

VoiceObjects Services:

Best Practice Guide
for the Text Channel

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1 Introduction

The text channel is one specific way of using a cell phone or mobile device to communicate with a company. The advantage of this channel is being available on virtually all GSM-based handsets and it also allows free entry of text, which traditional IVR's do not support due to the nature of speech recognition or the limitations of DTMF input.

VoiceObjects supports applications that are built on the text channel only as well as on combinations with other channels (voice, video, and mobile web). The channels are alternative interaction modes to serve individual preferences as well as situation dependent usage. Driving a car requests a hands-free interaction mode whereas traveling in a train asks for a silent mode to keep up privacy.

2 Text Interaction

Text Channel Services are called by a reference number that is enclosed with pound-signs, e.g. #123#. The service is controlled by replying with a predefined option or by sending free text. The example below demonstrates a menu selection.



Figure 1: Text Interaction

3 Technical Constraints

The text channel uses a texting protocol supported by GSM networks, called USSD (Unstructured Supplementary Services Data). The following features apply to the majority of platforms. As platforms are still enhancing the actual features should be checked at time of development.

LAYOUT

In the USSD channel all information is based on pure text with the look & feel of a text message (SMS, Short Message Service). This excludes any formatting and layout as well as embedding graphics such as logos. The only exception is:

- Line feed, including empty lines

TEXT LENGTH (SYSTEM OUTPUT)

Similar to text messages the number of characters per message is limited. The limitations depend on the language and on the platform.

- The maximum are 182 characters per text page, except the first page that is restricted to 157 characters. Languages using special characters and being represented by 16-bit Unicode only allow half the characters, i.e. 91 for regular pages and 78 for the first page.
- Some platforms allow concatenation of pages for texts longer than 184 characters.

MENU LENGTH

The first page is restricted to 9 menu items. All other pages can offer longer menus.

DYNAMIC HYPERLINKS

The dynamic display of hyperlinks is also dependent on the platform. However, platforms that support predefined hyperlinks only, may offer the feature of hiding hyperlinks with single pages.

Note: The dynamic hyperlinks are included in the number of maximum characters and the maximum menu length.

LENGTH OF ANSWER

The maximum characters for answering are 133.

MULTI-SLOT INPUT

The USSD channel allows no multi-slot input. Form-filling is a pure sequencing process.

DEFAULT ANSWER MODE

The default answer mode is set by the mobile device which may be numeric mode or alphanumeric mode. Additionally T9 may be activated by the user.

CONCATENATION OF VOICEOBJECTS OUTPUT OBJECTS

Contrary to voice platforms there is no automatic concatenation of sequencing output objects. To proceed from one output to the next one the user has to send a request. Per default the request code is "1" being represented as "1:OK".

TIME CONSTRAINTS

The average delay from calling a service to displaying the first page of the application takes 3.5 seconds to 6 seconds. Subsequent pages have an average delay from 0.5 seconds to 1.5 seconds. Depending on the carrier the response times may be significantly faster whereas long distance transmission may cause extra delay.

4 Easy and Efficient Interaction

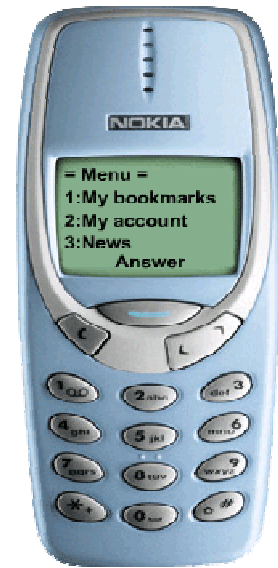
The look & feel of text-based applications is not standardized but depends on the mobile device being used. Therefore it is recommended to focus on relevant information.

RESOLUTION OF DISPLAY

Since text services are available for all GSM cell phones the designer has to have in mind that there are still older models with a low display resolution. This means that menu items may not fit in one line, and menus may not fit on one screen. Offering short and concise options increases readability and improves the usage of space.

MENU DRIVEN INTERACTION

One great advantage of the USSD channel is enabling free text input which is not possible with the traditional voice channel. However, a touchpad of a mobile device is less comfortable than a keyboard. To keep the interaction most simple the service should offer as many predefined answers, i.e. menus, as possible.



Resulting from the technical constraints a good design of a menu structure adapts to the following recommendations:

- The menu ideally contains a maximum of 5 options so that regular high resolution displays can hold the full information. In case more choices are required for the ease of usability it is recommended not to exceed 9 items.
- Regarding the restrictions of characters per page, the length of menus and the various resolutions of displays, as a rule of thumb the single menu items should not contain more than 13 characters.
- Easy navigation and quick task completion also suggests flat hierarchies. The optimal limitation is at three levels.

