

USSD

USER GUIDELINE

THIS DOCUMENT IS AIMED AT:

Grapevine Affiliate administrators and users who have been provisioned to use our USSD service.

FEEDBACK:

Was this document useful? What can we do to make this user guide more useful and informative?

Please email info@vine.co.za with your comments and feedback.

CONTACT US:



+27 21 702 3333



info@vine.co.za



www.grapevinegroup.co.za

SUPPORT:

Call us on +27 21 702 3333, or email support@vine.co.za.

**Note, you must be registered with Grapevine to log a support query.*

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Abbreviations

| | |
|----------------|-----------------------------------------------------------|
| GSM | Global System for Mobile Communication |
| GVI | Grapevine Interactive |
| IM | Instant Messaging |
| NI USSD | Network Initiated Unstructured Supplementary Service Data |
| USSD | Unstructured Supplementary Service Data |
| SMS | Short Message Service |
| WAP | Wireless Application Protocol |
| WASP | Wireless Application Service Provider |
| XML | eXtensible Markup Language |
| XSD | eXtensible Schema Definition |

Definitions

| | |
|------------------|----------------------------------------------------------------------------------------------------------------------|
| Affiliate | A Company that is registered with Grapevine and has been provisioned to use one or more of its products or services. |
| Campaign | In Outlook SMS, a campaign is a collection of messages sent out by an Affiliate to a number of mobile phones. |

NOTE: When referring to a **message sent from a mobile phone** to USSD, we use the term '**response**' except for the original process-initiating message. When we refer to a **message sent from the USSD application** to the mobile phone user, we use the term '**prompt**' (except for the final process-terminating message). The reason for this is that we are continuously trying to 'prompt' a 'response' from the user.

1 Introduction

The purpose of this document is to assist Grapevine Affiliates who have been provisioned to use our USSD service. This document describes Grapevine's USSD functionality, includes XML examples which can be used to send and receive data and highlights scenarios so that efficient campaigns can be developed.

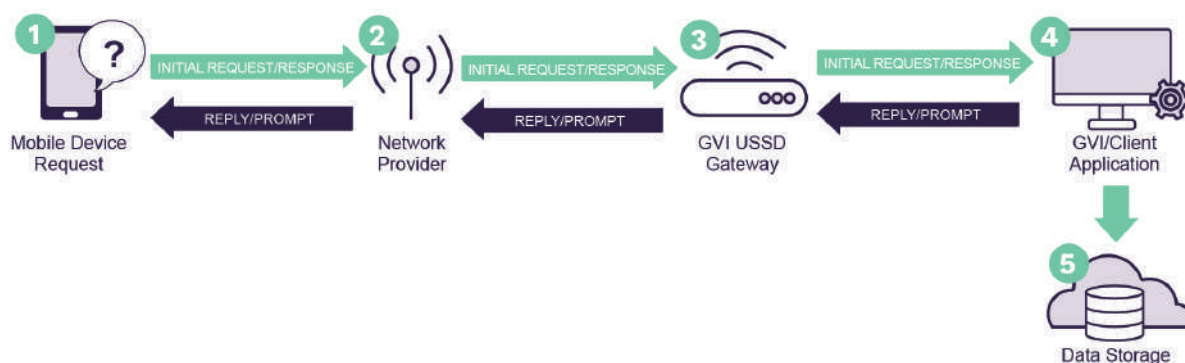
2 General Information

2.1 What is USSD?

USSD (Unstructured Supplementary Service Data) is a GSM technology which enables interactivity between a mobile phone user and a client application by means of transmitting text messages using session-based communication. A USSD string comprises an asterisk (*) followed by a number of digits and ends with a hash (#), e.g., *120*127#

2.1.1 How does it work?

Grapevine's USSD transmits multiple text messages between a mobile device and a client application program using XML files. The transmission of these messages comprises a series of prompts (requests) and responses. The XML files facilitate communication between USSD and the client application.



1. A USSD session is activated by a mobile device user typing a string of characters comprising an asterisk (*), followed by a number of digits and ending with a hash (#), e.g., *120*127#. A mobile device handset recognizes these characters as a USSD string and uses a USSD bearer or manager to transmit a text message request to a client application instead of making a voice call.
2. The request from the mobile device user is received by the applicable network provider.
3. The request is then routed via the network provider's USSD manager to Grapevine's USSD Gateway.
4. The request is sent from Grapevine's USSD Gateway to the GVI/client application program, which, in turn sends a prompt back to the mobile device.
5. All messages (requests and prompts) are stored for reporting purposes.

