

ECMA

Standardizing Information and Communication Systems

**Telephony System with Integrated
Internet Access -
Overview**

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Brief History

This Technical Report provides information on telephony systems with integrated Internet access, covering definitions, general architecture and standardization areas.

Originally, the work was started in ISRF (Internet Screenphone Reference Forum) and has been brought to ECMA TC32 for standardization in December 1998. TC32 has established a new Task Group (TG16) being responsible for standardization activities in this field.

This document is the first document of a set of related documents, which will cover specification of functional entities of such a system and the corresponding procedures and protocols.

The Technical Report is based upon the practical experience of ECMA member companies and the results of their active and continuous participation in the work of ISO, ITU-T, ETSI and other international and national standardization organisations.

This Technical Report has been adopted by the ECMA General Assembly of December 1999.

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1 Scope

This Technical Report investigate Screenphones and network functionality in support of Screenphones. Possible standardization activities in this area are identified. Screenphones requiring no additional network functionality are outside the scope of this Technical Report.

2 References

| | | |
|------------|---------------------------|--|
| [ECMA 133] | Standard ECMA-133 | Private Integrated Services Network (PISN) - Reference Configuration for PISN Exchanges (PINX) |
| [ISRF] | ISRF-Specification | ISRF Webphone document, www.isrf.org |
| [MExE] | 3GPP ETSI GSM 02.57 | "Digital cellular telecommunications system (Phase 2+); MExE Stage 1 Description" |
| [WAP™] | WAP™ | Wireless Application Protocol (WAP™), www.wapforum.org . |
| [W3C] | World Wide Web Consortium | www.w3.org |

3 Acronyms

| | |
|--------|--|
| API | Application Programming Interface |
| CP | Content Provider |
| ECMA | An International Europe-based Industry Association for Standardizing Information and Communication Systems |
| ETSI | European Telecommunications Standards Institute |
| GSM | Global System for Mobile Communication |
| HTML | Hyper Text Mark-up Language |
| HTTP | Hyper Text Transfer Protocol |
| IP | Internet Protocol |
| ISDN | Integrated Services Digital Network |
| ISP | InternetService Provider |
| ISRF | Internet Screenphone Reference Forum |
| ITU-T | Telecommunication sector of International Telecommunication Union |
| MExE | Mobile (Station) Execution Environment |
| PC | Personal Computer |
| PINX | PISN Exchanges |
| PISN | Private Integrated Services Network |
| PSTN | Public Switched Telephone Network |
| SMS | Short Message Service |
| SP | Service Provider |
| TCP/IP | Transport Control Protocol/Internet Protocol |
| WAP™ | Wireless Application Protocol |
| WWW | World Wide Web |

4 Definitions

For the purposes of this Technical Report, the following definitions apply:

4.1 Screenphone

Phone with a display providing access to Internet based services.

4.2 Terminal Manager

Functional entity that fulfils services such as: access control, terminal configuration, Screenphone software update, etc.

4.3 Terminal profile

Defined set of functionalities of a Screenphone (hardware and software related).

4.4 User Profile

Characteristics defined by the user himself (e.g., personalised look and feel, etc.).

5 Introduction

There are two major networks for telecommunication: the Internet and the telephony network, but the access to their services is usually based on separate terminal equipment, namely PC and telephone. Considering this, it appears obvious to combine both technologies in a single device.

This report describes a telephony system that enables telephony networks and Internet to offer complementary voice and information services accessible by a single terminal, a so-called Screenphone.

This Technical Report limits itself to the case where a Screenphone is attached to a (non-IP) Telephony Network and accesses Internet via the Telephony Network. This does not preclude future studies of Screenphones attached directly to Internet and using IP-Telephony techniques.

