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Information technology — Document processing and related communication — User interface to telephone-based services — Voice messaging applications

Technologies de l'information — Traitement de documents et communication connexe — Interface de l'utilisateur et des services à base de téléphone — Applications de messagerie vocale

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Contents

List of figures

List of tables

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 13714 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 18, *Document processing and related communication*.

Annexes A and B of this International Standard are for information only.

Introduction

Voice messaging systems allow telephone users to leave recorded messages for people who are unable to answer their telephone, either because they are absent or busy, or because they are currently engaged on another telephone call. This is commonly referred to as call answering. Voice messaging systems can also allow users to send voice messages directly, without accessing call answering.

Voice messaging systems are increasingly available and accessed from homes and offices, as well as from public and mobile telephones. With callers leaving messages on many different systems and subscribers increasingly likely to have mailboxes on more than one system, there is a need for users to have a common interface for the basic features of voice messaging systems.

Experience has shown that consistent and predictable human interfaces benefit users. Benefits can include faster learning, greater productivity, and greater satisfaction. Consistent human interfaces can also benefit an industry by promoting greater acceptance for products and services.

The DTMF interface provides a highly restricted user interface, as there are only 12 different keys available for input, and output is via an audio channel, whose performance is constrained by speed and users' limited short-term memory capabilities. For these reasons, users are particularly likely to benefit from common user interface features both within and across different voice messaging systems they encounter, as they can learn a common set of input and output protocols, which will maximise the efficiency and usability of these interfaces.

This International Standard includes only some of the features in DTMF-controlled systems used for voice messaging (see clauses 5, 6, 7, 8, and 9, following) but, as described later in this International Standard (see clause 1 and Figure 1) there exist large areas of commonality with important functions in other telephone-based (i.e., interactive voice response) systems and services. Many of the user interface features specified in this International Standard will be usable for and implemented in other interactive voice response applications. Annex B of this standard summarises the subset of the telephone user interface features described in the body of this standard that are generally applicable in DTMF-controlled telephone-based interfaces beyond voice messaging.

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1 Scope

This International Standard will provide users of voice messaging systems with a consistent mode of interaction in a way that is independent of the underlying system implementations. The interface is based on a set of design guidelines annexed to this International Standard.

The interface supports the ability of all users described in the user-system model (see Figure 2) to access the features of voice messaging systems. In a call answering application, the interface allows callers to leave messages from all types of telephones. It also allows callers to access additional features through the use of DTMF devices. In the voice mail application, through the use of DTMF devices, the interface allows subscribers to send and receive voice messages, and to manage stored data, and allows non-subscribers to leave voice messages for subscribers.

This International Standard addresses the following six functional areas:

- a caller leaving a voice message, when the call is answered by a voice messaging system call answering facility;
- a caller leaving a voice message, when a message is sent to a subscriber by a subscriber or non-subscriber through direct messaging;
- a subscriber listening to and processing voice messages received;
- a subscriber creating and sending voice messages through the voice mail application;
- the sending and receiving of messages via voice message delivery applications; and
- the use of voice bulletin boards.

Within these functional areas, only certain features are defined in this International Standard. However, standard-conforming systems are not limited to these functions and features, and this International Standard does not preclude alternative methods of invoking features specified in this International Standard, providing that these alternatives do not conflict with the standard interface specified for other features covered in this International Standard.

In this International Standard, the direct messaging functional area is covered in the clause specifying the call answering application.