To support an easy reply the menu options should be preceded by numbers. Instead of verbally entering the menu item the user just needs to send the according number. This is quick and prevents typing errors.

Numbers are also preferable over letters. No matter if the standard input mode of the mobile device is numeric or alphanumeric, numbers request pressing a key only once. Letters may request several hits of a key depending on its position. Additionally, letter input requests a mode switch in case the default mode is numeric input.



Figure 2: Menu driven interaction

COMBINATION OF MENU SELECTION AND FREE TEXT INPUT

A menu selection may be combined with free text input. This is reasonable if the amount of choices is too large to be offered within a menu, but the majority of choices concern only a small subgroup, and free text input is virtually standardized.



Figure 3: Menu selection & free text input

Let's take a roaming service, for example. Assumingly, there is roaming information for any country in the world but 71% of the customers request only four countries. To provide easy interaction for the majority of the users these four countries can be displayed as menu options succeeded by a fifth option "others" which enables a free input of the country of interest.

FIRST PAGE

The first page has additional restrictions. It takes maximal 157 characters and the menu length is limited to 9 items.

The introductory part of a service can be designed in two different ways.

- The first page may basically contain the welcome while the first menu appears at the next page.

The disadvantage of this approach is that the user needs to send an extra request to get the menu with available tasks. In case the service offers numerous services, specifically more than 9 items or more than 182 characters including the welcome message, it is necessary to separate the welcome message and the initial menu.

- The welcome message and the initial menu are both displayed at the first page. This requires a short welcome message as well as a brief menu. The advantage is that the user sees the available options immediately.

Preferring the second approach the designer has to consider how to deal with re-entering the initial menu. Selecting the hyperlink *Home*, for instance, could trigger the first page without any modification. Alternatively a re-enter could be restricted to the menu selection only.

OUTPUTS

Automatic output concatenation does not apply for the text channel. To proceed after an output the caller needs to actively request the next information. By default the reply message is "1". According to other GUI's it is recommended to label the replay with "OK".

If possible, sequencing outputs should be embedded in one output object. This clearly reduces caller driven interaction.

Note: Outputs can never offer any hyperlinks.

INPUTS & EVENT HANDLING STRATEGIES

The text channel requests different event handling strategies than the voice channel. The most important difference is the way of communication. Voice applications are based on a turn-taking dialog where the caller has to memorize the possible input options to proceed. In case of a *no input* or a *no match* the voice application has to repeat the options to keep the dialog going. The events of *no input* and *no match* are assigned to ASR (automatic speech recognition) which does not affect the text channel. Therefore the integrated event handling in VoiceObjects input objects do not apply. Still it may occur that the user does not send a reply or that the reply is invalid.

Principally the absence of a reply does not require any system driven reaction. The available options are displayed continuously and there is no need for repeating them. It is rather a question of setting a time-out. If there is no interaction for a while the user may be distracted or has set other priorities. To keep the costs short and the traffic on the server low the session should be terminated after a certain time. The optimal time-out from the users' perspective is dependent on the use case. A value to start with is 60 seconds. Often the maximal time-outs are defined by the USSD gateway.

Failures of interaction such as sending empty replies or invalid replies are handled by the platform. The same is true for technical problems, for example, a service or the application itself is not available.

INPUTS & CONFIRMATION STRATEGIES

Contrary to the voice channel text input does not request an explicit confirmation any time. The user sees the reply message and there is no ASR that might misinterpret the answer. The following cases are to consider:

- Menu selection / predefined answers

Principally selecting menu items or predefined answers do not request a confirmation. Providing an implicit feedback in the menu title or in the following step of a predefined answer is sufficient.

- Critical transactions

An explicit confirmation is recommended in case of a critical transaction such as ordering or a banking transfer. The user needs absolute certainty that the amount of money to be transferred or other critical data is correct.

- Accumulated confirmation

In case sequencing steps are necessary to complete one transaction all collected data may be presented at the end of the sequence for confirmation. To be efficient, however, all data should fit onto one page.