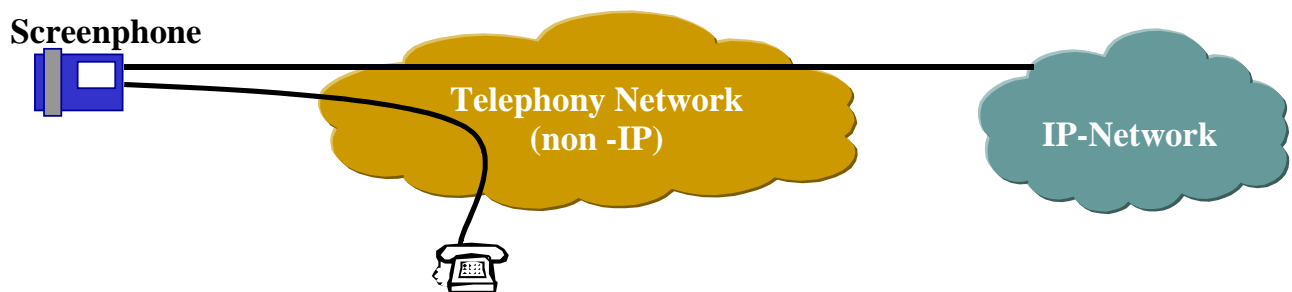


Figure 1 – Simple merger of telephony and Internet technologies

Simply merging these two technologies, as shown in figure 1, does not require additional standardization and is not considered further in this Technical Report. Instead this Technical Report focuses on an enhanced system architecture.

In addition to the access to telephony and Internet services, this system architecture will support:

- implementation of Screenphones as low-cost dedicated devices,
- service mobility/ user mobility in the sense of VHE (Virtual Home Environment),
- zero maintenance end-user terminals (maintenance by network services, e.g. software updates),
- provision of click-to-dial features.

In order to fulfil these requirements, new functions are required, separate from the Screenphone itself. These functions are deemed to exist within a new functional entity known as a Terminal Manager, in charge of the management of Screenphones. This is shown in figure 2.

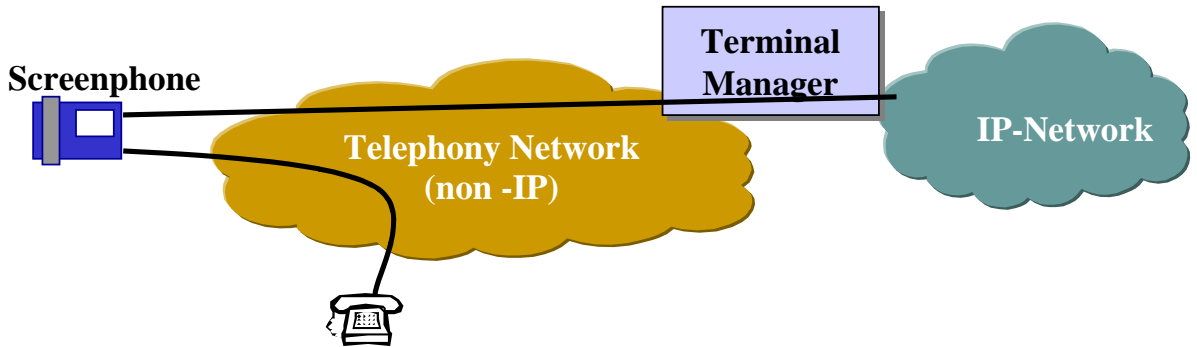


Figure 2 – Screenphone system architecture with Terminal Manager

6 General architecture

The general architecture chapter describes the “new” entities (the Screenphone and the Terminal Manager), a reference configuration and some example scenarios.

6.1 Reference Model

Two new functional entities are of importance for this Technical Report: the Screenphone and Terminal Manager functional entities. The Screenphone is the functional entity serving the user and the Terminal Manager is the functional entity that provides the network functions in support of Screenphones. The two functional entities are separated by the new TM reference point as shown in figure hereafter.

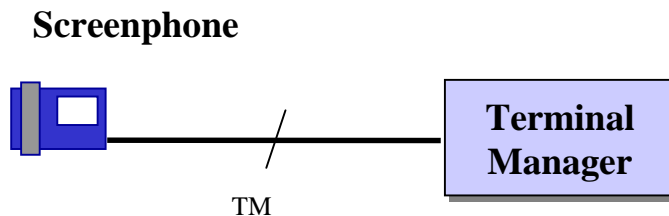


Figure 3 – Reference Model

6.1.1 Screenphone

A Screenphone may be used as an ordinary telephony device accessing common telephone services offered by operators such as voice calls, fax, messaging (e.g. SMS) and supplementary services, and as an Internet access device.

Typical characteristics of a Screenphone include a selection of the following:

- A single compact device for integrated voice and data communication.
- A screen to display alphanumerical and/or graphical data.
- Extended input device, e.g. keyboard, pointing device, touch screen.
- Easy to use, intuitive graphical user interface.
- Transparent access to network-based features.
- Integration of telephony and data services with click-to-phone features.

- Administration and maintenance of terminal and services via network.
- Support of Smartcards: A Screenphone may include a smartcard reader device, which does not depend on the type of card (e.g. memory cards, Javacards, multi-application cards, etc.) nor on the card reader device.