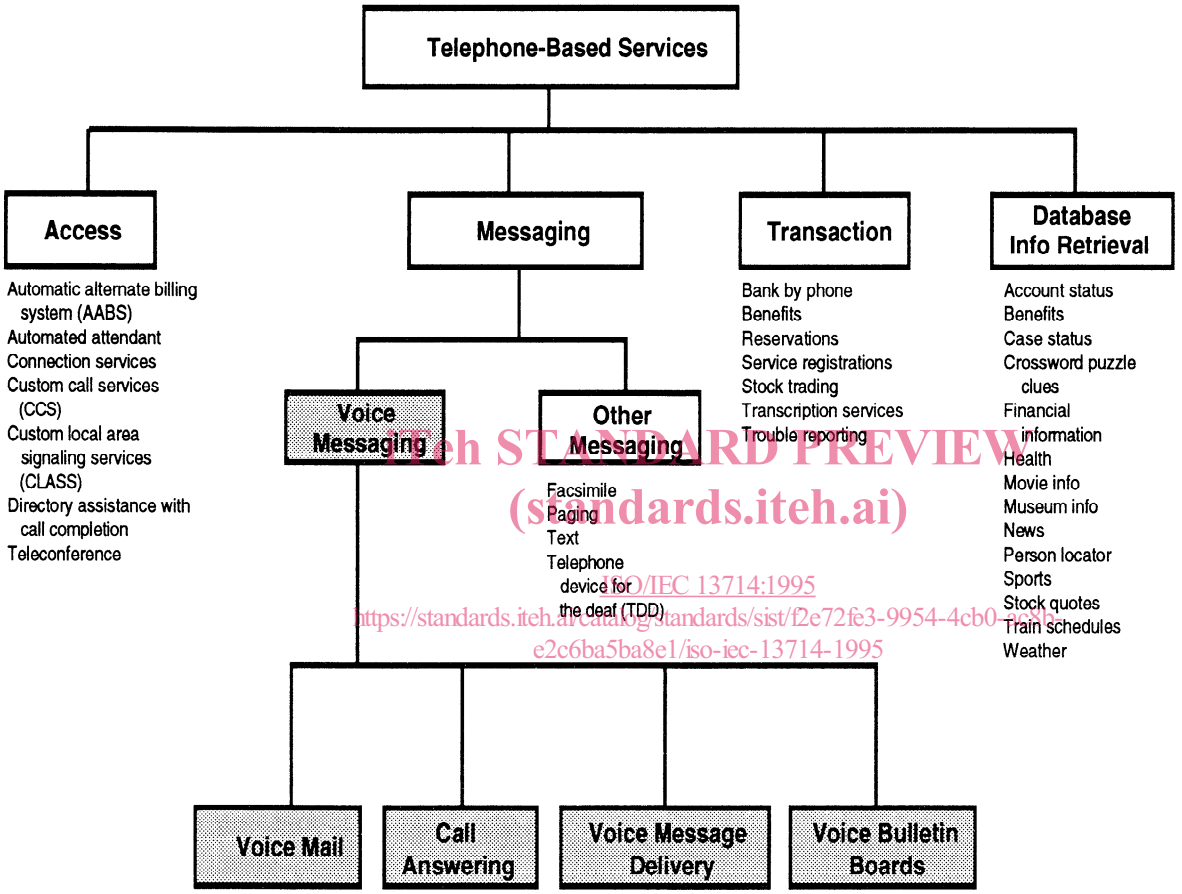
In addition, this International Standard specifies two requirements to be satisfied in all voice messaging contexts, not just the application contexts specified earlier in this clause: the use of # as a delimiter (see 5.6.1), and the access to and presence of the control menu (see 5.6.2) and its associated functionality.

This International Standard does not address the user/system interface for administrators, who have responsibility for the management and maintenance of the voice messaging system.

This International Standard also does not address the proactive method, if any, employed by a voice messaging system to notify a user that a voice mailbox contains a message. Notification is, at present, typically achieved by a message waiting light, a distinctive dial-tone, or a pager device.

This International Standard does not specify a non-DTMF user interface for Integrated Services Digital Network (ISDN) terminal access to voice messaging applications; however, if a user's ISDN terminal or switching equipment has the capability for full simulation of DTMF tones after call connection, the user interface specified in this International Standard will operate a conforming voice messaging system.

Figure 1 shows a taxonomy of telephone-based services, with shaded boxes indicating the services within the scope of this International Standard:



Notes:
The scope of this standard is shown by the shaded areas.
Database Info Retrieval: Read-only access to stored/presented information.
Transaction: Read/write access to a database or a service.

Figure 1- Taxonomy of telephone-based services

Figure 2 shows a user/system model of the scope of this International Standard:

