabilities offers a structured, yet flexible, means for creating service applications that:

- are internally coherent and self consistent;
- enable the inter-operation of services between different implementations of TIPHON systems;
- enable inter-working with other systems.

service capability: indivisible and exclusive set of functionality including user and network capabilities

service independent requirement: requirement that applies without reference to currently invoked service capabilities

service provider: entity that provides services to its service subscribers on a contractual basis and who is responsible for the services offered

The same entity may act as both a network operator and a service provider.

service provider access interface: interface between a network and a service provider's equipment for enabling the service provider to access specific functionality of a network

transport abstraction layer: provides a set of domain independent capabilities derived from the underlying Network Abstraction Layer in response to the transport and connectivity requirements of the Service Abstraction Layer

user: entity using the services of a network via terminal equipment

3.2 Abbreviations

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

GSM	Global System for Mobile communication
IEPS	International Emergency Preparedness Scheme
ISDN	Integrated Services Digital Network
RDS	Requirements Definition Study
SCD	Service Capability Definition
SP	Service Provider

4 Services and service capabilities framework

Traditional approaches to developing services offered by communications networks have largely been specific to a single network technology, such as ISDN. This has tended to create problems in enabling services to operate across multiple network technologies. An alternative approach is to derive a core set of capabilities in an abstract manner and then map these on to selected network technologies through an abstract, technology neutral, network architecture. By adopting this approach, the services developed on specific network technologies may be derived from a common core set of capabilities. This enables easier inter-working between different network technologies at the functional level.

By using a common core set of capabilities to implement services, a basic level of functional inter-working should be assured for TIPHON based networks. Furthermore, the approach enables technical inter-working problems to be identified in a structured manner.

The traditional service development approach described has also restricted the development of services to the limitations of the specific network technologies upon which they are based. The alternative adopted by TIPHON is a more flexible and extensible approach to service development because it enables services to be constructed from the aggregation of modular, re-usable components based on the concepts of service applications and service capabilities.

Service Interaction is a common problem within modern communications networks. The modular and hierarchical approach adopted by TIPHON allows easier identification and resolution of such problems by enabling them to be traced to the presence or absence of specific capabilities and the relationships between them.

4.1 The ITU ISDN approach to describing services

ITU-T Recommendations I.130 [2], I.140 [3] and I.210 [4] describe a method of describing service applications in the Integrated Services Digital Network (ISDN) by bearer and teleservice attributes. In general bearer services offer bearer attributes to teleservices and the teleservices provide service by manipulation of the bearer attributes. This approach views attributes of an overall service application in 3 parts.

Table 1: ITU ISDN 3 layer service application model

Part	Sub-part	Assigned attributes (examples)
Low layer	Information transfer	Mode Rate Structure
	Access attributes	Access channel and rate Access protocol Signalling for each of layers 1 to 3 Information protocol for each of layers 1 to 3
High layer		Type of User Information Protocol functions for each of layers 4 to 7
General		Supplementary Service provided QoS Interworking capabilities

In an environment comprising multiple network technologies, the lower layer attributes will vary between network technologies. In this approach, the information transfer and access layer attributes cannot be considered common between users.

4.2 The TIPHON environment

The TIPHON environment considers the case where multiple networks, possibly employing differing network technologies, inter-work to provide end-to-end communications services as shown in figure 1.

This model supports the different business roles found within the heterogeneous communications environment envisaged by TIPHON (see Annex A) and commonly found in modern public communications networks. The key requirements for this environment are:

- separation of service applications and transport services hence enabling users to access their call handling services irrespective of their transport connection;

- ability of service applications to work across multiple network domains thereby enabling users to access their services irrespective of the network domain they are connected to;
- ability of service applications to work across multiple network technologies thereby enabling service providers to offer services using a range of network technologies;
- ability to recursively construct network domains thereby enabling network providers to extend the reach of their networks.

By introducing a number of layers of abstraction, the TIPHON model provides a framework that is able to describe an end-to-end application capable of operating over a heterogeneous infrastructure.