6.1.2 Terminal Manager

As the architecture must allow for zero maintenance end-user terminals (see clause 5), there is a need for a terminal management entity outside the terminal. This entity in the network is called Terminal Manager.

The Terminal Manager may be within the telephony network or outside the telephony network (in the Internet).

The Terminal Manager provides:

- The ability to personalize the user interface. This can be done directly by the end-user or by the Terminal Manager under the control of the end-user (acknowledgement).
- The ability to personalize services.
- Means to download new features to the terminal (see 6.1.2.2).
- Means for remote maintenance of the terminal (see 6.1.2.1).
- The means for operator-specific services to be supported by all terminals of a particular terminal profile, independent of the terminal vendor.
- A security architecture that provides an access control to terminal resources, service control, etc. (see 6.1.2.3).
- The ability to charge subscribers for services.
- Storage of data, e.g. configuration values, subscribed services, Screenphone capabilities in user and terminal profiles.

6.1.2.1 Maintenance

Maintenance of a Screenphone includes:

- software update, upgrade, addition, removal,
- data management (update, removal),
- memory management (garbage collection).

6.1.2.2 Configuration

Configuration management refers to the behaviour of the Screenphone (terminal profile), and the ability of the user to modify the terminal to behave in his preferred manner (user profile).

The configuration parameter values which are specific to the Screenphone, and the user specific data may be stored in the network (ISP, Operator, Terminal Manager) or locally in the terminal.

User profile

The user profile may include the appearance of the display, the user interface and the access to personalised services. It is securely managed and stored at least partly by the Terminal Manager concerned.

This covers mainly the following topics:

- Service subscription and unsubscription, e.g., weather, stock market information, etc..
- The user's and Terminal Manager's capability to control the "look and feel" of applications/ services
- The ability of the user to personalize the user interface
- Personalization of applications.

Terminal Profile

The terminal profile includes data characterising the hardware and software capabilities of a specific Screenphone, e.g. kind of display and resolution, input devices, APIs, local software applications, revision status, etc..

6.1.2.3 Access control

The access control feature of the Terminal Manager may cover several aspects:

- Filtering of the URLs (parental authorization for example).
- Access control of the terminal resources: rejection of unauthorized or unsupported services.
- Gateway/proxy features: Translation of content (unsupported format) or protocols, etc..

6.2 Configuration examples

For the purpose of this edition of the Technical Report, it is assumed that the Screenphone and the Terminal Manager functional entities have a one-to-one relationship with physical equipments. A further decomposition of the Terminal Manager may be the subject of future investigations.

A Screenphone may be connected only to a (public or private) telephony network, not directly to the Internet (IP Phone). A Terminal Manager may be connected to either network. This leads to the physical configurations shown hereafter.

Interfaces to telephony networks already exist and are not affected by the introduction of these new entities, so these interfaces are not mentioned in the figures below.

Different telephony network types are considered: private telephony networks (PISN) and public telephony networks (PSTN or public ISDN).

In each of the physical configurations in 6.2.1 to 6.2.4, the Internet is not shown, as it is always “after” the Terminal Manager.

6.2.1 Private network (PISN)

In a PISN environment, the Screenphone and the Terminal Manager are connected to a PINX. The Screenphone may be connected to same PINX as the Terminal Manager or to a different PINX.