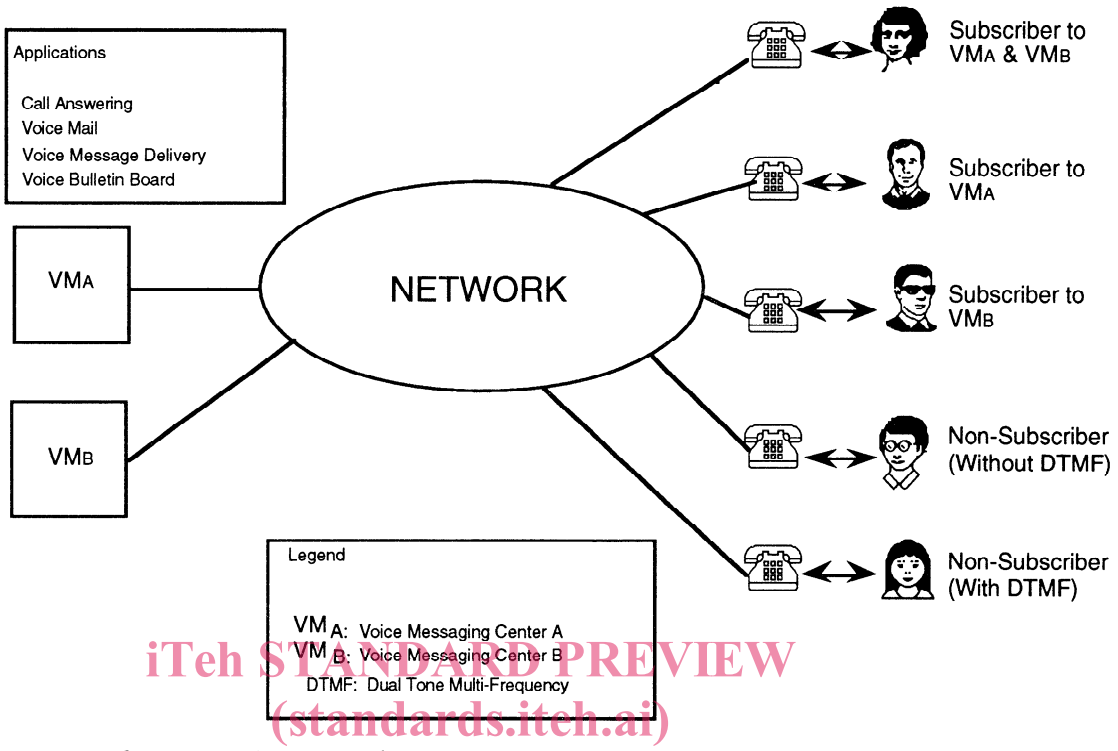


Figure 2 - The user/system model of this International Standard

2 Conformance

The user interface to a conforming voice messaging system shall conform to clause 5. Additionally, the user interface to a conforming call answering application shall conform to clause 6; the user interface to a conforming voice mail application shall conform to clause 7; the user interface to a conforming voice bulletin board application shall conform to clause 8; and the user interface to a conforming voice message delivery application shall conform to clause 9. The only requirement for conformance with respect to callers using non-DTMF telephones is as specified in 6.1.

A conforming system may also provide one or more additional, alternative user interfaces which are inconsistent with any or all of clauses 5, 7, 8, and 9, but only to logged-in subscribers who have chosen that alternative interface. The interface specified in this International Standard shall be the default configuration of the system when supplied.

A voice messaging system in which the call answering application conforms to clauses 5 & 6, but in which the other voice messaging applications covered by the scope of this International Standard do not conform may be described as having a conforming call answering application.

Throughout clauses 5, 6, 7, 8, and 9, the following conventions are used to indicate levels of conformance required of compliant systems:

Mandatory/reserved:	Conforming systems shall have this function/feature and the function/feature shall be accessible in (at least) the way specified.
Optional/reserved:	Conforming systems may or may not have this function/feature. If the function/feature is offered, it shall be accessible in (at least) the way specified. If the function/feature is not offered the access mechanism specified shall not be used to access any other function/feature.
Optional/not reserved:	Conforming systems may or may not have this function/feature. If the function/feature is offered in the system state and menu level concerned, it shall be accessible in (at least) the way specified at the menu concerned. If the function/feature is not offered, the access mechanism may be used to access another function/feature.

Note: In describing the effect of key-presses in a conforming interface, this International Standard uses a simple declarative mode (e.g. "the play command causes playback....."). The normative content of the standard is carried by the specification of "mandatory/reserved", "optional/reserved" and "optional/not reserved" in the associated table. Where the effect of user input is not specified, a conforming system may assign any effect to that user input, including an effect which is also available through a standard-specified means. For example, the help function as specified in this document on the control menu could additionally be presented as an option in other menus within that application.

3 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

CCITT Volume VI: *General recommendations on telephone switching and signaling, Recommendation Q.23: Technical features of push-button telephone sets* (1988).