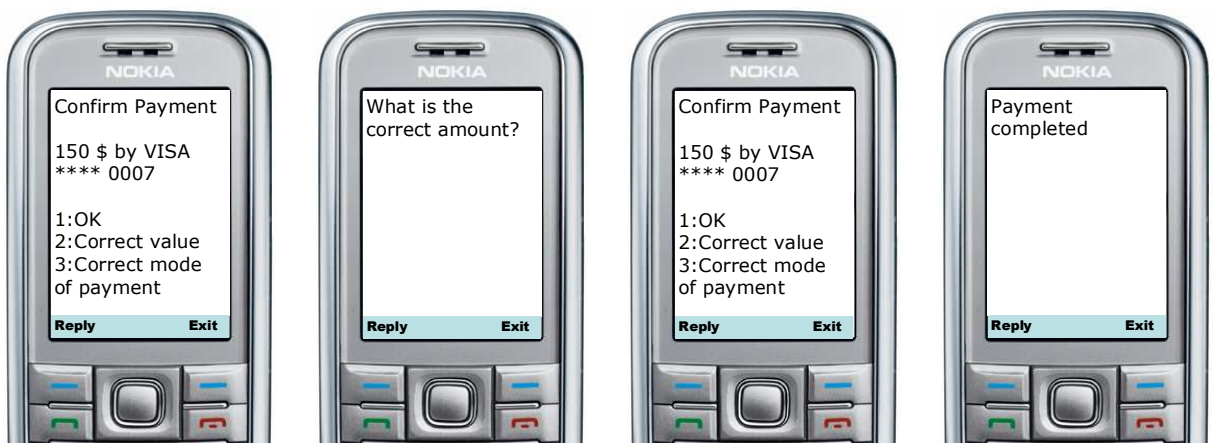


Figure 4: Accumulated confirmation with direct confirmation

DEFINITION OF HYPERLINKS (GLOBAL COMMANDS & STANDARD NAVIGATION)

In the content of voice applications, hyperlinks referred to grammars that are active in the background. For instance global commands or standard navigation. Their use is limited since they have to be remembered by the caller. With mobile devices the use of hyperlinks is also restricted. Here it is the rather small display. Therefore hyperlinks should be used carefully and be reduced to those being really necessary and providing added value.

- Global commands

Besides the start page any menu should contain a link to start over. As the text channel is closer to the web channel than to the voice channel the term *Home* is preferable over *Main menu*.

- Standard navigation

Another relevant option is to get back to the last menu, for instance, when the caller chose a wrong path. Even better and more transparent than using the generic hyperlink *back* is offering the menu itself.

The specific use of dynamic hyperlinks further depends on the platform provider. This includes the features below:

- Automatic numbering

Some platforms do only support auto-numbering of pre-defined hyperlinks.

- Combining open questions with hyperlinks

Displaying dynamic hyperlinks may be restricted to menu pages. Pages with open questions such as *How old are you?* or *Enter your new address* will ignore the dynamic hyperlinks.

In case the platform does not support the combination of open questions and dynamic hyperlinks the global command *Home* should be active as hidden option. This enables to start over other than hang up and call the service again.

All platforms, however, support omitting a hyperlink. For instance, presenting list items per page the first item of a list does not require the hyperlink "previous", and the last item does not require the option "next". Hiding these options emphasizes also the beginning, or the end of the list.

Note: Due to their properties output objects never support hyperlinks.

SHORT CUTS

Depending on the carrier and the distance of transmission the response time of a service may be quite long. Knowing from web users an interaction response is judged “immediate” when it takes less than 1 second. Longer times distract processing of information, and waiting times of 10 seconds and higher are simply annoying.

Since USSD applications do not support a direct response but ask for activating a reply page interaction times are likely to take longer than 1 second. Offering short cuts increases efficiency enormously. Short cuts can be used right from the beginning when calling a service by adding * and the number of the requested menu item. The sequence “*plus number” can be concatenated as necessary.

For instance, the short cut dialling #123*1*1# directly activates the corresponding service on the 2nd level. Over-dialling a short cut simply activates the last valid level.