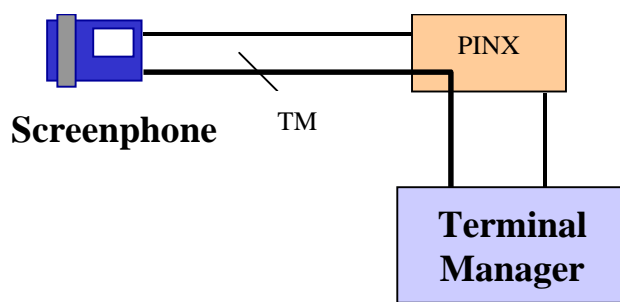


Figure 4 – Terminal Manager and Screenphone connected to the same PINX

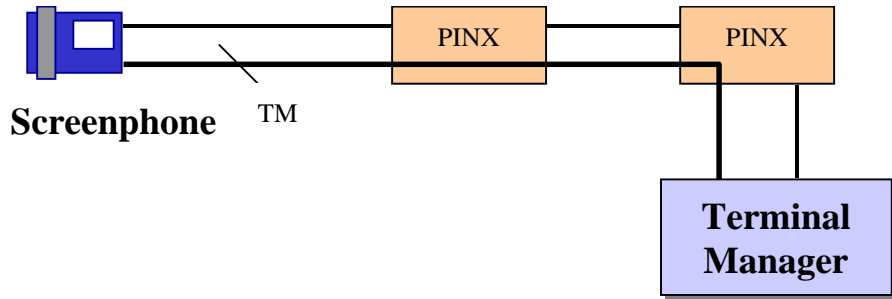


Figure 5 – Terminal Manager and Screenphone connected to different PINXs

6.2.2 Screenphone connected to a PISN, Terminal Manager connected to a public telephony network

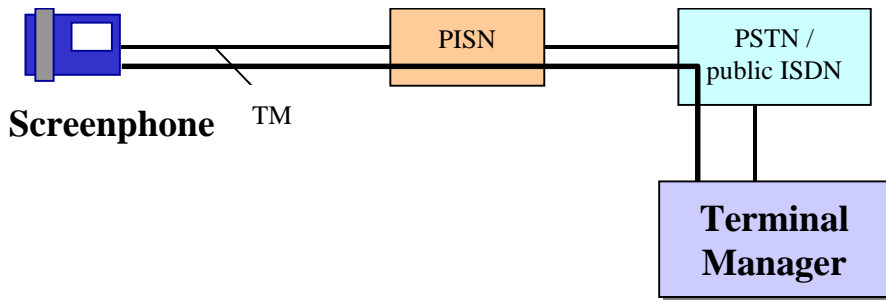


Figure 6 – Screenphone connected to the PISN, Terminal Manager connected to a public telephony network

6.2.3 Screenphone connected to a public telephony network, Terminal Manager to a PISN

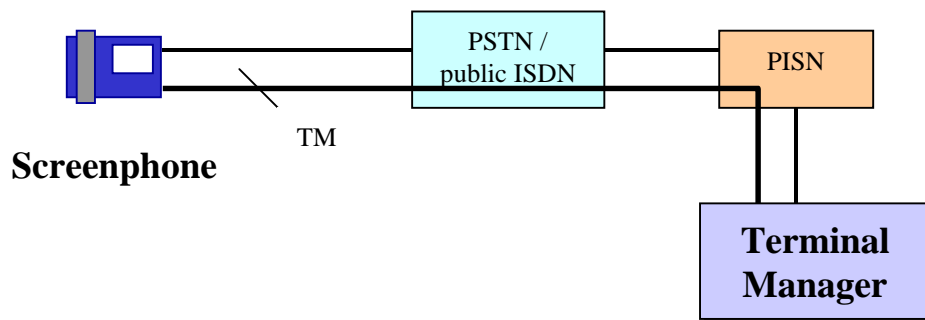


Figure 7 – Screenphone connected to the public telephony network, Terminal Manager connected to the PISN

6.2.4 Public telephony network

The two new entities are connected to a public telephony network.

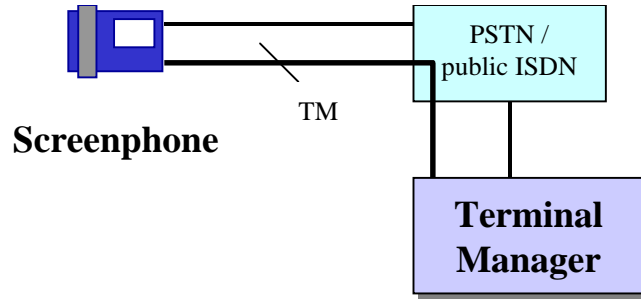


Figure 8 – Terminal Manager and Screenphone connected to a Public telephony network

6.2.5 Connection of Terminal Manager to the Internet

The Screenphone is not directly connected to the Internet but the Terminal Manager can be, as shown in figure below.

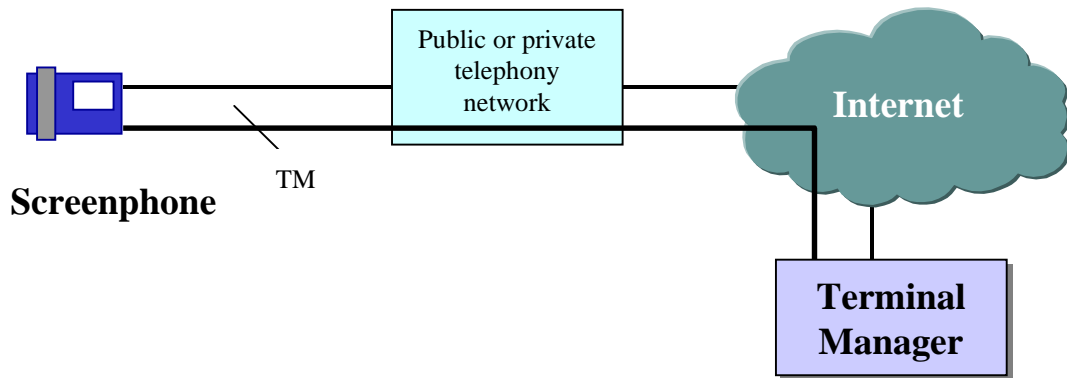


Figure 9 – Terminal Manager connected to the Internet

7 Standardization paths

Standards will ensure interoperability between multi-vendors products (Screenphone and Terminal Manager). Standardization should focus on new services and features that are not already available from Internet or Telephony networks.