ITU-T: *The telephone network and ISDN operation, numbering, routing and mobile service, Recommendation E.161: Arrangement of digits, letters and symbols on telephones and other devices that can be used for gaining access to a telephone network* (1993).

4 Definitions

For the purpose of this International Standard the following definitions apply:

4.1 administration: *Voice messaging system* functions concerned with the establishment and management of *voice mailboxes* on a system-wide basis, the configuration of the system, and the definition of system-wide and initial default individual parameters.

4.2 administrator: A person charged with the *administration* of a *voice messaging system*.

4.3 call answering: That segment of a *voice messaging system* concerned with accepting incoming calls and allowing the *caller* to leave a *message* in a *voice mailbox*.

4.4 caller: A *voice messaging system* user who accesses the *system* and is provided with a capability to send, leave, or record *voice messages*. A caller need not be a *subscriber*. Callers may enter the system either through the *call answering* facility or by direct connection to the voice mail application.

4.5 cancel: Clear the current (i.e. not yet *delimited*) *DTMF* or *voice input*. Typically, the *system* will indicate the cancellation and reprompt for continuing.

4.6 control menu: A menu of control functions accessible from any state in the system. This menu is presented when the user presses the * key in any context other than the control menu itself.

4.7 data entry: Numeric *DTMF* input that the *system* does not interpret as commands.

4.8 delimit: Indicate or cause completion of an input.

4.9 dial-ahead: The ability to enter *DTMF* input before the *system* has requested it. It is commonly used for rapid entry of data or a series of *menu* choices. In dial-ahead, a user enters a *key-press* or *key-presses* in advance of the associated *prompt*(s) and the output of these further *prompt*(s) associated with the input *key-press*(es) is suppressed.

Note: this term may also be referred to as key-ahead, or type-ahead.

4.10 dial-through: The interruption of *system* output with *DTMF* input acted on just as if it had been entered at the end of *system* output.

Note: this term may also be referred to as key-through or cut-through.

4.11 direct messaging: The capability for a voice messaging system to allow a user (either subscriber or non-subscriber) to leave a message for a subscriber without using the call-answering facility or the send facility.

4.12 DTMF: Dual tone multi-frequency encoding of *key press* input. The definition of the encoding employed may be found in CCITT Volume VI, Q.23.

4.13 DTMF device: A device through which a user can generate (or, in the case of equipment such as digital telephones, duplicate the effect of) the *DTMF* tones associated with the keys 0-9, * and #. This device is typically a *DTMF*-telephone but may also be a tone generator, a digital telephone used to invoke *DTMF* signals from a telephone switch, or a digital telephone.

4.14 feedback: Information supplied by the *system* to indicate that user actions have had their intended effects, or have had unintended effects. Typically, feedback consists of a new *prompt* or

message indicating that an action has had its intended effect, but feedback also includes error indications and tones.

4.15 forced disconnect: A user request to a *voice messaging system* for the *system* to disconnect from the call.

4.16 header: *System* supplied information associated with an individual *message*. This may include date, time, source and status information such as urgency and privacy.

4.17 help: Information provided, either automatically or upon request, to inform users of their available prompted and unprompted choices, and of their current place in the *system*.

4.18 inter-key time-out: The interval within which two *DTMF* signals must be input to be considered part of a single string.

4.19 interactive voice response: A telephone-based system or service where users enter information and make *menu* selections using *DTMF devices*, and receive information via *system prompts*.

4.20 interruptibility: Susceptibility of *system* output to *dial-through*.

4.21 key-press: The noun associated with the verb *press*.

4.22 mailbox access: A procedure required to gain access to the facilities of a *voice messaging system* for *subscribers*. *Mailbox access* typically involves use of a *security code* and of some form of *user identification*, but either or both of these may be available to the *voice messaging system* through other means than user input.

4.23 main menu: The *menu* typically presented after a *subscriber* has accessed a *voice messaging system* .

4.24 mandatory [feature/function]: A feature/function required by this International Standard.

4.25 menu: The presentation to the user of a list of possible actions. A menu typically consists of a set of *prompts* each describing an available function and the user action necessary to invoke that function.

4.26 message: Auditory data placed in a *voice mailbox*. Messages may be left by *callers*, *subscribers*, *systems*, or *system administrators*.

4.27 message originator: A *voice messaging system* user who sends *messages*. A message originator need not be the speaker of the original voice data.