NOTE: An application may be a custom application written by Grapevine for a client or may be an application a client already has. Grapevine writes the XML that will be used by all applications. You, the client, need to know the format of the XML which you will receive from USSD and the format of the XML which you need to send back to USSD.

2.2 Features

- ✓ Minimal delay between requests and responses.
- ✓ USSD is cost-effective and is billed on a rate per second for as long as the session is open.
- ✓ No extra software is needed on mobile devices.
- ✓ USSD technology is supported by most GSM mobile phones.

2.3 Common uses for USSD Technology

- ✓ Customer surveys & polls
- ✓ Billing & collection notices
- ✓ Transaction validation notifications
- ✓ Identity verification
- ✓ Account balance enquiries
- ✓ Account payment authorizations
- ✓ Customer care queries
- ✓ Account applications
- ✓ On-pack competition entries
- ✓ Support notifications

2.4 Access

1. In order to make use of the Grapevine USSD service, please contact us, by sending an email to: help@vine.co.za
2. One of our sales representatives will contact you to obtain all necessary information.
3. Should you choose to do in-house development, we will send you an application form which needs to be returned to us.
4. You will then receive a contract which stipulates your setup fee, monthly fee and session fee.
5. Should you choose use Grapevine to do your development, we will need a specification document from you and we will then send you a quote.
6. Should you accept the quote, we will send you a contract which stipulates the development fee, setup fee, monthly fee as well as session fee.

3 USSD Explained

A USSD session starts when a mobile phone user sends a USSD string request to an application and ends when the communication between the two is completed or there is a timeout. When there are numerous requests and responses between the two, the communication resembles a real-time conversation.

There are two methods in which USSD can be used, namely:

1. **USSD API:** This is used for developers who want to code their own USSD application.
2. **USSD Managed Service:** This is for clients who want GVI to develop and host the USSD application.

3.1 Types of USSD

3.1.1 Standard USSD

This is where the consumer initiates a once-off request using their mobile device and, in return, gets multiple service options from a menu-based application. The consumer is billed for the session. Standard USSD strings usually start with *120*

3.1.2 NI (Network Initiated), USSD aka USSD Push

This allows the company to initiate the session and send the first message, to which a customer can then respond. It is restricted to banking OTP / Authentication services only. The company to whom the string belongs to will be billed for the session and it is free for the consumer.

3.1.3 Reverse billed USSD (i.e., zero rated USSD)

The consumer initiates the session by dialing a unique string. The company to whom the string belongs to will be billed for the session and it is free for the consumer. Reversed billed USS strings usually start with *134*

3.1.4 Electronic charge USSD

Electronic charge USSD carries no session fees to the consumer, even though they initiate the session. This USSD string is used by financial institutions to perform transactions like purchasing airtime, data, or any other financial transaction. These USSD strings usually start with *130*

3.1.5 Premium rated USSD

When a consumer initiates a USSD session, they pay an additional session fee. The additional charge is calculated according to the premium rate band the USSD code falls in.

3.2 USSD Message Types

There are three types of session messages:

1. **Initial message** – an initial message is the first message sent (always initiated in the Grapevine process by a mobile phone user) to start a session.
2. **Input messages** – a series of requests (prompts) and responses that comprise the text prompts and responses between a mobile phone and a GVI/client application.
3. **Abort message** – an abort message ends a session and transports the final piece of content that may be sent by the GVI/client application. It is triggered by one of the following:
 - A keyword in the XML which is recognized by the USSD application.
 - If a mobile phone user simply switches off their phone or cancels the session.
 - If the session times out.

3.3 USSD Response Types

A USSD session comprises a series of requests and responses moving between mobile phone, network operator, USSD and GVI/client application. You need to understand the two message response types that a user can make because when you design your service, how the definition XML file is configured will depend on what type of response you are expecting from the user.