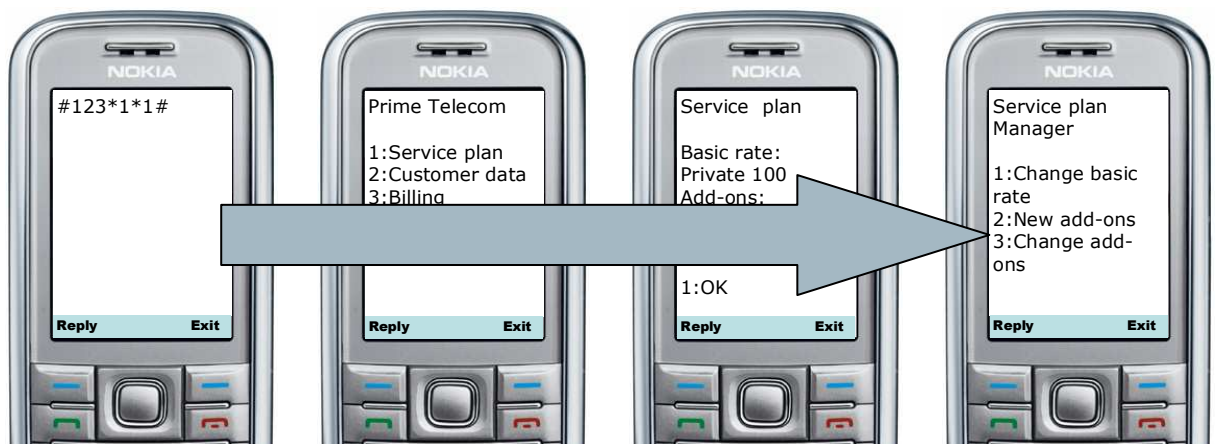


Figure 5: Short-cut dialing

Note: Short cuts for dialling a service can also be bookmarked in the phone book of the mobile device.

Note: The use of short cuts is affected by services that need identification and / or authentication. The same is true for dynamic pop ups. Unless

regulated by the gateway the designer needs to define the appropriate handling.

LISTS

Lists may consist of simple items as well as complex items. Due to the limited space the Text Channel may only display lists with short items as true list. Items can be selected by numbering just like menus.

Furthermore lists may be manipulated, i.e. items may be selected to a shopping cart for further processing or they may be deleted. Callers should also have the option to navigate through a list.

Displaying an item that may be manipulated in several ways asks for another strategy. Each item with its associated actions should be displayed on a separate page.

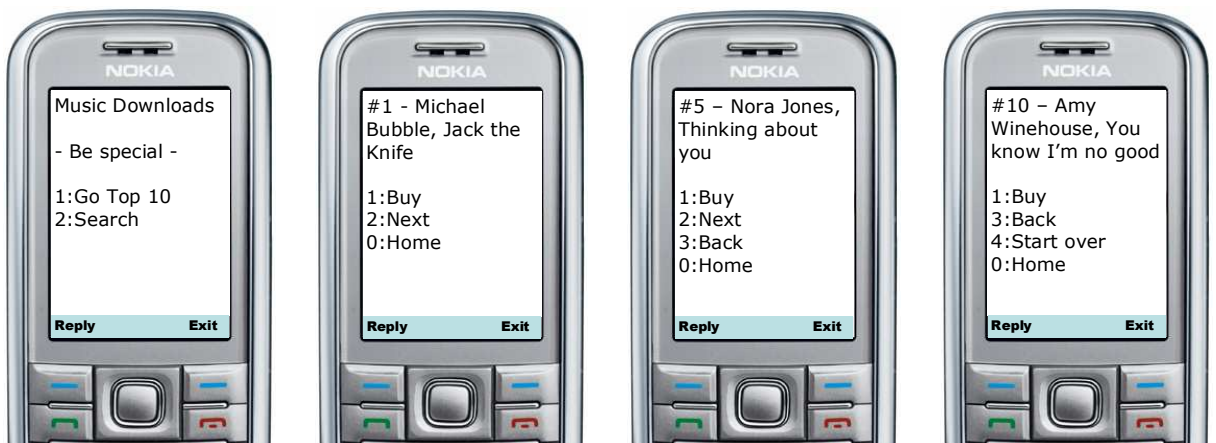


Figure 6: Output of multi-column list items

5 Security

Using the USSD channel a valid SIM card is necessary. Additionally to the ANI (Automatic Number Identification) the SIM (Subscriber Identity Module) card also provides the IMSI (international mobile subscriber identity). While the ANI is portable in some countries the IMSI is truly unique. Thus the USSD channel offers a more secure identification of the in calling device compared to other channels.

VoiceObjects is redefining over-the-phone customer service for global enterprises and carriers. By delivering adaptive, cost-effective self-service phone portals, VoiceObjects enables organizations to personalize each caller's experience, to integrate phone self-service into comprehensive customer experience strategies, and to manage the complexity of the world's most sophisticated phone applications. VoiceObjects' award-winning phone application server software is used by leading companies including Adobe, T-Mobile and Volkswagen Financial Services and provides personalized customer service experiences to more than 500 million callers each year. For more information, visit www.VoiceObjects.com.

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