4.28 message recipient: A *voice messaging system* user who receives *messages*.

4.29 non-reserved [feature/function]: The key assigned to this standard function in the given state may be used for other function(s) if the standard function is not provided at the given state.

4.30 non-subscriber: A user of a *voice messaging system* who is not acting as a *subscriber*.

4.31 not specified: Used in user action/effect tables to indicate that the effect of that action in the associated context is not addressed by this International Standard.

4.32 optional [feature/function]: A conforming *system* is not required to have this feature/function.

4.33 press: The verb used to describe the user action that generates *DTMF* tones.

4.34 prompt: Auditory *system* output providing instructions or guidance to the users. Prompts consist of recorded or synthesised voice and/or tones.

4.35 record tone: A tone output by a *voice messaging system* when it expects a user to record *voice input*. A record tone is a type of *prompt*.

4.36 reserved key: In the given context, available for use only for the purpose specified in this International Standard.

4.37 security code: Data that authorises access to a specific *voice mailbox* or user function. May also be known as password, passcode, personal identification number, etc.

4.38 subscriber: A *voice messaging system* user who usually has the capability to originate and receive *voice messages* and to manage the stored voice data.

4.39 system: A *voice messaging system*. Note: In this International Standard, the word "system" used alone refers to a voice messaging system.

4.40 time-out: (1) An interval of no user input that causes the *system* to change state. (2) The state change resulting from such an interval. For example, a time-out during numeric input may be interpreted as end-of-string and cause the *system* to change from numeric input state to command state or some appropriate action state.

4.41 user-configurable: Of an option, able to be set by an individual user, or by an *administrator* on his/her behalf.

4.42 user identification (user ID): Data that identify a *subscriber* to a *voice messaging system*.

4.43 voice input: Auditory input by a user.

4.44 voice mailbox: A descriptive term for those functions of a *voice messaging system* that receive and store voice *messages* for a *subscriber,* or for the logical storage itself.

4.45 voice message: A *message*.

4.46 voice messaging system: An automated system for the recording, storage, and retrieval of *voice messages*.

4.47 #: The *DTMF* key or button located at the lower right-hand corner of the standard 12-key pad on a *DTMF telephone.* Common names for this symbol are listed in annex A.2.2. Acceptable graphic representations for this symbol are shown in CCITT Recommendation E.161 (1993).

4.48 *: The *DTMF* key or button located at the lower left-hand corner of the standard 12-key pad on a *DTMF telephone*. Common names for this symbol are listed in annex A.2.3. The acceptable graphic representation for this symbol is shown in CCITT Recommendation E.161 (1993).

5 Standard elements of user/system dialogue

Voice messaging functions are invoked and controlled by a dialogue, or series of exchanges, between the system and a user. This International Standard addresses the following three general states of a voice messaging system: voice input by the user, DTMF input by the user, and system output. Depending upon the context, user input to the voice messaging system may be either voice or DTMF tones. For the purposes of this International Standard, voice input generally refers to any auditory input other than DTMF, and all DTMF input is assumed to result from a DTMF device.

The system portions of the dialogue contain voice or other auditory output. Other auditory output controlled by the system, such as music-on-hold, is outside the scope of this International Standard. Auditory feedback that accompanies DTMF input by the user is not considered to be part of the user/system dialogue and is outside the scope of this International Standard. Voice input by the user leaving messages is also outside the scope of this International Standard, except as specified in 5.1. Some command/response sequences employ time-outs. The length and details of these time-outs are specified in 5.4 and in the description of the affected sequences.

The tables in this and subsequent clauses show standard-conforming DTMF input for the functional areas specified in clause 1. This International Standard does not preclude the use of alternative methods of invoking the functions described, as long as the standard methods are also available.

5.1 Voice input

5.1.1 This International Standard does not require voice input to be interpreted by the voice messaging system. However, annex A provides some informative guidelines for using voice input to control the system.

5.1.2 During all voice input states, DTMF input as specified in this clause shall delimit the recording of ongoing voice input, with the indicated effects. During voice input the # key delimits the input state. The * key interrupts the input state and takes the user to the control menu (see 5.6.2).

5.1.3 When a pause is used to delimit the voice input state, the length of the time-out for no action (see 5.4.2.1) should be used as a guideline as to whether the pause should delimit or be ignored.

5.1.4 During all voice input states, the handling of sound interpreted by the system as invalid DTMF input is outside the scope of this International Standard.