There are two response types:

1. **Menu type response** – A menu is a set of options which are presented to a user. A menu selection is the option a user chooses. So, a menu type response is always a menu selection.

| MENU | MENU SELECTION RESPONSE EXAMPLE |
|----------------------------------------------------------------------------------------------------------|---------------------------------|
| Welcome to ABC! What would you like to do today? 1- Account information 2- Downloads 3- Help | 1 |

2. **String type response** – A string is comprised of a set of characters that can also contain spaces and numbers. A string is usually elicited from a user as a response to a question or request for information. So, a string type response is always a string of characters and spaces.

| MENU | STRING RESPONSE EXAMPLE |
|--------------------------------------------------------|-------------------------|
| Welcome to ABC! Please enter your name and surname. | Jenny du Toit |

4 USSD XML

Requests and responses are formatted as XML. Requests are sent from the USSD API to the client application and responses are sent back from the client application to the USSD API

The requests and responses are described in detail, below.

Note that affiliates can write the client application themselves. Alternatively, Grapevine offers a service to do this for them.

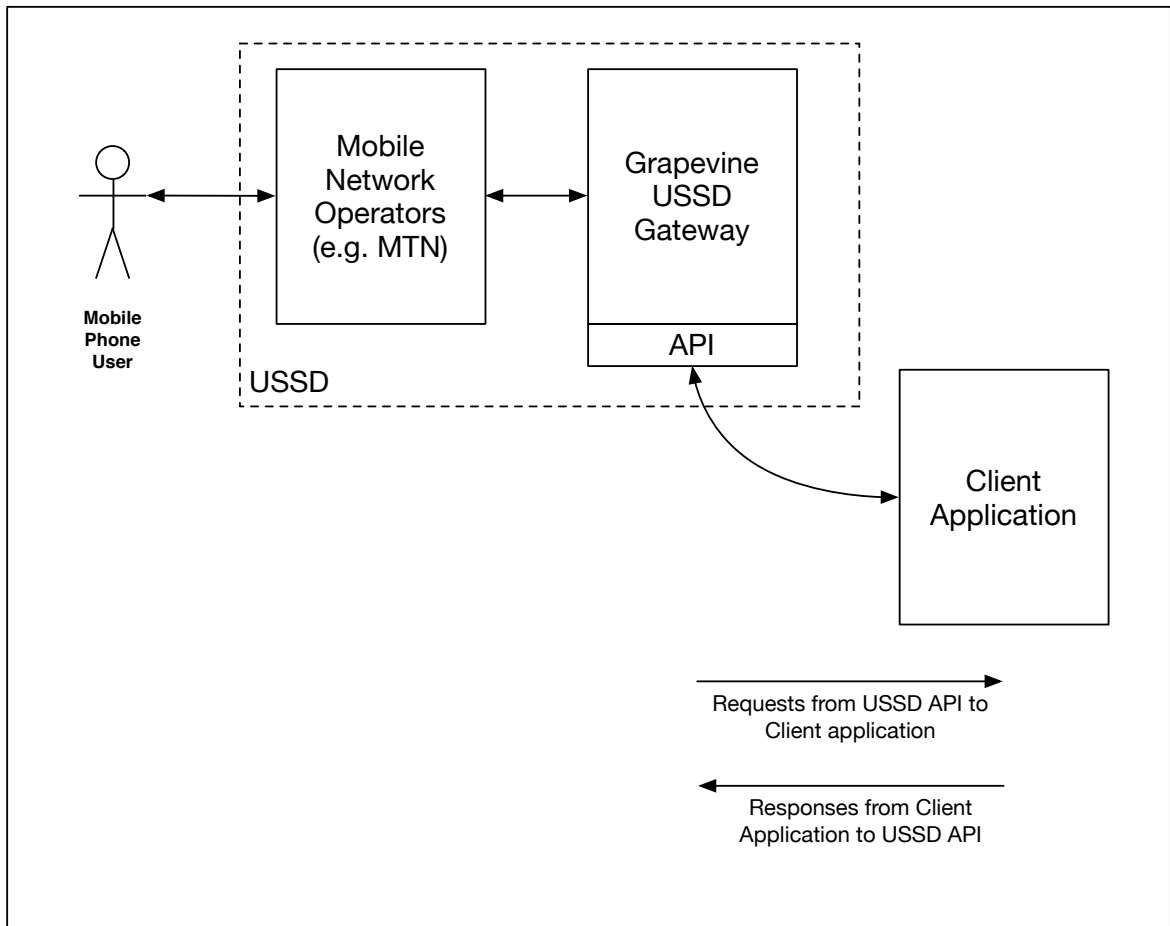


Figure 1: USSD Communication Overview

4.1 Request and response XML

There are **three possible request XMLs** that may be sent to an Affiliate the USSD API and **two responseXMLs** that an Affiliate will need to send the USSD API.