7.1 Potential standardization areas

Potential items for standardization by ECMA are:

Screenphone:

- interface specifications (may depend on the underlying access network)
- signalling protocols and flows
- procedures for terminal maintenance (e.g. software download)
- selection of supported payload transmission formats
- information coding format (will depend on the display capabilities of the terminal)
- support of supplementary telephony services (access network dependent).

Terminal manager:

- service definitions: related to maintenance, administration, admission, service request control and routing, data services, format conversion
- interface specifications (APIs)
- specification of signalling protocols and flows
- selection of supported transmission formats.

7.2 Co-operation with other standardization organizations

Internet services and telephony services are discussed within external standardization organisations. In order to avoid work duplication, collaboration with the following organisations has been initiated:

- ISRF
- 3GPP / ETSI SMG 4 MExE
- WAP Forum™
- IETF
- W3C
- ITU-T SG 16 Question 13, Packet based multi-systems and services
- ITU-T SG 11 Question 5, IN related
- ISO/IEC JTC1 SC 6 WG 6
- ISO/IEC JTC1 SC 35

Available documents from these organisations might be considered as input for the work.

Annex A

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Services example

A.1 Internet Services

Potential Internet services provided by a Screenphone in addition to voice telephony are:

- Access to WWW information sites
- E-Mail
- Customer care and provisioning
- Message notification
- Unified messaging (fax, SMS, voice-mail...)?!?
- Weather and traffic alerts
- News, sports and information services
- E-commerce, stock transactions and banking services
- Address book and directory services
- Access to Corporate intranet applications.

A.2 Telephony Services

Telephone services in the terminal support access to telephony functions both by the user and by suitable applications. These services are:

- main telephony application, providing primary access to telephony basic and supplemental services for voice calls. Both basic and supplementary network services offered by a Operator are supported
- event notification and action support, connecting events generated in the network with actions to be performed in the terminal
- event generation in a telephony network. CLI (Calling Line Identification) and MWI (Message Waiting Indicator) are supported to generated notification events
- support for the “phoneto:” protocol, which is supported in the browser to facilitate following links in web pages to place a call to service personal.

Annex B

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Status of related standardization activities

In the past, several organisations have started specification efforts in order to gather Internet & Telephony functionality. Most of these projects are related to wireless network environments, which has to cope with restricted bandwidth and display capabilities: WAPTM, MExE. A similar approach for Screenphones is under work at the ISRF, but ISRF is not a standardization body. The following will give a brief overview of these activities.

B.1 Internet Screenphone Reference Forum (ISRF)

The ISRF is an open forum created to establish a reference specification intended at easing the development of a worldwide mass market for an easy to use and low cost Screenphone. The first target terminal is a wired Screenphone, with internet access based on Java technologies. ISRF has published a Screenphone document on their homepage which addresses primarily the interfaces/ APIs between the terminal and the network operator and the service providers.

B.2 Wireless Application Protocol (WAP ForumTM)

The WAP ForumTM is an industry association that has developed the de-facto world standard for wireless information and telephony services on digital mobile phones and other wireless terminals.

The WAPTM architecture provides a scaleable and extensible environment for application development for mobile communication devices. This is achieved through a layered design of the entire protocol stack.

B.3 3GPP / ETSI SMG4 Mobile Station Application Execution Environment (MExE)

The MExE project within ETSI SMG4 provides a standardized execution environment in a mobile station. MExE is taking into consideration WAPTM and Java technologies. Furthermore, they have produced a security framework that may be applied outside the MExE environment.

B.4 Future: convergence to W3C

IETF and W3C are specifying Internet protocols and applications. All the different works described above will converge in order to have unique execution environment (protocols, profile negotiation...) for all devices, wired or wireless. This convergence has already begun: the WAP ForumTM and the World Wide Web Consortium (W3C) are working together to define next-generation Internet specifications for the wired and wireless domains (HTTP-NG, XHTML...).

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