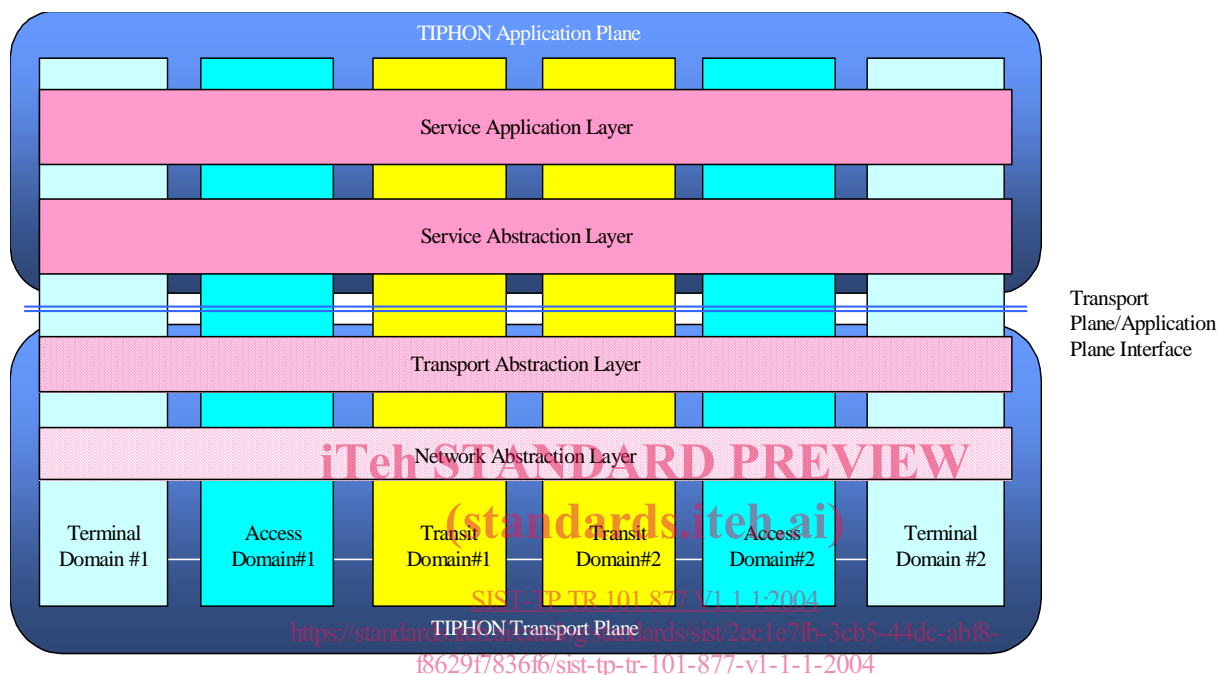


Figure 1: The TIPHON network and service environment model

TIPHON identifies the following layers within this model:

- a Service Application Layer that provides the end to end communications application;
- a Service Abstraction Layer that is defined by a modular and extensible set of Service Capabilities that place requirements on the Transport Abstraction Layer beneath it;
- a Transport Abstraction Layer that provides a set of domain independent capabilities derived from the underlying Network Abstraction Layer in response to the transport and connectivity requirements of the Service Abstraction Layer;
- a Network Abstraction Layer that provides a set of communications capabilities to the Transport Abstraction Layer that are derived from, but independent of, the capabilities of a specific underlying network technology.

The TIPHON network and service environment model is separated into two planes that exist across the various network domains encountered in the end-to-end communications path. The upper plane comprises the Service Application and Service Abstraction Layers and is termed the TIPHON Application Plane. This plane addresses the implementation of end-to-end communications applications. The lower plane includes the Transport and Network Abstraction Layers and is termed the TIPHON Transport Plane. The TIPHON Transport Plane provides domain independent communications capabilities to the TIPHON Application Plane. Requirements placed upon the TIPHON Transport Plane by the TIPHON Application Plane are expressed in Service Independent Requirements documents in accordance with the TIPHON project method [1].

The present document describes the framework for Service Capabilities in the Application Layer. The Network Abstraction Layer and Transport Abstraction Layer are defined by sets of Service Independent Requirements and are described elsewhere.

4.3 Service capability framework

TIPHON identifies a number of concepts when considering the TIPHON Application Plane. These are derived from a decomposition of a service into constituent elements. TIPHON places the following meanings on the terminology used to describe services as follows:

Service: commercial offering to a customer. It comprises functionality - known as a Service Application - set in a business context. The business context is outside of the scope of TIPHON to consider as it determined by commercial or political concerns.

As shown in figure 2, Service Applications are constructed in a modular fashion from Service Capabilities within the TIPHON Service Abstraction Layer.

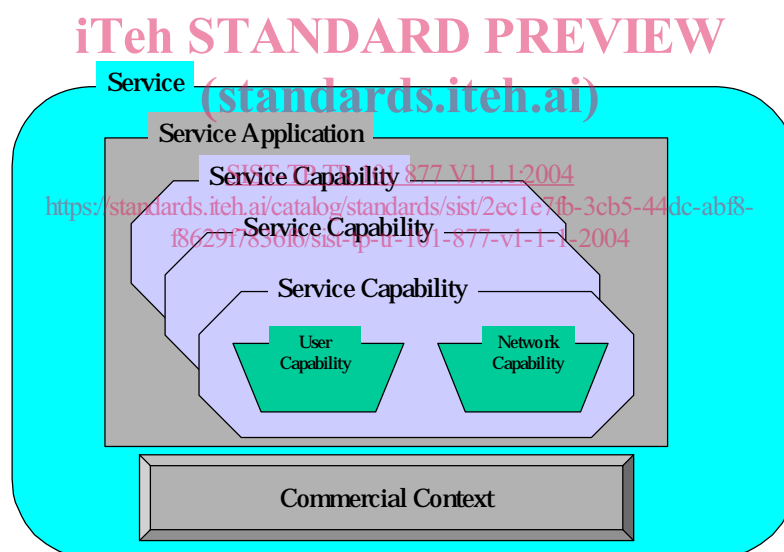


Figure 2: Services and Service Capabilities

Service Application: a Service Application is an integrated set of one or more Service Capabilities. TIPHON will not specify Service Applications other than Simple Call but may consider such groupings where this contributes to the definition of specific service capabilities. The ability to select and combine Service Capabilities offers a structured, yet flexible, means for creating service applications that:

- are internally coherent and self consistent;
- enable the inter-operation of services between different implementations of TIPHON systems;
- enable inter-working with other systems;
- enable service providers to develop differentiated services that inter-work across multiple networks and multiple network technologies.