4.1.1 Initial request XML <ussdAppRequest>

The first request sent by USSD to the GVI/client application.

```
<ussdAppRequest>
  <msisdn>27820000000</msisdn>
  <sessionId>7247952383</sessionId>
  <parameter>111</parameter>
  <type>initial</type>
  <network>VOD</network>
  <code>*120*127*111#</code>
</ussdAppRequest>
```

IMPORTANT:

<msisdn> The mobile number which the request is coming from.

The msisdn is in international format so that the leading 0 has been removed. e.g., 2782, 2783, 2784 etc.

<sessionId> A unique ID for the session which is maintained by the GVI USSD Gateway.

<parameter> This value will include unique user input, if any.

<type> Always 'initial' for the first request.

<network> MTN, VOD, CELLC or 8TA.

<code> The complete USSD string dialed by the user.

4.1.2 Initial response XML <ussdAppResponse>

The first response sent by the GVI/client application to USSD.

```
<ussdAppResponse>
  <prompt>Please enter your
  name</prompt>
  <responseType>string</responseType>
  <state>NextState</state>
</ussdAppResponse>
```

IMPORTANT:

<prompt> This is the message that the user will see.

<state> This will always be "NextState" unless communication needs to be stopped, in which case it will be "End".

NOTE: <state> is case sensitive.

4.1.3 Action request XML <ussdAppRequest>

These are the requests that are sent by USSD to the client application after the first request.

```
<ussdAppRequest>
  <msisdn>2782000000</msisdn>
  <sessionId>7247952383</sessionId>
  <name>nextStateAction</name>
  <network>VOD</network>
  <fields>
    <field>
      <name>userResponse</name>
      <value>Jenny</value>
    </field>
  </fields>
  <type>action</type>
</ussdAppRequest>
```

IMPORTANT:

<name> This will always be "nextStateAction".
field <name> always "userResponse".

field <value> in this instance it is the input made by the user.

<type> refers to the type of XML, in this case 'action', as opposed to 'initial' which is the first type of request.

4.1.4 Action response XML <ussdAppResponse>

These are the responses sent by the client application to USSD after the first response.

```
<ussdAppResponse>
  <prompt>Please select your Region:
  1. Western Cape
  2. Other</prompt>
  <responseType>string</responseType>
  <state>NextState</state>
</ussdAppResponse>
```

IMPORTANT:

<state> indicates whether the process is to continue "nextState" or whether it is to end "end".

' ' - USSD needs to continue to pass strings of data between the client application and the mobile phone.

'End' - the session should be ended.

NOTE: These are examples only. The tags in the XML files will vary depending on the requirements of individual applications.

4.1.5 Abort request XML <ussdAppRequest>

A request sent to the client application when the service provider notifies USSD that the session has timed out or has been aborted by the user.

```
<ussdAppRequest>
  <msisdn>2782000000</msisdn>
  <sessionId>7247952383</sessionId>
  <reason>TIMEOUT</reason>
  <network>VOD</network>
  <type>abort</type>
</ussdAppRequest>
```

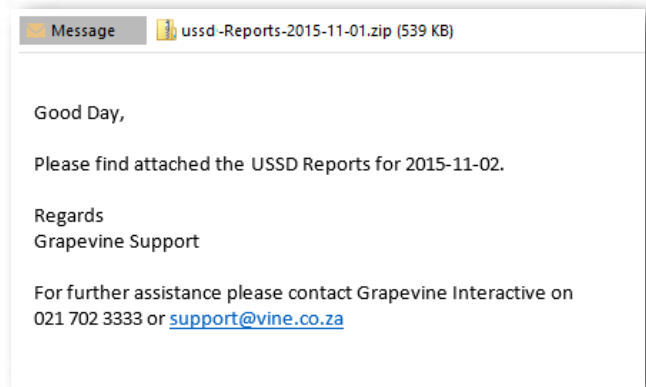
IMPORTANT:

<reason> can be 'TIMEOUT' or 'ABORT'.

<type> refers to the type of request this is, in this case 'abort'. As we saw earlier, other types are 'initial' (which is the first type of request) or 'action' (which specifies subsequent requests).

5 Reports

Summary and detailed reports are generated automatically and can be sent on a scheduled basis (daily, weekly, monthly) to a specified email address.



6 FAQs

6.1 What are USSD timeouts?

The USSD session will automatically be terminated if any of the following timeouts are exceeded:

- ✓ **Application timeout:** The maximum time between the mobile network sending an API call to the back-end code and receiving a response.
- ✓ **User timeout:** The maximum time between a USSD message being displayed on the phone and the user sending a response
- ✓ **Session timeout:** The maximum time between the initiation of the USSD session (e.g., the user sending a USSD string) and the end of the session.

Timeouts vary according to network:

| NETWORK | APPLICATION TIMEOUT | USER TIMEOUT | SESSION TIMEOUT |
|---------|---------------------|--------------|-----------------|
| Cell C | 10 seconds | 30 seconds | 180 seconds |
| Vodacom | 19 seconds | 60 seconds | 180 seconds |
| MTN | 10 seconds | 30 seconds | 360 seconds |
| 8ta | 25 seconds | 300 seconds | 1200 seconds |

6.2 What size can each message be on USSD?

| NETWORK | MESSAGE SIZE |
|---------|----------------|
| Cell C | 160 characters |
| Vodacom | 182 characters |
| MTN | 160 characters |
| 8ta | 182 characters |

6.3 What can you use USSD for?

- ✓ USSD works on ALL handsets – so it's good for the low LSM market
- ✓ USSD is what powers the network operators' services systems (e.g., *141*0# is the "one number you need to know" on MTN's network). This means that all mobile consumers are familiar with USSD, including low LSM consumers.
- ✓ The short User Timeout (for Cell C and MTN at any rate) means that consumers should not be asked to type long entries. For example, on some handsets it's difficult to type an ID number in 30 seconds.

Applications that USSD is particularly good for:

- ✓ **Keyword competitions** e.g., Dial *120*1234# and type your keyword when requested.
- ✓ **Unique code competition** e.g., Dial *120*1234*<your unique code>#
- ✓ **Menu-based information services** where only short responses are required (E.g., What's your nearest city? Send 1 for JHB, 2 for CPT, 3 for DBN).

6.4 When should you NOT use USSD?

- ✓ Services that require the user to type too many characters are not suited for USSD. (E.g., A form that requires first name, last name and ID number).
- ✓ For a service that will be available on all networks, the message size limit is 160 characters; although information can be spread over several "pages", this should be avoided.
- ✓ Services that require many interactions may not be a good fit. An ideal USSD service should have three or fewer interactions in a single session.

7 Appendix A: NI-USSD

Regular USSD sessions are initiated by a mobile user dialing a USSD string on their mobile phone. The mobile network operator (MNO) receives the resulting request and forwards it to Grapevine for processing.

With Network Initiated USSD (NI-USSD), the mobile user receives a message to start the session, sent by Grapevine (on behalf of its client) via the mobile networks.

Grapevine offers NI-USSD as part of its USSD service; this document explains how a NI-USSD session is started.

This document should be read in conjunction with:

- ✓ Grapevine's **USSD User Guideline** document, which describes the USSD API. With NI-USSD, the interactions excluding the initial message are described in this manual.
- ✓ Grapevine's **AppLink XML API Document**, which describes the AppLink XML over HTTP API.

7.1 AppLink API

The first, outbound message that initiates a NI-USSD session is accomplished by connecting to Grapevine's AppLink API.

To get started:

- ✓ You will be provisioned with Affiliate Code, Authentication Code and Password, and will use the specified URL.
- ✓ To send a message, you will code AppLink message XML and then POST it in an HTML request to the specified URL.
- ✓ Following the first message, all other interactions are as described in the USSD user guide.

7.2 POST Response

When the XML is POSTed to the URL, the response XML contains the response code.

The possible response codes are:

| CODE | MEANING | ACTION |
|------|--------------------------------|---------------------------|
| 0 | Message received OK | - |
| 1 | Authentication failure | Check Authentication Code |
| 2 | Invalid data format in payload | Check XML and values. |
| 3 | General system failure | Contact Grapevine Support |

7.3 AppLink XML

The sample XML displayed below is sufficient to initiate a NI-USSD session:

```
<?xml version="1.0" encoding="UTF-8"?>

<gviSmsMessage>

    <authenticationCode>qwertyuiop</authenticationCode>

    <submitDateTime>2010-06-20T11:30:20</submitDateTime>

    <messageType>text</messageType>

    <recipientList>

        <message>This is a test message to one recipient</message>
```

For more detail and descriptions of these and additional, optional tags, see the **Applink XML User Manual**.